STATUTÁRNÍ MĚSTO KARVINÁ
Magistrát města Karviné

Materiál pro 21. řádné zasedaní Zastupitelstva města Karviné, konané dne 13.09.2021

Přijetí dotace z Evropské komise na realizaci projektu ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES“

Návrh usnesení
Zastupitelstvo města Karviné

schválilo

realizaci projetu a přijetí dotace na projekt „ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES“ (inovační projekt v oblasti pozitivní klimatické změny).

Návrh usnesení
Zastupitelstvo města Karviné

schválilo

uzavření smlouvy Consortium Agreement projektu „ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES“ (inovační projekt v oblasti pozitivní klimatické změny) z rámcového programu „Evropské komise Horizon 2020, konkrétně jeho části Green Deal Call (budování a rekonstrukce budov energeticky efektivním způsobem)“ - dle přílohy č. 1 k tomuto usnesení.

Návrh usnesení
Zastupitelstvo města Karviné

schválilo

uzavření smlouvy Grant Agreement projektu „ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES“ (inovační projekt v oblasti pozitivní klimatické změny) z rámcového programu „Evropské komise Horizon 2020, konkrétně jeho části Green Deal Call (budování a rekonstrukce budov energeticky efektivním způsobem)“- dle přílohy č. 2 k tomuto usnesení.

Důvodová zpráva:

ZM-21-OŠR-Přijetí dotace z Evropské Komise na realizaci projektu ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES-DZ.pdf

Přílohy k usnesení:

1. ZM-21-OŠR-Přijetí dotace z Evropské Komise na realizaci projektu ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES- 1U.pdf

2. ZM-21-OŠR-Přijetí dotace z Evropské Komise na realizaci projektu ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES-2U.pdf

Vyřizuje:	Odbor školství a rozvoje, oddělení strategií a plánování Ing. Josef Woźniak
Schválil:	Ing. Martina Šrámková MPA (vedoucí odboru), podepsal: Ing. Gabriela Monczková v. r.
Předkládá RM:	Ing. Lukáš Raszyk (náměstek primátora) v. r.

Důvodová zpráva

Přijetí dotace z Evropské komise na realizaci projektu ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES“

Zastupitelstvo města rozhoduje dle § 84 odst. 1 zákona č. 128/2000 Sb., o obcích, ve znění pozdějších předpisů.

Odbor školství a rozvoje Magistrátu města Karviné předkládá Radě města Karviná ke schválení přijetí dotace projektu „ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES“ (inovační projekt v oblasti pozitivní klimatické změny). Projekt je podpořen v rámci rámcového programu Evropské komise Horizon 2020, konkrétně jeho části Green Deal Call (budování a rekonstrukce budov energeticky efektivním způsobem). Projekt bude realizován v termínu 01. 01. 2022 – 31. 12. 2025.

Koordinátorem je norská univerzita Norges Teknisk-naturvitenskapelige Uneversitet a statutární město Karviná vystupuje v projektu jako partner projektu v rámci českého konsorcia, které je složeno ze tří partnerů. Hlavní řešitel projektu za české konsorcium je České vysoké učení technické v Praze Univerzitní centrum energeticky efektivních budov (dále UCEEB), statutární město Karviná (dále jen SMK) je vlastník demo budovy, firma nano power a.s., která je průmyslovým partnerem.

Cílem projektu je realizace 2-6 rozsáhlých demonstračních projektů, kdy hlavním cílem projektu je budování a rekonstrukce budov energeticky efektivním způsobem. Demo projekty jsou umístěny v různých evropských podnebích, kontextech a zahrnují různé typy budov (obytné a veřejné budovy). Demonstrační budovy budou sloužit pro společnou tvorbu inovativních technologií a procesů, které v konečném důsledku povedou ke snížení a optimalizaci energetické náročnosti.
Inovativní část pro SMK zajišťuje hlavní řešitel projektu za české konsorcium, tj. UCEEB. Statutární město Karviná vstupuje do projektu budovou polikliniky na ul. Žižkova, tzv. demo budovou. Ta bude sloužit k návrhu energetických opatření (musí se jednat o taková, která jsou nad rámec standardních, ne pouhá výměna oken, zateplení apod.), která povedou k nulové či plusové energetické náročnosti budovy, bude-li toho možné dosáhnout.

Rozpočet demonstrační budovy na územní statutárního města Karviná činí přibližně 407 000,-- EUR. Z toho rozpočtu UCEEB bude realizovat vývoj inovativních řešení a jejich instalaci na budovu Polikliniky. V rámci aplikace bude realizována řešení systému obnovitelných zdrojů energie a akumulačního energetické soustavy budovy, vč. skladování energie v recyklovatelných bateriích a systému energetického managementu budovy, platformy monitorování kvality venkovního a vnitřního prostředí vč. systému předpovědi počasí, systém stínění budovy, nakládání se zelenou střechou a dešťovou vodou, stavbu integrovaného vyměnitelného fasádního systému s integrovaným obnovitelným zdrojem energie, nabíjecí systém pro elektrovozidla. Pořízený majetek a vybavení UCEEB formou zápůjčky svěří SMK (po dobu realizace projektu) a následně převede na SMK.

V rámci řešení projektu a přijetí dotace je nutné uzavřít dvě dohody, a to Consortium Agreement a Grant Agreement, které jsou uvedeny v příloze usnesení.

Rozpočet pro statutární město Karviná, který je předmětem těchto dohod, je 119 751,25 EUR (cca 3 113 532,50 Kč). Dotace bude poskytována ve výši 100 % způsobilých výdajů projektu. Rozpočet projektu města Karviné bude pokrývat osobní náklady (energetik, povinná publicita projektu, administrativa), drobný majetek, služby, materiál, cestovné, režijní výdaje.

Doporučení Odboru školství a rozvoje

Na základě výše uvedených skutečností Rada města Karviná doporučuje schválit realizaci projetu a přijetí dotace na projekt „ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES“ (inovační projekt v oblasti pozitivní klimatické změny) a uzavření smlouvy Consortium Agreement a Grant Agreement projektu „ARV - CLIMATE POSITIVE CIRCULAR CUMMUNITIES“ (inovační projekt v oblasti pozitivní klimatické změny) projektu z rámcového programu „Evropské komise Horizon 2020, konkrétně jeho části Green Deal Call (budování a rekonstrukce budov energeticky efektivním způsobem)“.

Příloha č. 1 k usnesení: Consortium Agreement

Příloha č. 2 k usnesení: Grant Agreement

Consortium Agreement

ARV
"CLIMATE POSITIVE CIRCULAR COMMUNITIES"

Version	*Date*	*Comments*	*Author*
Final	29.06.2021	Consortium Agreement for signature	NTNU

THIS CONSORTIUM AGREEMENT is based upon
REGULATION (EU) No 1290/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 laying down the rules for the participation and dissemination in "Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020)" (hereinafter referred to as "Rules for Participation"), and the European Commission Multi-beneficiary General Model Grant Agreement and its Annexes, and is made on 01.01.2022 hereinafter referred to as the Effective Date.

BETWEEN:

NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET, hereinafter referred to as NTNU, established in Høgskoleringen 1, 7491 Trondheim, Norway, represented by represented by Tor Grande or another authorised representative, the Project Coordinator

and

ARCHITECTS COUNCIL OF EUROPE, hereinafter referred to as ACE, established in Rue Paul Emile Janson 29, 1050 Brussels, Belgium represented by Mr Ian Pritchard or another authorised representative, and

CZECH TECHNICAL UNIVERSITY IN PRAGUE, hereinafter referred to as CVUT, established in Jugoslavskych partyzanu 1580/3, 160 00, Prague 6, Czech Republic, represented by doc. RNDr. Vojtech Petracek, CSc. or another authorised representative, and

DANMARKS TEKNISKE UNIVERSITET, hereinafter referred to as DTU, established in Anker Engelundsvej 1, Bygning 101 A, 2800 KGS Lyngby, Denmark, represented by Per B. Brockhoff or another authorised representative, and

DANFOSS AS, hereinafter referred to as DAN, established in Nordborgvej 81, 6430 Nordborg, Denmark, represented by Atli Benonysson or another authorised representative, and

ENFOR AS, hereinafter referred to as ENFOR, established in Røjelskær 11, 3., 2840, Holte, Denmark, represented by Mikkel Westenholz or another authorised representative, and

PROJECT ZERO, hereinafter referred to as PZ, established in Alsion 2, 6400 Sonderborg, Denmark, represented by Peter Rathje or another authorised representative, and

EURAC RESEARCH, hereinafter referred to as EURAC, established in Viale Druso 1, 39100, Bolzano, Italy, represented by Dr. Stephan Ortnername or another authorised representative, and

SINTEF AS, hereinafter referred to as SINTEF, established in Strindveien 4, 7034 Trondhein, Norway, represented by Siri Hunnes Blakstad or another authorised representative, and

PALMA CITY COUNCIL, hereinafter referred to as PALMA, established in PC Cort, 1, 07001, Palma, Spain, represented by Maria Antònia Orell Vicens or another authorised representative, and

IBAVI, hereinafter referred to as IBAVI, established in 9th Manuel Azaña street, 07006, Palma de Mallorca, Spain, represented by Cris Ballester Parets, and

FUNDACIÓ INSTITUT DE RECERCA EN ENERGIA DE CATALUNYA, hereinafter referred to as IREC, established in Jardins de les dones de negre 1 2pl. 08930 Sant Adrià de Besòs, Barcelona, represented by Jaume Marfà Sanchez or another authorised representative, and

METROVACESA, hereinafter referred to as MET, established in Calle Quintanavides 13, 28050, Madrid, Spain, represented by Miguel Díaz Batanero or another authorised representative, and

UNIVERSITY OF APPLIED SCIENCES UTRECHT, hereinafter referred to as HU, established in Padualaan 99, 3584CH, Utrecht, Netherlands, represented by Jan Bogerd or another authorised representative

HOUSING EUROPE, hereinafter referred to as HE, established in Square de Meeus 18, 1050, Brussels, Belgium, represented by Sorcha Edwards, and

BURO DE HAAN, hereinafter referred to as BDH, established in Achthoevenweg 34A, 7951 SK, Staphorst, the Netherlands, represented by A.K. de Haan or another authorised representative, and

CENTER DENMARK FONDEN/EU DIGITAL INNOVATION HUB, hereinafter referred to as EUDIH, established in Vendersgade 74, 7000 Fredericia, Denmark, represented by Søren Skov Bording or another authorised representative, and

SØNDERBORG ANDELSBOLIGFORENING, hereinafter referred to as SAB, established in Bygtoften 2, 6400 Sonderborg, Denmark represented by Brian Skou Juhler Larsen or another authorised representative, and

GREEN DIGITAL FINANCE ALLIANCE, hereinafter referred to as GDFA, established in International Environment House ,Chemin des Anémones 11-13, 1219, Châtelaine, Switzerland represented by Bruno Oberle or another authorised representative, and

STICHTING BO-EX '91, hereinafter referred to as BOEX, established in J.C. Maylaan 18, 3526 GV, Utrecht, The Netherlands, represented by Henk Kerlien or another authorised representative, and

RC PANELS, hereinafter referred to as RCP, established in Constructieweg 1, 8152 GA, Lemelerveld, The Netherlands represented by Carlos Klein or another authorised representative, and

UTRECHT UNIVERSITY, hereinafter referred to as UU, established in Heidelberglaan 8, Utrecht, The Netherlands, represented by Prof. dr. ir. Wilco Hazeleger or another authorised representative, and

MUNICIPALITY OF UTRECHT, hereinafter referred to as UTR, established in Stadsplateau 1, 3512 AZ Utrecht, The Netherlands, represented by Mr. Joop Oude Lohuis or another authorised representative, and

BOS INSTALLATIEWERKEN B.V. , hereinafter referred to as BOS, established in 1939, Tennesseedreef 17, 3565CK, Utrecht, Netherlands, represented by Rogier Bos

IWELL, hereinafter referred to as iWELL, established in Atoomweg 9, 3542 AA, Utrecht, The Netherlands, represented by Vincent Ruijter or another authorised representative, and

MEX ARCHITECTS B.V. , hereinafter referred to as MEX, established in Spoorlaan 18, 3721PB, Bilthoven, The Netherlands, represented by Frank. B. Stedehouder or another authorised representative, and

MITROS, hereinafter referred to as MITR, established in Koningin Wilhelminalaan 9, 3527 LA, UTRECHT, Netherlands, represented by Joseph ten Brink or another authorised representative.

STATUTARNI MESTO KARVINA, hereinafter referred to as KARV, established in Frystatska 1, 733 01, Karvina-Frystat, Czech Republic, represented by Ing. Jan Wolf or another authorised representative, and

DOLOMITI ENERGIA SOLUTIONS SRL, hereinafter referred to as DOL, established in street Fersina 23, 38123, Trento, Italia, represented by Massimo De Alessandri or another authorised representative, and

HABITECH, hereinafter referred to as HAB, established in Piazza Manifattura 1, 38068, Rovereto (TN), Italy represented by Marco Giglioli, or another authorised representative, and

UNIVERSITÀ DEGLI STUDI DI TRENTO, hereinafter referred to as UNITN, established in via Calepina 14, 38123, Trento, Italy, represented by Flavio Deflorian, as Rector, and

POLITECNICO DI TORINO, hereinafter referred to as POLITO, established in Corso Duca degli Abruzzi 24, 10129, Torino, Italy, represented by Giuseppe Andrea Ferro, or another authorised representative, and

OSLOBYGG KF, hereinafter referred to as OBY, established in Grensesvingen 7, 0661 Oslo, Norway represented by Eli Grimsby or another authorised representative, and

NANO POWER, hereinafter referred to as NANO, established in Tiskařská 599/12, 108 00 Prague, Czech Republic represented by František Šťastný or another authorised representative, and

AIGUASOL, hereinafter referred to as AIGUA, established in carrer Roger de Llúria, 29 3rd 2nd 08009 Barcelona, represented by Oriol Gavaldà Torrellas or another authorised representative, and

…….

hereinafter, jointly or individually, referred to as ”Parties” or ”Party”

relating to the Action entitled

CLIMATE POSITIVE CIRCULAR COMMUNITIES

in short

ARV

GA number: 101036723

hereinafter referred to as “Project”

WHEREAS:
The Parties, having considerable experience in the field concerned, have submitted a proposal for the Project to the Funding Authority as part of the Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020)

The Parties wish to specify or supplement binding commitments among themselves in addition to the provisions of the specific Grant Agreement to be signed by the Parties and the Funding Authority (hereinafter "Grant Agreement").

The Parties are aware that this Consortium Agreement is based upon the DESCA model consortium agreement.

NOW, THEREFORE, IT IS HEREBY AGREED AS FOLLOWS:

1 Section: Definitions

1.1 Definitions

Words beginning with a capital letter shall have the meaning defined either herein or in the Rules for Participation or in the Grant Agreement including its Annexes.

1.2 Additional Definitions

"**Application Programming Interface"**
Application Programming Interface means the application programming interface materials and related documentation containing all data and information to allow skilled Software developers to create Software interfaces that interface or interact with other specified Software.

"Consortium Body"
Consortium Body means any management body described in the Governance Structure section of this Consortium Agreement.

"Consortium Plan"
Consortium Plan means the description of the action and the related agreed budget as first defined in the Grant Agreement and which may be updated by the General Assembly.

"Controlled Licence Terms"
Controlled Licence Terms means terms in any licence that require that the use, copying, modification and/or distribution of Software or another work ("Work") and/or of any work that is a modified version of or is a derivative work of such Work (in each case, "Derivative Work") be subject, in whole or in part, to one or more of the following:

a) (where the Work or Derivative Work is Software) that the Source Code or
b) other formats preferred for modification be made available as of right to any third party on request, whether royalty-free or not;
c) that permission to create modified versions or derivative works of the Work or Derivative Work be granted to any third party;
d) that a royalty-free licence relating to the Work or Derivative Work be granted to any third party.

For the avoidance of doubt, any Software licence that merely permits (¬but does not require any of) the things mentioned in (a) to (c) is not a Controlled Licence (and so is an Uncontrolled Licence).

"Funding Authority"
Funding Authority means the body awarding the grant for the Project.

“Defaulting Party”
Defaulting Party means a Party, which the General Assembly has declared to be in breach of this Consortium Agreement and/or the Grant Agreement as specified in Section 4.2 of this Consortium Agreement.

“Needed”
means:
For the implementation of the Project:
Access Rights are Needed if, without the grant of such Access Rights, carrying out the tasks assigned to the recipient Party would be technically or legally impossible, significantly delayed, or require significant additional financial or human resources.

For Exploitation of own Results:
Access Rights are Needed if, without the grant of such Access Rights, the Exploitation of own Results would be technically or legally impossible.

“**Object Code”**
Object code means software in machine-readable, compiled and/or executable form including, but not limited to, byte code form and in form of machine-readable libraries used for linking procedures and functions to other software.

“Software”
Software means sequences of instructions to carry out a process in, or convertible into, a form executable by a computer and fixed in any tangible medium of expression.

“Software Documentation”
Software Documentation means software information, being technical information used, or useful in, or relating to the design, development, use or maintenance of any version of a software programme.

“Source Code”
Source Code means software in human readable form normally used to make modifications to it including, but not limited to, comments and procedural code such as job control language and scripts to control compilation and installation.

2 Section: Purpose

The purpose of this Consortium Agreement is to specify with respect to the Project the relationship among the Parties, in particular concerning the organisation of the work between the Parties, the management of the Project and the rights and obligations of the Parties concerning inter alia liability, Access Rights and dispute resolution.

3 Section: Entry into force, duration, and termination

3.1 Entry into force

An entity becomes a Party to this Consortium Agreement upon signature of this Consortium Agreement by a duly authorised representative.

This Consortium Agreement shall have effect from the Effective Date identified at the beginning of this Consortium Agreement.

A new entity becomes a Party to the Consortium Agreement upon signature of the accession document (Attachment 2) by the new Party and the Coordinator. Such accession shall have effect from the date identified in the accession document and will require a decision of the General Assembly.

3.2 Duration and termination

This Consortium Agreement shall continue in full force and effect until complete fulfilment of all obligations undertaken by the Parties under the Grant Agreement and under this Consortium Agreement.

However, this Consortium Agreement or the participation of one or more Parties to it may be terminated in accordance with the terms of this Consortium Agreement.

If
- the Grant Agreement is not signed by the Funding Authority or a Party, or
- the Grant Agreement is terminated, or
- a Party's participation in the Grant Agreement is terminated,

this Consortium Agreement shall automatically terminate in respect of the affected Party/ies, subject to the provisions surviving the expiration or termination under Section 3.3 of this Consortium Agreement.

3.3 Survival of rights and obligations

The provisions relating to Access Rights, Dissemination and confidentiality, for the time period mentioned therein, as well as for liability, applicable law and settlement of disputes shall survive the expiration or termination of this Consortium Agreement.

Termination shall not affect any rights or obligations of a Party leaving the Consortium incurred prior to the date of termination, unless otherwise agreed between the General Assembly and the leaving Party. This includes the obligation to provide all input, deliverables, and documents for the period up to the effective date of termination of the leaving Party’s participation in the Project.

4 Section: Responsibilities of Parties

4.1 General principles

Each Party undertakes to take part in the efficient implementation of the Project, and to cooperate, perform and fulfil, promptly and on time, all of its obligations under the Grant Agreement and this Consortium Agreement as may be reasonably required from it and in a manner of good faith as prescribed by Belgian law.

Each Party undertakes to notify promptly, in accordance with the governance structure of the Project, any significant information, fact, problem or delay likely to affect the Project.

Each Party shall promptly provide all information reasonably required by a Consortium Body or by the Coordinator to carry out its tasks.

Without constituting any kind of warranty, each Party shall take reasonable measures to ensure the accuracy of any information or materials it supplies to the other Parties.

4.2 Breach

In the event that a responsible Consortium Body identifies a breach by a Party of its obligations under this Consortium Agreement or the Grant Agreement (e.g. improper implementation of the project), the Coordinator or, if the Coordinator is in breach of its obligations, the Party appointed by the General Assembly, will give formal notice to such Party requiring that such breach will be remedied within 30 calendar days from the date of receipt of the written notice by the Party.

If such breach is substantial and is not remedied within that period or is not capable of remedy, the General Assembly may decide to declare the Party to be a Defaulting Party and to decide on the consequences thereof which may include termination of its participation.

In the event a Party is in breach of its obligations the remaining Parties, will, as far as possible, execute their obligations in a regular way. In the event that another Party is prevented from fulfilling its obligations by the non-fulfilment of another Party's obligations then the General Assembly will decide how to proceed in a reasonable manner.

4.3 Involvement of third parties

A Party that enters into a subcontract or otherwise involves third parties (including but not limited to Affiliated Entities) in the Project remains responsible for carrying out its relevant part of the Project and for such third party's compliance with the provisions of this Consortium Agreement and of the Grant Agreement. Such Party has to ensure that the involvement of third parties does not affect the rights and obligations of the other Parties under this Consortium Agreement and the Grant Agreement.

5 Section: Liability towards each other

5.1 No warranties

In respect of any information or materials (incl. Results and Background) supplied by one Party to another under the Project, no warranty or representation of any kind is made, given or implied as to the sufficiency or fitness for purpose nor as to the absence of any infringement of any proprietary rights of third parties.

Therefore,

- the recipient Party shall in all cases be entirely and solely liable for the use to which it puts such information and materials, and
- no Party granting Access Rights shall be liable in case of infringement of proprietary rights of a third party resulting from any other Party (or its Affiliated Entities) exercising its Access Rights.

– notwithstanding the foregoing, no Party shall knowingly supply to another Party in the course of the Project any information or materials which infringes proprietary rights of a third party.

5.2 Limitations of contractual liability

No Party shall be responsible to any other Party for any indirect or consequential loss or similar damage such as, but not limited to, loss of profit, loss of revenue or loss of contracts, provided such damage was not caused by a wilful act or by a breach of confidentiality.

For any remaining contractual liability, a Party's aggregate liability towards the other Parties collectively shall be limited to once the Party's share of the total costs of the Project as identified in Annex 2 of the Grant Agreement provided such damage was not caused by a wilful act or gross negligence.

The terms of this Consortium Agreement shall not be construed to amend or limit any Party's statutory liability.

5.3 Damage caused to third parties

Each Party shall be solely liable for any loss, damage or injury to third parties resulting from the performance of the said Party's obligations by it or on its behalf under this Consortium Agreement or from its use of Results or Background.

5.4 Force Majeure

No Party shall be considered to be in breach of this Consortium Agreement if it is prevented from fulfilling its obligations under the Consortium Agreement by Force Majeure.
Each Party will notify the competent Consortium Bodies of any Force Majeure without undue delay. If the consequences of Force Majeure for the Project are not overcome within 6 weeks after such notification, the transfer of tasks - if any - shall be decided by the competent Consortium Bodies.

6 Section: Governance structure

6.1 General structure and roles

The organisational structure of the Consortium shall comprise the following Consortium Bodies:

- General Assembly (GA)
- Executive Board (EB)
- ARV Exploitation Board (AEB)
- External Expert Advisory Board (EAB)

General Assembly as the ultimate decision-making body of the consortium.

Executive Board as the supervisory body for the execution of the Project, which shall report to and be accountable to the General Assembly.

ARV Exploitation Board is responsible for business models and financing instruments for the exploitation of ARV innovations. The AEB is composed of industry experts from among the ARV partners and influential external companies.

External Expert Advisory Board (EAB) is a supporting body consisting of three external experts in fields related to the project.

Overview of the different project roles.

The Project Coordinator (PC) is the legal entity acting as the intermediary between the Parties and the Funding Authority. The Project Coordinator shall, in addition to its responsibilities as a Party, perform the tasks assigned to it as described in the Grant Agreement and this Consortium Agreement.

Work Package Leader group consists of NTNU, IREC, SINTEF, NTNU, HU, CVUT, DTU, EURAC, GDFA, ACE. Each of the ten thematic work packages will have a responsible Work Package Leader assigned.

Demo Project Leader group consists of are HU, PALMA, OBY, PZ, KARV, and HAB. Each of the six demo projects will have a responsible Demo Project Leader assigned.

Innovation Manager (IM) role is hosted by NTNU. The IM has responsibility for innovation management in ARV across all demo projects and work packages. The Innovation Manager will support the ARV Exploitation Board.

6.2 General operational procedures for all Consortium Bodies

6.2.1 Representation in meetings

Any Party, which is a member of a Consortium Body (hereinafter referred to as "Member"):

- should be present or represented at any meeting;
- may appoint a substitute or a proxy to attend and vote at any meeting; and
- shall participate in a cooperative manner in the meetings.

6.2.2 Preparation and organisation of meetings

6.2.2.1 Convening meetings

The chairperson of a Consortium Body shall convene meetings of that Consortium Body.

	Ordinary meeting	Extraordinary meeting
General Assembly	At least once a year	At any time upon written request of the Executive Board or 1/3 of the Members of the General Assembly
Executive Board	At least quarterly	At any time upon written request of any Member of the Executive Board.

6.2.2.2 Notice of a meeting

The chairperson of a Consortium Body shall give notice in writing of a meeting to each Member of that Consortium Body as soon as possible and no later than the minimum number of days preceding the meeting as indicated below.

	Ordinary meeting	Extraordinary meeting
General Assembly	45 calendar days	15 calendar days
Executive Board	14 calendar days	7 calendar days

6.2.2.3 Sending the agenda

The chairperson of a Consortium Body shall prepare and send each Member of that Consortium Body a written (original) agenda no later than the minimum number of days preceding the meeting as indicated below.

General Assembly	21 calendar days, 10 calendar days for an extraordinary meeting
Executive Board	7 calendar days

6.2.2.4 Adding agenda items:

Any agenda item requiring a decision by the Members of a Consortium Body must be identified as such on the agenda.

Any Member of a Consortium Body may add an item to the original agenda by written notification to all of the other Members of that Consortium Body up to the minimum number of days preceding the meeting as indicated below.

General Assembly	14 calendar days, 7 calendar days for an extraordinary meeting
Executive Board	2 calendar days

6.2.2.5

During a meeting, the Members of a Consortium Body can unanimously agree to add a new item to the original agenda provided that all Members of such Consortium Body are present or duly represented.

6.2.2.6

Meetings of each Consortium Body may also be held by teleconference or other telecommunication means.

6.2.2.7

Decisions will only be binding once the relevant part of the Minutes has been accepted according to Section 6.2.5.

6.2.3

Any decision may also be taken without a meeting if the Coordinator circulates to all Members of the Consortium Body a written document, which is then agreed by the defined majority (see Section 6.2.3) of all Members of the Consortium Body. Such document shall include a reasonable deadline for responses. The Coordinator shall inform the Members of the Consortium Body about the outcome of the vote and send them the corresponding draft minutes.

Decisions taken without a meeting shall be considered as accepted if, within the period set out in article 6.2.5.4, no Member has sent an objection in writing to the chairperson. The decisions will be binding after the chairperson sends to all Members of the Consortium Body and to the Coordinator a written notification of this acceptance.

6.2.4 Voting rules and quorum

6.2.4.1
Each Consortium Body shall not deliberate and decide validly unless two-thirds (2/3) of its Members are present or represented (quorum). If the quorum is not reached, the chairperson of the Consortium Body shall convene another ordinary meeting within 15 calendar days. If in this meeting the quorum is not reached once more, the chairperson shall convene an extraordinary meeting, which shall be entitled to decide even if less than the quorum of Members is present or represented.

6.2.4.2
Each Member of a Consortium Body present or represented in the meeting shall have one vote.

6.2.4.3
A Party which the General Assembly has declared according to Section 4.2 to be a Defaulting Party may not vote.

6.2.4.4
Decisions shall be taken by a majority of two-thirds (2/3) of the votes cast of the Members attending to the corresponding Consortium Body or duly represented at such Consortium Body.

6.2.5 Veto rights

6.2.5.1
A Member which can show that its own work, time for performance, costs, liabilities, intellectual property rights or other legitimate interests would be severely affected by a decision of a Consortium Body may exercise a veto with respect to the corresponding decision or relevant part of the decision.

6.2.5.2
When the decision is foreseen on the original agenda, a Member may veto such a decision during the meeting only.

6.2.5.3
When a decision has been taken on a new item added to the agenda before or during the meeting, a Member may veto such decision during the meeting and within 15 calendar days after the draft minutes of the meeting are sent. A Party that is not a Member of a particular Consortium Body may veto a decision within the same number of calendar days after the draft minutes of the meeting are sent.

6.2.5.4
When a decision has been taken without a meeting a Member may veto such decision within 15 calendar days after written notification by the chairperson of the outcome of the vote.

6.2.5.5
In case of exercise of veto, the Members of the related Consortium Body shall make every effort to resolve the matter which occasioned the veto to the general satisfaction of all its Members.

6.2.5.6
A Party may neither veto decisions relating to its identification to be in breach of its obligations nor to its identification as a Defaulting Party. The Defaulting Party may not veto decisions relating to its participation and termination in the consortium or the consequences of them.

6.2.5.7
A Party requesting to leave the consortium may not veto decisions relating thereto.

6.2.6 Minutes of meetings

6.2.6.1
The chairperson of a Consortium Body shall produce written minutes of each meeting, which shall be the formal record of all decisions taken. He/she shall send the draft minutes to all Members within 10 calendar days of the meeting.

6.2.6.2
The minutes shall be considered as accepted if, within 15 calendar days from sending, no Member has sent an objection in writing to the chairperson with respect to the accuracy of the draft of the minutes.

6.2.6.3
The chairperson shall send the accepted minutes to all the Members of the Consortium Body and to the Project Coordinator, who shall safeguard them. If requested the Project Coordinator shall provide authenticated duplicates to Parties.

6.3 Specific operational procedures for the Consortium Bodies

6.3.1 General Assembly
In addition to the rules described in Section 6.2, the following rules apply:

6.3.1.1 Members

6.3.1.1.1
The General Assembly shall consist of one representative of each Party (hereinafter General Assembly Member).

6.3.1.1.2
Each General Assembly Member shall be deemed to be duly authorised to deliberate, negotiate and decide on all matters listed in Section 6.3.1.2. of this Consortium Agreement.

6.3.1.1.3
The Project Coordinator shall chair all meetings of the General Assembly.

The Parties agree to abide by all decisions of the General Assembly. This does not prevent the Parties to submit a dispute to resolution in accordance with the provisions of Settlement of disputes in Section 11.8.

6.3.1.2 Decisions
The General Assembly shall be free to act on its own initiative to formulate proposals and take decisions in accordance with the procedures set out herein. In addition, all proposals

made by the Executive Board shall also be considered and decided upon by the General Assembly.

The following decisions shall be taken by the General Assembly:

Content, finances, and intellectual property rights

- Proposals for changes to Annexes 1 and 2 of the Grant Agreement to be agreed by the Funding Authority.
- Changes to the Consortium Plan.
- Modifications to Attachment 1 (Background Included).
- Additions to Attachment 3 (List of Third Parties for simplified transfer according to Section 8.3.2).
- Additions to Attachment 4 (Identified Affiliated Entities).
- Appointment of members to the Executive Board.

Evolution of the consortium.

- Entry of a new Party to the consortium and approval of the settlement on the conditions of the accession of such a new Party.
- Withdrawal of a Party from the consortium and the approval of the settlement on the conditions of the withdrawal.
- Identification of a breach by a Party of its obligations under this Consortium Agreement or the Grant Agreement.
- Declaration of a Party to be a Defaulting Party.
- Remedies to be performed by a Defaulting Party.
- Termination of a Defaulting Party's participation in the consortium and measures relating thereto.
- Proposal to the Funding Authority for a change of the Project Coordinator.
- Proposal to the Funding Authority for suspension of all or part of the Project.
- Proposal to the Funding Authority for termination of the Project and the Consortium Agreement.

6.3.2 Executive Board

In addition to the rules in Section 6.2, the following rules shall apply:

6.3.2.1 Members

The Executive Board shall consist of the Project Coordinator (PC), the Work Package leaders (WPL), and the Demo Project Leaders (DPL).

The Project Coordinator shall chair all meetings of the Executive Board.

Minutes of meetings
Minutes of Executive Board meetings, once accepted, shall be sent by the Project Coordinator to the General Assembly Members for information.

6.3.2.2 Tasks

6.3.2.2.1
The Executive Board shall prepare the meetings, propose decisions, and prepare the agenda of the General Assembly according to Section 6.3.1.2.

6.3.2.2.2
The Executive Board shall seek a consensus among the Parties.

6.3.2.2.3
The Executive Board shall be responsible for the proper execution and implementation of the decisions of the General Assembly.

6.3.2.2.4
The Executive Board shall monitor the effective and efficient implementation of the Project.

6.3.2.2.5
In addition, the Executive Board shall collect information on the progress of the Project, examine that information to assess the compliance of the Project with the Consortium Plan and, if necessary, propose modifications of the Consortium Plan to the General Assembly.

6.3.2.2.6
The Executive Board shall:
- Support the Project Coordinator in preparing meetings with the Funding Authority and in preparing related data and deliverables
- Regularly collect information on the progress of the project to monitor the effective and efficient implementation of tasks, milestones, and deliverables
- Propose decisions and prepare the agenda of the General Assembly meetings
- Be responsible for the proper execution of decisions of the General Assembly
- Prepare the content and timing of press releases and joint publications by the consortium or proposed by the Funding Authority in respect of the procedures of the Grant Agreement Article 29.

6.3.2.2.7
In the case of abolished tasks as a result of a decision of the General Assembly, the Executive Board shall advise the General Assembly on ways to rearrange tasks and budgets of the Parties concerned. Such rearrangement shall take into consideration the legitimate commitments taken prior to the decisions, which cannot be cancelled.

6.4 Project Coordinator

6.4.1
The Project Coordinator shall be the intermediary between the Parties and the Funding Authority and shall perform all tasks assigned to it as described in the Grant Agreement and in this Consortium Agreement.

6.4.2
In particular, the Project Coordinator shall be responsible for:
- monitoring compliance by the Parties with their obligations;
- keeping the address list of Members and other contact persons updated and available

- collecting, reviewing to verify consistency, and submitting reports, other deliverables (including financial statements and related certifications) and specific requested documents to the Funding Authority;
- transmitting documents and information connected with the Project to any other Parties concerned;
- administering the financial contribution of the Funding Authority and fulfilling the financial tasks described in Section 7.3; and
- providing, upon request, the Parties with official copies or originals of documents that are in the sole possession of the Project Coordinator when such copies or originals are necessary for the Parties to present claims.

If one or more of the Parties is late in submission of any project deliverable, the Project Coordinator may nevertheless submit the other 'Parties' project deliverables and all other documents required by the Grant Agreement to the Funding Authority in time.

6.4.3
If the Project Coordinator fails in its coordination tasks, the General Assembly may propose to the Funding Authority to change the Project Coordinator.

6.4.4
The Project Coordinator shall not be entitled to act or to make legally binding declarations on behalf of any other Party or of the consortium, unless explicitly stated otherwise in the Grant Agreement or this Consortium Agreement.

6.4.5
The Project Coordinator shall not enlarge its role beyond the tasks specified in this Consortium Agreement and in the Grant Agreement.

6.5 The External Expert Advisory Board (EAB)

The External Expert Advisory Board (EAB) is a supporting body consisting of three external experts in fields related to the project. The aim of the scientific advisory board is to provide guidance to maintain the scientific quality of the project and feedback to the consortium on the overall progress of the project and its implementation. The members of the EAB will sign a non-disclosure agreement with the consortium. Its terms shall be no less stringent than those stipulated in this Consortium Agreement, and it shall be concluded no later than 30 calendar days after their nomination. They will be invited to consortium meetings on a regular basis and may be invited to participate in the General Assembly (although they will not have any voting rights).

6.6 The Work Package Leaders (WPL) and the Demo Project Leaders (DPL)

The Work Package Leaders (WPL) and the Demo Project Leaders (DPL) will work closely together to ensure the success of the project. In each of the thematic work packages, there is a task of innovation management, ensuring the connection between the work carried out in work packages and the demo projects.

The WPL and DPL have a duty to report any major issues or delays to the Executive Board and General Assembly.

The WPL and DPL will:

- coordinate and plan the work in the work packages and the demo projects;
- monitor the progress of work in their work packages and demo projects and report to the EB;
- chair joint WP and Demo Project meetings and produce minutes from those meetings;
- notify the EB and GA of major issues, delays, or poor performance of a beneficiary or a demo;
- contribute to periodic reporting; and
- identify IPR issues and opportunities and contribute to dissemination activities.

The WPLs and DPLs will organise common meetings in person or via web conference, as often as necessary.

7 Section: Financial provisions

7.1 General Principles

7.1.1 Distribution of Financial Contribution
The financial contribution of the Funding Authority to the Project shall be distributed by the Project Coordinator according to:

- the Consortium Plan;
- the approval of reports by the Funding Authority, and
- the provisions of payment in Section 7.3.

A Party shall be funded only for its tasks carried out in accordance with the Consortium Plan.

7.1.2 Justifying Costs

In accordance with its own usual accounting and management principles and practices, each Party shall be solely responsible for justifying its costs with respect to the Project towards the Funding Authority. Neither the Project Coordinator nor any of the other Parties shall be in any way liable or responsible for such justification of costs towards the Funding Authority.

7.1.3 Funding Principles

A Party which spends less than its allocated share of the budget as set out in the Consortium Plan or – in case of reimbursement via unit costs - implements less units than foreseen in the Consortium Plan will be funded in accordance with its actual duly justified eligible costs only. A Party that spends more than its allocated share of the budget as set out in the Consortium Plan will be funded only in respect of duly justified eligible costs up to an amount not exceeding that share.

7.1.4. Return of excess payments, receipts

7.1.4.1.
In any case of a Party having received excess payments, the Party has to return the relevant amount to the Project Coordinator without undue delay.

7.1.4.2.
In case a Party earns any receipt that is deductible from the total funding as set out in the Consortium Plan, the deduction is only directed toward the Party earning such income. The other

Parties' financial share of the budget shall not be affected by one Party's receipt. In case the relevant receipt is more than the allocated share of the Party as set out in the Consortium Plan, the Party shall reimburse the funding reduction suffered by other Parties.

7.1.5. Financial Consequences of the termination of the participation of a Party

A Party leaving the consortium shall refund all payments it has received except the amount of contribution accepted by the Funding Authority or another contributor. Furthermore, a Defaulting Party shall, within the limits specified in Section 5.2 of this Consortium Agreement, bear any reasonable and justifiable additional costs occurring to the other Parties in order to perform its and their tasks.

7.2 Budgeting

The budget set out in the Consortium Plan shall be valued in accordance with the usual accounting and management principles and practices of the respective Parties.

7.3 Payments

7.3.1 Payments to Parties are the exclusive tasks of the Project Coordinator

In particular, the Project Coordinator shall:

- **notify the Party concerned promptly of the date and composition of the amount transferred to its bank account, giving the relevant references;**
- **perform diligently its tasks in the proper administration of any funds and in maintaining financial accounts; and**
- **undertake to keep the Funding Authority's financial contribution to the Project separated from its normal business accounts, its own assets and property, except if the Project Coordinator is a Public Body or is not entitled to do so due to statutory legislation.**

With reference to Articles 21.2 and 21.3.2 of the Grant Agreement, no Party shall before the end of the Project receive more than its allocated share of the maximum grant amount from which the amounts retained by the Funding Authority for the Guarantee Fund and for the final payment have been deducted.

7.3.2 The payment schedule

The payment schedule, which contains the transfer of pre-financing and interim payments to Parties, will be handled according to the following:

Funding of costs included in the Consortium Plan will be paid to Parties after receipt from the Funding Authority in biannual instalments, subject to and corresponding to the following:

- **the Party in question having acceded to the Grant Agreement;**
- **the Party in question having signed this Consortium Agreement;**
- **the Party in question having delivered the information to the Project Coordinator that it has requested for the purpose of the monitoring of the implementation of the project;**
- **any relevant decisions of the General Assembly;**
- **any relevant decisions of the Executive Board.**

The biannual instalments will be calculated based on costs included in the Consortium Plan for the upcoming instalment period, and are deemed to constitute an advance funding for the instalment period in question, subject to the condition that funds have been transferred by the Funding Authority to the Project Coordinator's bank account. As such, the funds

transferred by the Funding Authority to the Project Coordinator's bank account shall constitute an upper limit to the accumulated amounts that may be disbursed within the Consortium.

The biannual instalments will be disbursed according to the following disbursement cycle – subject to the availability of funds from the Funding Authority: M1, M8, M14, M22, etc. This is in order to project synchronise payments with the internal consortium project monitoring cycle.

The Project Coordinator will prepare a detailed payment schedule based on the principles above, containing the expected amounts and timing of each instalment to each beneficiary before the start of the project. The Coordinator will be responsible for updating and maintaining the detailed payment schedule, following decisions by the Funding Authority and relevant Consortium Bodies.

The Project Coordinator will prepare a process description for budgeting, payments, and internal financial reporting activities, to be approved and updated by the relevant Consortium Bodies.

Under conditions of negative interest for the Project Coordinator's bank account, the Project Coordinator may disburse all of the funding that has been received from the Funding Authority within the Consortium in one round of instalments.

The Project Coordinator is entitled to withhold any payments due to a Party identified by a responsible Consortium Body to be in breach of its obligations under this Consortium Agreement or the Grant Agreement or to a Beneficiary, which has not yet signed this Consortium Agreement.

The Project Coordinator is entitled to recover any payments already paid to a Defaulting Party. The Project Coordinator is equally entitled to withhold payments to a Party when this is suggested by or agreed with the Funding Authority

7.3.3 Recovery of amounts after the final grant

The final payment covers the remaining part of the eligible costs incurred by the Party for the implementation of the Project.

If, for a Party, the total accepted EU contribution, as approved by the Funding Authority is lower than its budget in the Consortium Plan the final payment will be reduced accordingly.

If a Party did receive an amount that exceeds its total accepted EU contribution before the final payment, it must repay the difference to the Project Coordinator without undue delay. The Project Coordinator will confirm the amount to be recovered using a debit note specifying the terms and the date for payment.

If payment is not made by the date specified in the debit note, the Project Coordinator will recover the amount:

(a) by offsetting it — without the Party's consent — against any amounts owed to the Party by the Project Coordinator;
(b) by legal recovery or by adopting an enforceable decision.

If payment is not made by the date in the debit note, the amount to be recovered will be increased by late-payment interest at the rate set under national law applicable to the Project

Coordinator, from the day following the date for payment in the debit note, up to and including the date the Project Coordinator receives full payment of the amount.

For clarification purposes, the provisions set forth in this section shall not apply to a recovery of an amount due to the Funding Authority, as this is regulated by article 44 of the Grant Agreement.

8 Section: Results

8.1 Ownership of Results

Results are owned by the Party that generates them.

8.2 Joint ownership

Joint ownership is governed by Grant Agreement Article 26.2 with the following additions: Each joint owner's share of jointly owned Result is equal to the owners' intellectual contribution.

Unless otherwise agreed:

- each of the joint owners shall be entitled to use their jointly owned Results for non-commercial research activities and educational purposes on a royalty-free basis, and without requiring the prior consent of the other joint owner(s), and
- each of the joint owners shall be entitled to otherwise Exploit the jointly owned Results and to grant non-exclusive licenses to third parties (without any right to sub-license), if the other joint owners are given:
  (a) at least 45 calendar days advance notice; and
  (b) Fair and Reasonable compensation.

8.3 Transfer of Results

8.3.1

Each Party may transfer ownership of its own Results following the procedures of the Grant Agreement Article 30.

8.3.2

Each Party may identify specific third parties it intends to transfer the ownership of its Results to in Attachment (3) to this Consortium Agreement. The other Parties hereby waive their right to prior notice and their right to object to a transfer to listed third parties according to the Grant Agreement Article 30.1.

8.3.3

The transferring Party shall, however, at the time of the transfer, inform the other Parties of such transfer and shall ensure that the rights of the other Parties will not be affected by such transfer. Any addition to Attachment (3) after signature of this Agreement requires a decision of the General Assembly.

8.3.4

The Parties recognize that in the framework of a merger or an acquisition of an important part of its assets, it may be impossible under applicable EU and national laws on mergers and acquisitions for a Party to give the full 45 calendar days prior notice for the transfer as foreseen in the Grant Agreement.

8.3.5
The obligations above apply only for as long as other Parties still have - or still may request - Access Rights to the Results.

8.4 Dissemination

8.4.1
For the avoidance of doubt, nothing in this Section 8.4 has impact on the confidentiality obligations set out in Section 10.

8.4.2 Dissemination of own Results

8.4.2.1
During the Project and for a period of 1 year after the end of the Project, the dissemination of own Results by one or several Parties including but not restricted to publications and presentations, shall be governed by the procedure of Article 29.1 of the Grant Agreement subject to the following provisions. Where publications relate to jointly developed Results, each co-owner involved must give its prior consent to publish and such consent shall not be unreasonably delayed.

Prior notice of any planned publication shall be given to the other Parties at least 30 calendar days before the publication. Any objection to the planned publication shall be made in accordance with the Grant Agreement in writing to the Project Coordinator and to the Party or Parties proposing the dissemination within 21 calendar days after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted.

8.4.2.2
An objection is justified if
(a) the protection of the objecting Party's Results or Background would be adversely affected
(b) the objecting Party's legitimate interests in relation to the Results or Background would be significantly harmed.

The objection has to include a precise request for necessary modifications.

8.4.2.3
If an objection has been raised the involved Parties shall discuss how to overcome the justified grounds for the objection on a timely basis (for example by amendment to the planned publication and/or by protecting information before publication) and the objecting Party shall not unreasonably continue the opposition if appropriate measures are taken following the discussion.

8.4.2.4
The objecting Party can request a publication delay of not more than 90 calendar days from the time it raises such an objection. After 90 calendar days, the objecting Party cannot demand further delay, provided that appropriate steps have been taken to safeguard that the objecting Party’s legitimate interests in relation to the Results are not significantly harmed or that Confidential Information of the objecting Party has been removed from the publication as indicated by the objecting Party.

8.4.3 Dissemination of another Party's unpublished Results or Background

A Party shall not include in any dissemination activity another Party's Results or Background without obtaining the owning Party's prior written approval, unless they are already published.

8.4.4 Cooperation obligations

The Parties undertake to cooperate to allow the timely submission, examination, publication and defence of any dissertation or thesis for a degree that includes their Results or Background subject to the confidentiality and publication provisions agreed in this Consortium Agreement.

8.4.5 Use of names, logos or trademarks

Nothing in this Consortium Agreement shall be construed as conferring rights to use in advertising, publicity or otherwise the name of the Parties or any of their logos or trademarks without their prior written approval.

9 Section: Access Rights

9.1 Background included

9.1.1

In Attachment 1, the Parties have identified and agreed on the Background for the Project and have also, where relevant, informed each other that Access to specific Background is subject to legal restrictions or limits.

Anything not identified in Attachment 1 shall not be the object of Access Right obligations regarding Background.

9.1.2

Any Party may add further own Background to Attachment 1 during the Project by written notice to the other Parties. However, approval of the General Assembly is needed should a Party wish to modify or withdraw its Background in Attachment 1.

9.2 General Principles

9.2.1

Each Party shall implement its tasks in accordance with the Consortium Plan and shall bear sole responsibility for ensuring that its acts within the Project do not knowingly infringe third party property rights.

9.2.2

Any Access Rights granted expressly exclude any rights to sublicense unless expressly stated otherwise in this Consortium Agreement or unless otherwise agreed between the Parties concerned.

9.2.3

Access Rights shall be free of any administrative transfer costs.

9.2.4

Access Rights are granted on a non-exclusive basis.

9.2.5
Results and Background shall be used only for the purposes for which Access Rights to it have been granted.

9.2.6
All requests for Access Rights shall be made in writing. The granting of Access Rights may be made conditional on the acceptance of specific conditions aimed at ensuring that these rights will be used only for the intended purpose and that appropriate confidentiality obligations are in place.

9.2.7
The requesting Party must show that the Access Rights are Needed.

9.3 Access Rights for implementation

Access Rights to Results and Background Needed for the performance of the own work of a Party under the Project shall be granted on a royalty-free basis, unless otherwise agreed for Background in Attachment 1.

9.4 Access Rights for Exploitation

9.4.1 Access Rights to Results

Access Rights to Results if Needed for exploitation of a Party's own Results shall be granted on Fair and Reasonable conditions.

Access rights to Results for internal research activities shall be granted on a royalty-free basis.

9.4.2
Access Rights to Background if Needed for Exploitation of a Party's own Results, including for research on behalf of a third party, shall be granted on Fair and Reasonable conditions.

9.4.3
A request for Access Rights may be made up to twelve months after the end of the Project or, in the case of Section 9.7.2.1.2, after the termination of the requesting Party's participation in the Project.

9.5 Access Rights for Affiliated Entities

Affiliated Entities have Access Rights under the conditions of the Grant Agreement Articles 25.4 and 31.4, if they are identified in Attachment 4 (Identified Affiliated Entities) to this Consortium Agreement.

Such Access Rights must be requested by the Affiliated Entity from the Party that holds the Background or Results. Alternatively, the Party granting the Access Rights may individually agree with the Party requesting the Access Rights to have the Access Rights include the right to sublicense to the latter's Affiliated Entities listed in Attachment 4. Access Rights to Affiliated Entities shall be granted on Fair and Reasonable conditions and upon written bilateral agreement.

Affiliated Entities which obtain Access Rights in return fulfil all confidentiality and other obligations accepted by the Parties under the Grant Agreement or this Consortium Agreement as if such Affiliated Entities were Parties.

Access Rights may be refused to Affiliated Entities if such granting is contrary to the legitimate interests of the Party which owns the Background or the Results.

Access Rights granted to any Affiliated Entity are subject to the continuation of the Access Rights of the Party to which it is affiliated and shall automatically terminate upon termination of the Access Rights granted to such Party.

Upon cessation of the status as an Affiliated Entity, any Access Rights granted to such former Affiliated Entity shall lapse.

Further arrangements with Affiliated Entities may be negotiated in separate agreements.

9.6 Additional Access Rights

For the avoidance of doubt, any grant of Access Rights not covered by the Grant Agreement or this Consortium Agreement shall be at the absolute discretion of the owning Party and subject to such terms and conditions as may be agreed between the owning and receiving Parties.

9.7 Access Rights for Parties entering or leaving the consortium

9.7.1 New Parties entering the consortium

As regards Results developed before the accession of the new Party, the new Party will be granted Access Rights on the conditions applying for Access Rights to Background.

9.7.2 Parties leaving the consortium

9.7.2.1 Access Rights granted to a leaving Party

9.7.2.1.1 Defaulting Party

Access Rights granted to a Defaulting Party and such Party's right to request Access Rights shall cease immediately upon receipt by the Defaulting Party of the formal notice of the decision of the General Assembly to terminate its participation in the consortium.

9.7.2.1.2 Non-defaulting Party

A non-defaulting Party leaving voluntarily and with the other Parties' consent shall have Access Rights to the Results developed until the date of the termination of its participation. It may request Access Rights within the period of time specified in Section 9.4.3.

9.7.2.2 Access Rights to be granted by any leaving Party

Any Party leaving the Project shall continue to grant Access Rights pursuant to the Grant Agreement and this Consortium Agreement as if it had remained a Party for the whole duration of the Project.

9.8 Specific Provisions for Access Rights to Software

9.8.1 General principles

For the avoidance of doubt, the general provisions for Access Rights provided for in this Section 9 are applicable also to Software as far as not modified by this Section 9.8.

Parties' Access Rights to Software do not include any right to receive Source Code or Object Code ported to a certain hardware platform or any right to receive Source Code, Object Code or respective Software Documentation in any particular form or detail, but only as available from the Party granting the Access Rights.

The intended introduction of Intellectual Property (including, but not limited to Software) under Controlled Licence Terms in the Project requires the approval of the General Assembly to implement such introduction into the Consortium Plan.

9.8.2 Access to Software

Access Rights to Software that is Results shall comprise:

- access to the Object Code; and,
- where normal use of such an Object Code requires an Application Programming Interface (hereafter API), Access to the Object Code and such an API; and,
- if a Party can show that the execution of its tasks under the Project or the Exploitation of its own Results is technically or legally impossible without Access to the Source Code, Access to the Source Code to the extent necessary.

Background shall only be provided in Object Code unless otherwise agreed between the Parties concerned.

9.8.3 Software license and sublicensing rights

9.8.3.1 Object Code

9.8.3.1.1 Results - Rights of a Party

Where a Party has Access Rights to Object Code and/or API that is Results for Exploitation, such Access shall, in addition to the Access for Exploitation foreseen in Section 9.4, as far as Needed for the Exploitation of the Party's own Results, comprise the right:

to make an unlimited number of copies of Object Code and API; and
to distribute, make available, market, sell and offer for sale such Object Code and API alone or as part of or in connection with products or services of the Party having the Access Rights;

provided however that any product, process or service has been developed by the Party having the Access Rights in accordance with its rights to exploit Object Code and API for its own Results.

If it is intended to use the services of a third party for the purposes of this Section 9.8.3.1.1, the Parties concerned shall agree on the terms thereof with due observance of the interests of the Party granting the Access Rights as set out in Section 9.2 of this Consortium Agreement.

9.8.3.1.2 Results - Rights to grant sublicenses to end-users

In addition, Access Rights to Object Code shall, as far as Needed for the Exploitation of the Party's own Results, comprise the right to grant in the normal course of the relevant trade to end-user customers buying/using the product/services, a sublicense to the extent as necessary

for the normal use of the relevant product or service to use the Object Code alone or as part of or in connection with or integrated into products and services of the Party having the Access Rights and, as far as technically essential:

- to maintain such product/service;
- to create for its own end-use interacting interoperable software in accordance with the Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs

9.8.3.1.3 Background

For the avoidance of doubt, where a Party has Access Rights to Object Code and/or API that is Background for Exploitation, Access Rights exclude the right to sublicense. Such sublicensing rights may, however, be negotiated between the involved Parties.

9.8.3.2 Source Code

9.8.3.2.1 Results - Rights of a Party

Where, in accordance with Section 9.8.3, a Party has Access Rights to Source Code that is Results for Exploitation, Access Rights to such Source Code, as far as Needed for the Exploitation of the Party's own Results, shall comprise a worldwide right to use, to make copies, to modify, to develop, to adapt Source Code for research, to create/market a product/process and to create/provide a service.

If it is intended to use the services of a third party for the purposes of this Section 9.8.3.2.1, the Parties shall agree on the terms thereof, with due observance of the interests of the Party granting the Access Rights as set out in Section 9.2 of this Consortium Agreement.

9.8.3.2.2 Results – Rights to grant sublicenses to end-users

In addition, Access Rights, as far as Needed for the Exploitation of the Party's own Results, shall comprise the right to sublicense such Source Code, but solely for purpose of adaptation, error correction, maintenance and/or support of the Software.
Further sublicensing of Source Code is explicitly excluded.

9.8.3.2.3 Background

For the avoidance of doubt, where a Party has Access Rights to Source Code that is Background for Exploitation, Access Rights exclude the right to sublicense. Such sublicensing rights may, however, be negotiated between the Parties.

9.8.4 Specific formalities

Each sublicense granted according to the provisions of Section 9.8.3 shall be made by a traceable written agreement specifying and protecting the proprietary rights of the Party or Parties concerned.

10 Section: Non-disclosure of information

10.1

All information in whatever form or mode of communication, which is disclosed by a Party (the "Disclosing Party") to any other Party (the "Recipient") in connection with the Project during its implementation and which has been explicitly marked as "confidential" at the time of disclosure, or when disclosed orally has been identified as confidential at the time of

disclosure and has been confirmed and designated in writing within 15 calendar days from oral disclosure at the latest as confidential information by the Disclosing Party, is "Confidential Information".

10.2

The Recipients hereby undertake in addition and without prejudice to any commitment on non-disclosure under the Grand Agreement, for a period of 4 years after the end of the Project:

- not to use Confidential Information otherwise than for the purpose for which it was disclosed;
- not to disclose Confidential Information without the prior written consent by the Disclosing Party;
- to ensure that internal distribution of Confidential Information by a Recipient shall take place on a strict need-to-know basis; and
- to return to the Disclosing Party, or destroy, on request all Confidential Information that has been disclosed to the Recipients including all copies thereof and to delete all information stored in a machine readable form to the extent practically possible, except for Confidential Information temporarily stored on an automated back-up system. The Recipients may keep a copy to the extent it is required to keep, archive or store such Confidential Information because of compliance with applicable laws and regulations or for the proof of on-going obligations provided that the Recipient comply with the confidentiality obligations herein contained with respect to such copy for as long as the copy is retained.

10.3

The Recipient shall be responsible for the fulfilment of the above obligations on the part of their employees or third parties involved in the Project and shall ensure that they remain so obliged, as far as legally possible, during and after the end of the Project and/or after the termination of the contractual relationship with the employee or third party.

10.4

The above shall not apply for disclosure or use of Confidential Information, if and in so far as the Recipient can show that:

- the Confidential Information has become or becomes publicly available by means other than a breach of the Recipient's confidentiality obligations;
- the Disclosing Party subsequently informs the Recipient that the Confidential Information is no longer confidential;
- the Confidential Information is communicated to the Recipient without any obligation of confidentiality by a third party who is to the best knowledge of the Recipient in lawful possession thereof and under no obligation of confidentiality to the Disclosing Party;
- the disclosure or communication of the Confidential Information is foreseen by provisions of the Grant Agreement;
- the Confidential Information, at any time, was developed by the Recipient completely independently of any such disclosure by the Disclosing Party;
- the Confidential Information was already known to the Recipient prior to disclosure, or
- the Recipient is required to disclose the Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order, subject to the provision Section 10.7 hereunder.

10.5

The Recipient shall apply the same degree of care with regard to the Confidential Information disclosed within the scope of the Project as with its own confidential and/or proprietary information, but in no case less than reasonable care.

10.6

Each Party shall promptly advise the other Party in writing of any unauthorised disclosure, misappropriation or misuse of Confidential Information after it becomes aware of such unauthorised disclosure, misappropriation or misuse.

10.7

If any Party becomes aware that it will be required, or is likely to be required, to disclose Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order, it shall, to the extent it is lawfully able to do so, prior to any such disclosure

- notify the Disclosing Party, and
- limit the disclosure of the Confidential Information to the strictly necessary to comply with such mandatory request,
- comply with the Disclosing Party's reasonable instructions to protect the confidentiality of the information.

11 Section: Miscellaneous

11.1 Attachments, inconsistencies and severability

This Consortium Agreement consists of this core text and
Attachment 1 (Background included)
Attachment 2 (Accession document)
Attachment 3 (List of Third Parties for simplified transfer according to Section 8.3.2)
Attachment 4 (Identified Affiliated Entities)

In case the terms of this Consortium Agreement are in conflict with the terms of the Grant Agreement, the terms of the latter shall prevail. In case of conflicts between the attachments and the core text of this Consortium Agreement, the latter shall prevail.

Should any provision of this Consortium Agreement become invalid, illegal or unenforceable, it shall not affect the validity of the remaining provisions of this Consortium Agreement. In such a case, the Parties concerned shall be entitled to request that a valid and practicable provision be negotiated that fulfils the purpose of the original provision.

11.2 No representation, partnership or agency

Except as otherwise provided in Section 6.4.4, no Party shall be entitled to act or to make legally binding declarations on behalf of any other Party or of the consortium. Nothing in this Consortium Agreement shall be deemed to constitute a joint venture, agency, partnership, interest grouping or any other kind of formal business grouping or entity between the Parties.

11.3 Notices and other communication

Any notice to be given under this Consortium Agreement shall be in writing to the addresses and recipients as listed in the most current address list kept by the Project Coordinator.

Formal notices:
If it is required in this Consortium Agreement (Sections 4.2, 9.7.2.1.1, and 11.4) that a formal notice, consent or approval shall be given, such notice shall be signed by an authorised representative of a Party and shall either be served personally, sent by mail or another electronically communication system.

Other communication:
Other communication between the Parties may also be effected by other means such as e-mail with acknowledgement of receipt, which fulfils the conditions of written form.

Any change of persons or contact details shall be notified immediately by the respective Party to the Project Coordinator. The address list shall be accessible to all Parties.

11.4 Assignment and amendments

Except as set out in Section 8.3, no rights or obligations of the Parties arising from this Consortium Agreement may be assigned or transferred, in whole or in part, to any third party without the other Parties' prior formal approval. Amendments and modifications to the text of this Consortium Agreement not explicitly listed in Section 6.3.1.2 require a separate written agreement to be signed between all Parties.

11.5 Mandatory national law

Nothing in this Consortium Agreement shall be deemed to require a Party to breach any mandatory statutory law under which the Party is operating.

11.6 Language

This Consortium Agreement is drawn up in English, which language shall govern all documents, notices, meetings, arbitral proceedings and processes relative thereto.

11.7 Applicable law

This Consortium Agreement shall be construed in accordance with and governed by the laws of Belgium excluding its conflict of law provisions.

11.8 Data protection

Each Party acknowledges that information and personal data in the terms of the General Data Protection Regulation (EU) 2016/679 (GDPR) and the data protection laws as applicable relating to this are processed to implement and manage the contractual cooperation and – not least under funding granted – transmitted to third parties responsible for corresponding tasks. Third parties responsible for corresponding tasks are funding bodies, other funding agencies, relevant federal ministries, auditors installed for exercising control and reviewing the proper use of public funding as well as bodies of the EU and third parties funding bodies make use of for the purpose of providing the necessary economic and scientific analyses.

Each Party must seek any required data protection consent within their responsibility to satisfy in particular the information requirements related to the legal obligations to submit on the part of the funding body.

Any agreement related to data protection shall set out the purpose of such personal data processing or exchange and define the roles and liabilities of the Parties involved in accordance with the GDPR requirements. The data protections provisions of such separate

agreement shall prevail over any other provision referring to data protection in this Consortium Agreement.

Moreover, the Parties commit themselves to comply with the data secrecy and to take the usual and appropriate organisational and technical measures to safeguard data security.

11.9 Settlement of disputes

The Parties shall endeavour to settle their disputes amicably.

Any dispute, controversy or claim arising under, out of or relating to this Consortium Agreement and any subsequent amendments of this Consortium Agreement, including, without limitation, its formation, validity, binding effect, interpretation, performance, breach or termination, as well as non-contractual claims, shall be submitted to mediation in accordance with the WIPO Mediation Rules. The place of mediation shall be Brussels unless otherwise agreed upon. The language to be used in the mediation shall be English unless otherwise agreed upon.

If, and to the extent that, any such dispute, controversy or claim has not been settled pursuant to the mediation within 60 calendar days of the commencement of the mediation, the courts of Brussels shall have exclusive jurisdiction.

Nothing in this Consortium Agreement shall limit the Parties' right to seek injunctive relief in any applicable competent court.

Section Signatures

AS WITNESS:
The Parties have caused this Consortium Agreement to be duly signed by the undersigned authorised representatives in separate signature pages the day and year first above written.

NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET

Signature(s):

Name(s): Tor Grande

Title(s): Pro-Rector for Research

Date:

ARCHITECTS COUNCIL OF EUROPE

Signature(s):

Name(s): Ian PRITCHARD

Title(s): Secretary General

Date:

CZECH TECHNICAL UNIVERSITY

Signature(s):

Name(s): doc. RNDr. Vojtech Petracek

Title(s): Rector

Date:

DANMARKS TEKNISKE UNIVERSITET

Signature(s):

Name(s): Per B. Brockhoff

Title(s): Professor, Head of Department of Applied Mathematics and Computer Science

Date:

DANFOSS AS

Signature(s):

Name(s): Atli Benonysson

Title(s): Vice President, Application & Technology

Date:

ENFOR AS

Signature(s):

Name(s): Mikkel Westenholz

Title(s): Managing Director

Date:

PROJECT ZERO

Signature(s):

Name(s): Peter Rathje

Title(s): Managing Director

Date:

EURAC RESEARCH

Signature(s):

Name(s): Dr. Stephan Ortner

Title(s): Director

Date:

SINTEF AS

Signature:

Name: Siri Hunnes Blakstad

Title: Executive Vice President

Date:

PALMA CITY COUNCIL

Signature(s):

Name(s): Maria Antònia Orell Vicens

Title(s): Financial Director

Date:

IBAVI

Signature:

Name: Cris Ballester Parets

Title: Manager and Director

Date:

FUNDACIÓ INSTITUT DE RECERCA EN ENERGIA DE CATALUNYA

Signature(s):

Name(s): Jaume Marfà Sanchez

Title(s): Management and Financial Director

Date:

METROVACESA

Signature(s):

Name(s): Miguel Díaz Batanero

Title(s): Head of Land Development

Date:

UNIVERSITY OF APPLIED SCIENCES UTRECHT

Signature(s):

Name(s): Jan Bogerd

Title(s): Chairman of the Executive Board

Date:

HOUSING EUROPE

Signature(s):

Name(s): Sorcha Edwards

Title(s): Secretary General

Date:

BURO DE HAAN

Signature(s):

Name(s): A.K. de Haan

Title(s): Engineer

Date:

CENTER DENMARK/EU DIGITAL INNOVATION HUB

Signature(s):

Name(s): Søren Skov Bording

Title(s): Managing Director

Date:

SØNDERBORG ANDELSBOLIGFORENING

Signature(s):

Name(s): Brian Skou Juhler Larsen

Title(s): Technical Manager

Date:

GREEN DIGITAL FINANCE ALLIANCE

Signature(s):

Name(s): Bruno Oberle

Title(s): Co-Chair of the Board

Date:

STICHTING BO-EX '91

Signature(s):

Name(s): Henk Kerlien

Title(s): Vice Director

Date:

RC PANELS

Signature(s):

Name(s): Carlos Klein

Title(s): Director

Date:

UTRECHT UNIVERSITY

Signature(s):

Name(s): Prof. dr. ir. Wilco Hazeleger

Title(s): Dean of Faculty of Geosciences

Date:

MUNICIPALITY OF UTRECHT

Signature(s):

Name(s): Joop Oude Lohuis

Title(s): Director Energy Transition

Date:

BOS INSTALLATIEWERKEN B.V.

Signature(s):

Name: Rogier J. Bos

Title: Managing Director

Date:

IWELL

Signature(s):

Name(s): Vincent Ruijter

Title(s): Director

Date:

MEX ARCHITECTS B.V.

Signature(s):

Name(s): Frank. B. Stedehouder

Title(s): Architect

Date:

MITROS

Signature(s):

Name(s): Joseph ten Brink

Title(s): Senior Real Estate Developer

Date:

MUNICIPALITY OF KARVINA

Signature(s):

Name(s): Joop Oude Lohuis

Title(s): Director Energy Programme

Date:

DOLOMITI ENERGIA SOLUTIONS SRL

Signature(s):

Name(s): Nicola Fruet

Title(s): Engineer

Date:

HABITECH

Signature(s):

Name(s): Marco Giglioli

Title(s): President

Date:

UNIVERSITÀ DEGLI STUDI DI TRENTO

Signature(s):

Name(s): Flavio Deflorian

Title(s): Rector

Date:

POLITECNICO DI TORINO

Signature(s):

Name(s): Giuseppe Andrea Ferro

Title(s): Head of the Department of Structural, Geotechnical and Building Engineering

Date:

OSLOBYGG KF

Signature(s):

Name(s): Eli Grimsby

Title(s): Administrative Director

Date:

NANO POWER

Signature(s):

Name(s): František Šťastný

Title(s): Chairman of the Board

Date:

AIGUASOL

Signature(s):

Name(s): Oriol Gavaldà Torrellas

Title(s): Legal representative

Date:

Attachment 1: Background included

According to the Grant Agreement (Article 24) Background is defined as "data, know-how or information (…) that is needed to implement the action or exploit the results". Because of this need, Access Rights have to be granted in principle, but Parties must identify and agree amongst them on the Background for the project. This is the purpose of this attachment.

NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET

As to NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

ARCHITECTS COUNCIL OF EUROPE

As to ARCHITECTS COUNCIL OF EUROPE it is agreed between the Parties that, to the best of their knowledge: (please choose ***OPTION I*** or ***OPTION 2*** below),

OPTION 2: No data, know-how or information of ARCHITECTS COUNCIL OF EUROPE shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

CZECH TECHNICAL UNIVERSITY IN PRAGUE

As to CZECH TECHNICAL UNIVERSITY IN PRAGUE it is agreed between the Parties that, to the best of their knowledge:

OPTION 1: The following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
Technology, construction, and manufacturing of glazed PVT collectors based on siloxane gel as encapsulation material	CVUT can provide final product to the partners during project duration, not the know-how for production unless under license agreement	The technology might be exploited and licensed to 3rd parties under license agreement. No pre-emption rule is applied.
Mathematical model of glazed PVT collector for TRNSYS software	The know-how will be used within the project as a license-free know -how shared between the partners. Any commercial use and further development based on this knowledge is subjected to license agreement between the CVUT and interested partner.	The model might be exploited and licensed to 3rd parties under license agreement. No pre-emption rule is applied.
Mathematical model of combined solar heat pump system with solar collectors and heat pump (based on Macsheep project)	The know-how will be used within the project as a license-free know -how shared between the partners. Any commercial use and further development based on this knowledge is subjected to license agreement between the CVUT and interested partner.	The model might be exploited and licensed to 3rd parties under license agreement. No pre-emption rule is applied.
Fire Resistant Wood-Based Lightweight Cladding, Utility Model CZ 28801. 2015-11-10.	The know-how will be used within the project as a license-free know -how shared between the partners. Any commercial use and further development based on this knowledge is subjected to license agreement	The technology might be exploited and licensed to 3rd parties under license agreement without any limitation. No pre-emption rule is applied.

	between the CVUT and interested partner.	
Light Curtain Wall from Wood-Based Panels, Utility Model CZ 26609. 2014-03-13.	The know-how will be used within the project as a license-free know -how shared between the partners. Any commercial use and further development based on this knowledge is subjected to license agreement between the CVUT and interested partner.	The technology might be exploited and licensed to 3rd parties under license agreement without any limitation. No pre-emption rule is applied.
Air Handling unit with heating and cooling capability – Protected Intellectual property covering the technology of thermoelectric heating and cooling where passive and active heat exchanger are used in combination CZ patents and utility models: CZ 308 018 CZ 308 043 EU patent application: EP 1919 8822	The know-how will be used within the project as a license-free know -how shared between the partners. Any commercial use and further development based on this knowledge is subjected to license agreement between the CVUT and interested partner.	The technology might be exploited and licensed to 3rd parties under license agreement without any limitation. No pre-emption rule is applied.
Indoor Air Quality sensor – design, know – how without specific IP protection. Sensor mechanical and electrical design including firmware	CVUT provides sensors for the monitoring campaign within the project demonstration buildings. Requirements and further development of the sensor platform is possible upon the individual requests from the project partners or requirement of the planned work	The technology is market ready product modified according to the specific needs of the project. Sensors might be exploited and licensed to 3rd parties under non-exclusive license agreement. No pre-emption rule is applied.
Outdoor Air Quality sensor – design, know – how without specific IP protection. Sensor mechanical and electrical design including firmware	CVUT provides sensors for the monitoring campain within the project demonstration buildings. Requirements and further development	The technology is market ready product modified according to the specific needs of the project. Sensors might be exploited and licensed to 3rd parties under non-exclusive license agreement. No pre-emption rule is applied.

	of the sensor platform is possible upon the individual requests from the project partners or requirement of the planned work	
PV Forecast – algorithms and software providing the service, historical data collected from feedback sensors.	Irradiance forecast and nowcast will be provided within the project for given set of experimental places. Experience and know-how on usability and further processing of such service can be shared between project partners.	Only the service will be provided without sharing the code or deep knowledge of detailed algorithmical solution behind. Commercial application of this service or derived products are subjected to license agreement between the CVUT and interested partner.
Monitoring and control algorithm – energy management software optimizing local PV energy use based on irradiance prediction and market prices.	Expertise in optimizing management software and algorithms with aim to maximize local PV energy usage and minimize CO2 emissions in connection with market energy prices as a tool of grid stabilization will be used in the project.	Specific algorithms and parts of the software code derived are subject of exclusive CTU licensing. Results can be provided as a service under CTU license
Sky-imager with local data pre-processing – software and device set-up, server side software and algorithmically solution.	Device set-up and sky-imager device handling software will be provided for experimental place within the project together with the cloud tracking service. Experience and know-how on connected problematics will be shared with partners within the project.	Device set-up and sky-imager device handling software is generally provided as a freeware with open source code. Server side software for extensive short term irradiance prediction calculation and cloud tracking is licensed to CTU exclusively. Results can be provided as a service under CTU license.

This represents the status at the time of signature of this Consortium Agreement.

DANMARKS TEKNISKE UNIVERSITET

As to DANMARKS TEKNISKE UNIVERSITET it is agreed between the Parties that, to the best of their knowledge:

OPTION 1: The following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
Algorithms and software tools for control of buildings and district heating systems	Subject to Confidentiality Agreement with parts. This know-how shall only be used in the implementation of this project and under no circumstances can it be disclosed to third parties unless written consent by DTU Compute is provided	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed.
Algorithms and software for Human-in-the-Loop feedback and control of indoor climate quality	Subject to Confidentiality Agreement with parts. This know-how shall only be used in the implementation of this project and under no circumstances can it be disclosed to third parties unless written consent by DTU Compute is provided	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed.

This represents the status at the time of signature of this Consortium Agreement.

DANFOSS AS

As to DANFOSS AS it is agreed between the Parties that, to the best of their knowledge:

OPTION 1: The following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
EP3569936A1	Limited to Sønderborg demo case	

This represents the status at the time of signature of this Consortium Agreement.

ENFOR AS

As to ENFOR AS it is agreed between the Parties that, to the best of their knowledge:

OPTION 1: The following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
Energy (heat and power) forecasting algorithms	ENFOR can configure a forecasting system for other parties to use, but they will not get access to the source code.	After the project is complete other parties who would like to utilize ENFOR background knowledge will have to acquire a license for continuing using the services

This represents the status at the time of signature of this Consortium Agreement.

PROJECT ZERO

As to PROJECT ZERO it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of PROJECT ZERO shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

EURAC RESEARCH

As to EURAC RESEARCH it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of EURAC RESEARCH shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

SINTEF AS

As to SINTEF AS it is agreed between the Parties that, to the best of their knowledge:

OPTION 1: The following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
SINTEF AS has developed three tools called "PROFet" (energy demand load profiles estimator), "FLEXor" (FLEXible operation) og "PRIeST" (predictive steering). to be used in this project. "PROFet", "FLEXor" og "PRIeST" will be used in WP7 - "Efficient operation and flexibility".	Access to these tools will be available to partners with defined tasks in WP7.	The background shall not be used by other parties unless clarified with the developer (SINTEF).

This represents the status at the time of signature of this Consortium Agreement.

PALMA CITY COUNCIL

As to PALMA CITY COUNCIL it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of PALMA CITY COUNCIL shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

IBAVI

As to IBAVI it is agreed between the Parties that, to the best of their knowledge:

OPTION 1: The following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
Balearic eco-friendly building materials catalog	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)
Neptune grass thermal insulation (nature-based solution)	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)
Low emissions architectural design method in order to build <500Kg CO2/m2.	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)

This represents the status at the time of signature of this Consortium Agreement.

IREC

As to **IREC** it is agreed between the Parties that, to the best of their knowledge:

OPTION 1: The following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
Know-how and software tools for energy management systems in buildings with RES generation and thermal and electrical storage systems, as well of its implementation in hardware devices	Subject to Confidentiality Agreements with partners. This know-how shall be only used in the implementation of the WPs and within this project and under no circumstances can it be disclosed to third parties unless writing consent by IREC is provided.	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided to IREC.
Know how on control algorithms to activate energy flexibility in buildings using Heat Pumps (HPs) and Fault Detetction and Diagnosis (FDD)	Subject to Confidentiality Agreements with partners. This know-how shall be only used in the implementation of the WPs and within this project and under no circumstances can it be disclosed to third parties unless writing consent by IREC is provided.	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided to IREC.
Algorithms, Tools, and Software code elements conforming Urban Simulation Tools for Districts and Neighborhoods, including business model analysis.	Subject to Confidentiality Agreements with partners. This know-how shall be only used in the implementation of the WPs and within this project and under no circumstances can it be disclosed to third parties unless writing	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided to IREC.

	consent by IREC is provided.	
Grey Box models for Buildings	Subject to Confidentiality Agreements with partners. This know-how shall be only used in the implementation of the WPs and within this project and under no circumstances can it be disclosed to third parties unless writing consent by IREC is provided.	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided to IREC.
Know how related to IEQ (Indoor Evironmental Quality) monitoring, survey and assessment.	Subject to Confidentiality Agreements with partners. This know-how shall be only used in the implementation of the WPs and within this project and under no circumstances can it be disclosed to third parties unless writing consent by IREC is provided.	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided to IREC.

This represents the status at the time of signature of this Consortium Agreement.

METROVACESA

As to METROVACESA it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of METROVACESA shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

UNIVERSITY OF APPLIED SCIENCES UTRECHT

As to UNIVERSITY OF APPLIED SCIENCES UTRECHT it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of UNIVERSITY OF APPLIED SCIENCES UTRECHT shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

HOUSING EUROPE

As to HOUSING EUROPE it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of HOUSING EUROPE shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

BURO DE HAAN

As to BURO DE HAAN it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of BURO DE HAAN shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

CENTER DENMARK/EU DIGITAL INNOVATION HUB

As to CENTER DENMARK/EU DIGITAL INNOVATION HUB it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of CENTER DENMARK/EU DIGITAL INNOVATION HUB shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

SØNDERBORG ANDELSBOLIGFORENING

As to SØNDERBORG ANDELSBOLIGFORENING it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of SØNDERBORG ANDELSBOLIGFORENING shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

GREEN DIGITAL FINANCE ALLIANCE

As to GREEN DIGITAL FINANCE ALLIANCE it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of GREEN DIGITAL FINANCE ALLIANCE shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

STICHTING BO-EX ’91

As to STICHTING BO-EX ’91 it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of STICHTING BO-EX ’91 shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

RC PANELS

As to RC PANELS it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of RC PANELS shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

UTRECHT UNIVERSITY

As to UTRECHT UNIVERSITY it is agreed between the Parties that, to the best of their knowledge:

OPTION 1: The following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
Algorithms and software tools for control of buildings and district heating systems	Subject to Confidentiality Agreement with parts. This know-how shall only be used in the implementation of this project and under no circumstances can it be disclosed to third parties unless written consent by DTU Compute is provided	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed.
Algorithms and software for Human-in-the-Loop feedback and control of indoor climate quality	Subject to Confidentiality Agreement with parts. This know-how shall only be used in the implementation of this project and under no circumstances can it be disclosed to third parties unless written consent by DTU Compute is provided	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed.

This represents the status at the time of signature of this Consortium Agreement.

MUNICIPALITY OF UTRECHT

As to MUNICIPALITY OF UTRECHT it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of MUNICIPALITY OF UTRECHT shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

BOS INSTALLATIEWERKEN B.V.

As to BOS INSTALLATIEWERKEN B.V. it is agreed between the Parties that, to the best of their knowledge:

OPTION 1: The following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
Prefab Climate container with modular heat pump solutions.	The prefabrication of the climate container can only be built by the Bos group.	Always under supervision of Bos group or a third party chosen by the Bos group to maintain a safe and proper installation.
Modular climate façade, with integrated PV, installation, ventilation and heating	Integrated smart connection box is built under controlled supervision of Bos group. Otherwise there are too big of risks for failure and error.	Always under supervision of Bos group or a third party chosen by the Bos group to maintain a safe and proper installation.
Prefab PV modules for PV pergola	Prefab construction modules for the solar panels need to be calculated for each individual project.	Always under supervision of Bos group or a third party chosen by the Bos group to maintain a safe and proper installation.
Prefab balcony module with integrated PV	Integrated PV modules need to be of specific glass and cables for safety measurements.	Always under supervision of Bos group or a third party chosen by the Bos group to maintain a safe and proper installation.

This represents the status at the time of signature of this Consortium Agreement.

IWELL

As to IWELL it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of IWELL shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

MEX ARCHITECTS B.V.

As to MEX ARCHITECTS B.V. it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of MEX ARCHITECTS B.V. shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

MITROS

As to MITROS it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of MITROS shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

STATUTARNI MESTO KARVINA

As to STATUTARNI MESTO KARVINA it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of MUNICIPALITY OF KARVINA shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

DOLOMITI ENERGIA SOLUTIONS SRL

As to DOLOMITI ENERGIA it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of DOLOMITI ENERGIA shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

HABITECH

As to HABITECH it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of HABITECH shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

UNIVERSITÀ DEGLI STUDI DI TRENTO

As to UNIVERSITY OF TRENTO it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of UNIVERSITY OF TRENTO shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Party's Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

POLITECNICO DI TORINO

As to POLITECNICO DI TORINO it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of POLITECNICO DI TORINO shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

OSLOBYGG KF

As to OSLOBYGG KF it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of OSLOBYGG KF shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

NANO POWER

As to NANOPOWER it is agreed between the Parties that, to the best of their knowledge:

OPTION 2: No data, know-how or information of NANOPOWER shall be Needed by another Party for implementation of the Project (Article 25.2 Grant Agreement) or Exploitation of that other Partyś Results (Article 25.3 Grant Agreement).

This represents the status at the time of signature of this Consortium Agreement.

AIGUASOL

As to AIGUASOL it is agreed between the Parties that, to the best of their knowledge:

OPTION 1: The following background is hereby identified and agreed upon for the Project. Specific limitations and/or conditions, shall be as mentioned hereunder:

Describe Background	Specific limitations and/or conditions for implementation (Article 25.2 Grant Agreement)	Specific limitations and/or conditions for Exploitation (Article 25.3 Grant Agreement)
Algorithms, Tools, and Software code elements conforming Energy Communities creation tool (joinenergy).	Subject to Confidentiality Agreements with partners. This know-how shall be only used in the implementation of the WPs and within this project and under no circumstances can it be disclosed to third parties unless writing consent by Aiguasol is provided.	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided to Aiguasol.
Algorithms, Tools, and Software code elements conforming circularity KPI calculations, from Plug'n'Harvest and HOUSEFUL projects	Subject to Confidentiality Agreements with partners. This know-how shall be only used in the implementation of the WPs and within this project and under no circumstances can it be disclosed to third parties unless writing consent by Aiguasol is provided.	Subject to Confidentiality Agreements. This Background shall not be used until an exploitation agreement is signed, which will reflect the conditions on which royalties are provided to Aiguasol.

This represents the status at the time of signature of this Consortium Agreement.

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Attachment 2: Accession document

ACCESSION

of a new Party to

[ARV] Consortium Agreement, version [2021-06-28]

[OFFICIAL NAME OF THE NEW PARTY AS IDENTIFIED IN THE Grant Agreement]

hereby consents to become a Party to the Consortium Agreement identified above and accepts all the rights and obligations of a Party starting [date].

[OFFICIAL NAME OF THE PROJECT COORDINATOR AS IDENTIFIED IN THE Grant Agreement]

hereby certifies that the consortium has accepted in the meeting held on [date] the accession of [the name of the new Party] to the consortium starting [date].

This Accession document has been done in 2 originals to be duly signed by the undersigned authorised representatives.

[Date and Place]

[INSERT NAME OF THE NEW PARTY]
Signature(s)
Name(s)
Title(s)

[Date and Place]

[INSERT NAME OF THE PROJECT COORDINATOR]
Signature(s)
Name(s)
Title(s)

Attachment 3: List of Third Parties for simplified transfer according to Section 8.3.2.

- NTNU Technology Transfer AS
- HAB
- ARMALAM S.r.l.
- Fanti Legnami S.r.l.
- X-LAM Dolomiti S.r.l.

As Linked Third Parties of the beneficiary

Attachment 4: Identified Affiliated Entities according to Section 9.5

Dohoda o konsorciu

ARV
„KLIMATICKY POZITIVNÍ CIRKULÁRNÍ KOMUNITY“

Verze	*Datum*	*Komentáře*	*Autor*
Konečné znění	29.06.2021	Dohoda o konsorciu k podpisu	NTNU

TATO DOHODA O KONSORCIU je založena na
NAŘÍZENÍ (EU) č. 1290/2013 EVROPSKÉHO PARLAMENTU A RADY ze dne
11. prosince 2013 stanovícím pravidla pro účast a diseminaci v rámci „Horizon 2020 –
Rámcový program pro výzkum a inovace (2014-2020)“ (dále jen „Pravidla pro účast“)
a Obecné vzorové grantové smlouvě Evropské komise pro více příjemců a jejích dodatcích
a je uzavírána ke dni 01.01.2022, dále označovanému jako Datum účinnosti.

MEZI:

NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET, dále jen NTNU, se sídlem na adrese Høgskoleringen 1, 7491 Trondheim, Norsko, zastoupená osobou Tor Grande nebo jiným zplnomocněným zástupcem, Koordinátor projektu

a

ARCHITECTS COUNCIL OF EUROPE, dále jen ACE, se sídlem na adrese Rue Paul Emile Janson 29, 1050 Brusel, Belgie, zastoupená panem Ian Pritchard nebo jiným zplnomocněným zástupcem a

ČESKÝM VYSOKÝM UČENÍM TECHNICKÝM V PRAZE, dále ČVUT, se sídlem na adrese Jugoslávských partyzánů 1580/3, 160 00 Praha 6, Česká republika, zastoupená doc. RNDr. Vojtěchem Petráčkem, CSc. nebo jiným zplnomocněným zástupcem a

DANMARKS TEKNISKE UNIVERSITET, dále jen DTU, se sídlem na adrese Anker Engelundsvej 1, Bygning 101 A, 2800 KGS Lyngby, Dánsko, zastoupená osobou Per B. Brockhoff nebo jiným zplnomocněným zástupcem a

DANFOSS AS, dále jen DAN, se sídlem na adrese Nordborgvej 81, 6430 Nordborg, Dánsko, zastoupená osobou Atli Benonysson nebo jiným zplnomocněným zástupcem a

ENFOR AS, dále jen ENFOR, se sídlem na adrese Røjelskær 11, 3., 2840, Holte, Dánsko, zastoupená osobou Mikkel Westenholz nebo jiným zplnomocněným zástupcem a

PROJECT ZERO, dále jen PZ, se sídlem na adrese Alsion 2, 6400 Sonderborg, Dánsko, zastoupená osobou Peter Rathje nebo jiným zplnomocněným zástupcem a

EURAC RESEARCH, dále jen EURAC, se sídlem na adrese Viale Druso 1, 39100, Bolzano, Itálie, zastoupená osobou Dr. Stephan Ortnername nebo jiným zplnomocněným zástupcem a

SINTEF AS, dále jen SINTEF, se sídlem na adrese Strindveien 4, 7034 Trondhein, Norsko, zastoupená osobou Siri Hunnes Blakstad nebo jiným zplnomocněným zástupcem a

PALMA CITY COUNCIL, dále jen PALMA, se sídlem na adrese PC Cort, 1, 07001, Palma, Španělsko, zastoupená osobou Maria Antònia Orell Vicens nebo jiným zplnomocněným zástupcem a

IBAVI, dále jen IBAVI, se sídlem na adrese 9 Manuel Azaña street, 07006, Palma de Mallorca, Španělsko, zastoupená osobou Cris Ballester Parets a

FUNDACIÓ INSTITUT DE RECERCA EN ENERGIA DE CATALUNYA, dále jen IREC, se sídlem na adrese Jardins de les dones de negre 1 2pl. 08930 Sant Adrià de Besòs, Barcelona, zastoupená osobou Jaume Marfà Sanchez nebo jiným zplnomocněným zástupcem a

METROVACESA, dále jen MET, se sídlem na adrese Calle Quintanavides 13, 28050, Madrid, Španělsko, zastoupená osobou Miguel Díaz Batanero nebo jiným zplnomocněným zástupcem a

UNIVERZITA APLIKOVANÝCH VĚD UTRECHT, dále jen HU, se sídlem na adrese Padualaan 99, 3584CH, Utrecht, Nizozemí, zastoupená osobou Jan Bogerd nebo jiným zplnomocněným zástupcem a

HOUSING EUROPE, dále jen HE, se sídlem na adrese Square de Meeus 18, 1050, Brussels, Belgie, zastoupená osobou Sorcha Edwards a

BURO DE HAAN, dále jen BDH, se sídlem na adrese Achthoevenweg 34A, 7951 SK, Staphorst, Nizozemí, zastoupená osobou A.K. de Haan nebo jiným zplnomocněným zástupcem a

CENTER DENMARK FONDEN/EU DIGITAL INNOVATION HUB, dále jen EUDIH, se sídlem na adrese Vendersgade 74, 7000 Fredericia, Dánsko, zastoupená osobou Søren Skov Bording nebo jiným zplnomocněným zástupcem a

SØNDERBORG ANDELSBOLIGFORENING, dále jen SAB, se sídlem na adrese Bygtoften 2, 6400 Sonderborg, Dánsko, zastoupená osobou Brian Skou Juhler Larsen nebo jiným zplnomocněným zástupcem a

GREEN DIGITAL FINANCE ALLIANCE, dále jen GDFA, se sídlem na adrese International Environment House, Chemin des Anémones 11-13, 1219, Châtelaine, Švýcarsko, zastoupená osobou Bruno Oberle nebo jiným zplnomocněným zástupcem a

STICHTING BO-EX ’91, dále jen BOEX, se sídlem na adrese J.C. Maylaan 18, 3526 GV, Utrecht, Nizozemí, zastoupená osobou Henk Kerlien nebo jiným zplnomocněným zástupcem a

RC PANELS, dále jen RCP, se sídlem na adrese Constructieweg 1, 8152 GA, Lemelerveld, Nizozemí, zastoupená osobou Carlos Klein nebo jiným zplnomocněným zástupcem a

UNIVERZITA V UTRECHTU, dále jen UU, se sídlem na adrese Heidelberglaan 8, Utrecht, Nizozemí, zastoupená osobou Prof. dr. ir. Wilco Hazeleger nebo jiným zplnomocněným zástupcem a

OBEC UTRECHT, dále jen UTR, se sídlem na adrese Stadsplateau 1, 3512 AZ Utrecht, Nizozemí, zastoupená panem Joop Oude Lohuis nebo jiným zplnomocněným zástupcem a

BOS INSTALLATIEWERKEN B.V., dále jen BOS, se sídlem na adrese 1939, Tennesseedreef 17, 3565CK, Utrecht, Nizozemí, zastoupená osobou Rogier Bos

IWELL, dále jen iWELL, se sídlem na adrese Atoomweg 9, 3542 AA, Utrecht, Nizozemí, zastoupenou osobou Vincent Ruijter nebo jiným zplnomocněným zástupcem a

MEX ARCHITECTS B.V., dále jen MEX, se sídlem na adrese Spoorlaan 18, 3721PB, Bilthoven, Nizozemí, zastoupená osobou Frank. B. Stedehouder nebo jiným zplnomocněným zástupcem a

MITROS, dále jen MITR, se sídlem na adrese Koningin Wilhelminalaan 9, 3527 LA, UTRECHT, Nizozemí, zastoupená osobou Joseph ten Brink nebo jiným zplnomocněným zástupcem.

STATUTÁRNÍ MĚSTO KARVINÁ, dále jen KARV, se sídlem na adrese Fryštátská 1, 733 01, Karviná-Fryštát, Česká republika, zastoupené Ing. Janem Wolfem nebo jiným zplnomocněným zástupcem a

DOLOMITI ENERGIA SOLUTIONS SRL, dále jen DOL, se sídlem na adrese Fersina 23, 38123, Trento, Itálie, zastoupená osobou Massimo De Alessandri nebo jiným zplnomocněným zástupcem a

HABITECH, dále jen HAB, se sídlem na adrese Piazza Manifattura 1, 38068, Rovereto (TN), Itálie, zastoupená osobou Marco Giglioli nebo jiným zplnomocněným zástupcem a

UNIVERSITÀ DEGLI STUDI DI TRENTO, dále jen UNITN, se sídlem na adrese via Calepina 14, 38123, Trento, Itálie, zastoupená osobou Flavio Deflorian, rektorem a

POLITECNICO DI TORINO, dále jen POLITO, se sídlem na adrese Corso Duca degli Abruzzi 24, 10129, Torino, Itálie, zastoupená osobou Giuseppe Andrea Ferro nebo jiným zplnomocněným zástupcem a

OSLOBYGG KF, dále jen OBY, se sídlem na adrese Grensesvingen 7, 0661 Oslo, Norsko, zastoupená osobou Eli Grimsby nebo jiným zplnomocněným zástupcem a

NANO POWER, dále jen NANO, se sídlem na adrese Tiskařská 599/12, 108 00 Praha, Česká republika, zastoupená Františkem Šťastným nebo jiným zplnomocněným zástupcem a

AIGUASOL, dále jen AIGUA, se sídlem na adrese carrer Roger de Llúria, 29 3rd 2nd 08009 Barcelona, zastoupená osobou Oriol Gavaldà Torrellas nebo jiným zplnomocněným zástupcem a

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dále, společně nebo jednotlivě označované jako „Smluvní strany“ nebo „Smluvní strana“

ve vztahu k akci s názvem

KLIMATICKY POZITIVNÍ CIRKULÁRNÍ KOMUNITY

zkráceně

ARV

GA číslo: 101036723

dále označované jako „Projekt“

VZHLEDEM K TOMU, ŽE:

Smluvní strany, majíce značné zkušenosti v dotčené oblasti, předložily Projektovou žádost Financujícímu orgánu jako součást Horizon 2020 – Rámcového programu pro výzkum a inovace (2014-2020)

Smluvní strany si přejí mezi sebou specifikovat nebo doplnit závazné závazky, návdavkem k ustanovení specifické Grantové smlouvy, která bude podepsána Smluvními stranami a Financujícím orgánem (dále jen „Grantová smlouva“).

Smluvní strany berou na vědomí, že Dohoda o konsorciu je založena na vzorové dohodě o konsorciu DESCA.

SMLUVNÍ STRANY SE DOHODLY NA NÍŽE UVEDENÉM:

1 Oddíl: Definice

1.1 Definice

Slova začínající velkým písmenem budou mít význam definovaný buď v tomto dokumentu, nebo v Pravidlech pro účast nebo v Grantové smlouvě, včetně jejích Dodatků.

1.2 Další definice

„Aplikační programovací rozhraní“
Pojem Aplikační programovací rozhraní představuje materiály související s aplikačním programovacím rozhraním a další související dokumentaci obsahující veškerá data a informace umožňující kvalifikovaným Softwarovým programátorům vytvořit Softwarová rozhraní, která tvoří rozhraní nebo interagují s jiným specifickým Software.

„Orgány konsorcia“
Pojem Orgány konsorcia označuje jakýkoli řídící orgán popsaný v oddílu této Dohody o konsorciu vztahujícím se k Řídící struktuře.

„Plán konsorcia“
Pojem Plán konsorcia představuje popis postupu a související odsouhlasený rozpočet v podobě, v níž byl poprvé definován v Grantové smlouvě, a který může být aktualizován Valným shromážděním.

„Kontrolované licenční podmínky“
Pojem Kontrolované licenční podmínky znamená podmínky jakékoli licence vyžadující, aby použití, kopírování, úprava a/nebo distribuce Software nebo jiného díla („Dílo“) a/nebo jakéhokoli díla, které představuje modifikovanou verzi nebo je odvozeno od takovéhoto Díla (v každém případě, „Odvozené dílo“) bylo předmětem, celé nebo jeho část, jedné nebo vícero z následujících podmínek:

a) (v případě, že je Dílem nebo Odvozeným dílem Software), že bude Zdrojový kód nebo
b) jiné formáty preferované pro modifikaci dán k disposici ze zákona jakékoli třetí straně na požádání, ať již jako bezplatná licence nebo nikoli;
c) že svolení k vytvoření modifikovaných verzí nebo odvozených děl Díla nebo Odvozeného díla bude uděleno jakékoli třetí straně;
d) že bude bezplatná licence vztahující se k Dílu nebo Odvozenému dílu udělena jakékoli třetí straně.

Pro vyloučení pochybností, jakákoli licence k Software, která pouze umožňuje (-avšak nevyžaduje žádnou ze) skutečností uvedených v bodech (a) až (c) není Kontrolovanou licencí (a jedná se tudíž o Nekontrolovanou licenci).

„Financující orgán“
Pojem Financující orgán představuje orgán udělující grantovou podporu Projektu.

„Neplnící smluvní strana“
Pojem Neplnící smluvní strana označuje Smluvní stranu, o níž Valné shromáždění rozhodlo, že porušuje tuto Dohodu o konsorciu a/nebo Grantovou smlouvu, jak je blíže uvedeno v Oddíle 4.2 této Dohody o konsorciu.

„Nezbytný“
znamená:
Pro účely realizace Projektu:
Přístupová práva jsou považována za Nezbytná, pokud by bez udělení těchto Přístupových bylo provedení úkolů přidělených přijímající Smluvní straně technicky nebo právně nemožné, významně opožděné nebo by vyžadovalo značné dodatečné finanční nebo lidské zdroje.

Pro využití vlastních výsledků:
Přístupová práva jsou považována za Nezbytná, pokud by bez udělení těchto Přístupových práv bylo Využití vlastních výsledků technicky nebo právně nemožné.

„Cílový kód“
Pojem Cílový kód označuje strojově-čitelnou, zkompilovanou a/nebo spustitelnou podobu, mimo jiné včetně podoby bajtového kódu a podoby strojově-čitelných knihoven využívaných pro propojení a fungování s jiným software.

„Software“
Softwarem se rozumí posloupnost pokynů k provedení procesu ve formě, kterou lze převést do podoby, kterou lze provést počítačem a která je upevněna v jakémkoli hmatatelném médiu pro vyjádření.

„Softwarová dokumentace“
Softwarovou dokumentací se rozumí softwarové informace, které jsou technickými informacemi používanými nebo užitečnými nebo souvisejícími s návrhem, vývojem, používáním nebo údržbou jakékoli verze softwarového programu.

„Zdrojový kód“
Zdrojový kód znamená software v čitelné podobě, který se běžně používá k jeho úpravám, mimo jiné včetně komentářů a procedurálních kódů, jako je jazyk řízení úloh a skripty pro řízení kompilace a instalace.

2 Oddíl: Účel

Účelem této Dohody o konsorciu je specifikovat, vzhledem k Projektu, vztah mezi Smluvními stranami, zejména pokud se jedná o organizaci práce mezi Smluvními stranami, správu Projektu a práva a povinnosti Smluvních stran týkající se mimo jiné odpovědnosti, Přístupových práv a řešení sporů.

3 Oddíl: Vstup v platnost, doba platnosti a ukončení

3.1 Vstup v platnost

Subjekt se stává Smluvní stranou této Dohody o konsorciu připojením podpisu zplnomocněného zástupce na tuto Dohodu o konsorciu.

Tato Dohoda o konsorciu vstupuje v platnost k Datu účinnosti uvedenému na začátku této Dohody o konsorciu.

Nový subjekt se stává Smluvní stranou Dohody o konsorciu připojením podpisu nové Smluvní strany a Koordinátora na listinu o přistoupení (Příloha 2). Toto přistoupení bude platné od data uvedeného na listině o přistoupení a bude vyžadovat rozhodnutí Valného shromáždění.

3.2 Doba trvání a ukončení platnosti

Tato Dohoda o konsorciu zůstane v platnosti a účinnosti do úplného naplnění všech závazků převzatých Smluvními stranami v souladu s Grantovou smlouvou a touto Dohodou o konsorciu.

Platnost Dohody o konsorciu nebo účast jedné nebo více Smluvních stran může být však rovněž ukončena v souladu s podmínkami této Dohody o konsorciu.

Pokud

- nedojde k podpisu Grantové smlouvy ze strany Financujícího orgánu nebo některé ze Smluvních stran, nebo
- dojde k ukončení platnosti Grantové smlouvy, nebo
- dojde k ukončení účasti některé ze Smluvních stran v Grantové smlouvě,

platnost této Dohody o konsorciu bude automaticky ukončena s ohledem na dotčenou Smluvní stranu/Smluvní strany, v souladu s ustanoveními přetrvávajícími po vypršení platnosti nebo ukončení dle Oddílu 3.3 této Dohody o konsorciu.

3.3 Přetrvání práva a povinností

Ustanovení týkající se přístupových práv, šíření a důvěrnosti po dobu v nich uvedenou, jakož i ohledně odpovědnosti, platného práva a řešení sporů zůstanou v platnosti i po skončení platnosti nebo ukončení této dohody o konsorciu.

Ukončení nemá vliv na žádná práva nebo povinnosti strany opouštějící Konsorcium vzniklé před datem ukončení, pokud se Valné shromáždění a opouštějící strana nedohodnou jinak. To zahrnuje povinnost poskytnout veškeré vstupy, výstupy a dokumenty pro období do data účinnosti ukončení účasti odstupující strany na projektu.

4 Oddíl: Odpovědnosti Smluvních stran

4.1 Obecné zásady

Každá ze Smluvních stran se zavazuje podílet se na efektivní realizaci Projektu a spolupracovat, vykonávat a plnit, promptně a včas své povinnosti stanovené Grantovou smlouvou a touto Dohodou o konsorciu, které od ní mohou být přiměřeně a v dobré víře vyžadovány, jak je stanoveno belgickým právem.

Každá Smluvní strana se zavazuje, v souladu s řídící strukturou Projektu, pohotově sdělovat veškeré důležité informace, skutečnosti, problémy nebo zpoždění, u nichž existuje pravděpodobnost, že by mohly ovlivnit Projekt.

Každá strana bude pohotově sdělovat veškeré informace přiměřeně vyžadované ze strany Orgánů konsorcia nebo Koordinátorem, které jsou nezbytné pro plnění jejich úkolů.

Bez vytváření jakéhokoli druhu záruky, každá ze Smluvních stran přijme odpovídající opatření pro zajištění přesnosti informací nebo materiálů, které předkládá ostatním Smluvním stranám.

4.2 Porušení

V případě, že odpovědný Orgán konsorcia zjistí porušení povinností některé ze Smluvních stran stanovených touto Dohodou o konsorciu nebo Grantovou smlouvou (např. nesprávnou realizaci projektu), Koordinátor, anebo, v případě, že je to Koordinátor kdo porušuje své povinnosti, Smluvní strana určená Valným shromážděním, zašle oficiální oznámení této Smluvní straně, vyžadující nápravu porušení v průběhu 30 kalendářních dnů od data doručení písemného oznámení dané Smluvní straně.

Pokud se jedná o závažné porušení, které není napraveno v průběhu výše uvedeného období, nebo které není možno napravit, může Valné shromáždění prohlásit danou Smluvní stranu za Neplnící smluvní stranu a rozhodnout o dalších důsledcích, které mohou rovněž zahrnovat ukončení účasti dané Smluvní strany.

V případě, že některá ze Smluvních stran poruší své povinnosti, zbývající Smluvní strany budou, v maximální možné míře, řádným způsobem pokračovat v plnění svých povinností. V případě, kdy některá ze Smluvních stran nebude schopna dostát svým závazkům z důvodu neplnění povinností jinou Smluvní stranou, rozhodne Valné shromáždění o vhodném způsobu pokračování činnosti.

4.3 Zapojení třetích stran

Smluvní strana, která uzavře subdodavatelskou smlouvu nebo jiným způsobem zapojí do Projektu třetí strany (mimo jiné včetně Přidružených subjektů) zůstává odpovědná za vykonání své relevantní části Projektu a za dodržování ustanovení této Dohody o konsorciu a Grantové smlouvy třetí stranou. Takováto Smluvní strana musí zajistit, aby zapojení třetích stran neovlivnilo práva a povinnosti dalších Smluvních stran v souladu s touto Dohodou o konsorciu a Grantovou smlouvou.

5 Oddíl: Vzájemná odpovědnost

5.1 Žádné záruky

S ohledem na jakékoli informace nebo materiály (včetně Výsledků a Pozadí) dodaných v průběhu Projektu jednou Smluvní stranou jiné Smluvní straně, nejsou činěny žádné záruky nebo prohlášení žádného druhu, ať již přímé nebo implicitní pokud se jedná o dostatečnost nebo vhodnost pro účel, ani pokud se jedná o absenci porušení jakýchkoli vlastnických práv třetích stran.

Z tohoto důvodu,

- přijímající Smluvní strana bude za všech okolností zcela a výlučně odpovědná za způsob použití takovýchto informací a materiálů a
- žádná Smluvní strana udělující Přístupová práva neponese odpovědnost v případě porušení vlastnických práv třetí strany vyplývající z výkonu Přístupových práv jakoukoli další Smluvní stranou (nebo jejími Přidruženými subjekty).
- bez ohledu na výše uvedené, žádná Smluvní strana vědomě neposkytne jiné Smluvní straně v průběhu Projektu žádné informace nebo materiály, které porušují vlastnická práva třetí strany.

5.2 Omezení smluvní odpovědnosti

Žádná Smluvní strana nebude odpovědná vůči jiné Smluvní straně za jakékoli nepřímé nebo následné ztráty nebo obdobné škody, mimo jiné včetně ztráty zisku, ztráty příjmu nebo ztráty zakázek, za předpokladu, že tyto ztráty nebyly způsobeny úmyslným jednáním nebo porušením důvěrnosti.

Pokud se jedná o zbývající smluvní odpovědnost, souhrnné odpovědnosti některé ze Smluvních stran vůči ostatním Smluvním stranám společně budou omezeny na výši jednoho podílu dané Smluvní strany na celkových nákladech Projektu, jak je uvedeno v Příloze 2 Grantové smlouvy, za předpokladu, že tato ztráta nebyla způsobena úmyslným jednáním nebo hrubou nedbalostí.

Podmínky této Dohody o konsorciu nebudou sloužit pro doplnění nebo omezení zákonné odpovědnosti žádné ze Smluvních stran.

5.3 Škody způsobené třetím stranám

Každá Smluvní strana nese výhradní odpovědnost za jakékoli ztráty, poškození nebo zranění třetích stran vyplývající z plnění povinností uvedené strany ze strany této strany nebo jejím jménem podle této dohody o konsorciu nebo z použití Výsledků nebo Pozadí.

5.4 Vyšší moc

Pokud některá ze Smluvních stran nebude schopna plnit své povinnosti v souladu s touto Dohodou o konsorciu z důvodu Vyšší moci, nebude toto považováno za porušení Dohody o konsorciu.
Každá Smluvní strana upozorní příslušné kompetentní Orgány konsorcia na jakýkoli případ působení Vyšší moci, bez zbytečného odkladu. Pokud nebudou důsledky působení Vyšší moci na Projekt překonány v průběhu 6 týdnů od takového oznámení, rozhodnou příslušné kompetentní Orgány konsorcia o převedení úkolů – pokud takové budou.

6 Oddíl: Řídící struktura

6.1 Obecná struktura a role

Organizační struktura Konsorcia se skládá z následujících Orgánů konsorcia:

- Valné shromáždění (GA)
- Výkonná rada (EB)
- Rada pro využití ARV (AEB)
- Poradní výbor externích odborníků (EAB)

Valné shromáždění představuje vrcholný rozhodující orgán konsorcia.

Výkonná rada, jako dozorový orgán pro realizaci Projektu, předkládá zprávy a je odpovědná Valnému shromáždění.

Rada pro využití ARV je odpovědná za obchodní modely a finanční nástroje pro využití inovací ARV. AEG se skládá z odborníků v oblasti průmyslu od partnerů ARV a z vlivných externích společností.

Poradní výbor externích odborníků (EAB) je podpůrným orgánem skládajícím se ze tří externích odborníků v oblastech vztahujících se k projektu.

Přehled různých rolí v projektu.

Koordinátor projektu (PC) představuje právnickou osobu jednající jako prostředník mezi Smluvními stranami a Financujícím orgánem. Koordinátor projektu bude, kromě svých odpovědností jako Smluvní strana, provádět úkoly, které mu budou přiděleny v Grantové smlouvě a této Dohodě o konsorciu.

Vedoucí skupina pro Pracovní balíčky se skládá z NTNU, IREC, SINTEF, NTNU, HU, CVUT, DTU, EURAC, GDFA, ACE. Každý z tematických pracovních balíčků bude mít přiděleného Vedoucího pracovního balíčku.

Vedoucí skupina demo projektů se skládá z HU, PALMA, OBY, PZ, KARV a HAB. Každý ze šesti demo projektů bude mít přiděleného Vedoucího demo projektu.

Manažer pro inovace (IM) je rolí hostovanou NTNU. IM je odpovědný za správu inovací v ARV napříč všemi demo projekty a pracovními balíčky. Manažer pro inovace bude podporovat Radu pro využití ARV.

6.2 Obecné operační postupy pro všechny Orgány konsorcia

6.2.1 Účast na jednáních

Jakákoli Smluvní strana, která je členem některého z Orgánů konsorcia (dále jen „Člen“):

- by měla být přítomna nebo by měla zajistit přítomnost zástupce na všech jednáních;
- může určit zástupce nebo zmocněnce pro účast a hlasování na jakémkoli jednání; a
- bude na jednáních vystupovat vstřícně.

6.2.2 Příprava a organizace jednání

6.2.2.1 Svolávání jednání

Za svolávání jednání Orgánu konsorcia je odpovědný jeho předseda.

	Běžné jednání	Mimořádné jednání
Valné shromáždění	Nejméně jednou za rok	Kdykoli na základě písemné žádosti Výkonné rady nebo 1/3 Členů Valného shromáždění
Výkonná rada	Nejméně čtvrtletně	Kdykoli na základě písemné žádosti kteréhokoli Člena Výkonné rady.

6.2.2.2 Oznámení jednání

Předseda Orgánu konsorcia oznámí konání jednání písemnou formou každému Členu daného Orgánu konsorcia, a to co možná nejdříve a ne později než je níže uvedený minimální počet dnů předcházejících jednání.

	Běžné jednání	Mimořádné jednání
Valné shromáždění	45 kalendářních dnů	15 kalendářních dnů
Výkonná rada	14 kalendářních dnů	7 kalendářních dnů

6.2.2.3 Zaslání programu jednání

Předseda Orgánu konsorcia připraví a zašle každému Členu daného Orgánu konsorcia písemný (originál) programu jednání, a to ne později než je níže uvedený minimální počet dnů předcházejících jednání.

Valné shromáždění	21 kalendářních dnů, 10 kalendářních dnů pro mimořádné jednání
Výkonná rada	7 kalendářních dnů

6.2.2.4 Přidání nových bodů na program jednání:

Veškeré body jednání vyžadující rozhodnutí Členů Orgánu konsorcia musí být takto označeny na programu jednání.

Kterýkoli Člen Orgánu konsorcia může přidat bod k původnímu programu prostřednictvím písemného oznámení zaslaného všem ostatním Členům daného Orgánu konsorcia, až do níže uvedeného minimálního počtu dnů předcházejících jednání.

Valné shromáždění	14 kalendářních dnů, 7 kalendářních dnů pro mimořádné jednání
Výkonná rada	2 kalendářní dny

6.2.2.5

V průběhu jednání mohou Členové Orgánu konsorcia jednohlasně odsouhlasit přidání nového bodu na původní program jednání, za předpokladu, že všichni Členové daného Orgánu konsorcia jsou přítomni nebo řádně zastupováni.

6.2.2.6

Jednání každého Orgánu konsorcia se mohou konat rovněž prostřednictvím telekonference nebo telekomunikačních prostředků.

6.2.2.7

Rozhodnutí budou závazná pouze za předpokladu, že daná relevantní část programu byla přijata v souladu s postupem popsaným v Oddíle 6.2.5.

6.2.3

Jakákoli rozhodnutí mohou být rovněž přijata bez konání jednání, pakliže Koordinátor rozešle všem Členům daného Orgánu konsorcia písemný dokument, který je následně odsouhlasen definovanou většinou (viz Oddíl 6.2.3) všech Členů příslušného Orgánu konsorcia. Tento dokument by měl obsahovat přiměřený termín pro zaslání odpovědí. Koordinátor bude informovat Členy daného Orgánu konsorcia o výsledku hlasování a rozešle jim odpovídající návrh zápisu z jednání.

Rozhodnutí přijímaná bez konání jednání budou považována za přijatá, pokud v období uvedeném v článku 6.2.5.4 žádný z Členů nezaslal písemnou námitku předsedovi. Rozhodnutí budou považována za závazná poté, co předseda rozešle všem Členům daného Orgánu konsorcia a Koordinátorovi písemné oznámení o tomto přijetí.

6.2.4 Pravidla pro hlasování a kvorum

6.2.4.1

Rozhodování žádného z Orgánů konsorcia nebude považováno za uvážené a platné, pakliže nebudou na jednání přítomny nebo zastoupeny dvě třetiny (2/3) jeho Členů (kvorum). Pokud nebude kvora dosaženo, předseda daného Orgánu konsorcia svolá další řádné jednání v průběhu následujících 15 kalendářních dnů. Pakliže ani na tomto druhém jednání nebude dosaženo kvora, svolá předseda mimořádné jednání, které bude mít právo rozhodnout i v případě, že se jej bude účastnit nebo bude zastoupen menší počet Členů než je potřebné kvorum.

6.2.4.2

Každý člen Orgánu konsorcia, který je přítomen nebo zastoupen na jednání má jeden hlas.

6.2.4.3

Jakákoli Smluvní strana, která byla Valným shromážděním označena jako Neplnící smluvní strana, v souladu s ustanovením Oddílu 4.2, nebude mít umožněno hlasování.

6.2.4.4

Rozhodnutí budou přijímána dvoutřetinovou (2/3) většinou hlasů Členů přítomných nebo řádně zastoupených na jednání daného Orgánu konsorcia.

6.2.5 Právo veta

6.2.5.1

Člen, který může prokázat, že jeho vlastní práce, čas pro výkon práce, náklady, odpovědnosti, práva duševního vlastnictví nebo jiné oprávněné zájmy by byly rozhodnutím Orgánu konsorcia zásadním způsobem dotčeny, má právo vznést právo veta s ohledem na odpovídající rozhodnutí nebo relevantní část daného rozhodnutí.

6.2.5.2

Pokud je možno rozhodnutí předpokládat již v původním programu, má Člen právo vetovat dané rozhodnutí pouze v průběhu jednání.

6.2.5.3

Pokud bylo přijato rozhodnutí týkající se nového bodu přidaného do programu před nebo v průběhu jednání, může Člen takovéto rozhodnutí vetovat v průběhu jednání a dále v průběhu 15 kalendářních dnů po rozeslání návrhu zápisu z jednání. Smluvní strana, která není Členem daného Orgánu konsorcia může vetovat rozhodnutí v průběhu stejného počtu kalendářních dnů po rozeslání návrhu zápisu z jednání.

6.2.5.4

V případě, že bylo přijato rozhodnutí bez uskutečnění jednání, má Člen rovněž právo vetovat dané rozhodnutí v průběhu 15 kalendářních dnů od zaslání písemného oznámení předsedy o výsledku hlasování.

6.2.5.5

V případě využití práva veta se Členové dotčeného Orgánu konsorcia pokusí všemi silami vyřešit záležitost, která k vznesení práva veta vedla, k všeobecné spokojenosti všech svých Členů.

6.2.5.6

Smluvní strana nemá právo vznést právo veta při rozhodnutích týkajících se identifikace dané Smluvní strany jako neplnící své povinnosti, ani při označení dané Smluvní strany jako Neplnící smluvní strany. Neplnící smluvní strana rovněž nemá právo vetovat rozhodnutí týkající se její účasti nebo ukončení členství v konsorciu, ani jejich důsledky.

6.2.5.7

Smluvní strana, která požádá o ukončení členství v konsorciu nemá právo vetovat rozhodnutí týkající se této záležitosti.

6.2.6 Zápisy z jednání

6.2.6.1

Předseda Orgánu konsorcia bude vyhotovovat písemný zápis z každého jednání, který bude představovat oficiální záznam o přijatých rozhodnutích. Předseda rozešle návrh zápisu z jednání všem Členům v průběhu 10 kalendářních dnů ode dne konání jednání.

6.2.6.2

Zápis z jednání bude považován za schválený, pokud v průběhu 15 kalendářních dnů od jeho rozeslání žádný ze Členů nezašle písemnou námitku předsedovi týkající se přesnosti návrhu zápisu z jednání.

6.2.6.3

Předseda rozešle schválený zápis z jednání všem Členům daného Orgánu konsorcia a Koordinátorovi projektu, který je bude archivovat. Pokud to bude Koordinátorem projektu vyžadováno, poskytne rovněž ověřené druhopisy Smluvním stranám.

6.3 Specifické operační postupy pro Orgány konsorcia

6.3.1 Valná hromada

Kromě pravidel popsaných v Oddíle 6.2 budou platit následující pravidla:

6.3.1.1 Členové

6.3.1.1.1

Valné shromáždění se bude skládat z jednoho zástupce každé ze Smluvních stran (dále jen Člen valného shromáždění).

6.3.1.1.2

Každý Člen valného shromáždění bude považován za řádně zplnomocněného pro zvažování, vyjednávání a rozhodování ve všech záležitostech uvedených v Oddíle 6.3.1.2. této Dohody o konsorciu.

6.3.1.1.3

Všem jednáním Valného shromáždění bude předsedat Koordinátor projektu.

Smluvní strany se zavazují podřídit se všem rozhodnutím Valného shromáždění. Tato skutečnost však nebrání Smluvním stranám vznést námitku vůči rozhodnutím, v souladu s ustanovením pro Urovnán í sporů v Oddíle 11.8.

6.3.1.2 Rozhodnutí

Valné shromáždění bude mít volnou ruku jednat dle svého vlastního uvážení při formulaci návrhů a přijímání rozhodnutí v souladu s postupy zde uvedenými. Kromě toho bude Valné shromáždění zvažovat a rozhodovat o veškerých návrzích vznesených Výkonnou radou.

Valné shromáždění bude rozhodovat o následujících záležitostech:

Obsah, finance a práva duševního vlastnictví

- Návrhy na změnu Příloh 1 a 2 Grantové smlouvy, které budou předloženy ke schválení Financujícímu orgánu.
- Změny Plánu konsorcia
- Úpravy Přílohy 1 (včetně Pozadí)
- Dodatky k Příloze 3 (seznam Třetích stran pro zjednodušený transfer v souladu s Oddílem 8.3.2)
- Dodatky k Příloze 4 (identifikované Přidružené subjekty).
- Jmenování členů do Výkonné rady.

Evoluce konsorcia.

- Vstup nové Smluvní strany do konsorcia a schválení podmínek pro přijetí takovéto nové Smluvní strany.
- Odstoupení Smluvní strany z účasti v konsorciu a schválení podmínek pro odstoupení.
- Identifikace porušení povinností Smluvní stranou stanovených touto Dohodou o konsorciu nebo Grantovou smlouvou.
- Prohlášení Smluvní strany Neplnící smluvní stranou.
- Nápravná opatření, která mají být přijata Neplnící smluvní stranou.
- Ukončení účasti Neplnící smluvní strany v konsorciu a související opatření.
- Žádost Financujícímu orgánu o změnu Koordinátora projektu.
- Žádost Financujícímu orgánu o pozastavení celého nebo části Projektu.
- Žádost Financujícímu orgánu o ukončení Projektu a Dohody o konsorciu.

6.3.2 Výkonná rada

Kromě pravidel uvedených v Oddíle 6.2 budou platit následující pravidla:

6.3.2.1 Členové

Výkonná rada se skládá z Koordinátora projektu (PC), Vedoucích pracovních balíčků (WPL) a Vedoucích demo projektů (DPL).

Všem jednáním Výkonné rady bude předsedat Koordinátor projektu.

Zápisy z jednání
Zápisy z jednání Výkonné rady budou po schválení zaslány Koordinátorem projektu Členům Valného shromáždění pro informaci.

6.3.2.2 Úkoly

6.3.2.2.1

Výkonná rada bude připravovat jednání, navrhovat rozhodnutí a připravovat program jednání Valného shromáždění, v souladu s ustanoveními Oddílu 6.3.1.2.

6.3.2.2.2

Výkonná rada bude hledat konsensus mezi Smluvními stranami.

6.3.2.2.3

Výkonná rada bude odpovědná za správné provedení a implementaci rozhodnutí Valného shromáždění.

6.3.2.2.4

Výkonná rada bude monitorovat účinnou a účelnou realizaci Projektu.

6.3.2.2.5

Kromě toho bude Výkonná rada shromažďovat informace týkající se postupu Projektu, přezkoumávat tyto informace s cílem posoudit soulad realizace Projektu s Plánem konsorcia a v nezbytných případech bude navrhovat Valnému shromáždění úpravy Plánu konsorcia.

6.3.2.2.6

Výkonná rada bude:

- Poskytovat podporu Koordinátorovi projektu při přípravě jednání s Financujícím orgánem a při přípravě souvisejících dat a výstupů
- Pravidelně shromažďovat informace týkající se postupu projektu s cílem monitorovat účinnou a účelnou realizaci úkolů, milníků a výstupů
- Navrhovat rozhodnutí a připravovat program jednání Valného shromáždění
- Bude odpovědná za správné vykonání rozhodnutí Valného shromáždění
- Připravovat obsah a načasování tiskových zpráv a společných publikací konsorcia nebo navrhovaných Financujícím orgánem s ohledem na ustanovení Článku 29 Grantové smlouvy.

6.3.2.2.7
V případě zrušení úkolů jako důsledku rozhodnutí Valného shromáždění bude Výkonná rada navrhovat Valnému shromáždění způsoby úpravy uspořádání úkolů a rozpočtů dotčených Smluvních stran. Takovéto úpravy uspořádání budou brát v potaz právní závazky přijaté před rozhodnutími, které nelze zrušit.

6.4 Koordinátor projektu

6.4.1

Koordinátor projektu bude prostředníkem mezi Smluvními stranami a Financujícím orgánem a bude vykonávat veškeré úkoly mu svěřené, jak je popsáno v Grantové smlouvě a této Dohodě o konsorciu.

6.4.2

Zejména pak bude Koordinátor projektu odpovědný za následující:

- sledování dodržování povinností Smluvních stran;
- udržování seznamu adres Členů a dalších kontaktních osob v aktuální podobě a dostupný
- sběr, přezkoumání z pohledu konzistentnosti a předkládání zpráv, dalších výstupů (včetně finančních výkazů a souvisejících potvrzení) a specificky vyžádaných dokumentů Financujícímu orgánu;
- přenos dokumentů a informací souvisejících s Projektem směrem ke všem dotčeným Smluvním stranám;
- administraci finančního příspěvku Financujícího orgánu a plnění finančních úkolů popsaných v Oddíle 7.3; a
- poskytování Smluvním stranám na vyžádání oficiálních kopií nebo originálních dokumentů, které jsou ve výlučném vlastnictví Koordinátora projektu, pokud budou tyto kopie nebo originální dokumenty nezbytné pro Smluvní strany při vznášení nároků.

Pokud se jedna nebo vícero ze Smluvních stran opozdí se zasíláním jakýchkoli výsledků Projektu, Koordinátor projektu může přesto včas předložit výstupy jiných Smluvních stran a veškeré další dokumenty vyžadované Grantovou smlouvou nebo Financujícím orgánem.

6.4.3

Pokud Koordinátor projektu selže při plnění svých koordinačních úkolů, může Valné shromáždění navrhnout Financujícímu orgánu změnu Koordinátora projektu.

6.4.4

Koordinátor projektu nemá právo jednat nebo činit právně závazná prohlášení ve jménu žádné jiné Smluvní strany konsorcia, pokud to není výslovně uvedeno v Grantové smlouvě nebo této Dohodě o konsorciu.

6.4.5

Koordinátor projektu nebude rozšiřovat svou úlohu nad rámec úkolů specifikovaných v této Dohodě o konsorciu a Grantové smlouvě.

6.5 Poradní výbor externích odborníků (EAB)

Poradní výbor externích odborníků (EAB) je podpůrným orgánem skládajícím se ze tří externích odborníků v oblastech vztahujících se k projektu. Cílem vědeckého poradního výboru je poskytovat vedení pro zachování vědecké kvality projektu a poskytovat zpětnou vazbu konsorciu ohledně celkového postupu projektu a jeho realizace. Členové EAB podepíší s konsorciem dohodu o zachování důvěrnosti. Podmínky této dohody nebudou přísnější než jsou ty uvedené v této Dohodě o konsorciu a tato dohoda bude uzavřena nejpozději 30 kalendářních dnů po nominaci odborníků. Odborníci budou pravidelně zváni na jednání

konsorcia a mohou být přizváni k účasti na jednání Valného shromáždění (ačkoliv nebudou mít hlasovací právo).

6.6 Vedoucí pracovních balíčků (WPL) a Vedoucí demo projektů (DPL)

Vedoucí pracovních balíčků (WPL) a Vedoucí demo projektů (DPL) budou úzce spolupracovat pro zajištění úspěchu projektu. V každém z tematických pracovních balíčků je obsažen úkol managementu inovací, zajišťující propojení mezi prací vykonanou v rámci pracovních balíčků a demo projektů.

WPL a DPL mají za povinnost hlásit jakékoli závažné skutečnosti nebo zpoždění Výkonné radě a Valnému shromáždění.

WPL a DPL budou:

- koordinovat a plánovat práci v rámci pracovních balíčků a demo projektů;
- monitorovat postup prací ve svých pracovních balíčcích a demo projektech a hlásit jej EB;
- předsedat společným jednáním WP a Demo projektů a vyhotovovat zápisy z těchto jednání;
- upozorňovat EB a GA na závažné skutečnosti, zpoždění nebo nedostatky v práci příjemce nebo řešitele demo projektu;
- přispívat k periodickému hlášení; a
- identifikovat IPR záležitosti a příležitosti a přispívat k diseminačním aktivitám.

WPL a DPL budou organizovat společná jednání osobní formou nebo prostřednictvím webových konferencí, s četností dle potřeby.

7 Oddíl: Finanční ustanovení

7.1 **Obecné zásady**

7.1.1 Rozdělení finančního příspěvku
Finanční příspěvek Financujícího orgánu na Projekt bude rozdělen Koordinátorem projektu dle následujícího:

- Plán konsorcia;
- ustanovení týkající se plateb uvedená v Oddíle 7.3.

Smluvní strana obdrží financování pouze pro úkoly vykonávané v souladu s Plánem konsorcia.

7.1.2 Oprávněné náklady

Každá Smluvní strana bude výlučně odpovědná za ospravedlnění svých nákladů souvisejících s Projektem vůči Financujícímu orgánu, v souladu se svými vlastními obvyklými účetními postupy, řídícími principy a postupy. Koordinátor projektu ani žádná z dalších Smluvních stran nebudou žádným způsobem odpovědni za ospravedlnění nákladů vůči Financujícímu orgánu.

7.1.3 Zásady financování

Smluvní strana, která utratí méně než alokovaný podíl rozpočtu uvedený v Plánu konsorcia nebo – v případě refundace prostřednictvím jednotkových nákladů – realizuje méně jednotek než bylo v Plánu konsorcia předpokládáno, obdrží financování pouze dle svých skutečných a odpovídajícím způsobem zdůvodněných oprávněných nákladů. Smluvní strana, která utratí

více, než je její podíl na rozpočtu uvedený v Plánu konsorcia bude financována pouze do výše řádně odůvodněných uznatelných nákladů, do výše nepřesahující uvedený podíl.

7.1.4. Navrácení přeplatků, příjmy

7.1.4.1.

V případě, že některá ze Smluvních stran obdrží nadměrné financování, je uvedená Smluvní strana povinna bez zbytečného prodlení navrátit příslušnou částku Koordinátorovi projektu.

7.1.4.2.

V případě, že kterákoli ze Smluvních stran získá finance, které je možno odečíst z celkového financování uvedeného v Plánu konsorcia, uvedený odpočet je směřován pouze vůči dané Smluvní straně, která příjem získala. Podíl rozpočtu pro ostatní Smluvní strany nebude příjmem jedné Smluvní strany dotčen. V případě, že relevantní příjem přesahuje výši alokovaného podílu financování pro danou Smluvní stranu uvedenou v Plánu konsorcia, daná Smluvní strana nahradí snížení finančních prostředků, které ostatní Smluvní strany utrpěly.

7.1.5. Finanční dopady ukončení účasti některé ze Smluvních stran

Smluvní strana opouštějící konsorcium uhradí zpět veškeré platby, které obdržela, s výjimkou částky příspěvku přijaté Financujícím orgánem nebo jiným přispěvatelem. Kromě toho ponese Neplnící smluvní strana, v rámci limitů specifikovaných v Oddíle 5.2 této Dohody o konsorciu, jakékoli další rozumné a odůvodnitelné dodatečné náklady, které utrpěly ostatní Smluvní strany v souvislosti s výkonem jejich úkolů a úkolů Neplnící smluvní strany.

7.2 Rozpočtování

Rozpočet uvedený v Plánu konsorcia bude oceněn v souladu s obvyklými účetními a správními principy a postupy příslušných Smluvních stran.

7.3 Platby

7.3.1 Platby Smluvním stranám představují výlučnou úlohu Koordinátora projektu

Koordinátor projektu bude vykonávat zejména následující aktivity:

- **oznamovat neprodleně dotčené Smluvní straně datum a složení částky převáděné na její bankovní účet, s uvedením relevantních odkazů;**
- **provádět svědomitě své úkoly při řádné správě jakýchkoli finančních prostředků a při správě finančních účtů; a**
- **zavazuje se, že bude udržovat finanční příspěvek Financujícího orgánu na Projekt odděleně od běžných obchodních účtů, svých vlastních aktiv a majetku, s výjimkou situace, kdy je Koordinátor projektu Veřejným orgánem anebo mu příslušná zákonná nařízení takto učinit neumožňují.**

S odkazem na Články 21.2 a 21.3.2 Grantové smlouvy, žádná Smluvní strana neobdrží před ukončením Projektu více finančních prostředků než je alokovaný podíl maximální částky grantové podpory, z níž byly odečteny částky zadržené Financujícím orgánem pro Garanční fond a závěrečnou platbu.

7.3.2 Rozvrh plateb

Rozvrh plateb obsahující převod předfinancování a průběžných plateb Smluvním stranám bude spravován následujícím způsobem:

Financování nákladů zahrnutých v Plánu konsorcia bude hrazeno Smluvním stranám po obdržení od Financujícího orgánu v pololetních splátkách, a to za následujících podmínek:

- **příslušná Smluvní strana přistoupila ke Grantové smlouvě;**
- **příslušná Smluvní strana podepsala tuto Dohodu o konsorciu;**
- **příslušná Smluvní strana doručila informace Koordinátorovi projektu, vyžadované pro účely monitorování realizace projektu;**
- **dle jakýchkoli relevantních rozhodnutí Valného shromáždění;**
- **dle jakýchkoli relevantních rozhodnutí Výkonné rady.**

Půlroční splátky budou vypočítány na základě nákladů zahrnutých v Plánu konsorcia pro nadcházející splátkové období a budou představovat zálohové financování pro dané splátkové období, za předpokladu, že došlo k převodu finančních prostředků ze strany Financujícího orgánu na bankovní účet Koordinátora projektu. Finanční prostředky převedené Financujícím orgánem na bankovní účet Koordinátora projektu budou jako takové představovat horní limit akumulovaných částek, které je možno rozdělit v rámci Konsorcia.

Půlroční splátky budou vypláceny podle výplatního cyklu – dle dostupnosti finančních prostředků od Financujícího orgánu: M1, M8, M14, M22, atd. Tento postup je zvolen za účelem synchronizace plateb s interním cyklem monitorování projektu v rámci Konsorcia.

Koordinátor projektu připraví před zahájením projektu detailní rozvrh plateb založený na výše uvedených zásadách, obsahující očekávané částky a načasování každé splátky pro každého příjemce. Koordinátor bude odpovědný za aktualizování a správu detailního rozvrhu plateb, na základě rozhodnutí Financujícího orgánu a relevantních Orgánů konsorcia.

Koordinátor projektu připraví detailní popis rozpočtování, plateb a vnitřního finančního výkaznictví, který bude schválen a aktualizován příslušnými Orgány konsorcia.

V případě záporného úroku na bankovním účtu Koordinátora projektu může Koordinátor projektu rozdělit veškeré finanční prostředky, které obdržel od Financujícího orgánu v rámci Konsorcia v jednom kole splátek.

Koordinátor projektu má právo zadržet jakoukoli platbu pokud bude příslušným Orgánem konsorcia uznáno, že některá ze Smluvních stran porušuje své povinnosti stanovené touto Dohodou o konsorciu nebo Grantovou smlouvou, nebo platbu vůči Příjemci, který dosud nepodepsal tuto Dohodu o konsorciu.

Koordinátor projektu má právo požadovat navrácení jakýchkoli plateb již vyplacených Neplnící smluvní straně. Koordinátor projektu má rovněž právo zadržet platbu vůči některé ze Smluvních stran, bude-li to navrženo nebo odsouhlaseno Financujícím orgánem.

7.3.3 Zpětné získání částek po ukončení grantu

Závěrečná platba pokrývá zbývající část uznatelných nákladů vynaložených Smluvní stranou na realizaci Projektu.

Pokud je pro smluvní stranu celkový přijatý příspěvek EU schválený finančním orgánem nižší než její rozpočet v plánu konsorcia, bude odpovídajícím způsobem snížena konečná platba.

Pokud některá ze Smluvních stran obdržela před závěrečnou platbou částku převyšující její celkový příspěvek schválený EU, je daná Smluvní strana povinna bez zbytečného odkladu navrátit rozdíl Koordinátorovi projektu. Koordinátor projektu potvrdí výši částky, která má být navrácena pomocí oznámení o dluhu, s uvedením podmínek a data platby.

Pakliže nebude platba provedena k datu uvedenému v oznámení o dluhu, získá Koordinátor projektu částku:

(a) vyrovnáním dané částky – bez souhlasu Smluvní strany – oproti jakékoli částce dlužné vůči dané Smluvní straně ze strany Koordinátora projektu;
(b) právním vymáháním nebo přijetím vykonatelného rozhodnutí.

Pokud nebude platba provedena k datu uvedenému v oznámení o dluhu, bude dlužná částka navyšována úrokem z prodlení, se sazbou stanovenou dle národních zákonů aplikovatelných na Koordinátora projektu, ode dne následujícího po dni splatnosti uvedeného v oznámení o dluhu, až do data, kdy Koordinátor projektu obdrží platbu plné částky, včetně.

Pro vysvětlení, ustanovení uvedená v tomto oddíle se nevztahují na zpětnou platbu jakýchkoli částek vyžadovanou Financujícím orgánem, jelikož tato problematika se řídí článkem 44 Grantové smlouvy.

8 Oddíl: Výsledky

8.1 Vlastnictví výsledků

Výsledky jsou vlastnictvím Smluvní strany, která je vytvořila.

8.2 Společné vlastnictví

Společné vlastnictví se řídí článkem 26.2 Grantové smlouvy, s následujícími dodatky: Podíl každého vlastníka na společném vlastnictví Výsledku je roven duševnímu přispění daného vlastníka.

Pokud není dohodnuto jinak:

- každý ze společných vlastníků bude mít právo využívat společně vlastněné Výsledky pro nekomerční výzkumné aktivity a vzdělávací účely, a to bezplatně a bez nutnosti získat předem souhlas dalších společných vlastníků a

- každý ze společných vlastníků bude mít právo Využívat společně vlastněné Výsledky a udělovat nevýlučné licence třetím stranám (bez práva na sublicenci), pokud ostatní společní vlastníci obdrží:

  (a) oznámení nejméně 45 kalendářních dnů předem; a
  (b) spravedlivou a přiměřenou kompenzaci.

8.3 Převod Výsledků

8.3.1

Každá Smluvní strana má právo převést vlastnictví svých vlastních Výsledků dle ustanovení článku 30 Grantové smlouvy.

8.3.2

Každá Smluvní strana může určit specifické třetí strany na něž hodlá převést vlastnictví svých Výsledků v Příloze (3) této Dohody o konsorciu. Ostatní Smluvní strany se tímto vzdávají práva na oznámení předem a své právo vznášet námitky vůči převodu na uvedené třetí strany, v souladu s článkem 30.1 Grantové smlouvy.

8.3.3

Převádějící Smluvní strana však bude, v době převodu, informovat ostatní Smluvní strany o tomto převodu a zajistí, aby tímto převodem nebyla dotčena práva ostatních Smluvních stran. Jakékoli dodatky k Příloze (3) po podepsání této Dohody vyžadují rozhodnutí Valného shromáždění.

8.3.4

Smluvní strany uznávají, že v rámci rámce fúze nebo akvizice významné části jejich majetku může být pro danou Smluvní stranu nemožné v souladu s příslušnými zákony EU a národními zákony o fúzích a akvizicích zaslat oznámení 45 dnů před uskutečněním převodu, jak je vyžadováno Grantovou smlouvou.

8.3.5

Výše uvedené závazky zůstávají v platnosti pouze pokud ostatní Smluvní strany nadále mají – nebo nadále mohou požadovat – Přístupová práva k Výsledkům.

8.4 Diseminace

8.4.1

Pro zamezení pochybnostem, žádná část Oddílu 8.4 nemá dopad na závazky důvěrnosti stanovené v Oddíle 10.

8.4.2 Diseminace vlastních Výsledků

8.4.2.1

V průběhu Projektu a v období 1 roku od ukončení Projektu se bude diseminace vlastních Výsledků jednou nebo vícero Smluvními stranami, mimo jiné včetně publikací a prezentací, řídit ustanoveními článku 29.1 Grantové smlouvy a následujících ustanovení. V případě, že se publikace vztahují ke společně vlastněným Výsledkům, musí každý spoluvlastník předem udělit svolení s publikací, přičemž vydání tohoto souhlasu nesmí být bezdůvodně odkládáno.

Předchozí upozornění na plánované publikace budou zasílána ostatním Smluvním stranám nejméně 30 kalendářních dnů před publikací. Jakékoli námitky vůči plánované publikaci je nutno vznést v souladu s Grantovou smlouvou v písemné podobě a adresovat je

Koordinátorovi projektu a Smluvní straně nebo Smluvním stranám žádajícím diseminaci, a to v průběhu 21 dnů od data obdržení oznámení. Pokud nebudou v rámci výše uvedeného časového období vzneseny žádné námitky, je publikace umožněna.

8.4.2.2

Námitka je oprávněná pokud

(a) by došlo k negativnímu ovlivnění ochrany Výsledků nebo Pozadí namítající Smluvní strany
(b) by došlo k závažnému poškození oprávněných zájmů ve vztahu k Výsledkům nebo Pozadí namítající Smluvní strany.

Námitka musí obsahovat přesnou žádost o nezbytné úpravy.

8.4.2.3

Pokud byla vznesena námitka, budou dotčené Smluvní strany diskutovat o tom, jak včas překonat odůvodněné důvody pro námitku (například prostřednictvím dodatku k plánované publikaci a/nebo ochranou informací před publikací) a namítající Smluvní strana nebude nerozumně setrvávat v opozici, pokud budou po předchozí diskusi přijata odpovídající opatření.

8.4.2.4

Namítající Smluvní strana může vyžadovat odložení publikace o ne více než 90 kalendářních dnů od data, kdy námitku vznesla. Po uplynutí 90 kalendářních dnů nemůže namítající Smluvní strana požadovat další odklad, za předpokladu, že byly podniknuty odpovídající kroky pro to, aby nebyly oprávněné zájmy namítající Smluvní strany ve vztahu k Výsledkům závažným způsobem poškozeny, nebo aby byly dle instrukcí namítající Smluvní strany z publikace odstraněny důvěrné informace namítající Smluvní strany.

8.4.3 Diseminace nepublikovaných Výsledků nebo Pozadí jiné Smluvní strany

Žádná Smluvní strana nezahrne do jakékoli diseminační aktivity Výsledky nebo Pozadí jiné Smluvní strany, bez předchozího získání písemného svolení vlastnící Smluvní strany, za předpokladu, že nebyly dříve publikovány.

8.4.4 Závazky spolupráce

Smluvní strany se zavazují spolupracovat, aby umožnily včasné odevzdání, přezkoumání, zveřejnění a obhajobu jakékoli disertační práce nebo diplomové práce v míře, která zahrnuje jejich Výsledky nebo Pozadí, s výhradou ustanovení o důvěrnosti a zveřejnění dohodnutých v této Dohodě o konsorciu.

8.4.5 Použití jmen, log a obchodních známek

Žádné ustanovení této Dohody o konsorciu nebude vykládáno jako udělení práv pro použití názvů Smluvních stran nebo jejich log a obchodních známek v reklamní činnosti, publicitě nebo jiných způsobech využití, bez jejich předchozího písemného souhlasu.

9 Oddíl: Přístupová práva

9.1

9.1.1

V Příloze 1 Smluvní strany identifikovaly a odsouhlasily Pozadí Projektu a dále se v relevantních případech navzájem informovaly, že Přístup ke specifickému Pozadí je předmětem právních restrikcí nebo omezení.

Cokoli neuvedené v Příloze 1 nebude považováno za předmět závazků Přístupových práv pokud se jedná o Pozadí.

9.1.2

Kterákoli ze Smluvních stran může dále v průběhu Projektu doplnit své Pozadí v Příloze 1, a to písemným oznámením zaslaným ostatním Smluvním stranám. Pokud si však Smluvní strana přeje upravit nebo stáhnout své Pozadí v Příloze 1, bude vyžadováno schválení Valného shromáždění.

9.2 Obecné zásady

9.2.1

Každá ze Smluvních stran bude realizovat své úkoly v souladu s Plánem konsorcia a ponese výlučnou odpovědnost za zajištění toho, aby její skutky v rámci Projektu vědomě neporušovaly vlastnická práva třetích stran.

9.2.2

Jakákoli Přístupová práva výlučně udělená vylučují jakákoli práva na sublicenci, pokud není v Dohodě o konsorciu výslovně uvedeno jinak, nebo pokud není jinak dohodnuto mezi dotčenými Smluvními stranami.

9.2.3

Přístupová práva budou bez jakýchkoli administrativních poplatků za převod.

9.2.4

Přístupová práva jsou udělována na nevýlučné bázi.

9.2.5

Výsledky a Pozadí budou využívány pouze pro účely pro něž byla udělena Přístupová práva k nim.

9.2.6

Veškeré žádosti o udělení Přístupových práv budou vyhotoveny písemně. Udělení Přístupových práv může být provedeno podmínečně, za předpokladu přijetí specifických podmínek určených pro zajištění toho, aby tato práva byla využívána pouze pro určený účel a aby byly dodrženy odpovídající závazky důvěrnosti.

9.2.7

Žádající Smluvní strana musí prokázat, že jsou Přístupová práva Nezbytná.

9.3 Přístupová práva pro realizaci

Přístupová práva k Výsledkům a Pozadí Nezbytná pro provedení vlastní práce Smluvní strany na Projektu budou udělena bezplatně, pokud není dohodnuto pro Pozadí jinak v Příloze 1.

9.4 Přístupová práva pro využití

9.4.1 Přístupová práva k Výsledkům

Přístupová práva k Výsledkům, pokud jsou Nezbytná pro využití vlastních Výsledků dané Smluvní strany jsou udělována za Spravedlivých a Přiměřených podmínek.

Přístupová práva k Výsledkům interních výzkumných aktivit budou udělována bezplatně.

9.4.2

Přístupová práva k Pozadí, pokud jsou Nezbytná pro využití vlastních Výsledků dané Smluvní strany, včetně provádění výzkumu ve jménu třetí strany, budou udělována za Spravedlivých a Přiměřených podmínek.

9.4.3

Žádost o udělení Přístupových práv je možno vznést až dvanáct měsíců po ukončení Projektu, nebo, v případě Oddílu 9.7.2.1.2, po ukončení účasti žádající Smluvní strany v Projektu.

9.5 Přístupová práva pro Přidružené subjekty

Přidružené subjekty mají Přístupová práva za podmínek článků 25.4 a 31.4 Grantové smlouvy, pakliže jsou uvedeny v Příloze 4 (Identifikované Přidružené subjekty) této Dohody o konsorciu.

Přidružené subjekty si musí vyžádat takováto Přístupová práva od Smluvní strany, která je držitelem Pozadí nebo Výsledků. Další možností je, aby se Smluvní strana udělující Přístupová práva individuálně dohodla se Smluvní stranou požadující Přístupová práva na zahrnutí práva udělit sublicenci k využívání Přístupových práv Přidruženým subjektům požadující Smluvní strany uvedeným v Příloze 4. Přístupová práva pro Přidružené subjekty budou udělována za Spravedlivých a Přiměřených podmínek, na základě písemné dvoustranné dohody.

Přidružené subjekty, které obdrží Přístupová práva budou na oplátku dodržovat veškeré závazky týkající se důvěrnosti a jiné přijaté Smluvními stranami v Grantové smlouvě nebo této Dohodě o konsorciu, stejně tak jako by Přidružené subjekty byly Smluvními stranami.

Přístupová práva pro Přidružené subjekty mohou být odmítnuta, pokud by jejich udělení bylo v rozporu s oprávněnými zájmy Smluvní strany, která je držitelem Pozadí nebo Výsledků.

Přístupová práva udělená jakémukoli Přidruženému subjektu jsou podmíněna trváním Přístupových práv Smluvní strany k níž jsou přidruženy a tato práva automaticky zanikají při ukončení Přístupových práv udělených dané Smluvní straně.

Po ukončení statutu Přidruženého subjektu veškerá Přístupová práva udělená tomuto bývalému Přidruženému subjektu zanikají.

Další podmínky mohou být s Přidruženými subjekty dohodnuty ve formě separátních dohod.

9.6 Dodatečná Přístupová práva

Pro zamezení pochybnostem, jakékoli udělení Přístupových práv, které není kryto Grantovou smlouvou nebo touto Dohodou o konsorciu bude předmětem svrchovaného posouzení vlastnící Smluvní strany a podmínek, které budou odsouhlaseny mezi vlastnící a přijímající Smluvní stranou.

9.7 Přístupová práva pro Smluvní strany vstupující do nebo opouštějící konsorcium

9.7.1 Nové Smluvní strany vstupující do konsorcia

Pokud se jedná o Výsledky vyvinuté před přistoupením nové Smluvní strany, obdrží nová Smluvní strana Přístupová práva za podmínek vztahujících se k Přístupovým právům k Pozadí.

9.7.2 Smluvní strany opouštějící konsorcium

9.7.2.1 Přístupová práva udělená opouštějící Smluvní straně

9.7.2.1.1 Neplnící smluvní strana

Přístupová práva udělená Neplnící smluvní straně a práva této Smluvní strany žádat o Přístupová práva budou ukončeny neprodleně po doručení oficiálního oznámení rozhodnutí Valného shromáždění o ukončení účasti dané Smluvní strany v konsorciu.

9.7.2.1.2 Ne-neplnící smluvní strana

Ne-neplnící Smluvní strana opouštějící konsorcium dobrovolně a za souhlasu ostatních Smluvních stran bude mít Přístupová práva k Výsledkům vyvinutým do data ukončení její účasti. Daná Smluvní strana může požádat o Přístupová práva v průběhu časové lhůty uvedené v Oddíle 9.4.3.

9.7.2.2 Přístupová práva poskytovaná jakoukoli opouštějící Smluvní stranou

Jakákoli Smluvní strana opouštějící projekt bude nadále poskytovat Přístupová práva v souladu s ustanoveními Grantové smlouvy a této Dohody o konsorciu, jako by zůstala Smluvní stranou po celou dobu trvání projektu.

9.8 Specifická ustanovení o Přístupových právech k Software

9.8.1 Obecné zásady

Pro zamezení pochybnostem, obecná ustanovení týkající se Přístupových práv uvedená v Oddíle 9 jsou aplikovatelná rovněž na Software, pakliže nejsou tímto Oddílem 9.8 upravena.

Přístupová Práva Smluvních stran k Software nezahrnují žádné právo získat Zdrojový kód nebo Cílový kód portovaný k platformě určitého hardware ani právo získat Zdrojový kód, Cílový kód nebo příslušnou Softwarovou Dokumentaci v jakékoli konkrétní podobě nebo s konkrétními podrobnostmi, ale pouze v podobě poskytnuté Smluvní stranou udělující Přístupová práva.

Zamýšlené zahrnutí Duševního vlastnictví (včetně mimo jiné Software) v souladu s podmínkami Kontrolovaných licenčních podmínek v Projektu vyžaduje schválení Valného shromáždění s implementací daného zahrnutí do Plánu konsorcia.

9.8.2 Přístup k Software

Přístupová práva k Software, který je Výsledkem zahrnují:

- přístup k Cílovému kódu; a
- v případech, kdy běžné použití tohoto Cílového kódu vyžaduje Aplikační programovací rozhraní (dále jen API), Přístup k Cílovému kódu a takovéto API; a
- pokud Smluvní strana prokáže, že plnění úkolů v Projektu nebo Využití vlastních Výsledků je technicky nebo právně nemožné bez přístupu ke Zdrojovému kódu, přístup ke Zdrojovému kódu v nezbytném rozsahu.

Pozadí bude poskytnuto pouze v podobě Cílového kódu, pokud nebude dotčenými Smluvními stranami dohodnuto jinak.

9.8.3 Licence k Software a sublicenční práva

9.8.3.1 Cílový kód

9.8.3.1.1 Výsledky – práva Smluvní strany

V případě, že Smluvní strana má Přístupová práva k Cílovému kódu a/nebo k API, které jsou Výsledkem pro Využití, takovýto Přístup bude, kromě Přístupu pro Využití uvedeného v Oddíle 9.4, pokud je Nezbytný pro Využití vlastních Výsledků dané Smluvní strany, zahrnovat právo:

- pořizovat neomezené množství kopií Cílového kódu a API; a
- distribuovat, činit dostupným, uvádět na trh, prodávat a nabízet k prodeji takovýto Cílový kód a API, samostatně nebo jako součást nebo ve spojitosti s výrobky nebo službami Smluvní strany vlastnící Přístupová práva;
- ovšem za předpokladu, že jakýkoli výrobek, proces nebo služba byla vyvinuta Smluvní stranou vlastnící Přístupová práva v souladu se svými právy využívat Cílový kód a API pro své vlastní Výsledky.

Pokud je účelem využití služeb třetí strany pro účely tohoto Oddílu 9.8.3.1.1, dotčené Smluvní strany se dohodnou na podmínkách takovéhoto využití, s patřičným dodržením zájmů Smluvní strany udělující Přístupová práva, jak je uvedeno v Oddíle 9.2 této Dohody o konsorciu.

9.8.3.1.2 Výsledky – Práva udělovat sublicence koncovým uživatelům

Kromě toho budou Přístupová práva k Cílovému kódu, v rozsahu Nezbytném pro Využití vlastních Výsledků dané Smluvní strany, zahrnovat právo udělovat v běžném obchodní styku zákazníkům – koncovým uživatelům kupujícím/využívajícím produkt/službu sublicence v rozsahu nezbytném pro běžné používání příslušného výrobku nebo služby pro využívání Cílového kódu, samostatně nebo jako součást nebo ve spojitosti nebo integrovaného do výrobků a služeb Smluvní strany vlastnící Přístupová práva a pokud je to technicky nezbytné:

- pro udržování daného výrobku/služby;
- pro vytváření vlastního interagujícího interoperabilního software pro koncové využití v souladu s Nařízením 2009/24/EC Evropského parlamentu a Rady ze dne 23. dubna 2009 týkající se právní ochrany počítačových programů

9.8.3.1.3 Pozadí

Pro zamezení pochybnostem, v případě, kdy Smluvní strana má Přístupová práva k Cílovému kódu a/nebo API, které jsou Pozadím pro Využití, tato Přístupová práva vylučují právo na sublicence. Takováto práva na sublicence však mohou být dohodnuta mezi dotčenými Smluvními stranami.

9.8.3.2 Zdrojový kód

9.8.3.2.1 Výsledky – práva Smluvní strany

V případech, kdy v souladu s Oddílem 9.8.3 má Smluvní strana Přístupová práva ke Zdrojovému kódu, který je Výsledkem pro Využití, budou Přístupová práva k takovému Zdrojovému kódu, v rozsahu Nezbytném pro využití vlastních Výsledků dané Smluvní strany, zahrnovat celosvětové právo na využití, pořizování kopií, úpravy, vývoj, adaptaci Zdrojového kódu pro účely výzkumu, pro vytváření/uvádění na trh výrobku/procesu a pro vytváření/poskytování služby.

Pokud je účelem využití služeb třetí strany pro účely tohoto Oddílu 9.8.3.2.1, dotčené Smluvní strany se dohodnou na podmínkách takovéhoto využití, s patřičným dodržením zájmů Smluvní strany udělující Přístupová práva, jak je uvedeno v Oddíle 9.2 této Dohody o konsorciu.

9.8.3.2.2 Výsledky – Práva udělovat sublicence koncovým uživatelům

Kromě toho budou Přístupová práva, v rozsahu Nezbytném pro Využití vlastních Výsledků dané Smluvní strany, zahrnovat právo udělovat sublicence k danému Zdrojovému kódu, avšak výlučně za účelem adaptace, nápravy chyb, údržby a/nebo podpory daného Software.

Další sublicencování Zdrojového kódu je výslovně vyloučeno.

9.8.3.2.3 Pozadí

Pro zamezení pochybnostem, v případě, že Smluvní strana má Přístupová práva ke Zdrojovému kódu, který je Pozadím pro Využití, tato Přístupová práva vylučují právo na sublicence. Udělování sublicencí však může být předmětem dohody mezi Smluvními stranami.

9.8.4 Specifické formality

Každá sublicence udělená v souladu s ustanoveními Oddílu 9.8.3 bude provedena prostřednictvím dohledatelné písemné dohody specifikující a chránící vlastnická práva dotčené Smluvní strany nebo dotčených Smluvních stran.

10 Oddíl: Nezveřejňování informací

10.1

Veškeré informace v jakékoli podobě nebo způsobu komunikace, které jsou sděleny Smluvní stranou („Sdělující Smluvní strana“) jakékoli jiné Smluvní straně („Příjemce“) ve spojitosti s Projektem v průběhu jeho realizace, které byly v době sdělení výslovně označeny jako „důvěrné“, nebo které byly sděleny ústně a identifikovány jako důvěrné v době sdělení a jejichž důvěrná povaha byla Sdělující stranou potvrzena písemnou formou nejpozději v průběhu 15 kalendářních dnů od ústního sdělení představují „Důvěrné informace“.

10.2

Příjemci se tímto zavazují, navíc a aniž je dotčen jakýkoli závazek zachování důvěrnosti v souladu s Grantovou smlouvou, po období 4 let od ukončení Projektu:

- nepoužívat Důvěrné informace pro jiné účely, než pro který byly sděleny;
- nesdělovat Důvěrné informace bez předchozího písemného souhlasu Sdělující Smluvní strany;
- zajistit, aby interní šíření Důvěrné informace Příjemcem probíhalo pouze směrem k osobám, které ji nezbytně potřebují znát; a
- navrátit Sdělující Smluvní straně nebo zničit na žádost veškeré Důvěrné informace, které byly Příjemci sděleny, včetně všech jejích kopií a vymazat veškeré informace uložené ve strojově čitelné podobě v rozsahu prakticky možném, s výjimkou Důvěrných informací dočasně uložených v automatickém zálohovacím systému. Příjemci si mohou ponechat kopii za předpokladu, že je uchování, archivace nebo uložení dané Důvěrné informace vyžadováno souladem s příslušnými zákony a nařízeními, nebo jako důkaz o probíhajících závazcích, za předpokladu, že Příjemce bude postupovat v souladu se závazky zachování důvěrnosti zde uvedenými pokud se jedná o takovouto kopii, a to po celou dobu jejího uchovávání.

10.3

Příjemce bude odpovědný za dodržování výše uvedených závazků na straně jeho zaměstnanců nebo třetích stran zahrnutých do Projektu a zajistí jejich závazek v maximální možné míře dané zákony, v průběhu a po ukončení Projektu a/nebo po ukončení smluvního vztahu se zaměstnancem nebo třetí stranou.

10.4

Výše uvedená ustanovení se nevztahují na sdělování Důvěrných informací u nichž Příjemce může dokázat, že:

- Důvěrné informace se staly nebo jsou veřejně dostupné jinými prostředky než je porušení závazků zachování důvěrnosti ze strany Příjemce;
- sdělující Smluvní strana následně informuje Příjemce, že Důvěrné informace již nejsou důvěrné;
- Důvěrné informace jsou Příjemci sděleny bez jakéhokoli závazku důvěrnosti třetí stranou, která je dle nejlepšího vědomí Příjemce oprávněným vlastníkem těchto informací a bez závazku důvěrnosti vůči Sdělující Smluvní straně;
- sdělení nebo přenos Důvěrných informací je předpokládán ustanoveními Grantové smlouvy;
- Důvěrné informace byly vyvinuty Příjemcem zcela nezávisle na jakémkoli sdělení Sdělující Smluvní strany;
- Důvěrné informace byly Příjemci známy před jejich sdělením, nebo
- Příjemce je povinen sdělit Důvěrné informace v souladu s příslušnými zákony nebo nařízeními nebo na základě nařízení soudu nebo administrativního nařízení, v souladu s ustanoveními Oddílu 10.7 níže.

10.5

Příjemce se zavazuje postupovat stejně důkladně s ohledem na Důvěrné informace, které mu byly sděleny v průběhu Projektu jako postupuje v případě svých vlastních důvěrných a/nebo vlastnických informací, avšak v žádném případě ne méně důkladně než je rozumné.

10.6

Každá ze Smluvních stran bude neprodleně písemně informovat jinou Smluvní stranu o jakémkoli případu neautorizovaného sdělení, zpronevěře nebo zneužití Důvěrných informací poté, co se o tomto neautorizovaném sdělení, zpronevěře nebo zneužití dozvěděla.

10.7

Pokud se některá Smluvní strana dozví, že bude nezbytné, nebo že existuje pravděpodobnost, že bude nezbytné, sdělit Důvěrné informace pro dodržení souladu s příslušnými zákony nebo nařízeními, nebo v souladu s rozhodnutím soudu nebo administrativním rozhodnutím, provede, v souladu se zákonem, před sdělením následující:

- upozorní Sdělující Smluvní stranu a
- omezí sdělení Důvěrných informací na nejmenší nezbytnou míru pro dodržení právního požadavku,
- bude postupovat v souladu s přiměřenými instrukcemi Sdělující Smluvní strany pro zachování důvěrnosti informací.

11 Oddíl: Různé

11.1 Přílohy, Attachments, nesrovnalosti a oddělitelnost

Tato Dohoda o konsorciu se skládá ze základního textu a
Přílohy 1 (Zahrnuté Pozadí)
Přílohy 2 (Listina o přistoupení)
Přílohy 3 (Seznam třetích stran pro zjednodušený převod v souladu s Oddílem 8.3.2)
Přílohy 4 (Identifikované Přidružené subjekty)

V případě, že budou ustanovení této Dohody o konsorciu v rozporu s ustanoveními Grantové smlouvy, budou mít přednost ustanovení Grantové smlouvy. V případě rozporů mezi přílohami a základním textem této Dohody o konsorciu bude mít přednost znění základního textu.

Pokud by se kterékoli ustanovení této Dohody o konsorciu stalo neplatným, nezákonným nebo nevymahatelným, nebude to mít vliv na platnost zbývajících ustanovení této Dohody o konsorciu. V takovém případě jsou Smluvní strany oprávněny požadovat sjednání platného a proveditelného ustanovení, které splňuje účel původního ustanovení.

11.2 Žádné zastoupení, partnerství ani agentura

S výjimkou ustanovení v Oddíle 6.4.4 nebude mít žádná ze Smluvních stran právo činit právně závazná prohlášení ve jménu jakékoli jiné Smluvní strany nebo konsorcia. Žádná informace uvedená v této Dohodě o konsorciu nebude považována za společný podnik, agenturu, partnerství, zájmové sdružení nebo jakýkoli jiný druh formálního obchodního seskupení nebo subjektu mezi Smluvními stranami.

11.3 Oznámení a další komunikace

Veškerá oznámení zasílaná v souladu s touto Dohodou o konsorciu budou vyhotovena v písemné podobě a zasílána na adresy a příjemce uvedené v posledním aktualizovaném adresáři spravovaném Koordinátorem projektu.

Formální oznámení:

Pokud je touto Dohodou o konsorciu vyžadováno (Oddíly 4.2, 9.7.2.1.1 a 11.4) zaslání formálního oznámení souhlasu nebo schválení, toto oznámení musí být podepsáno zplnomocněným zástupcem Smluvní strany a doručeno buď osobně, odesláno poštou nebo jiným elektronickým způsobem komunikace.

Další komunikace:

Další komunikace mezi Smluvními stranami může být realizována dalšími způsoby, jako je e-mail s potvrzením o doručení, který splňuje podmínky stanovené pro písemnou formu.

Veškeré změny osob nebo kontaktních informací musí být neprodleně sděleny příslušnou Smluvní stranou Koordinátorovi projektu. Adresář bude dostupný všem Smluvním stranám.

11.4 Postoupení a změny

S výjimkou případů uvedených v Oddíle 8.3, nesmí být žádná práva nebo závazky Smluvních stran vycházející z této Dohody o konsorciu postoupena ani převedena, zcela nebo zčásti, na žádnou třetí stranu bez předchozího formálního souhlasu ostatních Smluvních stran. Změny a úpravy textu této Dohody o konsorciu, které nejsou výslovně uvedeny v Oddíle 6.3.1.2 vyžadují, aby byla podepsána samostatná písemná dohoda mezi všemi Smluvními stranami.

11.5 Povinné vnitrostátní právo

Nic v této Dohodě o konsorciu nebude mít za to, že vyžaduje, aby Smluvní strana porušila jakýkoli povinný zákon, podle kterého tato Smluvní strana působí.

11.6 Jazyk

Tato Dohoda o konsorciu je napsána v anglickém jazyce, tímto jazykem se budou řídit všechny dokumenty, oznámení, schůze, rozhodčí řízení a související postupy.

11.7 Aplikované právo

Tato Dohoda o konsorciu bude vykládána v souladu s belgickými zákony a bude se jimi řídit, s výjimkou kolizních ustanovení.

11.8 Ochrana dat

Každá Smluvní strana bere na vědomí, že informace a osobní údaje ve smyslu Obecného nařízení o ochraně osobních údajů (EU) 2016/679 (GDPR) a příslušných zákonů o ochraně údajů, které se na ně vztahují, jsou zpracovávány za účelem provádění a řízení smluvní spolupráce a – v neposlední řadě poskytnuté finanční prostředky – předány třetím stranám odpovědným za odpovídající úkoly.

Třetími stranami odpovědnými za odpovídající úkoly jsou financující orgány, další finanční agentury, příslušná federální ministerstva, auditoři instalovaní za účelem kontroly a přezkoumávání řádného využívání veřejného financování, jakož i orgány EU a finanční subjekty třetích stran využívané pro účely poskytování nezbytných ekonomických a vědeckých analýz.

Každá Smluvní strana musí v rámci své odpovědnosti usilovat o jakýkoli požadovaný souhlas s ochranou údajů, aby uspokojila zejména požadavky na informace související s právními povinnostmi, které musí poskytnout na straně financujícího orgánu.

Každá dohoda týkající se ochrany údajů stanoví účel takového zpracování nebo výměny osobních údajů a definuje role a odpovědnost Smluvních stran v souladu s požadavky GDPR. Ustanovení o ochraně osobních údajů takové samostatné dohody mají přednost před jakýmikoli jinými ustanoveními týkajícími se ochrany údajů v této Dohodě o konsorciu.

Smluvní strany se navíc zavazují dodržovat ochranu údajů a přijmout obvyklá a vhodná organizační a technická opatření k zajištění bezpečnosti údajů.

11.9 Řešení sporů

Smluvní strany se budou snažit urovnat své spory smírnou cestou.

Jakýkoli spor, kontroverze nebo nárok vyplývající z této Dohody o konsorciu a jakýchkoli následných dodatků k této Dohodě o konsorciu, včetně, bez omezení, jejího vzniku, platnosti, závazného účinku, výkladu, plnění, porušení nebo ukončení, jakož i mimosmluvní nároky, budou předloženy k mediaci v souladu s pravidly WIPO pro mediaci. Místem mediace je Brusel, není-li dohodnuto jinak. Jazykem, který se má při mediaci použít, bude angličtina, pokud nebude dohodnuto jinak.

Pokud a do té míry, že jakýkoli takový spor, kontroverze nebo nárok nebudou na základě mediace urovnány do 60 kalendářních dnů od zahájení mediace, jsou výlučně příslušné bruselské soudy.

Nic v této dohodě o konsorciu neomezuje právo stran požadovat předběžnou žalobu u příslušného příslušného soudu.

Oddíl Podpisy

NA DŮKAZ:

Smluvní strany způsobily, že tato Dohoda o konsorciu bude řádně podepsána níže podepsanými zplnomocněnými zástupci na samostatných podpisových stránkách, s uvedením dne a roku výše.

Příloha 1: Zahrnuté Pozadí

V souladu s Grantovou smlouvou (Článek 24) je Pozadí definováno jako „data, know-how nebo informace (…), které jsou potřebné k provedení akce nebo využití výsledků“. Vzhledem k této potřebě je principiálně nutné udělit Přístupová práva, Smluvní strany však musí určit a dohodnout se vzájemně na Pozadí pro projekt. To je účelem této přílohy.

NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET

Pokud se jedná o NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

ARCHITECTS COUNCIL OF EUROPE

Pokud se jedná o ARCHITECTS COUNCIL OF EUROPE, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí: (zvolte prosím ***MOŽNOST 1*** nebo ***MOŽNOST 2*** níže),

MOŽNOST 2: Žádná data, know-how ani informace ARCHITECTS COUNCIL OF EUROPE nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

Pokud se jedná o ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 1: Následující pozadí je tímto určeno a odsouhlaseno pro realizaci Projektu. Specifická omezení a/nebo podmínky jsou uvedeny níže:

Popis Pozadí	Specifická omezení a/nebo podmínky pro realizaci (Článek 25.2 Grantové smlouvy)	Specifická omezení a/nebo podmínky pro Využití (Článek 25.3 Grantové smlouvy)
Technologie, konstrukce a výroba prosklených kolektorů PVT na bázi siloxanového gelu jako zapouzdřovacího materiálu	ČVUT může během trvání projektu poskytnout partnerům finální produkt, nikoli know-how pro výrobu, pokud není na základě licenční smlouvy	Tato technologie může být využívána a licencována třetím stranám na základě licenční smlouvy. Není použito žádné předkupní pravidlo.
Matematický model proskleného kolektoru PVT pro software TRNSYS	Know-how bude v rámci projektu použito jako bezlicenční know-how sdílené mezi partnery. Jakékoli komerční využití a další vývoj založený na těchto znalostech podléhá licenční smlouvě mezi ČVUT a zainteresovaným partnerem.	Model může být využíván a licencován třetím stranám na základě licenční smlouvy. Není použito žádné předkupní pravidlo.
Matematický model kombinovaného systému solárního tepelného čerpadla se solárními kolektory a tepelným čerpadlem (na základě projektu Macsheep)	Know-how bude v rámci projektu použito jako bezlicenční know-how sdílené mezi partnery. Jakékoli komerční využití a další vývoj založený na těchto znalostech podléhá licenční smlouvě mezi ČVUT a zainteresovaným partnerem.	Model může být využíván a licencován třetím stranám na základě licenční smlouvy. Není použito žádné předkupní pravidlo.
Protipožární lehký obklad na bázi dřeva, užitný model CZ 28801. 2015-11-10.	Know-how bude v rámci projektu použito jako bezlicenční know-how sdílené mezi partnery. Jakékoli komerční využití a další vývoj založený na těchto znalostech podléhá licenční smlouvě mezi ČVUT a zainteresovaným partnerem.	Tato technologie může být využívána a licencována třetím stranám na základě licenční smlouvy bez jakéhokoli omezení. Není použito žádné předkupní pravidlo.

Světelná clona z dřevěných desek, užitný vzor CZ 26609. 2014-03-13.	Know-how bude v rámci projektu použito jako bezlicenční know-how sdílené mezi partnery. Jakékoli komerční využití a další vývoj založený na těchto znalostech podléhá licenční smlouvě mezi ČVUT a zainteresovaným partnerem.	Tato technologie může být využívána a licencována třetím stranám na základě licenční smlouvy bez jakéhokoli omezení. Není použito žádné předkupní pravidlo.
Vzduchotechnická jednotka s možností vytápění a chlazení - Chráněné duševní vlastnictví pokrývající technologii termoelektrického vytápění a chlazení, kde se používá kombinace pasivních a aktivních výměníků tepla CZ patenty a užitné vzory: CZ 308018 CZ 308 043 Patentová přihláška EU: EP 1919 8822	Know-how bude v rámci projektu použito jako bezlicenční know-how sdílené mezi partnery. Jakékoli komerční využití a další vývoj založený na těchto znalostech podléhá licenční smlouvě mezi ČVUT a zainteresovaným partnerem.	Tato technologie může být využívána a licencována třetím stranám na základě licenční smlouvy bez jakéhokoli omezení. Není použito žádné předkupní pravidlo.
Senzor kvality vnitřního vzduchu – design, know-how bez specifické ochrany duševního vlastnictví. Mechanický a elektrický design senzoru včetně firmwaru	ČVUT poskytuje senzory pro monitorovací kampaň v rámci demonstračních budov projektu. Požadavky a další vývoj platformy senzorů jsou možné na základě individuálních požadavků partnerů projektu nebo požadavku plánované práce.	Tato technologie představuje produkt připravený na trh upravený podle konkrétních potřeb projektu. Senzory mohou být využívány a licencovány třetím stranám na základě nevýhradní licenční smlouvy. Není použito žádné předkupní pravidlo.
Senzor kvality venkovního vzduchu – design, know-how bez specifické ochrany duševního vlastnictví. Mechanický a elektrický design senzoru včetně firmwaru.	ČVUT poskytuje senzory pro monitorovací kampaň v rámci demonstračních budov projektu. Požadavky a další vývoj platformy senzorů jsou možné na základě individuálních požadavků partnerů projektu nebo požadavku plánované práce	Tato technologie představuje produkt připravený na trh upravený podle konkrétních potřeb projektu. Senzory mohou být využívány a licencovány třetím stranám na základě nevýhradní licenční smlouvy. Není použito žádné předkupní pravidlo.
PV Forecast - algoritmy a software poskytující službu, historická data shromážděná ze senzorů zpětné vazby.	Pro daný soubor experimentálních míst bude v rámci projektu poskytnuta předpověď ozáření a krátkodobá předpověď počasí. Zkušenosti a know-	Bude poskytována pouze služba, bez sdílení kódu nebo hlubokých znalostí podrobného algoritmického řešení. Komerční použití této služby nebo odvozených

	how v oblasti použitelnosti a dalšího zpracování těchto služeb lze sdílet mezi partnery projektu.	produktů podléhá licenční smlouvě mezi ČVUT a zainteresovaným partnerem.
Algoritmus pro monitorování a řízení - software pro správu energie optimalizující využití lokální FV energie na základě predikce ozáření a tržních cen.	V projektu budou použity odborné znalosti v oblasti optimalizace softwaru pro správu a algoritmů s cílem maximalizovat lokální využití FV energie a minimalizovat emise CO2 v souvislosti s tržními cenami energie jako nástroj stabilizace sítě.	Specifické algoritmy a části odvozeného softwarového kódu podléhají výhradní licenci CTU. Výsledky lze poskytovat jako službu pod licencí CTU.
Sky-imager s předzpracováním místních dat – nastavení softwaru a zařízení, software na straně serveru a algoritmické řešení.	Pro experimentální místo v rámci projektu bude společně se službou sledování mraků poskytnut software pro nastavení zařízení a software pro zpracování oblohy. Zkušenosti a know-how související s problematikou budou sdíleny s partnery v rámci projektu.	Software pro nastavení zařízení a manipulaci se zařízením sky-imager je obecně poskytován jako freeware s otevřeným zdrojovým kódem. Software na straně serveru pro rozsáhlý výpočet předpovědi krátkodobé ozáření a sledování mraků je licencován výhradně pro ČVUT. Výsledky lze poskytovat jako službu pod licencí ČVUT.

To představuje stav v době podpisu této Dohody o konsorciu.

DANMARKS TEKNISKE UNIVERSITET

Pokud se jedná o DANMARKS TEKNISKE UNIVERSITET, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 1: Následující pozadí je tímto určeno a odsouhlaseno pro realizaci Projektu. Specifická omezení a/nebo podmínky jsou uvedeny níže:

Popis Pozadí	Specifická omezení a/nebo podmínky pro realizaci (Článek 25.2 Grantové smlouvy)	Specifická omezení a/nebo podmínky pro Využití (Článek 25.3 Grantové smlouvy)
Algoritmy a softwarové nástroje pro řízení budov a systémů dálkového vytápění	Je předmětem Dohod o zachování důvěrnosti se Smluvními stranami. Toto know-how lze použít pouze při realizaci tohoto projektu a za žádných okolností jej nelze poskytnout třetím osobám, pokud není poskytnut písemný souhlas společnosti DTU Compute.	Je předmětem Dohod o zachování důvěrnosti. Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání.
Algoritmy a software pro zpětnou vazbu Human-in-the-Loop a řízení kvality vnitřního klimatu	Je předmětem Dohod o zachování důvěrnosti se Smluvními stranami. Toto know-how lze použít pouze při realizaci tohoto projektu a za žádných okolností jej nelze poskytnout třetím osobám, pokud není poskytnut písemný souhlas společnosti DTU Compute.	Je předmětem Dohod o zachování důvěrnosti. Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání.

To představuje stav v době podpisu této Dohody o konsorciu.

DANFOSS AS

Pokud se jedná o DANFOSS AS, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 1: Následující pozadí je tímto určeno a odsouhlaseno pro realizaci Projektu. Specifická omezení a/nebo podmínky jsou uvedeny níže:

Popis Pozadí	Specifická omezení a/nebo podmínky pro realizaci (Článek 25.2 Grantové smlouvy)	Specifická omezení a/nebo podmínky pro Využití (Článek 25.3 Grantové smlouvy)
EP3569936A1	Omezeno na ukázkový případ Sønderborg	

To představuje stav v době podpisu této Dohody o konsorciu.

ENFOR AS

Pokud se jedná o ENFOR AS, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 1: Následující pozadí je tímto určeno a odsouhlaseno pro realizaci Projektu. Specifická omezení a/nebo podmínky jsou uvedeny níže:

Popis Pozadí	Specifická omezení a/nebo podmínky pro realizaci (Článek 25.2 Grantové smlouvy)	Specifická omezení a/nebo podmínky pro Využití (Článek 25.3 Grantové smlouvy)
Algoritmy předpovídání energie (tepla a elektrické energie)	ENFOR může nakonfigurovat prognostický systém pro použití jinými stranami, tyto však nezískají přístup ke zdrojovému kódu.	Po dokončení projektu budou muset další strany, které by chtěly využít znalosti Pozadí ENFOR, získat licenci pro další používání služeb.

To představuje stav v době podpisu této Dohody o konsorciu.

PROJECT ZERO

Pokud se jedná o PROJECT ZERO, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace PROJECT ZERO nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

EURAC RESEARCH

Pokud se jedná o EURAC RESEARCH, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace EURAC RESEARCH nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

SINTEF AS

Pokud se jedná o SINTEF AS, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 1: Následující pozadí je tímto určeno a odsouhlaseno pro realizaci Projektu. Specifická omezení a/nebo podmínky jsou uvedeny níže:

Popis Pozadí	Specifická omezení a/nebo podmínky pro realizaci (Článek 25.2 Grantové smlouvy)	Specifická omezení a/nebo podmínky pro Využití (Článek 25.3 Grantové smlouvy)
SINTEF AS vyvinul tři nástroje zvané „PROFet“ (odhad zátěžových profilů energetické náročnosti), „FLEXor“ (FLEXible operation) a „PRIeST“ (prediktivní řízení), které mají být použity v tomto projektu. „PROFet“, „FLEXor“ nebo „PRIeST“ budou použity ve WP7 - „Efektivní provoz a flexibilita“.	Přístup k těmto nástrojům bude k dispozici partnerům s definovanými úkoly ve WP7.	Pozadí nebude použito jinými stranami, pokud nebude dohodnuto s vývojářem (SINTEF).

To představuje stav v době podpisu této Dohody o konsorciu.

PALMA CITY COUNCIL

Pokud se jedná o PALMA CITY COUNCIL, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace PALMA CITY COUNCIL nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

IBA VI

Pokud se jedná o IBA VI, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 1: Následující pozadí je tímto určeno a odsouhlaseno pro realizaci Projektu. Specifická omezení a/nebo podmínky jsou uvedeny níže:

Popis Pozadí	Specifická omezení a/nebo podmínky pro realizaci (Článek 25.2 Grantové smlouvy)	Specifická omezení a/nebo podmínky pro Využití (Článek 25.3 Grantové smlouvy)
Baleárský katalog ekologických stavebních materiálů	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY- NC-SA 4.0)	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY- NC-SA 4.0)
Tepelná izolace s využitím trávy Posidonie mořská (řešení založené na přírodě)	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY- NC-SA 4.0)	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY- NC-SA 4.0)
Metoda architektonického návrhu s nízkými emisemi, s cílem vybudovat <500 kg CO2 / m2.	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY- NC-SA 4.0)	Attribution-NonCommercial-ShareAlike 4.0 International (CC BY- NC-SA 4.0)

To představuje stav v době podpisu této Dohody o konsorciu.

IREC

Pokud se jedná o IREC, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 1: Následující pozadí je tímto určeno a odsouhlaseno pro realizaci Projektu. Specifická omezení a/nebo podmínky jsou uvedeny níže:

Popis Pozadí	Specifická omezení a/nebo podmínky pro realizaci (Článek 25.2 Grantové smlouvy)	Specifická omezení a/nebo podmínky pro Využití (Článek 25.3 Grantové smlouvy)
Know-how a softwarové nástroje pro systémy řízení energie v budovách s generováním OZE a tepelnými a elektrickými akumulačními systémy, jakož i jeho implementace v hardwarových zařízeních.	Je předmětem Dohod o zachování důvěrnosti se Smluvními stranami. Toto know-how může být použito pouze při implementaci WP a v rámci tohoto projektu a za žádných okolností nemůže být poskytnuto třetím stranám, pokud není poskytnut písemný souhlas IREC.	Je předmětem Dohod o zachování důvěrnosti.Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání, která bude odrážet podmínky, za nichž jsou licenční poplatky poskytovány IREC.
Know-how týkající se řídících algoritmů pro aktivaci energetické flexibility v budovách pomocí tepelných čerpadel (HPs) a detekce a diagnostiky poruch (FDD)	Je předmětem Dohod o zachování důvěrnosti se Smluvními stranami. Toto know-how může být použito pouze při implementaci WP a v rámci tohoto projektu a za žádných okolností nemůže být poskytnuto třetím stranám, pokud není poskytnut písemný souhlas IREC.	Je předmětem Dohod o zachování důvěrnosti.Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání, která bude odrážet podmínky, za nichž jsou licenční poplatky poskytovány IREC.
Algoritmy, nástroje a softwarové prvky kódu vyhovující Urban Simulation Tools pro okresy a sousedství, včetně analýzy obchodních modelů.	Je předmětem Dohod o zachování důvěrnosti se Smluvními stranami. Toto know-how může být použito pouze při implementaci WP a v rámci tohoto projektu a za žádných okolností nemůže být poskytnuto třetím stranám, pokud není poskytnut písemný souhlas IREC.	Je předmětem Dohod o zachování důvěrnosti.Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání, která bude odrážet podmínky, za nichž jsou licenční poplatky poskytovány IREC.
Modely Grey Box pro budovy	Je předmětem Dohod o zachování důvěrnosti se Smluvními stranami. Toto know-how může být použito pouze při implementaci WP	Je předmětem Dohod o zachování důvěrnosti.Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání, která

	a v rámci tohoto projektu a za žádných okolností nemůže být poskytnuto třetím stranám, pokud není poskytnut písemný souhlas IREC.	bude odrážet podmínky, za nichž jsou licenční poplatky poskytovány IREC.
Know how vztahující se k monitorování, průzkumu a hodnocení IEQ (Kvalita vnitřního prostředí).	Je předmětem Dohod o zachování důvěrnosti se Smluvními stranami. Toto know-how může být použito pouze při implementaci WP a v rámci tohoto projektu a za žádných okolností nemůže být poskytnuto třetím stranám, pokud není poskytnut písemný souhlas IREC.	Je předmětem Dohod o zachování důvěrnosti.Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání, která bude odrážet podmínky, za nichž jsou licenční poplatky poskytovány IREC.

To představuje stav v době podpisu této Dohody o konsorciu.

METROV ACESA

Pokud se jedná o METROV ACESA, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace METROV ACESA nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

UNIVERZITA APLIKOVANÝCH VĚD UTRECHT

Pokud se jedná o UNIVERZITU APLIKOVANÝCH VĚD UTRECHT, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace UNIVERZITY APLIKOVANÝCH VĚD UTRECHT nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

HOUSING EUROPE

Pokud se jedná o HOUSING EUROPE, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace HOUSING EUROPE nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

BURO DE HAAN

Pokud se jedná o BURO DE HAAN, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace BURO DE HAAN nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

CENTER DENMARK/EU DIGITAL INNOVATION HUB

Pokud se jedná o CENTER DENMARK/EU DIGITAL INNOVATION HUB, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace CENTER DENMARK/EU DIGITAL INNOVATION HUB nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

SØNDERBORG ANDELSBOLIGFORENING

Pokud se jedná o SØNDERBORG ANDELSBOLIGFORENING, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace SØNDERBORG ANDELSBOLIGFORENING nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

GREEN DIGITAL FINANCE ALLIANCE

Pokud se jedná o GREEN DIGITAL FINANCE ALLIANCE, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace GREEN DIGITAL FINANCE ALLIANCE nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

STICHTING BO-EX ’91

Pokud se jedná o STICHTING BO-EX ’91, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace STICHTING BO-EX ’91 nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

RC PANELS

Pokud se jedná o RC PANELS, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace RC PANELS nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

UNIVERZITA V UTRECHTU

Pokud se jedná o UNIVERZITU V UTRECHTU, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 1: Následující pozadí je tímto určeno a odsouhlaseno pro realizaci Projektu. Specifická omezení a/nebo podmínky jsou uvedeny níže:

Popis Pozadí	Specifická omezení a/nebo podmínky pro realizaci (Článek 25.2 Grantové smlouvy)	Specifická omezení a/nebo podmínky pro Využití (Článek 25.3 Grantové smlouvy)
Algoritmy a softwarové nástroje pro řízení budov a systémů dálkového vytápění	Je předmětem Dohody o zachování důvěrnosti se Smluvními stranami. Toto know-how lze použít pouze při realizaci tohoto projektu a za žádných okolností jej nelze poskytnout třetím stranám, pokud není poskytnut písemný souhlas společnosti DTU Compute.	Je předmětem Dohody o zachování důvěrnosti. Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání.
Algoritmy a software pro zpětnou vazbu Human-in-the-Loop a řízení kvality vnitřního klimatu	Je předmětem Dohody o zachování důvěrnosti se Smluvními stranami. Toto know-how lze použít pouze při realizaci tohoto projektu a za žádných okolností jej nelze poskytnout třetím stranám, pokud není poskytnut písemný souhlas společnosti DTU Compute.	Je předmětem Dohody o zachování důvěrnosti. Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání.

To představuje stav v době podpisu této Dohody o konsorciu.

OBEC UTRECHT

Pokud se jedná o OBEC UTRECHT, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace OBEC UTRECHT nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

BOS INSTALLATIEWERKEN B.V.

Pokud se jedná o BOS INSTALLATIEWERKEN B.V., je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 1: Následující pozadí je tímto určeno a odsouhlaseno pro realizaci Projektu. Specifická omezení a/nebo podmínky jsou uvedeny níže:

Popis Pozadí	Specifická omezení a/nebo podmínky pro realizaci (Článek 25.2 Grantové smlouvy)	Specifická omezení a/nebo podmínky pro Využití (Článek 25.3 Grantové smlouvy)
Montovaný klimatický kontejner s modulárními řešeními tepelných čerpadel.	Prefabrikaci klimatického kontejneru může postavit pouze skupina Bos.	Bezpečná a správná instalace musí probíhat pod dohledem skupiny Bos nebo třetí strany vybrané skupinou Bos.
Modulární klimatická fasáda s integrovanou FV, instalací, větráním a vytápěním	Integrovaná inteligentní připojovací skříňka je postavena pod kontrolovaným dohledem skupiny Bos. Jinak existuje příliš velké riziko selhání a chyby.	Bezpečná a správná instalace musí probíhat pod dohledem skupiny Bos nebo třetí strany vybrané skupinou Bos.
Prefabrikované FV moduly pro FV pergolu	Prefabrikované konstrukční moduly pro solární panely je třeba vypočítat pro každý jednotlivý projekt.	Bezpečná a správná instalace musí probíhat pod dohledem skupiny Bos nebo třetí strany vybrané skupinou Bos.
Montovaný balkonový modul s integrovanou FV	Integrované FV panely musí být z bezpečnostních důvodů vyrobeny ze speciálního skla a kabelů.	Bezpečná a správná instalace musí probíhat pod dohledem skupiny Bos nebo třetí strany vybrané skupinou Bos.

To představuje stav v době podpisu této Dohody o konsorciu.

IWELL

Pokud se jedná o IWELL, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace IWELL nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

MEX ARCHITECTS B.V.

Pokud se jedná o MEX ARCHITECTS B.V., je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace MEX ARCHITECTS B.V. nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

MITROS

Pokud se jedná o MITROS, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace MITROS nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

STATUTÁRNÍ MĚSTO KARVINÁ

Pokud se jedná o STATUTÁRNÍ MĚSTO KARVINÁ, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace STATUTÁRNÍHO MĚSTA KARVINÁ nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

DOLOMITI ENERGIA SOLUTIONS SRL

Pokud se jedná o DOLOMITI ENERGIA SOLUTIONS SRL, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace DOLOMITI ENERGIA SOLUTIONS SRL nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

HABITECH

Pokud se jedná o HABITECH, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace HABITECH nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

UNIVERSITÀ DEGLI STUDI DI TRENTO

Pokud se jedná o UNIVERSITÀ DEGLI STUDI DI TRENTO, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace UNIVERSITÀ DEGLI STUDI DI TRENTO nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

POLITECNICO DI TORINO

Pokud se jedná o POLITECNICO DI TORINO, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace POLITECNICO DI TORINO nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

OSLOBYGG KF

Pokud se jedná o OSLOBYGG KF, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace OSLOBYGG KF nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

NANO POWER

Pokud se jedná o NANO POWER, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 2: Žádná data, know-how ani informace NANO POWER nebudou Nezbytné pro žádnou jinou Smluvní stranu pro realizaci Projektu (Článek 25.2 Grantové smlouvy) ani pro Využití Výsledků jiné Smluvní strany (Článek 25.3 Grantové smlouvy).

To představuje stav v době podpisu této Dohody o konsorciu.

AIGUASOL

Pokud se jedná o AIGUASOL, je mezi Smluvními stranami odsouhlaseno, že podle jejich nejlepších znalostí:

MOŽNOST 1: Následující pozadí je tímto určeno a odsouhlaseno pro realizaci Projektu. Specifická omezení a/nebo podmínky jsou uvedeny níže:

Popis Pozadí	Specifická omezení a/nebo podmínky pro realizaci (Článek 25.2 Grantové smlouvy)	Specifická omezení a/nebo podmínky pro Využití (Článek 25.3 Grantové smlouvy)
Algoritmy, nástroje a softwarové prvky kódu pro nástroj pro vytváření Energetických společenství (joinenergy).	Je předmětem Dohod o zachování důvěrnosti se Smluvními stranami. Toto know-how může být použito pouze při implementaci WP a v rámci tohoto projektu a za žádných okolností nemůže být poskytnuto třetím stranám, pokud není poskytnut písemný souhlas společnosti Aiguasol.	Je předmětem Dohod o zachování důvěrnosti. Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání, která bude odrážet podmínky, za nichž jsou společnosti Aiguasol poskytovány licenční poplatky.
Algoritmy, nástroje a softwarové prvky kódu pro výpočty KPI cirkulárnosti, z projektů Plug'n'Harvest a HOUSEFUL	Je předmětem Dohod o zachování důvěrnosti se Smluvními stranami. Toto know-how může být použito pouze při implementaci WP a v rámci tohoto projektu a za žádných okolností nemůže být poskytnuto třetím stranám, pokud není poskytnut písemný souhlas společnosti Aiguasol.	Je předmětem Dohod o zachování důvěrnosti. Toto Pozadí nebude použito, dokud nebude podepsána dohoda o využívání, která bude odrážet podmínky, za nichž jsou společnosti Aiguasol poskytovány licenční poplatky.

To představuje stav v době podpisu této Dohody o konsorciu.

…….

Příloha 2: Listina o přistoupení

PŘISTOUPENÍ

nové Smluvní strany k

[ARV] Dohodě o konsorciu, verze [2021-06-28]

[OFICIÁLNÍ NÁZEV NOVÉ STRANY, JAK JE UVEDEN V Grantové smlouvě]

tímto souhlasí, že se stane smluvní stranou výše zmíněné Dohody o konsorciu, a přijímá všechna práva a povinnosti Smluvní strany počínaje dnem [datum].

[OFICIÁLNÍ NÁZEV KOORDINÁTORA PROJEKTU, JAK JE UVEDEN V Grantové smlouvě]

tímto potvrzuje, že konsorcium přijalo na schůzi konané dne [datum] přistoupení [název nové Smluvní strany] ke konsorciu počínaje dnem [datum].

Tato listina o přistoupení byla vyhotovena ve 2 originálech, které jsou řádně podepsány níže podepsanými zmocněnými zástupci.

[Datum a Místo]

[VLOŽTE NÁZEV NOVÉ SMLUVNÍ STRANY]

Podpis

Jméno

Titul

[Datum a Místo]

[VLOŽTE NÁZEV KOORDINÁTORA PROJEKTU]

Podpis

Jméno

Titul

Příloha 3: Seznam třetích stran pro zjednodušený převod dle Oddílu 8.3.2

- NTNU Technology Transfer AS
- HAB
- ARMALAM S.r.l.
- Fanti Legnami S.r.l.
- X-LAM Dolomiti S.r.l.

Jako Přidružené subjekty příjemce

Příloha 4: Identifikované Přidružené subjekty dle Oddílu 9.5

EUROPEAN COMMISSION
European Climate, Infrastructure and Environment Executive Agency

Director

GRANT AGREEMENT

NUMBER 101036723 — ARV

This **Agreement** ('the Agreement') is **between** the following parties:

on the one part,

the **European Climate, Infrastructure and Environment Executive Agency (CINEA)** ('the Agency'), under the powers delegated by the European Commission ('the Commission'), represented for the purposes of signature of this Agreement by Head of Department - Horizon Europe, European Climate, Infrastructure and Environment Executive Agency, Green research and innovation, Patrik KOLAR,

and

on the other part,

1. 'the coordinator':

NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU (NTNU), established in HOGSKOLERINGEN 1, TRONDHEIM 7491, Norway, VAT number: NO974767880MVA, represented for the purposes of signing the Agreement by Project Legal Signatory, Tor GRANDE

and the following other beneficiaries, if they sign their 'Accession Form' (see Annex 3 and Article 56):

2. **CONSEIL DES ARCHITECTES D'EUROPE (ACE)**, established in RUE PAUL EMILE JANSON 29, BRUXELLES 1050, Belgium, VAT number: BE0464884970,

3. **CESKE VYSOKE UCENI TECHNICKE V PRAZE (CVUT)**, established in JUGOSLAVSKYCH PARTYZANU 1580/3, PRAHA 160 00, Czech Republic, VAT number: CZ68407700,

4. **DANMARKS TEKNISKE UNIVERSITET (DTU)**, established in ANKER ENGELUNDSVEJ 1 BYGNING 101 A, KGS LYNGBY 2800, Denmark, VAT number: DK30060946,

5. **DANFOSS A/S (DANFOSS A/S)**, established in Nordborgvej 81, NORDBORG 6430, Denmark, VAT number: DK20165715,

6. **ENFOR AS (ENFOR)**, established in LYNGSO ALLE 3, HORSHOLM 2970, Denmark, VAT number: DK29421633,

7. **PROJECT ZERO A/S (PROJECTZERO)**, established in Alsion 2, Sonderborg 6400, Denmark, VAT number: DK29215642,

8. **ACCADEMIA EUROPEA DI BOLZANO (EURAC)**, established in VIALE DRUSO 1, BOLZANO 39100, Italy, VAT number: IT01659400210,

9. **SINTEF AS (SINTEF)**, established in STRINDVEGEN 4, TRONDHEIM 7034, Norway, VAT number: NO919303808MVA,

10. **AYUNTAMENT DE PALMA DE MALLORCA (PALMA)**, established in PLAZA DE CORT 1, PALMA DE MALLORCA 07001, Spain, VAT number: ESP0704000I,

11. **INSTITUTO BALEAR DE LA VIVIENDA (IBAVI)**, established in CALLE MANUEL AZANA 9 BAJOS, PALMA DE MALLORCA 07006, Spain, VAT number: ESQ5750001I,

12. **FUNDACIO INSTITUT DE RECERCA DE L'ENERGIA DE CATALUNYA (IREC)**, established in C/ JARDINS DE LES DONES DE NEGRE 1, SANT ADRIA DE BESOS 08930, Spain, VAT number: ESG64946387,

13. **METROVACESA, SA (MET)**, established in C QUINTANAVIDES 13 PARQUE EMPRESARIAL VIA NORTE ED 1 PLANTA 1, MADRID 28050, Spain, VAT number: ESA87471264,

14. **Stichting Hogeschool Utrecht (UAS Utrecht)**, established in PADUALAAN 99, UTRECHT 3584 CH, Netherlands, VAT number: NL806163185B01,

15. **COMITE EUROPEEN DE COORDINATION DE L'HABITAT SOCIAL AISBL (HOUSING EUROPE)**, established in SQUARE DE MEEUS 18, BRUXELLES 1050, Belgium, VAT number: BE0473324762,

16. **BURO DE HAAN INFORMATIE TECHNOLOGIE BV (Buro de Haan)**, established in ACHTHOEVENWEG 34, STAPHORST 7951 SK, Netherlands, VAT number: NL857548773B01,

17. **CENTER DANMARK DRIFT APS (Center Denmark)**, established in VENDERSGADE 74, FREDERICIA 7000, Denmark, VAT number: DK40868399,

18. **SONDERBORG ANDELSBOLIGFORENING (SAB)**, established in BYGTOFTEN 2, SONDERBORG 6400, Denmark, VAT number: DK45569810,

19. **GREEN DIGITAL FINANCE ALLIANCE (GDFA)**, established in CHEMIN DES ANEMONES 11-13, CHATELAINE 1219, Switzerland, VAT number: CHE496481826TVA,

20. **STICHTING BO-EX 91 (BOEX)**, established in JAN CORNELISZ MAYLAAN 18, UTRECHT 3526GV, Netherlands, VAT number: NL800519085B01,

21. **RC PANELS BV (Rc Panels B.V.)**, established in CONSTRUCTIEWEG 1, LEMELERVELD 8152 GA, Netherlands, VAT number: NL856857270B01,

22. **UNIVERSITEIT UTRECHT (UU)**, established in HEIDELBERGLAAN 8, UTRECHT 3584 CS, Netherlands, VAT number: NL001798650B01,

23. **GEMEENTE UTRECHT (CITY OF UTRECHT)**, established in STADSPLATEAU 1, UTRECHT 3521 AZ, Netherlands, VAT number: NL002220647B01,

24. **BOS INSTALLATIEWERKEN BV (BOSGROEP)**, established in TENNESSEEDREEF 17, UTRECHT 3565 CK, Netherlands, VAT number: NL801071197B01,

25. **IWELL BV (iwell)**, established in ATOOMWEG 7-9, UTRECHT 3542 AA, Netherlands, VAT number: NL856333268B01,

26. **ME X ARCHITECTS BV (MEX)**, established in SPOORLAAN 18, BILTHOVEN 3721 PB, Netherlands, VAT number: NL809748253B01,

27. **STICHTING MITROS (Mitros)**, established in KONINGIN WILHELMINALAAN 9, UTRECHT 3527 LA, Netherlands,

28. **STATUTARNI MESTO KARVINA (KARV)**, established in FRYSTATSKA 72 1, KARVINA FRYSTAT 733 24, Czech Republic, VAT number: CZ00297534,

29. **DOLOMITI ENERGIA RINNOVABILI SOCIETA A RESPONSABILITA' LIMITATA (DOL)**, established in VIA FERSINA 23, TRENTO 38123, Italy, VAT number: IT01840970220,

30. **DISTRETTO TECNOLOGICO TRENTINO SCARL (DTTN)**, established in PIAZZA MANIFATTURA 1, ROVERETO 38068, Italy, VAT number: IT01990440222,

31. **UNIVERSITA DEGLI STUDI DI TRENTO (UNITN)**, established in VIA CALEPINA 14, TRENTO 38122, Italy, VAT number: IT00340520220,

32. **POLITECNICO DI TORINO (POLITO)**, established in CORSO DUCA DEGLI ABRUZZI 24, TORINO 10129, Italy, VAT number: IT00518460019,

33. **OSLO KOMMUNE (OBF)**, established in RADHUSET, OSLO 0037, Norway, VAT number: NO958935420MVA,

34. **NANO POWER AS (NANO)**, established in TISKARSKA 599/12, PRAHA 108 00, Czech Republic, VAT number: CZ01719041,

35. **SISTEMES AVANCATS D ENERGIA SOLAR TERMICA SCCL (AIGUASOL SAEST)**, established in CALLE ROGER DE LLURIA 29 3R 2E, BARCELONA 08009, Spain, VAT number: ESF62787692,

Unless otherwise specified, references to ‘beneficiary’ or ‘beneficiaries’ include the coordinator.

The parties referred to above have agreed to enter into the Agreement under the terms and conditions below.

By signing the Agreement or the Accession Form, the beneficiaries accept the grant and agree to implement it under their own responsibility and in accordance with the Agreement, with all the obligations and conditions it sets out.

The Agreement is composed of:

Terms and Conditions

Annex 1 Description of the action

Annex 2 Estimated budget for the action

2a Additional information on the estimated budget

Annex 3 Accession Forms

Annex 4 Model for the financial statements

Annex 5 Model for the certificate on the financial statements

Annex 6 Model for the certificate on the methodology

TERMS AND CONDITIONS

TABLE OF CONTENTS

CHAPTER 1 GENERAL

ARTICLE 1 — SUBJECT OF THE AGREEMENT

This Agreement sets out the rights and obligations and the terms and conditions applicable to the grant awarded to the beneficiaries for implementing the action set out in Chapter 2.

CHAPTER 2 ACTION

ARTICLE 2 — ACTION TO BE IMPLEMENTED

The grant is awarded for the action entitled '**Climate Positive Circular Communities**' — '**ARV**' **('action')**, as described in Annex 1.

ARTICLE 3 — DURATION AND STARTING DATE OF THE ACTION

The duration of the action will be **48 months** as of 1 January 2022 ('**starting date of the action**').

ARTICLE 4 — ESTIMATED BUDGET AND BUDGET TRANSFERS

4.1 Estimated budget

The '**estimated budget**' for the action is set out in Annex 2.

It contains the estimated eligible costs and the forms of costs, broken down by beneficiary (and linked third party) and budget category (see Articles 5, 6, and 14).

4.2 Budget transfers

The estimated budget breakdown indicated in Annex 2 may be adjusted — without an amendment (see Article 55) — by transfers of amounts between beneficiaries, budget categories and/or forms of costs set out in Annex 2, if the action is implemented as described in Annex 1.

However, the beneficiaries may not add costs relating to subcontracts not provided for in Annex 1, unless such additional subcontracts are approved by an amendment or in accordance with Article 13.

CHAPTER 3 GRANT

ARTICLE 5 — GRANT AMOUNT, FORM OF GRANT, REIMBURSEMENT RATES AND FORMS OF COSTS

5.1 Maximum grant amount

The '**maximum grant amount**' is **EUR 19 998 408.55** (nineteen million nine hundred and ninety eight thousand four hundred and eight EURO and fifty five eurocents).

5.2 Form of grant, reimbursement rates and forms of costs

The grant reimburses **100% of the eligible costs of the beneficiaries that are non-profit legal entities and 70% of the eligible costs of the beneficiaries and the affiliated entities that are profit legal entities** (see Article 6) (‘**reimbursement of eligible costs grant**’) (see Annex 2).

The estimated eligible costs of the action are EUR **21 316 651.63** (twenty one million three hundred and sixteen thousand six hundred and fifty one EURO and sixty three eurocents).

Eligible costs (see Article 6) must be declared under the following forms ('**forms of costs**'):

(a) for **direct personnel costs**:

- as actually incurred costs (‘**actual costs**’) or
- on the basis of an amount per unit calculated by the beneficiary in accordance with its usual cost accounting practices (‘**unit costs**’).

Personnel **costs for SME owners** or **beneficiaries that are natural persons** not receiving a salary (see Article 6.2, Points A.4 and A.5) must be declared on the basis of the amount per unit set out in Annex 2a (**unit costs**);

(b) for **direct costs for subcontracting**: as actually incurred costs (**actual costs**);

(c) for **direct costs of providing financial support to third parties**: not applicable;

(d) for **other direct costs**:

- for costs of internally invoiced goods and services: on the basis of an amount per unit calculated by the beneficiary in accordance with its usual cost accounting practices (‘**unit costs**’);
- for all other costs: as actually incurred costs (**actual costs**);

(e) for **indirect costs**: on the basis of a flat-rate applied as set out in Article 6.2, Point E (‘**flat-rate costs**’);

(f) **specific cost category(ies):** not applicable.

5.3 Final grant amount — Calculation

The ‘**final grant amount**’ depends on the actual extent to which the action is implemented in accordance with the Agreement’s terms and conditions.

This amount is calculated by the Agency — when the payment of the balance is made (see Article 21.4) — in the following steps:

Step 1 — Application of the reimbursement rates to the eligible costs

Step 2 — Limit to the maximum grant amount

Step 3 — Reduction due to the no-profit rule

Step 4 — Reduction due to substantial errors, irregularities or fraud or serious breach of obligations

5.3.1 Step 1 — Application of the reimbursement rates to the eligible costs

The reimbursement rate(s) (see Article 5.2) are applied to the eligible costs (actual costs, unit costs and flat-rate costs; see Article 6) declared by the beneficiaries and linked third parties (see Article 20) and approved by the Agency (see Article 21).

5.3.2 Step 2 — Limit to the maximum grant amount

If the amount obtained following Step 1 is higher than the maximum grant amount set out in Article 5.1, it will be limited to the latter.

5.3.3 Step 3 — Reduction due to the no-profit rule

The grant must not produce a profit.

'**Profit**' means the surplus of the amount obtained following Steps 1 and 2 plus the action's total receipts, over the action's total eligible costs.

The '**action's total eligible costs**' are the consolidated total eligible costs approved by the Agency.

The '**action's total receipts**' are the consolidated total receipts generated during its duration (see Article 3).

The following are considered **receipts**:

(a) income generated by the action; if the income is generated from selling equipment or other assets purchased under the Agreement, the receipt is up to the amount declared as eligible under the Agreement;

(b) financial contributions given by third parties to the beneficiary or to a linked third party specifically to be used for the action, and

(c) in-kind contributions provided by third parties free of charge and specifically to be used for the action, if they have been declared as eligible costs.

The following are however not considered receipts:

(a) income generated by exploiting the action's results (see Article 28);

(b) financial contributions by third parties, if they may be used to cover costs other than the eligible costs (see Article 6);

(c) financial contributions by third parties with no obligation to repay any amount unused at the end of the period set out in Article 3.

If there is a profit, it will be deducted from the amount obtained following Steps 1 and 2.

5.3.4 Step 4 — Reduction due to substantial errors, irregularities or fraud or serious breach of obligations — Reduced grant amount — Calculation

If the grant is reduced (see Article 43), the Agency will calculate the reduced grant amount by deducting the amount of the reduction (calculated in proportion to the seriousness of the errors,

irregularities or fraud or breach of obligations, in accordance with Article 43.2) from the maximum grant amount set out in Article 5.1.

The final grant amount will be the lower of the following two:

- the amount obtained following Steps 1 to 3 or
- the reduced grant amount following Step 4.

5.4 Revised final grant amount — Calculation

If — after the payment of the balance (in particular, after checks, reviews, audits or investigations; see Article 22) — the Agency rejects costs (see Article 42) or reduces the grant (see Article 43), it will calculate the '**revised final grant amount**' for the beneficiary concerned by the findings.

This amount is calculated by the Agency on the basis of the findings, as follows:

- in case of **rejection of costs**: by applying the reimbursement rate to the revised eligible costs approved by the Agency for the beneficiary concerned;
- in case of **reduction of the grant**: by calculating the concerned beneficiary's share in the grant amount reduced in proportion to the seriousness of the errors, irregularities or fraud or breach of obligations (see Article 43.2).

In case of **rejection of costs and reduction of the grant**, the revised final grant amount for the beneficiary concerned will be the lower of the two amounts above.

ARTICLE 6 — ELIGIBLE AND INELIGIBLE COSTS

6.1 General conditions for costs to be eligible

'**Eligible costs**' are costs that meet the following criteria:

(a) for **actual costs**:

(i) they must be actually incurred by the beneficiary;

(ii) they must be incurred in the period set out in Article 3, with the exception of costs relating to the submission of the periodic report for the last reporting period and the final report (see Article 20);

(iii) they must be indicated in the estimated budget set out in Annex 2;

(iv) they must be incurred in connection with the action as described in Annex 1 and necessary for its implementation;

(v) they must be identifiable and verifiable, in particular recorded in the beneficiary's accounts in accordance with the accounting standards applicable in the country where the beneficiary is established and with the beneficiary's usual cost accounting practices;

(vi) they must comply with the applicable national law on taxes, labour and social security, and

(vii) they must be reasonable, justified and must comply with the principle of sound financial management, in particular regarding economy and efficiency;

(b) for **unit costs**:

(i) they must be calculated as follows:

{amounts per unit set out in Annex 2a or calculated by the beneficiary in accordance with its usual cost accounting practices (see Article 6.2, Point A and Article 6.2.D.5)

multiplied by

the number of actual units};

(ii) the number of actual units must comply with the following conditions:

- the units must be actually used or produced in the period set out in Article 3;
- the units must be necessary for implementing the action or produced by it, and
- the number of units must be identifiable and verifiable, in particular supported by records and documentation (see Article 18);

(c) for **flat-rate costs**:

(i) they must be calculated by applying the flat-rate set out in Annex 2, and

(ii) the costs (actual costs or unit costs) to which the flat-rate is applied must comply with the conditions for eligibility set out in this Article.

6.2 Specific conditions for costs to be eligible

Costs are eligible if they comply with the general conditions (see above) and the specific conditions set out below for each of the following budget categories:

A. direct personnel costs;
B. direct costs of subcontracting;
C. not applicable;
D. other direct costs;
E. indirect costs;
F. not applicable.

'Direct costs' are costs that are directly linked to the action implementation and can therefore be attributed to it directly. They must not include any indirect costs (see Point E below).

'Indirect costs' are costs that are not directly linked to the action implementation and therefore cannot be attributed directly to it.

A. Direct personnel costs

<u>Types of eligible personnel costs</u>

A.1 Personnel costs are eligible, if they are related to personnel working for the beneficiary under an employment contract (or equivalent appointing act) and assigned to the action ('**costs for employees (or equivalent)**'). They must be limited to salaries (including during parental leave), social security contributions, taxes and other costs included in the **remuneration**, if they arise from national law or the employment contract (or equivalent appointing act).

Beneficiaries that are non-profit legal entities[1] may also declare as personnel costs **additional remuneration** for personnel assigned to the action (including payments on the basis of supplementary contracts regardless of their nature), if:

(a) it is part of the beneficiary's usual remuneration practices and is paid in a consistent manner whenever the same kind of work or expertise is required;

(b) the criteria used to calculate the supplementary payments are objective and generally applied by the beneficiary, regardless of the source of funding used.

'Additional remuneration' means any part of the remuneration which exceeds what the person would be paid for time worked in projects funded by national schemes.

Additional remuneration for personnel assigned to the action is eligible up to the following amount:

(a) if the person works full time and exclusively on the action during the full year: up to EUR 8 000;

(b) if the person works exclusively on the action but not full-time or not for the full year: up to the corresponding pro-rata amount of EUR 8 000, or

(c) if the person does not work exclusively on the action: up to a pro-rata amount calculated as follows:

{{EUR 8 000

divided by

the number of annual productive hours (see below)},

multiplied by

the number of hours that the person has worked on the action during the year}.

A.2 The **costs for natural persons working under a direct contract** with the beneficiary other than an employment contract are eligible personnel costs, if:

(a) the person works under conditions similar to those of an employee (in particular regarding the way the work is organised, the tasks that are performed and the premises where they are performed);

(b) the result of the work carried out belongs to the beneficiary (unless exceptionally agreed otherwise), and

[1] For the definition, see Article 2.1(14) of the Rules for Participation Regulation No 1290/2013: '**non-profit legal entity**' means a legal entity which by its legal form is non-profit-making or which has a legal or statutory obligation not to distribute profits to its shareholders or individual members.

(c) the costs are not significantly different from those for personnel performing similar tasks under an employment contract with the beneficiary.

A.3 The **costs of personnel seconded by a third party against payment** are eligible personnel costs, if the conditions in Article 11.1 are met.

A.4 **Costs of owners** of beneficiaries that are small and medium-sized enterprises ('**SME owners**') who are working on the action and who do not receive a salary are eligible personnel costs, if they correspond to the amount per unit set out in Annex 2a multiplied by the number of actual hours worked on the action.

A.5 **Costs of 'beneficiaries that are natural persons'** not receiving a salary are eligible personnel costs, if they correspond to the amount per unit set out in Annex 2a multiplied by the number of actual hours worked on the action.

Calculation

Personnel costs must be calculated by the beneficiaries as follows:

{{hourly rate

multiplied by

the number of actual hours worked on the action},

plus

for non-profit legal entities: additional remuneration to personnel assigned to the action under the conditions set out above (Point A.1)}.

The number of actual hours declared for a person must be identifiable and verifiable (see Article 18).

The total number of hours declared in EU or Euratom grants, for a person for a year, cannot be higher than the annual productive hours used for the calculations of the hourly rate. Therefore, the maximum number of hours that can be declared for the grant are:

{number of annual productive hours for the year (see below)

minus

total number of hours declared by the beneficiary, for that person in that year, for other EU or Euratom grants}.

The '**hourly rate**' is one of the following:

(a) for personnel costs declared as **actual costs** (i.e. budget categories A.1, A.2, A.3): the hourly rate is calculated *per full financial year*, as follows:

{actual annual personnel costs (excluding additional remuneration) for the person

divided by

number of annual productive hours}.

using the personnel costs and the number of productive hours for each full financial year covered by the reporting period concerned. If a financial year is not closed at the end of the

reporting period, the beneficiaries must use the hourly rate of the last closed financial year available.

For the 'number of annual productive hours', the beneficiaries may choose one of the following:

(i) 'fixed number of hours': 1 720 hours for persons working full time (or corresponding pro-rata for persons not working full time);

(ii) 'individual annual productive hours': the total number of hours worked by the person in the year for the beneficiary, calculated as follows:

{annual workable hours of the person (according to the employment contract, applicable collective labour agreement or national law)

plus

overtime worked

minus

absences (such as sick leave and special leave)}.

'Annual workable hours' means the period during which the personnel must be working, at the employer's disposal and carrying out his/her activity or duties under the employment contract, applicable collective labour agreement or national working time legislation.

If the contract (or applicable collective labour agreement or national working time legislation) does not allow to determine the annual workable hours, this option cannot be used;

(iii) 'standard annual productive hours': the 'standard number of annual hours' generally applied by the beneficiary for its personnel in accordance with its usual cost accounting practices. This number must be at least 90% of the 'standard annual workable hours'.

If there is no applicable reference for the standard annual workable hours, this option cannot be used.

For all options, the actual time spent on **parental leave** by a person assigned to the action may be deducted from the number of annual productive hours.

As an alternative, beneficiaries may calculate the hourly rate *per month*, as follows:

{actual monthly personnel cost (excluding additional remuneration) for the person

divided by

{number of annual productive hours / 12}}

using the personnel costs for each month and (one twelfth of) the annual productive hours calculated according to either option (i) or (iii) above, i.e.:

- fixed number of hours or
- standard annual productive hours.

Time spent on **parental leave** may not be deducted when calculating the hourly rate per month. However, beneficiaries may declare personnel costs incurred in periods of parental leave in proportion to the time the person worked on the action in that financial year.

If parts of a basic remuneration are generated over a period longer than a month, the beneficiaries may include only the share which is generated in the month (irrespective of the amount actually paid for that month).

Each beneficiary must use only one option (per full financial year or per month) for each full financial year;

(b) for personnel costs declared on the basis of **unit costs** (i.e. budget categories A.1, A.2, A.4, A.5): the hourly rate is one of the following:

(i) for SME owners or beneficiaries that are natural persons: the hourly rate set out in Annex 2a (see Points A.4 and A.5 above), or

(ii) for personnel costs declared on the basis of the beneficiary's usual cost accounting practices: the hourly rate calculated by the beneficiary in accordance with its usual cost accounting practices, if:

- the cost accounting practices used are applied in a consistent manner, based on objective criteria, regardless of the source of funding;

- the hourly rate is calculated using the actual personnel costs recorded in the beneficiary's accounts, excluding any ineligible cost or costs included in other budget categories.

  The actual personnel costs may be adjusted by the beneficiary on the basis of budgeted or estimated elements. Those elements must be relevant for calculating the personnel costs, reasonable and correspond to objective and verifiable information;

and

- the hourly rate is calculated using the number of annual productive hours (see above).

B. Direct costs of subcontracting (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are eligible if the conditions in Article 13.1.1 are met.

C. Direct costs of providing financial support to third parties

Not applicable

D. Other direct costs

D.1 **Travel costs and related subsistence allowances** (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are eligible if they are in line with the beneficiary's usual practices on travel.

D.2 The **depreciation costs of equipment, infrastructure or other assets** (new or second-hand) as recorded in the beneficiary's accounts are eligible, if they were purchased in accordance with

Article 10.1.1 and written off in accordance with international accounting standards and the beneficiary's usual accounting practices.

The **costs of renting or leasing** equipment, infrastructure or other assets (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are also eligible, if they do not exceed the depreciation costs of similar equipment, infrastructure or assets and do not include any financing fees.

The costs of equipment, infrastructure or other assets **contributed in-kind against payment** are eligible, if they do not exceed the depreciation costs of similar equipment, infrastructure or assets, do not include any financing fees and if the conditions in Article 11.1 are met.

The only portion of the costs that will be taken into account is that which corresponds to the duration of the action and rate of actual use for the purposes of the action.

D.3 **Costs of other goods and services** (including related duties, taxes and charges such as non-deductible value added tax (VAT) paid by the beneficiary) are eligible, if they are:

(a) purchased specifically for the action and in accordance with Article 10.1.1 or

(b) contributed in kind against payment and in accordance with Article 11.1.

Such goods and services include, for instance, consumables and supplies, dissemination (including open access), protection of results, certificates on the financial statements (if they are required by the Agreement), certificates on the methodology, translations and publications.

D.4 **Capitalised and operating costs of 'large research infrastructure'**[2] directly used for the action are eligible, if:

(a) the value of the large research infrastructure represents at least 75% of the total fixed assets (at historical value in its last closed balance sheet before the date of the signature of the Agreement or as determined on the basis of the rental and leasing costs of the research infrastructure[3]);

(b) the beneficiary's methodology for declaring the costs for large research infrastructure has been positively assessed by the Commission ('**ex-ante assessment**');

(c) the beneficiary declares as direct eligible costs only the portion which corresponds to the duration of the action and the rate of actual use for the purposes of the action, and

(d) they comply with the conditions as further detailed in the annotations to the H2020 grant agreements.

[2] '**Large research infrastructure**' means research infrastructure of a total value of at least EUR 20 million, for a beneficiary, calculated as the sum of historical asset values of each individual research infrastructure of that beneficiary, as they appear in its last closed balance sheet before the date of the signature of the Agreement or as determined on the basis of the rental and leasing costs of the research infrastructure.

[3] For the definition, see Article 2(6) of the H2020 Framework Programme Regulation No 1291/2013: '**Research infrastructure**' are facilities, resources and services that are used by the research communities to conduct research and foster innovation in their fields. Where relevant, they may be used beyond research, e.g. for education or public services. They include: major scientific equipment (or sets of instruments); knowledge-based resources such as collections, archives or scientific data; e-infrastructures such as data and computing systems and communication networks; and any other infrastructure of a unique nature essential to achieve excellence in research and innovation. Such infrastructures may be 'single-sited', 'virtual' or 'distributed'.

D.5 **Costs of internally invoiced goods and services** directly used for the action are eligible, if:

(a) they are declared on the basis of a unit cost calculated in accordance with the beneficiary's usual cost accounting practices;

(b) the cost accounting practices used are applied in a consistent manner, based on objective criteria, regardless of the source of funding;

(c) the unit cost is calculated using the actual costs for the good or service recorded in the beneficiary's accounts, excluding any ineligible cost or costs included in other budget categories.

The actual costs may be adjusted by the beneficiary on the basis of budgeted or estimated elements. Those elements must be relevant for calculating the costs, reasonable and correspond to objective and verifiable information;

(d) the unit cost excludes any costs of items which are not directly linked to the production of the invoiced goods or service.

'Internally invoiced goods and services' means goods or services which are provided by the beneficiary directly for the action and which the beneficiary values on the basis of its usual cost accounting practices.

E. Indirect costs

Indirect costs are eligible if they are declared on the basis of the flat-rate of 25% of the eligible direct costs (see Article 5.2 and Points A to D above), from which are excluded:

(a) costs of subcontracting and

(b) costs of in-kind contributions provided by third parties which are not used on the beneficiary's premises;

(c) not applicable;

(d) not applicable.

Beneficiaries receiving an operating grant[4] financed by the EU or Euratom budget cannot declare indirect costs for the period covered by the operating grant, unless they can demonstrate that the operating grant does not cover any costs of the action.

F. Specific cost category(ies)

Not applicable

6.3 Conditions for costs of linked third parties to be eligible

[4] For the definition, see Article 121(1)(b) of Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002 ('**Financial Regulation No 966/2012**')(OJ L 218, 26.10.2012, p.1): '**operating grant**' means direct financial contribution, by way of donation, from the budget in order to finance the functioning of a body which pursues an aim of general EU interest or has an objective forming part of and supporting an EU policy.

Costs incurred by linked third parties are eligible if they fulfil — *mutatis mutandis* — the general and specific conditions for eligibility set out in this Article (Article 6.1 and 6.2) and Article 14.1.1.

6.4 Conditions for in-kind contributions provided by third parties free of charge to be eligible

In-kind contributions provided free of charge are eligible direct costs (for the beneficiary or linked third party), if the costs incurred by the third party fulfil — *mutatis mutandis* — the general and specific conditions for eligibility set out in this Article (Article 6.1 and 6.2) and Article 12.1.

6.5 Ineligible costs

'**Ineligible costs**' are:

(a) costs that do not comply with the conditions set out above (Article 6.1 to 6.4), in particular:

(i) costs related to return on capital;

(ii) debt and debt service charges;

(iii) provisions for future losses or debts;

(iv) interest owed;

(v) doubtful debts;

(vi) currency exchange losses;

(vii) bank costs charged by the beneficiary's bank for transfers from the Agency;

(viii) excessive or reckless expenditure;

(ix) deductible VAT;

(x) costs incurred during suspension of the implementation of the action (see Article 49);

(b) costs declared under another EU or Euratom grant (including grants awarded by a Member State and financed by the EU or Euratom budget and grants awarded by bodies other than the Agency for the purpose of implementing the EU or Euratom budget); in particular, indirect costs if the beneficiary is already receiving an operating grant financed by the EU or Euratom budget in the same period, unless it can demonstrate that the operating grant does not cover any costs of the action.

6.6 Consequences of declaration of ineligible costs

Declared costs that are ineligible will be rejected (see Article 42).

This may also lead to any of the other measures described in Chapter 6.

CHAPTER 4 RIGHTS AND OBLIGATIONS OF THE PARTIES

SECTION 1 RIGHTS AND OBLIGATIONS RELATED TO IMPLEMENTING THE ACTION

ARTICLE 7 — GENERAL OBLIGATION TO PROPERLY IMPLEMENT THE ACTION

7.1 General obligation to properly implement the action

The beneficiaries must implement the action as described in Annex 1 and in compliance with the provisions of the Agreement and all legal obligations under applicable EU, international and national law.

7.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 8 — RESOURCES TO IMPLEMENT THE ACTION — THIRD PARTIES INVOLVED IN THE ACTION

The beneficiaries must have the appropriate resources to implement the action.

If it is necessary to implement the action, the beneficiaries may:

- purchase goods, works and services (see Article 10);
- use in-kind contributions provided by third parties against payment (see Article 11);
- use in-kind contributions provided by third parties free of charge (see Article 12);
- call upon subcontractors to implement action tasks described in Annex 1 (see Article 13);
- call upon linked third parties to implement action tasks described in Annex 1 (see Article 14);
- call upon international partners to implement action tasks described in Annex 1 (see Article 14a).

In these cases, the beneficiaries retain sole responsibility towards the Agency and the other beneficiaries for implementing the action.

ARTICLE 9 — IMPLEMENTATION OF ACTION TASKS BY BENEFICIARIES NOT RECEIVING EU FUNDING

Not applicable

ARTICLE 10 — PURCHASE OF GOODS, WORKS OR SERVICES

10.1 Rules for purchasing goods, works or services

10.1.1 If necessary to implement the action, the beneficiaries may purchase goods, works or services.

The beneficiaries must make such purchases ensuring the best value for money or, if appropriate, the lowest price. In doing so, they must avoid any conflict of interests (see Article 35).

The beneficiaries must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards their contractors.

10.1.2 Beneficiaries that are 'contracting authorities' within the meaning of Directive 2004/18/EC[5] (or 2014/24/EU[6]) or 'contracting entities' within the meaning of Directive 2004/17/EC[7] (or 2014/25/EU[8]) must comply with the applicable national law on public procurement.

10.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under Article 10.1.1, the costs related to the contract concerned will be ineligible (see Article 6) and will be rejected (see Article 42).

If a beneficiary breaches any of its obligations under Article 10.1.2, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 11 — USE OF IN-KIND CONTRIBUTIONS PROVIDED BY THIRD PARTIES AGAINST PAYMENT

11.1 Rules for the use of in-kind contributions against payment

If necessary to implement the action, the beneficiaries may use in-kind contributions provided by third parties against payment.

The beneficiaries may declare costs related to the payment of in-kind contributions as eligible (see Article 6.1 and 6.2), up to the third parties' costs for the seconded persons, contributed equipment, infrastructure or other assets or other contributed goods and services.

The third parties and their contributions must be set out in Annex 1. The Agency may however approve in-kind contributions not set out in Annex 1 without amendment (see Article 55), if:

- they are specifically justified in the periodic technical report and
- their use does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiaries must ensure that the Agency, the Commission, the European Court of Auditors

[5] Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public work contracts, public supply contracts and public service contracts (OJ L 134, 30.04.2004, p. 114).

[6] Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC. (OJ L 94, 28.03.2014, p. 65).

[7] Directive 2004/17/EC of the European Parliament and of the Council of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors (OJ L 134, 30.04.2004, p. 1)

[8] Directive 2014/25/EU of the European Parliament and of the Council of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC (OJ L 94, 28.03.2014, p. 243).

(ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards the third parties.

11.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the costs related to the payment of the in-kind contribution will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 12 — USE OF IN-KIND CONTRIBUTIONS PROVIDED BY THIRD PARTIES FREE OF CHARGE

12.1 Rules for the use of in-kind contributions free of charge

If necessary to implement the action, the beneficiaries may use in-kind contributions provided by third parties free of charge.

The beneficiaries may declare costs incurred by the third parties for the seconded persons, contributed equipment, infrastructure or other assets or other contributed goods and services as eligible in accordance with Article 6.4.

The third parties and their contributions must be set out in Annex 1. The Agency may however approve in-kind contributions not set out in Annex 1 without amendment (see Article 55), if:

- they are specifically justified in the periodic technical report and
- their use does not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiaries must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards the third parties.

12.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the costs incurred by the third parties related to the in-kind contribution will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 13 — IMPLEMENTATION OF ACTION TASKS BY SUBCONTRACTORS

13.1 Rules for subcontracting action tasks

13.1.1 If necessary to implement the action, the beneficiaries may award subcontracts covering the implementation of certain action tasks described in Annex 1.

Subcontracting may cover only a limited part of the action.

The beneficiaries must award the subcontracts ensuring the best value for money or, if appropriate, the lowest price. In doing so, they must avoid any conflict of interests (see Article 35).

The tasks to be implemented and the estimated cost for each subcontract must be set out in Annex 1 and the total estimated costs of subcontracting per beneficiary must be set out in Annex 2. The Agency may however approve subcontracts not set out in Annex 1 and 2 without amendment (see Article 55), if:

- they are specifically justified in the periodic technical report and
- they do not entail changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

The beneficiaries must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards their subcontractors.

13.1.2 The beneficiaries must ensure that their obligations under Articles 35, 36, 38 and 46 also apply to the subcontractors.

Beneficiaries that are 'contracting authorities' within the meaning of Directive 2004/18/EC (or 2014/24/EU) or 'contracting entities' within the meaning of Directive 2004/17/EC (or 2014/25/EU) must comply with the applicable national law on public procurement.

13.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under Article 13.1.1, the costs related to the subcontract concerned will be ineligible (see Article 6) and will be rejected (see Article 42).

If a beneficiary breaches any of its obligations under Article 13.1.2, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 14 — IMPLEMENTATION OF ACTION TASKS BY LINKED THIRD PARTIES

14.1 Rules for calling upon linked third parties to implement part of the action

14.1.1 The following **affiliated entities**[10] and **third parties with a legal link to a beneficiary**[11] ('**linked third parties**') may implement the action tasks attributed to them in Annex 1:

[10] For the definition see Article 2.1(2) Rules for Participation Regulation No 1290/2013: '**affiliated entity**' means any legal entity that is:
- under the direct or indirect control of a participant, or
- under the same direct or indirect control as the participant, or
- directly or indirectly controlling a participant.

'Control' may take any of the following forms:
(a) the direct or indirect holding of more than 50% of the nominal value of the issued share capital in the legal entity concerned, or of a majority of the voting rights of the shareholders or associates of that entity;
(b) the direct or indirect holding, in fact or in law, of decision-making powers in the legal entity concerned.

However the following relationships between legal entities shall not in themselves be deemed to constitute controlling relationships:
(a) the same public investment corporation, institutional investor or venture-capital company has a direct or indirect holding of more than 50% of the nominal value of the issued share capital or a majority of voting rights of the shareholders or associates;
(b) the legal entities concerned are owned or supervised by the same public body.

- ARMALAM SRL (Armalam), affiliated or linked to DTTN
- X-LAM DOLOMITI SRL (X-LAM DOLOMITI), affiliated or linked to DTTN
- FANTI LEGNAMI SRL (FANTI LEGNAMI), affiliated or linked to DTTN

The linked third parties may declare as eligible the costs they incur for implementing the action tasks in accordance with Article 6.3.

The beneficiaries must ensure that the Agency, the Commission, the European Court of Auditors (ECA) and the European Anti-Fraud Office (OLAF) can exercise their rights under Articles 22 and 23 also towards their linked third parties.

14.1.2 The beneficiaries must ensure that their obligations under Articles 18, 20, 35, 36 and 38 also apply to their linked third parties.

14.2 Consequences of non-compliance

If any obligation under Article 14.1.1 is breached, the costs of the linked third party will be ineligible (see Article 6) and will be rejected (see Article 42).

If any obligation under Article 14.1.2 is breached, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 14a — IMPLEMENTATION OF ACTION TASKS BY INTERNATIONAL PARTNERS

Not applicable

ARTICLE 15 — FINANCIAL SUPPORT TO THIRD PARTIES

15.1 Rules for providing financial support to third parties

Not applicable

15.2 Financial support in the form of prizes

Not applicable

15.3 Consequences of non-compliance

Not applicable

ARTICLE 16 — PROVISION OF TRANS-NATIONAL OR VIRTUAL ACCESS TO RESEARCH INFRASTRUCTURE

16.1 Rules for providing trans-national access to research infrastructure

[11] '**Third party with a legal link to a beneficiary**' is any legal entity which has a legal link to the beneficiary implying collaboration that is not limited to the action.

Not applicable

16.2 Rules for providing virtual access to research infrastructure

Not applicable

16.3 Consequences of non-compliance

Not applicable

SECTION 2 RIGHTS AND OBLIGATIONS RELATED TO THE GRANT ADMINISTRATION

ARTICLE 17 — GENERAL OBLIGATION TO INFORM

17.1 General obligation to provide information upon request

The beneficiaries must provide — during implementation of the action or afterwards and in accordance with Article 41.2 — any information requested in order to verify eligibility of the costs, proper implementation of the action and compliance with any other obligation under the Agreement.

17.2 Obligation to keep information up to date and to inform about events and circumstances likely to affect the Agreement

Each beneficiary must keep information stored in the Participant Portal Beneficiary Register (via the electronic exchange system; see Article 52) up to date, in particular, its name, address, legal representatives, legal form and organisation type.

Each beneficiary must immediately inform the coordinator — which must immediately inform the Agency and the other beneficiaries — of any of the following:

(a) **events** which are likely to affect significantly or delay the implementation of the action or the EU's financial interests, in particular:

  (i) changes in its legal, financial, technical, organisational or ownership situation or those of its linked third parties and

  (ii) changes in the name, address, legal form, organisation type of its linked third parties;

(b) **circumstances** affecting:

  (i) the decision to award the grant or

  (ii) compliance with requirements under the Agreement.

17.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 18 — KEEPING RECORDS — SUPPORTING DOCUMENTATION

18.1 Obligation to keep records and other supporting documentation

The beneficiaries must — for a period of five years after the payment of the balance — keep records and other supporting documentation in order to prove the proper implementation of the action and the costs they declare as eligible.

They must make them available upon request (see Article 17) or in the context of checks, reviews, audits or investigations (see Article 22).

If there are on-going checks, reviews, audits, investigations, litigation or other pursuits of claims under the Agreement (including the extension of findings; see Article 22), the beneficiaries must keep the records and other supporting documentation until the end of these procedures.

The beneficiaries must keep the original documents. Digital and digitalised documents are considered originals if they are authorised by the applicable national law. The Agency may accept non-original documents if it considers that they offer a comparable level of assurance.

18.1.1 Records and other supporting documentation on the scientific and technical implementation

The beneficiaries must keep records and other supporting documentation on scientific and technical implementation of the action in line with the accepted standards in the respective field.

18.1.2 Records and other documentation to support the costs declared

The beneficiaries must keep the records and documentation supporting the costs declared, in particular the following:

(a) for **actual costs**: adequate records and other supporting documentation to prove the costs declared, such as contracts, subcontracts, invoices and accounting records. In addition, the beneficiaries' usual cost accounting practices and internal control procedures must enable direct reconciliation between the amounts declared, the amounts recorded in their accounts and the amounts stated in the supporting documentation;

(b) for **unit costs**: adequate records and other supporting documentation to prove the number of units declared. Beneficiaries do not need to identify the actual eligible costs covered or to keep or provide supporting documentation (such as accounting statements) to prove the amount per unit.

In addition, **for unit costs calculated in accordance with the beneficiary's usual cost accounting practices**, the beneficiaries must keep adequate records and documentation to prove that the cost accounting practices used comply with the conditions set out in Article 6.2.

The beneficiaries and linked third parties may submit to the Commission, for approval, a certificate (drawn up in accordance with Annex 6) stating that their usual cost accounting practices comply with these conditions (‘**certificate on the methodology**’). If the certificate is approved, costs declared in line with this methodology will not be challenged subsequently, unless the beneficiaries have concealed information for the purpose of the approval.

(c) for **flat-rate costs**: adequate records and other supporting documentation to prove the eligibility

of the costs to which the flat-rate is applied. The beneficiaries do not need to identify the costs covered or provide supporting documentation (such as accounting statements) to prove the amount declared at a flat-rate.

In addition, for **personnel costs** (declared as actual costs or on the basis of unit costs), the beneficiaries must keep **time records** for the number of hours declared. The time records must be in writing and approved by the persons working on the action and their supervisors, at least monthly. In the absence of reliable time records of the hours worked on the action, the Agency may accept alternative evidence supporting the number of hours declared, if it considers that it offers an adequate level of assurance.

As an exception, for **persons working exclusively on the action**, there is no need to keep time records, if the beneficiary signs a **declaration** confirming that the persons concerned have worked exclusively on the action.

For costs declared by linked third parties (see Article 14), it is the beneficiary that must keep the originals of the financial statements and the certificates on the financial statements of the linked third parties.

18.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, costs insufficiently substantiated will be ineligible (see Article 6) and will be rejected (see Article 42), and the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 19 — SUBMISSION OF DELIVERABLES

19.1 Obligation to submit deliverables

The coordinator must submit the '**deliverables**' identified in Annex 1, in accordance with the timing and conditions set out in it.

19.2 Consequences of non-compliance

If the coordinator breaches any of its obligations under this Article, the Agency may apply any of the measures described in Chapter 6.

ARTICLE 20 — REPORTING — PAYMENT REQUESTS

20.1 Obligation to submit reports

The coordinator must submit to the Agency (see Article 52) the technical and financial reports set out in this Article. These reports include requests for payment and must be drawn up using the forms and templates provided in the electronic exchange system (see Article 52).

20.2 Reporting periods

The action is divided into the following '**reporting periods**':

- RP1: from month 1 to month 18
- RP2: from month 19 to month 36
- RP3: from month 37 to month 48

20.3 Periodic reports — Requests for interim payments

The coordinator must submit a periodic report within 60 days following the end of each reporting period.

The **periodic report** must include the following:

(a) a '**periodic technical report**' containing:

(i) an **explanation of the work carried out** by the beneficiaries;

(ii) an **overview of the progress** towards the objectives of the action, including milestones and deliverables identified in Annex 1.

This report must include explanations justifying the differences between work expected to be carried out in accordance with Annex 1 and that actually carried out.

The report must detail the exploitation and dissemination of the results and — if required in Annex 1 — an updated '**plan for the exploitation and dissemination of the results**'.

The report must indicate the communication activities;

(iii) a **summary** for publication by the Agency;

(iv) the answers to the '**questionnaire**', covering issues related to the action implementation and the economic and societal impact, notably in the context of the Horizon 2020 key performance indicators and the Horizon 2020 monitoring requirements;

(b) a '**periodic financial report**' containing:

(i) an '**individual financial statement**' (see Annex 4) from each beneficiary and from each linked third party, for the reporting period concerned.

The individual financial statement must detail the eligible costs (actual costs, unit costs and flat-rate costs; see Article 6) for each budget category (see Annex 2).

The beneficiaries and linked third parties must declare all eligible costs, even if — for actual costs, unit costs and flat-rate costs — they exceed the amounts indicated in the estimated budget (see Annex 2). Amounts which are not declared in the individual financial statement will not be taken into account by the Agency.

If an individual financial statement is not submitted for a reporting period, it may be included in the periodic financial report for the next reporting period.

The individual financial statements of the last reporting period must also detail the **receipts of the action** (see Article 5.3.3).

Each beneficiary and each linked third party must **certify** that:

- the information provided is full, reliable and true;
- the costs declared are eligible (see Article 6);
- the costs can be substantiated by adequate records and supporting documentation (see Article 18) that will be produced upon request (see Article 17) or in the context of checks, reviews, audits and investigations (see Article 22), and
- for the last reporting period: that all the receipts have been declared (see Article 5.3.3);

(ii) an **explanation of the use of resources** and the information on subcontracting (see Article 13) and in-kind contributions provided by third parties (see Articles 11 and 12) from each beneficiary and from each linked third party, for the reporting period concerned;

(iii) not applicable;

(iv) a '**periodic summary financial statement**', created automatically by the electronic exchange system, consolidating the individual financial statements for the reporting period concerned and including — except for the last reporting period — the **request for interim payment**.

20.4 Final report — Request for payment of the balance

In addition to the periodic report for the last reporting period, the coordinator must submit the final report within 60 days following the end of the last reporting period.

The **final report** must include the following:

(a) a '**final technical report**' with a **summary** for publication containing:

(i) an overview of the results and their exploitation and dissemination;

(ii) the conclusions on the action, and

(iii) the socio-economic impact of the action;

(b) a '**final financial report**' containing:

(i) a '**final summary financial statement**', created automatically by the electronic exchange system, consolidating the individual financial statements for all reporting periods and including the **request for payment of the balance** and

(ii) a '**certificate on the financial statements**' (drawn up in accordance with Annex 5) for each beneficiary and for each linked third party, if it requests a total contribution of EUR 325 000 or more, as reimbursement of actual costs and unit costs calculated on the basis of its usual cost accounting practices (see Article 5.2 and Article 6.2).

20.5 Information on cumulative expenditure incurred

Not applicable

20.6 Currency for financial statements and conversion into euro

Financial statements must be drafted in euro.

Beneficiaries and linked third parties with accounting established in a currency other than the euro must convert the costs recorded in their accounts into euro, at the average of the daily exchange rates published in the C series of the *Official Journal of the European Union*, calculated over the corresponding reporting period.

If no daily euro exchange rate is published in the *Official Journal of the European Union* for the currency in question, they must be converted at the average of the monthly accounting rates published on the Commission's website, calculated over the corresponding reporting period.

Beneficiaries and linked third parties with accounting established in euro must convert costs incurred in another currency into euro according to their usual accounting practices.

20.7 Language of reports

All reports (technical and financial reports, including financial statements) must be submitted in the language of the Agreement.

20.8 Consequences of non-compliance

If the reports submitted do not comply with this Article, the Agency may suspend the payment deadline (see Article 47) and apply any of the other measures described in Chapter 6.

If the coordinator breaches its obligation to submit the reports and if it fails to comply with this obligation within 30 days following a written reminder, the Agency may terminate the Agreement (see Article 50) or apply any of the other measures described in Chapter 6.

ARTICLE 21 — PAYMENTS AND PAYMENT ARRANGEMENTS

21.1 Payments to be made

The following payments will be made to the coordinator:

- one **pre-financing payment**;
- one or more **interim payments**, on the basis of the request(s) for interim payment (see Article 20), and
- one **payment of the balance**, on the basis of the request for payment of the balance (see Article 20).

21.2 Pre-financing payment — Amount — Amount retained for the Guarantee Fund

The aim of the pre-financing is to provide the beneficiaries with a float.

It remains the property of the EU until the payment of the balance.

The amount of the pre-financing payment will be EUR **10 665 817.89** (ten million six hundred and sixty five thousand eight hundred and seventeen EURO and eighty nine eurocents).

The Agency will — except if Article 48 applies — make the pre-financing payment to the coordinator within 30 days, either from the entry into force of the Agreement (see Article 58) or from 10 days before the starting date of the action (see Article 3), whichever is the latest.

An amount of EUR **999 920.43** (nine hundred and ninety nine thousand nine hundred and twenty EURO and forty three eurocents), corresponding to 5% of the maximum grant amount (see Article 5.1), is retained by the Agency from the pre-financing payment and transferred into the '**Guarantee Fund**'.

21.3 Interim payments — Amount — Calculation

Interim payments reimburse the eligible costs incurred for the implementation of the action during the corresponding reporting periods.

The Agency will pay to the coordinator the amount due as interim payment within 90 days from receiving the periodic report (see Article 20.3), except if Articles 47 or 48 apply.

Payment is subject to the approval of the periodic report. Its approval does not imply recognition of the compliance, authenticity, completeness or correctness of its content.

The **amount due as interim payment** is calculated by the Agency in the following steps:

Step 1 — Application of the reimbursement rates

Step 2 — Limit to 90% of the maximum grant amount

21.3.1 Step 1 — Application of the reimbursement rates

The reimbursement rate(s) (see Article 5.2) are applied to the eligible costs (actual costs, unit costs and flat-rate costs; see Article 6) declared by the beneficiaries and the linked third parties (see Article 20) and approved by the Agency (see above) for the concerned reporting period.

21.3.2 Step 2 — Limit to 90% of the maximum grant amount

The total amount of pre-financing and interim payments must not exceed 90% of the maximum grant amount set out in Article 5.1. The maximum amount for the interim payment will be calculated as follows:

{90% of the maximum grant amount (see Article 5.1)

minus

{pre-financing and previous interim payments}}.

21.4 Payment of the balance — Amount — Calculation — Release of the amount retained for the Guarantee Fund

The payment of the balance reimburses the remaining part of the eligible costs incurred by the beneficiaries for the implementation of the action.

If the total amount of earlier payments is greater than the final grant amount (see Article 5.3), the payment of the balance takes the form of a recovery (see Article 44).

If the total amount of earlier payments is lower than the final grant amount, the Agency will pay the balance within 90 days from receiving the final report (see Article 20.4), except if Articles 47 or 48 apply.

Payment is subject to the approval of the final report. Its approval does not imply recognition of the compliance, authenticity, completeness or correctness of its content.

The **amount due as the balance** is calculated by the Agency by deducting the total amount of pre-financing and interim payments (if any) already made, from the final grant amount determined in accordance with Article 5.3:

{final grant amount (see Article 5.3)

minus

{pre-financing and interim payments (if any) made}}.

At the payment of the balance, the amount retained for the Guarantee Fund (see above) will be released and:

- if the balance is positive: the amount released will be paid in full to the coordinator together with the amount due as the balance;
- if the balance is negative (payment of the balance taking the form of recovery): it will be deducted from the amount released (see Article 44.1.2). If the resulting amount:
    - is positive, it will be paid to the coordinator
    - is negative, it will be recovered.

The amount to be paid may however be offset — without the beneficiaries' consent — against any other amount owed by a beneficiary to the Agency, the Commission or another executive agency (under the EU or Euratom budget), up to the maximum EU contribution indicated, for that beneficiary, in the estimated budget (see Annex 2).

21.5 Notification of amounts due

When making payments, the Agency will formally notify to the coordinator the amount due, specifying whether it concerns an interim payment or the payment of the balance.

For the payment of the balance, the notification will also specify the final grant amount.

In the case of reduction of the grant or recovery of undue amounts, the notification will be preceded by the contradictory procedure set out in Articles 43 and 44.

21.6 Currency for payments

The Agency will make all payments in euro.

21.7 Payments to the coordinator — Distribution to the beneficiaries

Payments will be made to the coordinator.

Payments to the coordinator will discharge the Agency from its payment obligation.

The coordinator must distribute the payments between the beneficiaries without unjustified delay.

Pre-financing may however be distributed only:

(a) if the minimum number of beneficiaries set out in the call for proposals has acceded to the Agreement (see Article 56) and

(b) to beneficiaries that have acceded to the Agreement (see Article 56).

21.8 Bank account for payments

All payments will be made to the following bank account:

Name of bank: DNB BANK ASA
Full name of the account holder: NORGES TEKNISK NATURVITENSKAPELIGEUNIVERSITET NTNU
IBAN code: NO8174500447293

21.9 Costs of payment transfers

The cost of the payment transfers is borne as follows:

- the Agency bears the cost of transfers charged by its bank;
- the beneficiary bears the cost of transfers charged by its bank;
- the party causing a repetition of a transfer bears all costs of the repeated transfer.

21.10 Date of payment

Payments by the Agency are considered to have been carried out on the date when they are debited to its account.

21.11 Consequences of non-compliance

21.11.1 If the Agency does not pay within the payment deadlines (see above), the beneficiaries are entitled to **late-payment interest** at the rate applied by the European Central Bank (ECB) for its main refinancing operations in euros (‘reference rate’), plus three and a half points. The reference rate is the rate in force on the first day of the month in which the payment deadline expires, as published in the C series of the *Official Journal of the European Union*.

If the late-payment interest is lower than or equal to EUR 200, it will be paid to the coordinator only upon request submitted within two months of receiving the late payment.

Late-payment interest is not due if all beneficiaries are EU Member States (including regional and local government authorities or other public bodies acting on behalf of a Member State for the purpose of this Agreement).

Suspension of the payment deadline or payments (see Articles 47 and 48) will not be considered as late payment.

Late-payment interest covers the period running from the day following the due date for payment (see above), up to and including the date of payment.

Late-payment interest is not considered for the purposes of calculating the final grant amount.

21.11.2 If the coordinator breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement or the participation of the coordinator may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 22 — CHECKS, REVIEWS, AUDITS AND INVESTIGATIONS — EXTENSION OF FINDINGS

22.1 Checks, reviews and audits by the Agency and the Commission

22.1.1 Right to carry out checks

The Agency or the Commission will — during the implementation of the action or afterwards — check the proper implementation of the action and compliance with the obligations under the Agreement, including assessing deliverables and reports.

For this purpose the Agency or the Commission may be assisted by external persons or bodies.

The Agency or the Commission may also request additional information in accordance with Article 17. The Agency or the Commission may request beneficiaries to provide such information to it directly.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

22.1.2 Right to carry out reviews

The Agency or the Commission may — during the implementation of the action or afterwards — carry out reviews on the proper implementation of the action (including assessment of deliverables and reports), compliance with the obligations under the Agreement and continued scientific or technological relevance of the action.

Reviews may be started up to two years after the payment of the balance. They will be formally notified to the coordinator or beneficiary concerned and will be considered to have started on the date of the formal notification.

If the review is carried out on a third party (see Articles 10 to 16), the beneficiary concerned must inform the third party.

The Agency or the Commission may carry out reviews directly (using its own staff) or indirectly (using external persons or bodies appointed to do so). It will inform the coordinator or beneficiary concerned of the identity of the external persons or bodies. They have the right to object to the appointment on grounds of commercial confidentiality.

The coordinator or beneficiary concerned must provide — within the deadline requested — any information and data in addition to deliverables and reports already submitted (including information

on the use of resources). The Agency or the Commission may request beneficiaries to provide such information to it directly.

The coordinator or beneficiary concerned may be requested to participate in meetings, including with external experts.

For **on-the-spot** reviews, the beneficiaries must allow access to their sites and premises, including to external persons or bodies, and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the review findings, a '**review report**' will be drawn up.

The Agency or the Commission will formally notify the review report to the coordinator or beneficiary concerned, which has 30 days to formally notify observations ('**contradictory review procedure**').

Reviews (including review reports) are in the language of the Agreement.

22.1.3 Right to carry out audits

The Agency or the Commission may — during the implementation of the action or afterwards — carry out audits on the proper implementation of the action and compliance with the obligations under the Agreement.

Audits may be started up to two years after the payment of the balance. They will be formally notified to the coordinator or beneficiary concerned and will be considered to have started on the date of the formal notification.

If the audit is carried out on a third party (see Articles 10 to 16), the beneficiary concerned must inform the third party.

The Agency or the Commission may carry out audits directly (using its own staff) or indirectly (using external persons or bodies appointed to do so). It will inform the coordinator or beneficiary concerned of the identity of the external persons or bodies. They have the right to object to the appointment on grounds of commercial confidentiality.

The coordinator or beneficiary concerned must provide — within the deadline requested — any information (including complete accounts, individual salary statements or other personal data) to verify compliance with the Agreement. The Agency or the Commission may request beneficiaries to provide such information to it directly.

For **on-the-spot** audits, the beneficiaries must allow access to their sites and premises, including to external persons or bodies, and must ensure that information requested is readily available.

Information provided must be accurate, precise and complete and in the format requested, including electronic format.

On the basis of the audit findings, a '**draft audit report**' will be drawn up.

The Agency or the Commission will formally notify the draft audit report to the coordinator or beneficiary concerned, which has 30 days to formally notify observations ('**contradictory audit procedure**'). This period may be extended by the Agency or the Commission in justified cases.

The '**final audit report**' will take into account observations by the coordinator or beneficiary concerned. The report will be formally notified to it.

Audits (including audit reports) are in the language of the Agreement.

The Agency or the Commission may also access the beneficiaries' statutory records for the periodical assessment of unit costs or flat-rate amounts.

22.2 Investigations by the European Anti-Fraud Office (OLAF)

Under Regulations No 883/2013[16] and No 2185/96[17] (and in accordance with their provisions and procedures), the European Anti-Fraud Office (OLAF) may — at any moment during implementation of the action or afterwards — carry out investigations, including on-the-spot checks and inspections, to establish whether there has been fraud, corruption or any other illegal activity affecting the financial interests of the EU.

22.3 Checks and audits by the European Court of Auditors (ECA)

Under Article 287 of the Treaty on the Functioning of the European Union (TFEU) and Article 161 of the Financial Regulation No 966/2012[18], the European Court of Auditors (ECA) may — at any moment during implementation of the action or afterwards — carry out audits.

The ECA has the right of access for the purpose of checks and audits.

22.4 Checks, reviews, audits and investigations for international organisations

Not applicable

22.5 Consequences of findings in checks, reviews, audits and investigations — Extension of findings

22.5.1 Findings in this grant

Findings in checks, reviews, audits or investigations carried out in the context of this grant may lead to the rejection of ineligible costs (see Article 42), reduction of the grant (see Article 43), recovery of undue amounts (see Article 44) or to any of the other measures described in Chapter 6.

Rejection of costs or reduction of the grant after the payment of the balance will lead to a revised final grant amount (see Article 5.4).

Findings in checks, reviews, audits or investigations may lead to a request for amendment for the modification of Annex 1 (see Article 55).

[16] Regulation (EU, Euratom) No 883/2013 of the European Parliament and of the Council of 11 September 2013 concerning investigations conducted by the European Anti-Fraud Office (OLAF) and repealing Regulation (EC) No 1073/1999 of the European Parliament and of the Council and Council Regulation (Euratom) No 1074/1999 (OJ L 248, 18.09.2013, p. 1).

[17] Council Regulation (Euratom, EC) No 2185/1996 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities (OJ L 292, 15.11.1996, p. 2).

[18] Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002 (OJ L 298, 26.10.2012, p. 1).

Checks, reviews, audits or investigations that find systemic or recurrent errors, irregularities, fraud or breach of obligations may also lead to consequences in other EU or Euratom grants awarded under similar conditions ('**extension of findings from this grant to other grants**').

Moreover, findings arising from an OLAF investigation may lead to criminal prosecution under national law.

22.5.2 Findings in other grants

The Agency or the Commission may extend findings from other grants to this grant ('**extension of findings from other grants to this grant**'), if:

(a) the beneficiary concerned is found, in other EU or Euratom grants awarded under similar conditions, to have committed systemic or recurrent errors, irregularities, fraud or breach of obligations that have a material impact on this grant and

(b) those findings are formally notified to the beneficiary concerned — together with the list of grants affected by the findings — no later than two years after the payment of the balance of this grant.

The extension of findings may lead to the rejection of costs (see Article 42), reduction of the grant (see Article 43), recovery of undue amounts (see Article 44), suspension of payments (see Article 48), suspension of the action implementation (see Article 49) or termination (see Article 50).

22.5.3 Procedure

The Agency or the Commission will formally notify the beneficiary concerned the systemic or recurrent errors and its intention to extend these audit findings, together with the list of grants affected.

22.5.3.1 If the findings concern **eligibility of costs**: the formal notification will include:

(a) an invitation to submit observations on the list of grants affected by the findings;

(b) the request to submit **revised financial statements** for all grants affected;

(c) the **correction rate for extrapolation** established by the Agency or the Commission on the basis of the systemic or recurrent errors, to calculate the amounts to be rejected if the beneficiary concerned:

(i) considers that the submission of revised financial statements is not possible or practicable or

(ii) does not submit revised financial statements.

The beneficiary concerned has 90 days from receiving notification to submit observations, revised financial statements or to propose a duly substantiated **alternative correction method**. This period may be extended by the Agency or the Commission in justified cases.

The Agency or the Commission may then start a rejection procedure in accordance with Article 42, on the basis of:

- the revised financial statements, if approved;

- the proposed alternative correction method, if accepted

or

- the initially notified correction rate for extrapolation, if it does not receive any observations or revised financial statements, does not accept the observations or the proposed alternative correction method or does not approve the revised financial statements.

22.5.3.2 If the findings concern **substantial errors**, **irregularities or fraud** or **serious breach of obligations**: the formal notification will include:

(a) an invitation to submit observations on the list of grants affected by the findings and

(b) the flat-rate the Agency or the Commission intends to apply according to the principle of proportionality.

The beneficiary concerned has 90 days from receiving notification to submit observations or to propose a duly substantiated alternative flat-rate.

The Agency or the Commission may then start a reduction procedure in accordance with Article 43, on the basis of:

- the proposed alternative flat-rate, if accepted

or

- the initially notified flat-rate, if it does not receive any observations or does not accept the observations or the proposed alternative flat-rate.

22.6 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, any insufficiently substantiated costs will be ineligible (see Article 6) and will be rejected (see Article 42).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 23 — EVALUATION OF THE IMPACT OF THE ACTION

23.1 Right to evaluate the impact of the action

The Agency or the Commission may carry out interim and final evaluations of the impact of the action measured against the objective of the EU programme.

Evaluations may be started during implementation of the action and up to five years after the payment of the balance. The evaluation is considered to start on the date of the formal notification to the coordinator or beneficiaries.

The Agency or the Commission may make these evaluations directly (using its own staff) or indirectly (using external bodies or persons it has authorised to do so).

The coordinator or beneficiaries must provide any information relevant to evaluate the impact of the action, including information in electronic format.

23.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the Agency may apply the measures described in Chapter 6.

SECTION 3 RIGHTS AND OBLIGATIONS RELATED TO BACKGROUND AND RESULTS

SUBSECTION 1 GENERAL

ARTICLE 23a — MANAGEMENT OF INTELLECTUAL PROPERTY

23a.1 Obligation to take measures to implement the Commission Recommendation on the management of intellectual property in knowledge transfer activities

Beneficiaries that are universities or other public research organisations must take measures to implement the principles set out in Points 1 and 2 of the Code of Practice annexed to the Commission Recommendation on the management of intellectual property in knowledge transfer activities[19].

This does not change the obligations set out in Subsections 2 and 3 of this Section.

The beneficiaries must ensure that researchers and third parties involved in the action are aware of them.

23a.2 Consequences of non-compliance

If a beneficiary breaches its obligations under this Article, the Agency may apply any of the measures described in Chapter 6.

SUBSECTION 2 RIGHTS AND OBLIGATIONS RELATED TO BACKGROUND

ARTICLE 24 — AGREEMENT ON BACKGROUND

24.1 Agreement on background

The beneficiaries must identify and agree (in writing) on the background for the action ('**agreement on background**').

'**Background**' means any data, know-how or information — whatever its form or nature (tangible or intangible), including any rights such as intellectual property rights — that:

(a) is held by the beneficiaries before they acceded to the Agreement, and

(b) is needed to implement the action or exploit the results.

24.2 Consequences of non-compliance

[19] Commission Recommendation C(2008) 1329 of 10.4.2008 on the management of intellectual property in knowledge transfer activities and the Code of Practice for universities and other public research institutions attached to this recommendation.

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 25 — ACCESS RIGHTS TO BACKGROUND

25.1 Exercise of access rights — Waiving of access rights — No sub-licensing

To exercise access rights, this must first be requested in writing ('**request for access**').

'**Access rights**' means rights to use results or background under the terms and conditions laid down in this Agreement.

Waivers of access rights are not valid unless in writing.

Unless agreed otherwise, access rights do not include the right to sub-license.

25.2 Access rights for other beneficiaries, for implementing their own tasks under the action

The beneficiaries must give each other access — on a royalty-free basis — to background needed to implement their own tasks under the action, unless the beneficiary that holds the background has — before acceding to the Agreement —:

(a) informed the other beneficiaries that access to its background is subject to legal restrictions or limits, including those imposed by the rights of third parties (including personnel), or

(b) agreed with the other beneficiaries that access would not be on a royalty-free basis.

25.3 Access rights for other beneficiaries, for exploiting their own results

The beneficiaries must give each other access — under fair and reasonable conditions — to background needed for exploiting their own results, unless the beneficiary that holds the background has — before acceding to the Agreement — informed the other beneficiaries that access to its background is subject to legal restrictions or limits, including those imposed by the rights of third parties (including personnel).

'**Fair and reasonable conditions**' means appropriate conditions, including possible financial terms or royalty-free conditions, taking into account the specific circumstances of the request for access, for example the actual or potential value of the results or background to which access is requested and/or the scope, duration or other characteristics of the exploitation envisaged.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

25.4 Access rights for affiliated entities

Unless otherwise agreed in the consortium agreement, access to background must also be given — under fair and reasonable conditions (see above; Article 25.3) and unless it is subject to legal restrictions or limits, including those imposed by the rights of third parties (including personnel) —

to affiliated entities[20] established in an EU Member State or '**associated country**'[21], if this is needed to exploit the results generated by the beneficiaries to which they are affiliated.

Unless agreed otherwise (see above; Article 25.1), the affiliated entity concerned must make the request directly to the beneficiary that holds the background.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

25.5 Access rights for third parties

Not applicable

25.6 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

SUBSECTION 3 RIGHTS AND OBLIGATIONS RELATED TO RESULTS

ARTICLE 26 — OWNERSHIP OF RESULTS

26.1 Ownership by the beneficiary that generates the results

Results are owned by the beneficiary that generates them.

'**Results**' means any (tangible or intangible) output of the action such as data, knowledge or information — whatever its form or nature, whether it can be protected or not — that is generated in the action, as well as any rights attached to it, including intellectual property rights.

26.2 Joint ownership by several beneficiaries

Two or more beneficiaries own results jointly if:

(a) they have jointly generated them and

(b) it is not possible to:

(i) establish the respective contribution of each beneficiary, or

(ii) separate them for the purpose of applying for, obtaining or maintaining their protection (see Article 27).

[20] For the definition, see 'affiliated entity' footnote (Article 14.1).

[21] For the definition, see Article 2.1(3) of the Rules for Participation Regulation No 1290/2013: '**associated country**' means a third country which is party to an international agreement with the Union, as identified in Article 7 of Horizon 2020 Framework Programme Regulation No 1291/2013. Article 7 sets out the conditions for association of non-EU countries to Horizon 2020.

The joint owners must agree (in writing) on the allocation and terms of exercise of their joint ownership ('**joint ownership agreement**'), to ensure compliance with their obligations under this Agreement.

Unless otherwise agreed in the joint ownership agreement, each joint owner may grant non-exclusive licences to third parties to exploit jointly-owned results (without any right to sub-license), if the other joint owners are given:

(a) at least 45 days advance notice and

(b) fair and reasonable compensation.

Once the results have been generated, joint owners may agree (in writing) to apply another regime than joint ownership (such as, for instance, transfer to a single owner (see Article 30) with access rights for the others).

26.3 Rights of third parties (including personnel)

If third parties (including personnel) may claim rights to the results, the beneficiary concerned must ensure that it complies with its obligations under the Agreement.

If a third party generates results, the beneficiary concerned must obtain all necessary rights (transfer, licences or other) from the third party, in order to be able to respect its obligations as if those results were generated by the beneficiary itself.

If obtaining the rights is impossible, the beneficiary must refrain from using the third party to generate the results.

26.4 Agency ownership, to protect results

26.4.1 The Agency may — with the consent of the beneficiary concerned — assume ownership of results to protect them, if a beneficiary intends — up to four years after the period set out in Article 3 — to disseminate its results without protecting them, except in any of the following cases:

(a) the lack of protection is because protecting the results is not possible, reasonable or justified (given the circumstances);

(b) the lack of protection is because there is a lack of potential for commercial or industrial exploitation, or

(c) the beneficiary intends to transfer the results to another beneficiary or third party established in an EU Member State or associated country, which will protect them.

Before the results are disseminated and unless any of the cases above under Points (a), (b) or (c) applies, the beneficiary must formally notify the Agency and at the same time inform it of any reasons for refusing consent. The beneficiary may refuse consent only if it can show that its legitimate interests would suffer significant harm.

If the Agency decides to assume ownership, it will formally notify the beneficiary concerned within 45 days of receiving notification.

No dissemination relating to these results may take place before the end of this period or, if the Agency takes a positive decision, until it has taken the necessary steps to protect the results.

26.4.2 The Agency may — with the consent of the beneficiary concerned — assume ownership of results to protect them, if a beneficiary intends — up to four years after the period set out in Article 3 — to stop protecting them or not to seek an extension of protection, except in any of the following cases:

(a) the protection is stopped because of a lack of potential for commercial or industrial exploitation;

(b) an extension would not be justified given the circumstances.

A beneficiary that intends to stop protecting results or not seek an extension must — unless any of the cases above under Points (a) or (b) applies — formally notify the Agency at least 60 days before the protection lapses or its extension is no longer possible and at the same time inform it of any reasons for refusing consent. The beneficiary may refuse consent only if it can show that its legitimate interests would suffer significant harm.

If the Agency decides to assume ownership, it will formally notify the beneficiary concerned within 45 days of receiving notification.

26.5 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to the any of the other measures described in Chapter 6.

ARTICLE 27 — PROTECTION OF RESULTS — VISIBILITY OF EU FUNDING

27.1 Obligation to protect the results

Each beneficiary must examine the possibility of protecting its results and must adequately protect them — for an appropriate period and with appropriate territorial coverage — if:

(a) the results can reasonably be expected to be commercially or industrially exploited and

(b) protecting them is possible, reasonable and justified (given the circumstances).

When deciding on protection, the beneficiary must consider its own legitimate interests and the legitimate interests (especially commercial) of the other beneficiaries.

27.2 Agency ownership, to protect the results

If a beneficiary intends not to protect its results, to stop protecting them or not seek an extension of protection, the Agency may — under certain conditions (see Article 26.4) — assume ownership to ensure their (continued) protection.

27.3 Information on EU funding

Applications for protection of results (including patent applications) filed by or on behalf of a beneficiary must — unless the Agency requests or agrees otherwise or unless it is impossible — include the following:

> "The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036723".

27.4 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such a breach may also lead to any of the other measures described in Chapter 6.

ARTICLE 28 — EXPLOITATION OF RESULTS

28.1 Obligation to exploit the results

Each beneficiary must — up to four years after the period set out in Article 3 — take measures aiming to ensure '**exploitation**' of its results (either directly or indirectly, in particular through transfer or licensing; see Article 30) by:

(a) using them in further research activities (outside the action);

(b) developing, creating or marketing a product or process;

(c) creating and providing a service, or

(d) using them in standardisation activities.

This does not change the security obligations in Article 37, which still apply.

28.2 Results that could contribute to European or international standards — Information on EU funding

If results could reasonably be expected to contribute to European or international standards, the beneficiary concerned must — up to four years after the period set out in Article 3 — inform the Agency.

If results are incorporated in a standard, the beneficiary concerned must — unless the Agency requests or agrees otherwise or unless it is impossible — ask the standardisation body to include the following statement in (information related to) the standard:

> "Results incorporated in this standard received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036723".

28.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced in accordance with Article 43.

Such a breach may also lead to any of the other measures described in Chapter 6.

ARTICLE 29 — DISSEMINATION OF RESULTS — OPEN ACCESS — VISIBILITY OF EU FUNDING

29.1 Obligation to disseminate results

Unless it goes against their legitimate interests, each beneficiary must — as soon as possible —

'**disseminate**' its results by disclosing them to the public by appropriate means (other than those resulting from protecting or exploiting the results), including in scientific publications (in any medium).

This does not change the obligation to protect results in Article 27, the confidentiality obligations in Article 36, the security obligations in Article 37 or the obligations to protect personal data in Article 39, all of which still apply.

A beneficiary that intends to disseminate its results must give advance notice to the other beneficiaries of — unless agreed otherwise — at least 45 days, together with sufficient information on the results it will disseminate.

Any other beneficiary may object within — unless agreed otherwise — 30 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the dissemination may not take place unless appropriate steps are taken to safeguard these legitimate interests.

If a beneficiary intends not to protect its results, it may — under certain conditions (see Article 26.4.1) — need to formally notify the Agency before dissemination takes place.

29.2 Open access to scientific publications

Each beneficiary must ensure open access (free of charge online access for any user) to all peer-reviewed scientific publications relating to its results.

In particular, it must:

(a) as soon as possible and at the latest on publication, deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publications;

Moreover, the beneficiary must aim to deposit at the same time the research data needed to validate the results presented in the deposited scientific publications.

(b) ensure open access to the deposited publication — via the repository — at the latest:

(i) on publication, if an electronic version is available for free via the publisher, or

(ii) within six months of publication (twelve months for publications in the social sciences and humanities) in any other case.

(c) ensure open access — via the repository — to the bibliographic metadata that identify the deposited publication.

The bibliographic metadata must be in a standard format and must include all of the following:

- the terms "European Union (EU)" and "Horizon 2020";
- the name of the action, acronym and grant number;
- the publication date, and length of embargo period if applicable, and
- a persistent identifier.

29.3 Open access to research data

Regarding the digital research data generated in the action ('**data**'), the beneficiaries must:

(a) deposit in a research data repository and take measures to make it possible for third parties to access, mine, exploit, reproduce and disseminate — free of charge for any user — the following:

(i) the data, including associated metadata, needed to validate the results presented in scientific publications, as soon as possible;

(ii) not applicable;

(iii) other data, including associated metadata, as specified and within the deadlines laid down in the 'data management plan' (see Annex 1);

(b) provide information — via the repository — about tools and instruments at the disposal of the beneficiaries and necessary for validating the results (and — where possible — provide the tools and instruments themselves).

This does not change the obligation to protect results in Article 27, the confidentiality obligations in Article 36, the security obligations in Article 37 or the obligations to protect personal data in Article 39, all of which still apply.

As an exception, the beneficiaries do not have to ensure open access to specific parts of their research data under Point (a)(i) and (iii), if the achievement of the action's main objective (as described in Annex 1) would be jeopardised by making those specific parts of the research data openly accessible. In this case, the data management plan must contain the reasons for not giving access.

29.4 Information on EU funding — Obligation and right to use the EU emblem

Unless the Agency requests or agrees otherwise or unless it is impossible, any dissemination of results (in any form, including electronic) must:

(a) display the EU emblem and

(b) include the following text:

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036723".

When displayed together with another logo, the EU emblem must have appropriate prominence.

For the purposes of their obligations under this Article, the beneficiaries may use the EU emblem without first obtaining approval from the Agency.

This does not however give them the right to exclusive use.

Moreover, they may not appropriate the EU emblem or any similar trademark or logo, either by registration or by any other means.

29.5 Disclaimer excluding Agency responsibility

Any dissemination of results must indicate that it reflects only the author's view and that the Agency is not responsible for any use that may be made of the information it contains.

29.6 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such a breach may also lead to any of the other measures described in Chapter 6.

ARTICLE 30 — TRANSFER AND LICENSING OF RESULTS

30.1 Transfer of ownership

Each beneficiary may transfer ownership of its results.

It must however ensure that its obligations under Articles 26.2, 26.4, 27, 28, 29, 30 and 31 also apply to the new owner and that this owner has the obligation to pass them on in any subsequent transfer.

This does not change the security obligations in Article 37, which still apply.

Unless agreed otherwise (in writing) for specifically-identified third parties or unless impossible under applicable EU and national laws on mergers and acquisitions, a beneficiary that intends to transfer ownership of results must give at least 45 days advance notice (or less if agreed in writing) to the other beneficiaries that still have (or still may request) access rights to the results. This notification must include sufficient information on the new owner to enable any beneficiary concerned to assess the effects on its access rights.

Unless agreed otherwise (in writing) for specifically-identified third parties, any other beneficiary may object within 30 days of receiving notification (or less if agreed in writing), if it can show that the transfer would adversely affect its access rights. In this case, the transfer may not take place until agreement has been reached between the beneficiaries concerned.

30.2 Granting licenses

Each beneficiary may grant licences to its results (or otherwise give the right to exploit them), if:

(a) this does not impede the access rights under Article 31 and

(b) not applicable.

In addition to Points (a) and (b), exclusive licences for results may be granted only if all the other beneficiaries concerned have waived their access rights (see Article 31.1).

This does not change the dissemination obligations in Article 29 or security obligations in Article 37, which still apply.

30.3 Agency right to object to transfers or licensing

Not applicable

30.4 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such a breach may also lead to any of the other measures described in Chapter 6.

ARTICLE 31 — ACCESS RIGHTS TO RESULTS

31.1 Exercise of access rights — Waiving of access rights — No sub-licensing

The conditions set out in Article 25.1 apply.

The obligations set out in this Article do not change the security obligations in Article 37, which still apply.

31.2 Access rights for other beneficiaries, for implementing their own tasks under the action

The beneficiaries must give each other access — on a royalty-free basis — to results needed for implementing their own tasks under the action.

31.3 Access rights for other beneficiaries, for exploiting their own results

The beneficiaries must give each other — under fair and reasonable conditions (see Article 25.3) — access to results needed for exploiting their own results.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

31.4 Access rights of affiliated entities

Unless agreed otherwise in the consortium agreement, access to results must also be given — under fair and reasonable conditions (Article 25.3) — to affiliated entities established in an EU Member State or associated country, if this is needed for those entities to exploit the results generated by the beneficiaries to which they are affiliated.

Unless agreed otherwise (see above; Article 31.1), the affiliated entity concerned must make any such request directly to the beneficiary that owns the results.

Requests for access may be made — unless agreed otherwise — up to one year after the period set out in Article 3.

31.5 Access rights for the EU institutions, bodies, offices or agencies and EU Member States

The beneficiaries must give access to their results — on a royalty-free basis — to EU institutions, bodies, offices or agencies, for developing, implementing or monitoring EU policies or programmes.

Such access rights are limited to non-commercial and non-competitive use.

This does not change the right to use any material, document or information received from the beneficiaries for communication and publicising activities (see Article 38.2).

31.6 Access rights for third parties

Not applicable

31.7 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

SECTION 4 OTHER RIGHTS AND OBLIGATIONS

ARTICLE 32 — RECRUITMENT AND WORKING CONDITIONS FOR RESEARCHERS

32.1 Obligation to take measures to implement the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers

The beneficiaries must take all measures to implement the principles set out in the Commission Recommendation on the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers[23], in particular regarding:

- working conditions;
- transparent recruitment processes based on merit, and
- career development.

The beneficiaries must ensure that researchers and third parties involved in the action are aware of them.

32.2 Consequences of non-compliance

If a beneficiary breaches its obligations under this Article, the Agency may apply any of the measures described in Chapter 6.

ARTICLE 33 — GENDER EQUALITY

33.1 Obligation to aim for gender equality

The beneficiaries must take all measures to promote equal opportunities between men and women in the implementation of the action. They must aim, to the extent possible, for a gender balance at all levels of personnel assigned to the action, including at supervisory and managerial level.

33.2 Consequences of non-compliance

If a beneficiary breaches its obligations under this Article, the Agency may apply any of the measures described in Chapter 6.

[23] Commission Recommendation 2005/251/EC of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers (OJ L 75, 22.3.2005, p. 67).

ARTICLE 34 — ETHICS AND RESEARCH INTEGRITY

34.1 Obligation to comply with ethical and research integrity principles

The beneficiaries must carry out the action in compliance with:

(a) ethical principles (including the highest standards of research integrity)

and

(b) applicable international, EU and national law.

Funding will not be granted for activities carried out outside the EU if they are prohibited in all Member States or for activities which destroy human embryos (for example, for obtaining stem cells).

The beneficiaries must ensure that the activities under the action have an exclusive focus on civil applications.

The beneficiaries must ensure that the activities under the action do not:

(a) aim at human cloning for reproductive purposes;

(b) intend to modify the genetic heritage of human beings which could make such changes heritable (with the exception of research relating to cancer treatment of the gonads, which may be financed), or

(c) intend to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

In addition, the beneficiaries must respect the fundamental principle of research integrity — as set out, for instance, in the European Code of Conduct for Research Integrity[24].

This implies compliance with the following fundamental principles:

- **reliability** in ensuring the quality of research reflected in the design, the methodology, the analysis and the use of resources;

- **honesty** in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair and unbiased way;

- **respect** for colleagues, research participants, society, ecosystems, cultural heritage and the environment;

- **accountability** for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts

and means that beneficiaries must ensure that persons carrying out research tasks follow the good research practices and refrain from the research integrity violations described in this Code.

[24] European Code of Conduct for Research Integrity of ALLEA (All European Academies) http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020-ethics_code-of-conduct_en.pdf

This does not change the other obligations under this Agreement or obligations under applicable international, EU or national law, all of which still apply.

34.2 Activities raising ethical issues

Activities raising ethical issues must comply with the '**ethics requirements**' set out as deliverables in Annex 1.

Before the beginning of an activity raising an ethical issue, each beneficiary must have obtained:

(a) any ethics committee opinion required under national law and

(b) any notification or authorisation for activities raising ethical issues required under national and/or European law

needed for implementing the action tasks in question.

The documents must be kept on file and be submitted upon request by the coordinator to the Agency (see Article 52). If they are not in English, they must be submitted together with an English summary, which shows that the action tasks in question are covered and includes the conclusions of the committee or authority concerned (if available).

34.3 Activities involving human embryos or human embryonic stem cells

Activities involving research on human embryos or human embryonic stem cells may be carried out, in addition to Article 34.1, only if:

- they are set out in Annex 1 or

- the coordinator has obtained explicit approval (in writing) from the Agency (see Article 52).

34.4 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement or participation of the beneficiary may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 35 — CONFLICT OF INTERESTS

35.1 Obligation to avoid a conflict of interests

The beneficiaries must take all measures to prevent any situation where the impartial and objective implementation of the action is compromised for reasons involving economic interest, political or national affinity, family or emotional ties or any other shared interest ('**conflict of interests**').

They must formally notify to the Agency without delay any situation constituting or likely to lead to a conflict of interests and immediately take all the necessary steps to rectify this situation.

The Agency may verify that the measures taken are appropriate and may require additional measures to be taken by a specified deadline.

35.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43) and the Agreement or participation of the beneficiary may be terminated (see Article 50).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 36 — CONFIDENTIALITY

36.1 General obligation to maintain confidentiality

During implementation of the action and for four years after the period set out in Article 3, the parties must keep confidential any data, documents or other material (in any form) that is identified as confidential at the time it is disclosed ('**confidential information**').

If a beneficiary requests, the Agency may agree to keep such information confidential for an additional period beyond the initial four years.

If information has been identified as confidential only orally, it will be considered to be confidential only if this is confirmed in writing within 15 days of the oral disclosure.

Unless otherwise agreed between the parties, they may use confidential information only to implement the Agreement.

The beneficiaries may disclose confidential information to their personnel or third parties involved in the action only if they:

(a) need to know to implement the Agreement and

(b) are bound by an obligation of confidentiality.

This does not change the security obligations in Article 37, which still apply.

The Agency may disclose confidential information to its staff, other EU institutions and bodies. It may disclose confidential information to third parties, if:

(a) this is necessary to implement the Agreement or safeguard the EU's financial interests and

(b) the recipients of the information are bound by an obligation of confidentiality.

Under the conditions set out in Article 4 of the Rules for Participation Regulation No 1290/2013[25], the Commission must moreover make available information on the results to other EU institutions, bodies, offices or agencies as well as Member States or associated countries.

The confidentiality obligations no longer apply if:

(a) the disclosing party agrees to release the other party;

[25] Regulation (EU) No 1290/2013 of the European Parliament and of the Council of 11 December 2013 laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" (OJ L 347, 20.12.2013 p.81).

(b) the information was already known by the recipient or is given to him without obligation of confidentiality by a third party that was not bound by any obligation of confidentiality;

(c) the recipient proves that the information was developed without the use of confidential information;

(d) the information becomes generally and publicly available, without breaching any confidentiality obligation, or

(e) the disclosure of the information is required by EU or national law.

36.2 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 37 — SECURITY-RELATED OBLIGATIONS

37.1 Results with a security recommendation

Not applicable

37.2 Classified information

Not applicable

37.3 Activities involving dual-use goods or dangerous materials and substances

Not applicable

37.4 Consequences of non-compliance

Not applicable

ARTICLE 38 — PROMOTING THE ACTION — VISIBILITY OF EU FUNDING

38.1 Communication activities by beneficiaries

38.1.1 Obligation to promote the action and its results

The beneficiaries must promote the action and its results, by providing targeted information to multiple audiences (including the media and the public) in a strategic and effective manner.

This does not change the dissemination obligations in Article 29, the confidentiality obligations in Article 36 or the security obligations in Article 37, all of which still apply.

Before engaging in a communication activity expected to have a major media impact, the beneficiaries must inform the Agency (see Article 52).

38.1.2 Information on EU funding — Obligation and right to use the EU emblem

Unless the Agency requests or agrees otherwise or unless it is impossible, any communication activity related to the action (including in electronic form, via social media, etc.) and any infrastructure, equipment and major results funded by the grant must:

(a) display the EU emblem and

(b) include the following text:

For communication activities:

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036723".

For infrastructure, equipment and major results:

"This *[infrastructure][equipment][insert type of result]* is part of a project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036723".

When displayed together with another logo, the EU emblem must have appropriate prominence.

For the purposes of their obligations under this Article, the beneficiaries may use the EU emblem without first obtaining approval from the Agency.

This does not, however, give them the right to exclusive use.

Moreover, they may not appropriate the EU emblem or any similar trademark or logo, either by registration or by any other means.

38.1.3 Disclaimer excluding Agency and Commission responsibility

Any communication activity related to the action must indicate that it reflects only the author's view and that the Agency and the Commission are not responsible for any use that may be made of the information it contains.

38.2 Communication activities by the Agency and the Commission

38.2.1 Right to use beneficiaries' materials, documents or information

The Agency and the Commission may use, for its communication and publicising activities, information relating to the action, documents notably summaries for publication and public deliverables as well as any other material, such as pictures or audio-visual material received from any beneficiary (including in electronic form).

This does not change the confidentiality obligations in Article 36 and the security obligations in Article 37, all of which still apply.

If the Agency's or the Commission's use of these materials, documents or information would risk compromising legitimate interests, the beneficiary concerned may request the Agency or the Commission not to use it (see Article 52).

The right to use a beneficiary's materials, documents and information includes:

(a) **use for its own purposes** (in particular, making them available to persons working for the Agency, the Commission or any other EU institution, body, office or agency or body or

institutions in EU Member States; and copying or reproducing them in whole or in part, in unlimited numbers);

(b) **distribution to the public** (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes);

(c) **editing or redrafting** for communication and publicising activities (including shortening, summarising, inserting other elements (such as meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation);

(d) translation;

(e) giving **access in response to individual requests** under Regulation No 1049/2001[27], without the right to reproduce or exploit;

(f) **storage** in paper, electronic or other form;

(g) **archiving**, in line with applicable document-management rules, and

(h) the right to authorise **third parties** to act on its behalf or sub-license the modes of use set out in Points (b), (c), (d) and (f) to third parties if needed for the communication and publicising activities of the Agency or the Commission.

If the right of use is subject to rights of a third party (including personnel of the beneficiary), the beneficiary must ensure that it complies with its obligations under this Agreement (in particular, by obtaining the necessary approval from the third parties concerned).

Where applicable (and if provided by the beneficiaries), the Agency or the Commission will insert the following information:

> "© – [year] – [name of the copyright owner]. All rights reserved. Licensed to the European Climate, Infrastructure and Environment Executive Agency (CINEA) and the European Union (EU) under conditions."

38.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under this Article, the grant may be reduced (see Article 43).

Such breaches may also lead to any of the other measures described in Chapter 6.

ARTICLE 39 — PROCESSING OF PERSONAL DATA

39.1 Processing of personal data by the Agency and the Commission

Any personal data under the Agreement will be processed by the Agency or the Commission under

[27] Regulation (EC) No 1049/2001 of the European Parliament and of the Council of 30 May 2001 regarding public access to European Parliament, Council and Commission documents, OJ L 145, 31.5.2001, p. 43.

Regulation No 45/2001[28] and according to the 'notifications of the processing operations' to the Data Protection Officer (DPO) of the Agency or the Commission (publicly accessible in the DPO register).

Such data will be processed by the '**data controller**' of the Agency or the Commission for the purposes of implementing, managing and monitoring the Agreement or protecting the financial interests of the EU or Euratom (including checks, reviews, audits and investigations; see Article 22).

The persons whose personal data are processed have the right to access and correct their own personal data. For this purpose, they must send any queries about the processing of their personal data to the data controller, via the contact point indicated in the privacy statement(s) that are published on the Agency and the Commission websites.

They also have the right to have recourse at any time to the European Data Protection Supervisor (EDPS).

39.2 Processing of personal data by the beneficiaries

The beneficiaries must process personal data under the Agreement in compliance with applicable EU and national law on data protection (including authorisations or notification requirements).

The beneficiaries may grant their personnel access only to data that is strictly necessary for implementing, managing and monitoring the Agreement.

The beneficiaries must inform the personnel whose personal data are collected and processed by the Agency or the Commission. For this purpose, they must provide them with the privacy statement(s) (see above), before transmitting their data to the Agency or the Commission.

39.3 Consequences of non-compliance

If a beneficiary breaches any of its obligations under Article 39.2, the Agency may apply any of the measures described in Chapter 6.

ARTICLE 40 — ASSIGNMENTS OF CLAIMS FOR PAYMENT AGAINST THE AGENCY

The beneficiaries may not assign any of their claims for payment against the Agency to any third party, except if approved by the Agency on the basis of a reasoned, written request by the coordinator (on behalf of the beneficiary concerned).

If the Agency has not accepted the assignment or the terms of it are not observed, the assignment will have no effect on it.

In no circumstances will an assignment release the beneficiaries from their obligations towards the Agency.

[28] Regulation (EC) No 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data (OJ L 8, 12.01.2001, p. 1).

CHAPTER 5 DIVISION OF BENEFICIARIES' ROLES AND RESPONSIBILITIES — RELATIONSHIP WITH COMPLEMENTARY BENEFICIARIES — RELATIONSHIP WITH PARTNERS OF A JOINT ACTION

ARTICLE 41 — DIVISION OF BENEFICIARIES' ROLES AND RESPONSIBILITIES — RELATIONSHIP WITH COMPLEMENTARY BENEFICIARIES — RELATIONSHIP WITH PARTNERS OF A JOINT ACTION

41.1 Roles and responsibility towards the Agency

The beneficiaries have full responsibility for implementing the action and complying with the Agreement.

The beneficiaries are jointly and severally liable for the **technical implementation** of the action as described in Annex 1. If a beneficiary fails to implement its part of the action, the other beneficiaries become responsible for implementing this part (without being entitled to any additional EU funding for doing so), unless the Agency expressly relieves them of this obligation.

The **financial responsibility** of each beneficiary is governed by Article 44.

41.2 Internal division of roles and responsibilities

The internal roles and responsibilities of the beneficiaries are divided as follows:

(a) Each **beneficiary** must:

(i) keep information stored in the Participant Portal Beneficiary Register (via the electronic exchange system) up to date (see Article 17);

(ii) inform the coordinator immediately of any events or circumstances likely to affect significantly or delay the implementation of the action (see Article 17);

(iii) submit to the coordinator in good time:

- individual financial statements for itself and its linked third parties and, if required, certificates on the financial statements (see Article 20);
- the data needed to draw up the technical reports (see Article 20);
- ethics committee opinions and notifications or authorisations for activities raising ethical issues (see Article 34);
- any other documents or information required by the Agency or the Commission under the Agreement, unless the Agreement requires the beneficiary to submit this information directly to the Agency or the Commission.

(b) The **coordinator** must:

(i) monitor that the action is implemented properly (see Article 7);

(ii) act as the intermediary for all communications between the beneficiaries and the Agency

(in particular, providing the Agency with the information described in Article 17), unless the Agreement specifies otherwise;

(iii) request and review any documents or information required by the Agency and verify their completeness and correctness before passing them on to the Agency;

(iv) submit the deliverables and reports to the Agency (see Articles 19 and 20);

(v) ensure that all payments are made to the other beneficiaries without unjustified delay (see Article 21);

(vi) inform the Agency of the amounts paid to each beneficiary, when required under the Agreement (see Articles 44 and 50) or requested by the Agency.

The coordinator may not delegate or subcontract the above-mentioned tasks to any other beneficiary or third party (including linked third parties).

41.3 Internal arrangements between beneficiaries — Consortium agreement

The beneficiaries must have internal arrangements regarding their operation and co-ordination to ensure that the action is implemented properly. These internal arrangements must be set out in a written '**consortium agreement**' between the beneficiaries, which may cover:

- internal organisation of the consortium;
- management of access to the electronic exchange system;
- distribution of EU funding;
- additional rules on rights and obligations related to background and results (including whether access rights remain or not, if a beneficiary is in breach of its obligations) (see Section 3 of Chapter 4);
- settlement of internal disputes;
- liability, indemnification and confidentiality arrangements between the beneficiaries.

The consortium agreement must not contain any provision contrary to the Agreement.

41.4 Relationship with complementary beneficiaries — Collaboration agreement

Not applicable

41.5 Relationship with partners of a joint action — Coordination agreement

Not applicable

CHAPTER 6 REJECTION OF COSTS — REDUCTION OF THE GRANT — RECOVERY — SANCTIONS — DAMAGES — SUSPENSION — TERMINATION — FORCE MAJEURE

SECTION 1 REJECTION OF COSTS — REDUCTION OF THE GRANT — RECOVERY — SANCTIONS

ARTICLE 42 — REJECTION OF INELIGIBLE COSTS

42.1 Conditions

The Agency will — after **termination of the participation of a beneficiary**, at the time of an **interim payment**, **at the payment of the balance** or **afterwards** — reject any costs which are ineligible (see Article 6), in particular following checks, reviews, audits or investigations (see Article 22).

The rejection may also be based on the **extension of findings from other grants to this grant** (see Article 22.5.2).

42.2 Ineligible costs to be rejected — Calculation — Procedure

Ineligible costs will be rejected in full.

If the rejection of costs does not lead to a recovery (see Article 44), the Agency will formally notify the coordinator or beneficiary concerned of the rejection of costs, the amounts and the reasons why (if applicable, together with the notification of amounts due; see Article 21.5). The coordinator or beneficiary concerned may — within 30 days of receiving notification — formally notify the Agency of its disagreement and the reasons why.

If the rejection of costs leads to a recovery, the Agency will follow the contradictory procedure with pre-information letter set out in Article 44.

42.3 Effects

If the Agency rejects costs at the time of an **interim payment** or **the payment of the balance**, it will deduct them from the total eligible costs declared, for the action, in the periodic or final summary financial statement (see Articles 20.3 and 20.4). It will then calculate the interim payment or payment of the balance as set out in Articles 21.3 or 21.4.

If the Agency rejects costs **after termination of the participation of a beneficiary**, it will deduct them from the costs declared by the beneficiary in the termination report and include the rejection in the calculation after termination (see Article 50.2 and 50.3).

If the Agency — **after an interim payment but before the payment of the balance** — rejects costs declared in a periodic summary financial statement, it will deduct them from the total eligible costs declared, for the action, in the next periodic summary financial statement or in the final summary financial statement. It will then calculate the interim payment or payment of the balance as set out in Articles 21.3 or 21.4.

If the Agency rejects costs **after the payment of the balance**, it will deduct the amount rejected from the total eligible costs declared, by the beneficiary, in the final summary financial statement. It will then calculate the revised final grant amount as set out in Article 5.4.

ARTICLE 43 — REDUCTION OF THE GRANT

43.1 Conditions

The Agency may — **after termination of the participation of a beneficiary**, **at the payment of the balance** or **afterwards** — reduce the grant amount (see Article 5.1), if :

(a) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed:

(i) substantial errors, irregularities or fraud or

(ii) serious breach of obligations under the Agreement or during the award procedure (including improper implementation of the action, submission of false information, failure to provide required information, breach of ethical principles) or

(b) a beneficiary (or a natural person who has the power to represent or take decision on its behalf) has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2).

43.2 Amount to be reduced — Calculation — Procedure

The amount of the reduction will be proportionate to the seriousness of the errors, irregularities or fraud or breach of obligations.

Before reduction of the grant, the Agency will formally notify a '**pre-information letter**' to the coordinator or beneficiary concerned:

- informing it of its intention to reduce the grant, the amount it intends to reduce and the reasons why and

- inviting it to submit observations within 30 days of receiving notification.

If the Agency does not receive any observations or decides to pursue reduction despite the observations it has received, it will formally notify **confirmation** of the reduction (if applicable, together with the notification of amounts due; see Article 21).

43.3 Effects

If the Agency reduces the grant **after termination of the participation of a beneficiary**, it will calculate the reduced grant amount for that beneficiary and then determine the amount due to that beneficiary (see Article 50.2 and 50.3).

If the Agency reduces the grant **at the payment of the balance**, it will calculate the reduced grant amount for the action and then determine the amount due as payment of the balance (see Articles 5.3.4 and 21.4).

If the Agency reduces the grant **after the payment of the balance**, it will calculate the revised final grant amount for the beneficiary concerned (see Article 5.4). If the revised final grant amount for the beneficiary concerned is lower than its share of the final grant amount, the Agency will recover the difference (see Article 44).

ARTICLE 44 — RECOVERY OF UNDUE AMOUNTS

44.1 Amount to be recovered — Calculation — Procedure

The Agency will — after **termination of the participation of a beneficiary, at the payment of the balance** or **afterwards** — claim back any amount that was paid, but is not due under the Agreement.

Each beneficiary's financial responsibility in case of recovery is limited to its own debt (including undue amounts paid by the Agency for costs declared by its linked third parties), except for the amount retained for the Guarantee Fund (see Article 21.4).

44.1.1 Recovery after termination of a beneficiary's participation

If recovery takes place after termination of a beneficiary's participation (including the coordinator), the Agency will claim back the undue amount from the beneficiary concerned, by formally notifying it a debit note (see Article 50.2 and 50.3). This note will specify the amount to be recovered, the terms and the date for payment.

If payment is not made by the date specified in the debit note, the Agency or the Commission will **recover** the amount:

(a) by '**offsetting**' it — without the beneficiary's consent — against any amounts owed to the beneficiary concerned by the Agency, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU's financial interests, the Agency or the Commission may offset before the payment date specified in the debit note;

(b) not applicable;

(c) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date specified in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the Agency or the Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC[29] applies.

44.1.2 Recovery at payment of the balance

If the payment of the balance takes the form of a recovery (see Article 21.4), the Agency will formally notify a '**pre-information letter**' to the coordinator:

- informing it of its intention to recover, the amount due as the balance and the reasons why;

[29] Directive 2007/64/EC of the European Parliament and of the Council of 13 November 2007 on payment services in the internal market amending Directives 97/7/EC, 2002/65/EC, 2005/60/EC and 2006/48/EC and repealing Directive 97/5/EC (OJ L 319, 05.12.2007, p. 1).

- specifying that it intends to deduct the amount to be recovered from the amount retained for the Guarantee Fund;

- requesting the coordinator to submit a report on the distribution of payments to the beneficiaries within 30 days of receiving notification, and

- inviting the coordinator to submit observations within 30 days of receiving notification.

If no observations are submitted or the Agency decides to pursue recovery despite the observations it has received, it will **confirm recovery** (together with the notification of amounts due; see Article 21.5) and:

- pay the difference between the amount to be recovered and the amount retained for the Guarantee Fund, **if the difference is positive** or

- formally notify to the coordinator a **debit note** for the difference between the amount to be recovered and the amount retained for the Guarantee Fund, **if the difference is negative**. This note will also specify the terms and the date for payment.

If the coordinator does not repay the Agency by the date in the debit note and has not submitted the report on the distribution of payments: the Agency or the Commission will **recover** the amount set out in the debit note from the coordinator (see below).

If the coordinator does not repay the Agency by the date in the debit note, but has submitted the report on the distribution of payments: the Agency will:

(a) identify the beneficiaries for which the amount calculated as follows is negative:

{{{{beneficiary's costs declared in the final summary financial statement and approved by the Agency multiplied by the reimbursement rate set out in Article 5.2 for the beneficiary concerned

plus

its linked third parties' costs declared in the final summary financial statement and approved by the Agency multiplied by the reimbursement rate set out in Article 5.2 for each linked third party concerned}

divided by

the EU contribution for the action calculated according to Article 5.3.1}

multiplied by

the final grant amount (see Article 5.3)},

minus

{pre-financing and interim payments received by the beneficiary}}.

(b) formally notify to each beneficiary identified according to point (a) a **debit note** specifying the terms and date for payment. The amount of the debit note is calculated as follows:

{{amount calculated according to point (a) for the beneficiary concerned

divided by

the sum of the amounts calculated according to point (a) for all the beneficiaries identified according to point (a)}

multiplied by

the amount set out in the debit note formally notified to the coordinator}.

If payment is not made by the date specified in the debit note, the Agency or the Commission will **recover** the amount:

(a) by **offsetting** it — without the beneficiary's consent — against any amounts owed to the beneficiary concerned by the Agency, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU's financial interests, the Agency or the Commission may offset before the payment date specified in the debit note;

(b) by **drawing on the Guarantee Fund**. The Agency or the Commission will formally notify the beneficiary concerned the debit note on behalf of the Guarantee Fund and recover the amount:

(i) not applicable;

(ii) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the payment date in the debit note, up to and including the date the Agency or the Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

44.1.3 Recovery of amounts after payment of the balance

If, for a beneficiary, the revised final grant amount (see Article 5.4) is lower than its share of the final grant amount, it must repay the difference to the Agency.

The beneficiary's share of the final grant amount is calculated as follows:

{{{beneficiary's costs declared in the final summary financial statement and approved by the Agency multiplied by the reimbursement rate set out in Article 5.2 for the beneficiary concerned

plus

its linked third parties' costs declared in the final summary financial statement and approved by the Agency multiplied by the reimbursement rate set out in Article 5.2 for each linked third party concerned}

divided by

the EU contribution for the action calculated according to Article 5.3.1}

multiplied by

the final grant amount (see Article 5.3)}.

If the coordinator has not distributed amounts received (see Article 21.7), the Agency will also recover these amounts.

The Agency will formally notify a **pre-information letter** to the beneficiary concerned:

- informing it of its intention to recover, the due amount and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If no observations are submitted or the Agency decides to pursue recovery despite the observations it has received, it will **confirm** the amount to be recovered and formally notify to the beneficiary concerned a **debit note**. This note will also specify the terms and the date for payment.

If payment is not made by the date specified in the debit note, the Agency or the Commission will **recover** the amount:

(a) by **offsetting** it — without the beneficiary's consent — against any amounts owed to the beneficiary concerned by the Agency, the Commission or another executive agency (from the EU or Euratom budget).

In exceptional circumstances, to safeguard the EU's financial interests, the Agency or the Commission may offset before the payment date specified in the debit note;

(b) by **drawing on the Guarantee Fund**. The Agency or the Commission will formally notify the beneficiary concerned the debit note on behalf of the Guarantee Fund and recover the amount:

(i) not applicable;

(ii) by **taking legal action** (see Article 57) or by **adopting an enforceable decision** under Article 299 of the Treaty on the Functioning of the EU (TFEU) and Article 79(2) of the Financial Regulation No 966/2012.

If payment is not made by the date in the debit note, the amount to be recovered (see above) will be increased by **late-payment interest** at the rate set out in Article 21.11, from the day following the date for payment in the debit note, up to and including the date the Agency or the Commission receives full payment of the amount.

Partial payments will be first credited against expenses, charges and late-payment interest and then against the principal.

Bank charges incurred in the recovery process will be borne by the beneficiary, unless Directive 2007/64/EC applies.

ARTICLE 45 — ADMINISTRATIVE SANCTIONS

In addition to contractual measures, the Agency or the Commission may also adopt administrative sanctions under Articles 106 and 131(4) of the Financial Regulation No 966/2012 (i.e. exclusion from future procurement contracts, grants, prizes and expert contracts and/or financial penalties).

SECTION 2 LIABILITY FOR DAMAGES

ARTICLE 46 — LIABILITY FOR DAMAGES

46.1 Liability of the Agency

The Agency cannot be held liable for any damage caused to the beneficiaries or to third parties as a consequence of implementing the Agreement, including for gross negligence.

The Agency cannot be held liable for any damage caused by any of the beneficiaries or third parties involved in the action, as a consequence of implementing the Agreement.

46.2 Liability of the beneficiaries

Except in case of force majeure (see Article 51), the beneficiaries must compensate the Agency for any damage it sustains as a result of the implementation of the action or because the action was not implemented in full compliance with the Agreement.

SECTION 3 SUSPENSION AND TERMINATION

ARTICLE 47 — SUSPENSION OF PAYMENT DEADLINE

47.1 Conditions

The Agency may — at any moment — suspend the payment deadline (see Article 21.2 to 21.4) if a request for payment (see Article 20) cannot be approved because:

(a) it does not comply with the provisions of the Agreement (see Article 20);

(b) the technical or financial reports have not been submitted or are not complete or additional information is needed, or

(c) there is doubt about the eligibility of the costs declared in the financial statements and additional checks, reviews, audits or investigations are necessary.

47.2 Procedure

The Agency will formally notify the coordinator of the suspension and the reasons why.

The suspension will **take effect** the day notification is sent by the Agency (see Article 52).

If the conditions for suspending the payment deadline are no longer met, the suspension will be **lifted** — and the remaining period will resume.

If the suspension exceeds two months, the coordinator may request the Agency if the suspension will continue.

If the payment deadline has been suspended due to the non-compliance of the technical or financial reports (see Article 20) and the revised report or statement is not submitted or was submitted but is also rejected, the Agency may also terminate the Agreement or the participation of the beneficiary (see Article 50.3.1(l)).

ARTICLE 48 — SUSPENSION OF PAYMENTS

48.1 Conditions

The Agency may — at any moment — suspend payments, in whole or in part and interim payments or the payment of the balance for one or more beneficiaries, if:

(a) a beneficiary (or a natural person who has the power to represent or take decision on its behalf) has committed or is suspected of having committed:

(i) substantial errors, irregularities or fraud or

(ii) serious breach of obligations under the Agreement or during the award procedure (including improper implementation of the action, submission of false information, failure to provide required information, breach of ethical principles) or

(b) a beneficiary (or a natural person who has the power to represent or take decision on its behalf) has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2).

If payments are suspended for one or more beneficiaries, the Agency will make partial payment(s) for the part(s) not suspended. If suspension concerns the payment of the balance, — once suspension is lifted — the payment or the recovery of the amount(s) concerned will be considered the payment of the balance that closes the action.

48.2 Procedure

Before suspending payments, the Agency will formally notify the coordinator or beneficiary concerned:

- informing it of its intention to suspend payments and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If the Agency does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify **confirmation** of the suspension. Otherwise, it will formally notify that the suspension procedure is not continued.

The suspension will **take effect** the day the confirmation notification is sent by the Agency.

If the conditions for resuming payments are met, the suspension will be **lifted**. The Agency will formally notify the coordinator or beneficiary concerned.

During the suspension, the periodic report(s) for all reporting periods except the last one (see Article 20.3), must not contain any individual financial statements from the beneficiary concerned and its linked third parties. The coordinator must include them in the next periodic report after the suspension is lifted or — if suspension is not lifted before the end of the action — in the last periodic report.

The beneficiaries may suspend implementation of the action (see Article 49.1) or terminate the Agreement or the participation of the beneficiary concerned (see Article 50.1 and 50.2).

ARTICLE 49 — SUSPENSION OF THE ACTION IMPLEMENTATION

49.1 Suspension of the action implementation, by the beneficiaries

49.1.1 Conditions

The beneficiaries may suspend implementation of the action or any part of it, if exceptional circumstances — in particular *force majeure* (see Article 51) — make implementation impossible or excessively difficult.

49.1.2 Procedure

The coordinator must immediately formally notify to the Agency the suspension (see Article 52), stating:

- the reasons why and
- the expected date of resumption.

The suspension will **take effect** the day this notification is received by the Agency.

Once circumstances allow for implementation to resume, the coordinator must immediately formally notify the Agency and request an **amendment** of the Agreement to set the date on which the action will be resumed, extend the duration of the action and make other changes necessary to adapt the action to the new situation (see Article 55) — unless the Agreement or the participation of a beneficiary has been terminated (see Article 50).

The suspension will be **lifted** with effect from the resumption date set out in the amendment. This date may be before the date on which the amendment enters into force.

Costs incurred during suspension of the action implementation are not eligible (see Article 6).

49.2 Suspension of the action implementation, by the Agency

49.2.1 Conditions

The Agency may suspend implementation of the action or any part of it, if:

(a) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed or is suspected of having committed:

  (i) substantial errors, irregularities or fraud or

  (ii) serious breach of obligations under the Agreement or during the award procedure (including improper implementation of the action, submission of false information, failure to provide required information, breach of ethical principles);

(b) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed — in other EU or Euratom grants awarded to it under similar conditions —

systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2), or

(c) the action is suspected of having lost its scientific or technological relevance.

49.2.2 Procedure

Before suspending implementation of the action, the Agency will formally notify the coordinator or beneficiary concerned:

- informing it of its intention to suspend the implementation and the reasons why and
- inviting it to submit observations within 30 days of receiving notification.

If the Agency does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify **confirmation** of the suspension. Otherwise, it will formally notify that the procedure is not continued.

The suspension will **take effect** five days after confirmation notification is received (or on a later date specified in the notification).

It will be **lifted** if the conditions for resuming implementation of the action are met.

The coordinator or beneficiary concerned will be formally notified of the lifting and the Agreement will be **amended** to set the date on which the action will be resumed, extend the duration of the action and make other changes necessary to adapt the action to the new situation (see Article 55) — unless the Agreement has already been terminated (see Article 50).

The suspension will be lifted with effect from the resumption date set out in the amendment. This date may be before the date on which the amendment enters into force.

Costs incurred during suspension are not eligible (see Article 6).

The beneficiaries may not claim damages due to suspension by the Agency (see Article 46).

Suspension of the action implementation does not affect the Agency's right to terminate the Agreement or participation of a beneficiary (see Article 50), reduce the grant or recover amounts unduly paid (see Articles 43 and 44).

ARTICLE 50 — TERMINATION OF THE AGREEMENT OR OF THE PARTICIPATION OF ONE OR MORE BENEFICIARIES

50.1 Termination of the Agreement, by the beneficiaries

50.1.1 Conditions and procedure

The beneficiaries may terminate the Agreement.

The coordinator must formally notify termination to the Agency (see Article 52), stating:

- the reasons why and

- the date the termination will take effect. This date must be after the notification.

If no reasons are given or if the Agency considers the reasons do not justify termination, the Agreement will be considered to have been '**terminated improperly**'.

The termination will **take effect** on the day specified in the notification.

50.1.2 Effects

The coordinator must — within 60 days from when termination takes effect — submit:

(i) a periodic report (for the open reporting period until termination; see Article 20.3) and

(ii) the final report (see Article 20.4).

If the Agency does not receive the reports within the deadline (see above), only costs which are included in an approved periodic report will be taken into account.

The Agency will **calculate** the final grant amount (see Article 5.3) and the balance (see Article 21.4) on the basis of the reports submitted. Only costs incurred until termination are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

Improper termination may lead to a reduction of the grant (see Article 43).

After termination, the beneficiaries' obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38, 40, 42, 43 and 44) continue to apply.

50.2 Termination of the participation of one or more beneficiaries, by the beneficiaries

50.2.1 Conditions and procedure

The participation of one or more beneficiaries may be terminated by the coordinator, on request of the beneficiary concerned or on behalf of the other beneficiaries.

The coordinator must formally notify termination to the Agency (see Article 52) and inform the beneficiary concerned.

If the coordinator's participation is terminated without its agreement, the formal notification must be done by another beneficiary (acting on behalf of the other beneficiaries).

The notification must include:

- the reasons why;
- the opinion of the beneficiary concerned (or proof that this opinion has been requested in writing);
- the date the termination takes effect. This date must be after the notification, and
- a request for amendment (see Article 55), with a proposal for reallocation of the tasks and the estimated budget of the beneficiary concerned (see Annexes 1 and 2) and, if necessary, the addition of one or more new beneficiaries (see Article 56). If termination takes effect after the period set out in Article 3, no request for amendment must be included unless the beneficiary

concerned is the coordinator. In this case, the request for amendment must propose a new coordinator.

If this information is not given or if the Agency considers that the reasons do not justify termination, the participation will be considered to have been **terminated improperly**.

The termination will **take effect** on the day specified in the notification.

50.2.2 Effects

The coordinator must — within 30 days from when termination takes effect — submit:

(i) a report on the distribution of payments to the beneficiary concerned and

(ii) if termination takes effect during the period set out in Article 3, a '**termination report**' from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, an overview of the use of resources, the individual financial statement and, if applicable, the certificate on the financial statement (see Articles 20.3 and 20.4).

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 20.3).

If the request for amendment is rejected by the Agency (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the Agreement may be terminated according to Article 50.3.1(c).

If the request for amendment is accepted by the Agency, the Agreement is **amended** to introduce the necessary changes (see Article 55).

The Agency will — on the basis of the periodic reports, the termination report and the report on the distribution of payments — **calculate** the amount which is due to the beneficiary and if the (pre-financing and interim) payments received by the beneficiary exceed this amount.

The **amount which is due** is calculated in the following steps:

Step 1 — Application of the reimbursement rate to the eligible costs

The grant amount for the beneficiary is calculated by applying the reimbursement rate(s) to the total eligible costs declared by the beneficiary and its linked third parties in the termination report and approved by the Agency.

Only costs incurred by the beneficiary concerned until termination takes effect are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

Step 2 — Reduction due to substantial errors, irregularities or fraud or serious breach of obligations

In case of a reduction (see Article 43), the Agency will calculate the reduced grant amount for the beneficiary by deducting the amount of the reduction (calculated in proportion to the seriousness of the errors, irregularities or fraud or breach

of obligations, in accordance with Article 43.2) from the grant amount for the beneficiary.

If the payments received **exceed the amounts due**:

- if termination takes effect during the period set out in Article 3 and the request for amendment is accepted, the beneficiary concerned must repay to the coordinator the amount unduly received. The Agency will formally notify the amount unduly received and request the beneficiary concerned to repay it to the coordinator within 30 days of receiving notification. If it does not repay the coordinator, the Agency will draw upon the Guarantee Fund to pay the coordinator and then notify a **debit note** on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);

- in all other cases, in particular if termination takes effect after the period set out in Article 3, the Agency will formally notify a **debit note** to the beneficiary concerned. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the Agency the amount due and the Agency will notify a debit note on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);

- if the beneficiary concerned is the former coordinator, it must repay the new coordinator according to the procedure above, unless:

  - termination takes effect after an interim payment and

  - the former coordinator has not distributed amounts received as pre-financing or interim payments (see Article 21.7).

  In this case, the Agency will formally notify a **debit note** to the former coordinator. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the Agency the amount due. The Agency will then pay the new coordinator and notify a debit note on behalf of the Guarantee Fund to the former coordinator (see Article 44).

If the payments received **do not exceed the amounts due**: amounts owed to the beneficiary concerned will be included in the next interim or final payment.

If the Agency does not receive the termination report within the deadline (see above), only costs included in an approved periodic report will be taken into account.

If the Agency does not receive the report on the distribution of payments within the deadline (see above), it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that

- the beneficiary concerned must not repay any amount to the coordinator.

Improper termination may lead to a reduction of the grant (see Article 43) or termination of the Agreement (see Article 50).

After termination, the concerned beneficiary's obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38, 40, 42, 43 and 44) continue to apply.

50.3 Termination of the Agreement or the participation of one or more beneficiaries, by the Agency

50.3.1 Conditions

The Agency may terminate the Agreement or the participation of one or more beneficiaries, if:

(a) one or more beneficiaries do not accede to the Agreement (see Article 56);

(b) a change to their legal, financial, technical, organisational or ownership situation (or those of its linked third parties) is likely to substantially affect or delay the implementation of the action or calls into question the decision to award the grant;

(c) following termination of participation for one or more beneficiaries (see above), the necessary changes to the Agreement would call into question the decision awarding the grant or breach the principle of equal treatment of applicants (see Article 55);

(d) implementation of the action is prevented by force majeure (see Article 51) or suspended by the coordinator (see Article 49.1) and either:

(i) resumption is impossible, or

(ii) the necessary changes to the Agreement would call into question the decision awarding the grant or breach the principle of equal treatment of applicants;

(e) a beneficiary is declared bankrupt, being wound up, having its affairs administered by the courts, has entered into an arrangement with creditors, has suspended business activities, or is subject to any other similar proceedings or procedures under national law;

(f) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has been found guilty of professional misconduct, proven by any means;

(g) a beneficiary does not comply with the applicable national law on taxes and social security;

(h) the action has lost scientific or technological relevance;

(i) not applicable;

(j) not applicable;

(k) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed fraud, corruption, or is involved in a criminal organisation, money laundering or any other illegal activity;

(l) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed:

(i) substantial errors, irregularities or fraud or

(ii) serious breach of obligations under the Agreement or during the award procedure (including improper implementation of the action, submission of false information, failure to provide required information, breach of ethical principles);

(m) a beneficiary (or a natural person who has the power to represent or take decisions on its behalf) has committed — in other EU or Euratom grants awarded to it under similar conditions — systemic or recurrent errors, irregularities, fraud or serious breach of obligations that have a material impact on this grant (**extension of findings from other grants to this grant**; see Article 22.5.2);

(n) despite a specific request by the Agency, a beneficiary does not request — through the coordinator — an amendment to the Agreement to end the participation of one of its linked third parties or international partners that is in one of the situations under points (e), (f), (g), (k), (l) or (m) and to reallocate its tasks.

50.3.2 Procedure

Before terminating the Agreement or participation of one or more beneficiaries, the Agency will formally notify the coordinator or beneficiary concerned:

- informing it of its intention to terminate and the reasons why and

- inviting it, within 30 days of receiving notification, to submit observations and — in case of Point (l.ii) above — to inform the Agency of the measures to ensure compliance with the obligations under the Agreement.

If the Agency does not receive observations or decides to pursue the procedure despite the observations it has received, it will formally notify to the coordinator or beneficiary concerned **confirmation** of the termination and the date it will take effect. Otherwise, it will formally notify that the procedure is not continued.

The termination will **take effect**:

- for terminations under Points (b), (c), (e), (g), (h), (j), (l.ii) and (n) above: on the day specified in the notification of the confirmation (see above);

- for terminations under Points (a), (d), (f), (i), (k), (l.i) and (m) above: on the day after the notification of the confirmation is received.

50.3.3 Effects

(a) for **termination of the Agreement**:

The coordinator must — within 60 days from when termination takes effect — submit:

(i) a periodic report (for the last open reporting period until termination; see Article 20.3) and

(ii) a final report (see Article 20.4).

If the Agreement is terminated for breach of the obligation to submit reports (see Articles 20.8 and 50.3.1(l)), the coordinator may not submit any reports after termination.

If the Agency does not receive the reports within the deadline (see above), only costs which are included in an approved periodic report will be taken into account.

The Agency will **calculate** the final grant amount (see Article 5.3) and the balance (see

Article 21.4) on the basis of the reports submitted. Only costs incurred until termination takes effect are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

This does not affect the Agency's right to reduce the grant (see Article 43) or to impose administrative sanctions (Article 45).

The beneficiaries may not claim damages due to termination by the Agency (see Article 46).

After termination, the beneficiaries' obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38, 40, 42, 43 and 44) continue to apply.

(b) for **termination of the participation of one or more beneficiaries**:

The coordinator must — within 60 days from when termination takes effect — submit:

(i) a report on the distribution of payments to the beneficiary concerned;

(ii) a request for amendment (see Article 55), with a proposal for reallocation of the tasks and estimated budget of the beneficiary concerned (see Annexes 1 and 2) and, if necessary, the addition of one or more new beneficiaries (see Article 56). If termination is notified after the period set out in Article 3, no request for amendment must be submitted unless the beneficiary concerned is the coordinator. In this case the request for amendment must propose a new coordinator, and

(iii) if termination takes effect during the period set out in Article 3, a **termination report** from the beneficiary concerned, for the open reporting period until termination, containing an overview of the progress of the work, an overview of the use of resources, the individual financial statement and, if applicable, the certificate on the financial statement (see Article 20).

The information in the termination report must also be included in the periodic report for the next reporting period (see Article 20.3).

If the request for amendment is rejected by the Agency (because it calls into question the decision awarding the grant or breaches the principle of equal treatment of applicants), the Agreement may be terminated according to Article 50.3.1(c).

If the request for amendment is accepted by the Agency, the Agreement is **amended** to introduce the necessary changes (see Article 55).

The Agency will — on the basis of the periodic reports, the termination report and the report on the distribution of payments — **calculate** the amount which is due to the beneficiary and if the (pre-financing and interim) payments received by the beneficiary exceed this amount.

The **amount which is due** is calculated in the following steps:

Step 1 — Application of the reimbursement rate to the eligible costs

The grant amount for the beneficiary is calculated by applying the reimbursement rate(s) to the total eligible costs declared by the beneficiary and its linked third parties in the termination report and approved by the Agency.

Only costs incurred by the beneficiary concerned until termination takes effect are eligible (see Article 6). Costs relating to contracts due for execution only after termination are not eligible.

Step 2 — Reduction due to substantial errors, irregularities or fraud or serious breach of obligations

In case of a reduction (see Article 43), the Agency will calculate the reduced grant amount for the beneficiary by deducting the amount of the reduction (calculated in proportion to the seriousness of the errors, irregularities or fraud or breach of obligations, in accordance with Article 43.2) from the grant amount for the beneficiary.

If the payments received **exceed the amounts due**:

- if termination takes effect during the period set out in Article 3 and the request for amendment is accepted, the beneficiary concerned must repay to the coordinator the amount unduly received. The Agency will formally notify the amount unduly received and request the beneficiary concerned to repay it to the coordinator within 30 days of receiving notification. If it does not repay the coordinator, the Agency will draw upon the Guarantee Fund to pay the coordinator and then notify a **debit note** on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);

- in all other cases, in particular if termination takes effect after the period set out in Article 3, the Agency will formally notify a **debit note** to the beneficiary concerned. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the Agency the amount due and the Agency will notify a debit note on behalf of the Guarantee Fund to the beneficiary concerned (see Article 44);

- if the beneficiary concerned is the former coordinator, it must repay the new coordinator according to the procedure above, unless:

  - termination takes effect after an interim payment and

  - the former coordinator has not distributed amounts received as pre-financing or interim payments (see Article 21.7).

  In this case, the Agency will formally notify a **debit note** to the former coordinator. If payment is not made by the date in the debit note, the Guarantee Fund will pay to the Agency the amount due. The Agency will then pay the new coordinator and notify a debit note on behalf of the Guarantee Fund to the former coordinator (see Article 44).

If the payments received **do not exceed the amounts due**: amounts owed to the beneficiary concerned will be included in the next interim or final payment.

If the Agency does not receive the termination report within the deadline (see above), only costs included in an approved periodic report will be taken into account.

If the Agency does not receive the report on the distribution of payments within the deadline (see above), it will consider that:

- the coordinator did not distribute any payment to the beneficiary concerned and that
- the beneficiary concerned must not repay any amount to the coordinator.

After termination, the concerned beneficiary's obligations (in particular Articles 20, 22, 23, Section 3 of Chapter 4, 36, 37, 38, 40, 42, 43 and 44) continue to apply.

SECTION 4 FORCE MAJEURE

ARTICLE 51 — FORCE MAJEURE

'Force majeure' means any situation or event that:

- prevents either party from fulfilling their obligations under the Agreement,
- was unforeseeable, exceptional situation and beyond the parties' control,
- was not due to error or negligence on their part (or on the part of third parties involved in the action), and
- proves to be inevitable in spite of exercising all due diligence.

The following cannot be invoked as force majeure:

- any default of a service, defect in equipment or material or delays in making them available, unless they stem directly from a relevant case of force majeure,
- labour disputes or strikes, or
- financial difficulties.

Any situation constituting force majeure must be formally notified to the other party without delay, stating the nature, likely duration and foreseeable effects.

The parties must immediately take all the necessary steps to limit any damage due to force majeure and do their best to resume implementation of the action as soon as possible.

The party prevented by force majeure from fulfilling its obligations under the Agreement cannot be considered in breach of them.

CHAPTER 7 FINAL PROVISIONS

ARTICLE 52 — COMMUNICATION BETWEEN THE PARTIES

52.1 Form and means of communication

Communication under the Agreement (information, requests, submissions, 'formal notifications', etc.) must:

- be made in writing and

- bear the number of the Agreement.

All communication must be made through the Participant Portal **electronic** exchange system and using the forms and templates provided there.

If — after the payment of the balance — the Agency finds that a formal notification was not accessed, a second formal notification will be made by registered post with proof of delivery ('formal notification on **paper**'). Deadlines will be calculated from the moment of the second notification.

Communications in the electronic exchange system must be made by persons authorised according to the Participant Portal Terms & Conditions. For naming the authorised persons, each beneficiary must have designated — before the signature of this Agreement — a 'legal entity appointed representative (LEAR)'. The role and tasks of the LEAR are stipulated in his/her appointment letter (see Participant Portal Terms & Conditions).

If the electronic exchange system is temporarily unavailable, instructions will be given on the Agency and Commission websites.

52.2 Date of communication

Communications are considered to have been made when they are sent by the sending party (i.e. on the date and time they are sent through the electronic exchange system).

Formal notifications through the **electronic** exchange system are considered to have been made when they are received by the receiving party (i.e. on the date and time of acceptance by the receiving party, as indicated by the time stamp). A formal notification that has not been accepted within 10 days after sending is considered to have been accepted.

Formal notifications **on paper** sent by **registered post** with proof of delivery (only after the payment of the balance) are considered to have been made on either:

- the delivery date registered by the postal service or

- the deadline for collection at the post office.

If the electronic exchange system is temporarily unavailable, the sending party cannot be considered in breach of its obligation to send a communication within a specified deadline.

52.3 Addresses for communication

The **electronic** exchange system must be accessed via the following URL:

https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/myarea/projects

The Agency will formally notify the coordinator and beneficiaries in advance any changes to this URL.

Formal notifications on paper (only after the payment of the balance) addressed **to the Agency** must be sent to the official mailing address indicated on the Agency's website.

Formal notifications on paper (only after the payment of the balance) addressed **to the beneficiaries** must be sent to their legal address as specified in the Participant Portal Beneficiary Register.

ARTICLE 53 — INTERPRETATION OF THE AGREEMENT

53.1 Precedence of the Terms and Conditions over the Annexes

The provisions in the Terms and Conditions of the Agreement take precedence over its Annexes.

Annex 2 takes precedence over Annex 1.

53.2 Privileges and immunities

Not applicable

ARTICLE 54 — CALCULATION OF PERIODS, DATES AND DEADLINES

In accordance with Regulation No 1182/71[30], periods expressed in days, months or years are calculated from the moment the triggering event occurs.

The day during which that event occurs is not considered as falling within the period.

ARTICLE 55 — AMENDMENTS TO THE AGREEMENT

55.1 Conditions

The Agreement may be amended, unless the amendment entails changes to the Agreement which would call into question the decision awarding the grant or breach the principle of equal treatment of applicants.

Amendments may be requested by any of the parties.

55.2 Procedure

The party requesting an amendment must submit a request for amendment signed in the electronic exchange system (see Article 52).

The coordinator submits and receives requests for amendment on behalf of the beneficiaries (see Annex 3).

If a change of coordinator is requested without its agreement, the submission must be done by another beneficiary (acting on behalf of the other beneficiaries).

The request for amendment must include:

- the reasons why;
- the appropriate supporting documents, and
- for a change of coordinator without its agreement: the opinion of the coordinator (or proof that this opinion has been requested in writing).

[30] Regulation (EEC, Euratom) No 1182/71 of the Council of 3 June 1971 determining the rules applicable to periods, dates and time-limits (OJ L 124, 8.6.1971, p. 1).

The Agency may request additional information.

If the party receiving the request agrees, it must sign the amendment in the electronic exchange system within 45 days of receiving notification (or any additional information the Agency has requested). If it does not agree, it must formally notify its disagreement within the same deadline. The deadline may be extended, if necessary for the assessment of the request. If no notification is received within the deadline, the request is considered to have been rejected.

An amendment **enters into force** on the day of the signature of the receiving party.

An amendment **takes effect** on the date agreed by the parties or, in the absence of such an agreement, on the date on which the amendment enters into force.

ARTICLE 56 — ACCESSION TO THE AGREEMENT

56.1 Accession of the beneficiaries mentioned in the Preamble

The other beneficiaries must accede to the Agreement by signing the Accession Form (see Annex 3) in the electronic exchange system (see Article 52) within 30 days after its entry into force (see Article 58).

They will assume the rights and obligations under the Agreement with effect from the date of its entry into force (see Article 58).

If a beneficiary does not accede to the Agreement within the above deadline, the coordinator must — within 30 days — request an amendment to make any changes necessary to ensure proper implementation of the action. This does not affect the Agency's right to terminate the Agreement (see Article 50).

56.2 Addition of new beneficiaries

In justified cases, the beneficiaries may request the addition of a new beneficiary.

For this purpose, the coordinator must submit a request for amendment in accordance with Article 55. It must include an Accession Form (see Annex 3) signed by the new beneficiary in the electronic exchange system (see Article 52).

New beneficiaries must assume the rights and obligations under the Agreement with effect from the date of their accession specified in the Accession Form (see Annex 3).

ARTICLE 57 — APPLICABLE LAW AND SETTLEMENT OF DISPUTES

57.1 Applicable law

The Agreement is governed by the applicable EU law, supplemented if necessary by the law of Belgium.

57.2 Dispute settlement

If a dispute concerning the interpretation, application or validity of the Agreement cannot be settled amicably, the General Court — or, on appeal, the Court of Justice of the European Union — has sole

jurisdiction. Such actions must be brought under Article 272 of the Treaty on the Functioning of the EU (TFEU).

As an exception, if such a dispute is between the Agency and NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU, SINTEF AS, GREEN DIGITAL FINANCE ALLIANCE, OSLO KOMMUNE, the competent Belgian courts have sole jurisdiction.

If a dispute concerns administrative sanctions, offsetting or an enforceable decision under Article 299 TFEU (see Articles 44, 45 and 46), the beneficiaries must bring action before the General Court — or, on appeal, the Court of Justice of the European Union — under Article 263 TFEU. Actions against offsetting and enforceable decisions must be brought against the Commission (not against the Agency).

ARTICLE 58 — ENTRY INTO FORCE OF THE AGREEMENT

The Agreement will enter into force on the day of signature by the Agency or the coordinator, depending on which is later.

SIGNATURES

For the coordinator

For the Agency

EUROPEAN COMMISSION

European Climate, Infrastructure and Environment Executive Agency (CINEA)

The Director

ANNEX 1 (part A)

Innovation action

NUMBER — 101036723 — ARV

Table of Contents

1.1. The project summary

Project Number [1]	101036723	Project Acronym [2]	ARV

One form per project

General information

Project title [3]	Climate Positive Circular Communities
Starting date [4]	01/01/2022
Duration in months [5]	48
Call (part) identifier [6]	H2020-LC-GD-2020-7
Topic	LC-GD-4-1-2020 Building and renovating in an energy and resource efficient way
Fixed EC Keywords	Low/nearly zero &-energy positive buildings, Sustainable design (for recycling, for environment, eco-design), Architecture, smart buildings, smart cities, urban engineering, Integration of renewables, Energy efficient buildings, Ecodesign, Life Cycle Analysis
Free keywords	climate positive circular communities, zero emission neighbourhoods, stakeholder engagement, citizen awareness, circular economy, green digital financing, policy and regulations, IEQ

Abstract [7]

The vision of the ARV project is to contribute to speedy wide scale implementation of Climate Positive Circular Communities (CPCC) where people can thrive and prosper for generations to come.
The overall aim is to demonstrate and validate attractive, resilient, and affordable solutions for CPCC that will significantly speed up the deep energy renovations and the deployment of energy and climate measures in the construction and energy industries.
To achieve this, the ARV project will employ a novel concept relying on a combination of 3 conceptual pillars, 6 demonstration projects, and 9 thematic focus areas.
The 3 conceptual pillars are integration, circularity and simplicity. Integration in ARV means the coupling of people, buildings, and energy systems, through multi-stakeholder co-creation and use of innovative digital tools. Circularity in ARV means a systematic way of addressing circular economy through automated use of LCA, digital logbooks and material banks. Simplicity in ARV means to make the solutions easy to understand and use for all stakeholders, from manufacturers to end-users.
The 6 demos are urban regeneration projects in 6 locations around Europe. They have been carefully selected to represent the different European climates and contexts, and due to their high ambitions in environmental, social and economic sustainability. Renovation of social housing and public buildings are specifically focused. Together, they will demonstrate more than 50 innovations in more than 150,00 m2 of buildings.
The 9 thematic focus areas are 1) Effective planning and implementation of CPCCs, 2) Citizen engagement, environment and well-being, 3) Sustainable building re(design) 4) Resource efficient manufacturing and construction workflows, 5) Integrated renewables and storage, 6) Energy management and flexibility, 7) Monitoring and evaluation, 8) Business models, financial mechanisms, policy and exploitation, 9) Communication, dissemination, and stakeholder outreach.

1.2. List of Beneficiaries

Project Number [1]	101036723	Project Acronym [2]	ARV

List of Beneficiaries

No	Name	Short name	Country	Project entry month[8]	Project exit month
1	NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU	NTNU	Norway	1	48
2	CONSEIL DES ARCHITECTES D'EUROPE	ACE	Belgium	1	48
3	CESKE VYSOKE UCENI TECHNICKE V PRAZE	CVUT	Czech Republic	1	48
4	DANMARKS TEKNISKE UNIVERSITET	DTU	Denmark	1	48
5	DANFOSS A/S	DANFOSS A/S	Denmark	1	48
6	ENFOR AS	ENFOR	Denmark	1	48
7	PROJECT ZERO A/S	PROJECTZERO	Denmark	1	48
8	ACCADEMIA EUROPEA DI BOLZANO	EURAC	Italy	1	48
9	SINTEF AS	SINTEF	Norway	1	48
10	AYUNTAMENT DE PALMA DE MALLORCA	PALMA	Spain	1	48
11	INSTITUTO BALEAR DE LA VIVIENDA	IBAVI	Spain	1	48
12	FUNDACIO INSTITUT DE RECERCA DE L'ENERGIA DE CATALUNYA	IREC	Spain	1	48
13	METROVACESA, SA	MET	Spain	1	48
14	Stichting Hogeschool Utrecht	UAS Utrecht	Netherlands	1	48
15	COMITE EUROPEEN DE COORDINATION DE L'HABITAT SOCIAL AISBL	HOUSING EUROPE	Belgium	1	48
16	BURO DE HAAN INFORMATIE TECHNOLOGIE BV	Buro de Haan	Netherlands	1	48
17	CENTER DANMARK DRIFT APS	Center Denmark	Denmark	1	48
18	SONDERBORG ANDELSBOLIGFORENING	SAB	Denmark	1	48
19	GREEN DIGITAL FINANCE ALLIANCE	GDFA	Switzerland	1	48
20	STICHTING BO-EX 91	BOEX	Netherlands	1	48
21	RC PANELS BV	Rc Panels B.V.	Netherlands	1	48
22	UNIVERSITEIT UTRECHT	UU	Netherlands	1	48
23	GEMEENTE UTRECHT	CITY OF UTRECHT	Netherlands	1	48
24	BOS INSTALLATIEWERKEN BV	BOSGROEP	Netherlands	1	48
25	IWELL BV	iwell	Netherlands	1	48
26	ME X ARCHITECTS BV	MEX	Netherlands	1	48
27	STICHTING MITROS	Mitros	Netherlands	1	48

1.2. List of Beneficiaries

No	Name	Short name	Country	Project entry month[8]	Project exit month
28	STATUTARNI MESTO KARVINA	KARV	Czech Republic	1	48
29	DOLOMITI ENERGIA RINNOVABILI SOCIETA A RESPONSABILITA' LIMITATA	DOL	Italy	1	48
30	DISTRETTO TECNOLOGICO TRENTINO SCARL	DTTN	Italy	1	48
31	UNIVERSITA DEGLI STUDI DI TRENTO	UNITN	Italy	1	48
32	POLITECNICO DI TORINO	POLITO	Italy	1	48
33	OSLO KOMMUNE	OBF	Norway	1	48
34	NANO POWER AS	NANO	Czech Republic	1	48
35	SISTEMES AVANCATS D ENERGIA SOLAR TERMICA SCCL	AIGUASOL SAEST	Spain	1	48

1.3. Workplan Tables - Detailed implementation

1.3.1. WT1 List of work packages

WP Number[9]	WP Title	Lead beneficiary[10]	Person-months[11]	Start month[12]	End month[13]
WP1	Project Management and coordination	1 - NTNU	162.00	1	48
WP2	Framework and tools for effective implementation and assessment of CPCC	12 - IREC	197.50	1	48
WP3	Community engagement, environment, and well-being	9 - SINTEF	213.00	1	48
WP4	Sustainable Building (re) Design	1 - NTNU	267.50	1	40
WP5	Resource Efficient (Pre)Manufacturing and Construction Workflows	14 - UAS Utrecht	231.50	1	48
WP6	Integrated renewables and storage systems	3 - CVUT	192.50	1	46
WP7	Efficient Operation and Flexibility	4 - DTU	253.50	1	48
WP8	Monitoring, Evaluation and Impact Assessment	8 - EURAC	228.00	1	48
WP9	Business models, financial instruments, policy and exploitation	19 - GDFA	155.00	3	48
WP10	Communication, disseminations and stakeholder outreach	2 - ACE	87.00	1	48
		Total	1 987.50		

1.3.2. WT2 list of deliverables

Deliverable Number[14]	Deliverable Title	WP number[9]	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D1.1	Overall Consortium Plan	WP1	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	3
D1.2	Progress report	WP1	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D1.3	Innovation Management Plan	WP1	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	6
D1.4	Demo Project Innovation Progress Reports (annually)	WP1	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D1.5	Quality Assurance Plan QAP	WP1	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	3
D1.6	Risk Management Plan	WP1	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	3
D1.7	Legal & Knowledge Management Plan	WP1	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	3
D1.8	ARV Data Management Plan DMP	WP1	1 - NTNU	ORDP: Open Research Data Pilot	Confidential, only for members of the consortium (including the Commission Services)	6

Deliverable Number[14]	Deliverable Title	WP number[9]	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D2.1	Assessment framework for CPCC	WP2	12 - IREC	Report	Public	9
D2.2	Description of methods and tools for Large-Scale Retrofitting in CPCC	WP2	4 - DTU	Report	Confidential, only for members of the consortium (including the Commission Services)	18
D2.3	Description of methods and tools for CEC in CPCC	WP2	12 - IREC	Report	Confidential, only for members of the consortium (including the Commission Services)	15
D2.4	Application of tools for Large-Scale Retrofitting actions. Uses cases and guidelines for replicability	WP2	12 - IREC	Report	Public	46
D2.5	Application of tools for implementation of Citizen Energy Communities. Uses cases and guidelines for replicability	WP2	12 - IREC	Report	Public	42
D2.6	Demos of Virtual Reality Environments	WP2	9 - SINTEF	Demonstrator	Public	36
D2.7	Description and lessons learnt from training & awareness sessions using Virtual Environments	WP2	9 - SINTEF	Report	Public	48
D2.8	Assessment framework for CPCC. Updated version	WP2	12 - IREC	Report	Public	48
D3.1	Plan and overall methodology design for establishing CPCC Living Labs, including stakeholder mapping	WP3	9 - SINTEF	Demonstrator	Public	12
D3.2	Implementation plan of CPCC Living Labs per demo site, demonstration of LL	WP3	10 - PALMA	Demonstrator	Public	13
D3.3	CPCC Living Labs reports	WP3	3 - CVUT	Report	Public	24

Deliverable Number[14]	Deliverable Title	WP number[9]	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D3.4	Analysis of citizen engagement tools and processes using a citizen science approach	WP3	9 - SINTEF	Report	Public	40
D3.5	Community-scale citizen engagement strategy and tools for the renovation wave	WP3	9 - SINTEF	Websites, patents filing, etc.	Public	48
D4.1	Design guidelines of zero-emission and positive energy buildings in a climate positive energy neighbourhood in Oslo	WP4	9 - SINTEF	Report	Public	12
D4.2	Design configuration for a modular, scalable, integrated retrofitting concept for Positive Energy Mid- & Highrise Buildings embedded in a green neighbourhood in Utrecht	WP4	14 - UAS Utrecht	Report	Public	12
D4.3	Design guidelines for zero-emission & positive energy refurbished and new buildings in Palma	WP4	12 - IREC	Report	Public	12
D4.4	Design guidelines for the zero-emission & positive energy renovation of the Health Care Centre in Karviná	WP4	3 - CVUT	Report	Public	12
D4.5	Design guidelines of timber-based construction & renovation of small-medium size buildings in Trento	WP4	31 - UNITN	Report	Public	12
D4.6	Design guidelines of new & retrofitting of existing buildings as zero-emission positive energy-buildings in climate positive circular communities	WP4	1 - NTNU	Report	Public	40
D5.1	Manufacturing configurator for	WP5	14 - UAS Utrecht	Report	Public	24

Deliverable Number[14]	Deliverable Title	WP number[9]	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
	high-rise apartment buildings to directly start production (File2Factory) process partly validated in participating European demo countries.					
D5.2	Workflow analyses and advise on how to move towards more prefabricated components and reduce work on-site.	WP5	14 - UAS Utrecht	Report	Public	36
D5.3	Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Utrecht	WP5	14 - UAS Utrecht	Report	Public	48
D5.4	Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Palma	WP5	12 - IREC	Report	Public	48
D5.5	Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Oslo	WP5	33 - OBF	Report	Public	48
D5.6	Resource Efficient (Pre)Manufacturing &Construction Workflows – Demo Karviná	WP5	3 - CVUT	Report	Public	48
D5.7	Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Trento	WP5	31 - UNITN	Report	Public	48
D5.8	Demonstration case of CPCC in Utrecht	WP5	14 - UAS Utrecht	Demonstrator	Public	36
D5.9	Demonstration case of CPCC in Palma	WP5	10 - PALMA	Demonstrator	Public	36
D5.10	Demonstration case of CPCC in Oslo	WP5	33 - OBF	Demonstrator	Public	36
D5.11	Demonstration case of CPCC in Karviná	WP5	3 - CVUT	Demonstrator	Public	36
D5.12	Demonstration case of CPCC in Trento	WP5	31 - UNITN	Demonstrator	Public	36

Deliverable Number[14]	Deliverable Title	WP number[9]	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D6.1	Guidelines for integrated design and implementation of RESs and ESSs for building/ neighbourhood's energy needs in Oslo	WP6	9 - SINTEF	Demonstrator	Public	42
D6.2	Guidelines for integrated design and implementation of RESs and ESSs for building/ neighbourhood's energy needs in Sønderborg	WP6	7 - PROJECTZERO	Demonstrator	Public	26
D6.3	Guidelines for integrated design and implementation of RESs and ESSs for building/ neighbourhood's energy needs in Utrecht	WP6	22 - UU	Demonstrator	Public	44
D6.4	Guidelines for integrated design and implementation of RESs and ESSs for building/ neighbourhood's energy needs in Karviná	WP6	3 - CVUT	Demonstrator	Public	44
D6.5	Guidelines for integrated design and implementation of RESs and ESSs for building/ neighbourhood's energy needs in Trento	WP6	8 - EURAC	Demonstrator	Public	46
D7.1	Establishment of ARV central digitalization hub and data lake	WP7	17 - Center Denmark	Demonstrator	Confidential, only for members of the consortium (including the Commission Services)	18
D7.2	Archetype building models	WP7	3 - CVUT	Report	Public	32
D7.3	City fine resolution weather forecasting at demo sites	WP7	6 - ENFOR	Demonstrator	Confidential, only for members of the consortium (including the Commission Services)	12

Deliverable Number[14]	Deliverable Title	WP number[9]	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D7.4	Forecasting of wind, solar, load, prices at demo sites	WP7	17 - Center Denmark	Demonstrator	Confidential, only for members of the consortium (including the Commission Services)	18
D7.5	Controllers with interface to provide user preferences	WP7	4 - DTU	Demonstrator	Confidential, only for members of the consortium (including the Commission Services)	32
D7.6	Guidelines on descriptions of smartness and flexibility	WP7	4 - DTU	Report	Public	24
D7.7	Guidelines on climate zone related design principles	WP7	1 - NTNU	Report	Public	32
D7.8	Handbook for smart communities	WP7	22 - UU	Report	Public	42
D7.9	Principles for CEC-DSO interactions	WP7	4 - DTU	Report	Public	46
D8.1	Monitoring, evaluation and impact assessment frameworks	WP8	8 - EURAC	Report	Public	12
D8.2	Data architecture, including description of monitoring systems in the ARV demos	WP8	17 - Center Denmark	Report	Public	18
D8.3	Structure and use of the data warehouse	WP8	17 - Center Denmark	Report	Public	48
D8.4	Evaluation results reports (including recommendations and guidelines for future projects)	WP8	1 - NTNU	Report	Public	48
D8.5	Streamlined LCA-LCCA comparing alternative solutions & scenarios	WP8	8 - EURAC	Report	Public	24
D8.6	LCA and LCC of the implemented solutions and social component	WP8	8 - EURAC	Report	Public	48
D8.7	Report on Multiple Benefits analysis and assessment	WP8	8 - EURAC	Report	Public	48

Deliverable Number[14]	Deliverable Title	WP number[9]	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D8.8	Guidelines and recommendations for replication and/or future research	WP8	8 - EURAC	Report	Public	48
D9.1	Develop an annual ARV Innovation Intel for Impact (AI3) report.	WP9	19 - GDFA	Report	Public	12
D9.2	Develop catalogue of business and financing models proven in other markets for adaptation in the EU to accelerate the renovation wave.	WP9	19 - GDFA	Report	Public	6
D9.3	Design business model blueprints for energy positive retrofits for different asset classes as modules for replication across the EU.	WP9	19 - GDFA	Report	Public	36
D9.4	Design Platform Based Prosumer Business Models with clear policy and regulatory recommendations.	WP9	19 - GDFA	Demonstrator	Public	41
D9.5	Design Building-linked financing instruments for FI adoption in re-estate portfolios	WP9	19 - GDFA	Demonstrator	Public	36
D9.6	Develop green digital bonds guide to scale prosumer flexible energy markets.	WP9	19 - GDFA	Other	Public	45
D9.7	Enable scaling across EU markets of energy positive renovation.	WP9	19 - GDFA	Other	Public	46
D10.1	ARV corporate identity	WP10	1 - NTNU	Other	Public	3
D10.2	i) Core Communication and Dissemination Plan & ii) tailored strategies for the 6 CPCC LL demos	WP10	2 - ACE	Report	Confidential, only for members of the consortium (including the Commission Services)	8
D10.3	Project website, e-marketplace &Social Media	WP10	15 - HOUSING EUROPE	Websites, patents filing, etc.	Public	6

Deliverable Number[14]	Deliverable Title	WP number[9]	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D10.4	Newsletters & dissemination material: Leaflet, Posters, Video, Infographic	WP10	15 - HOUSING EUROPE	Websites, patents filing, etc.	Public	6
D10.5	Project booklet summarising results achieved in ARV	WP10	15 - HOUSING EUROPE	Report	Public	42
D10.6	Final report on dissemination and communication activities	WP10	2 - ACE	Report	Public	48
D10.7	Report on contribution to common H2020 Activities	WP10	2 - ACE	Report	Public	44
D10.8	A blueprint for planning, (re)design, (re)construction, operation and use of CPCCs	WP10	1 - NTNU	Report	Public	12

1.3.3. WT3 Work package descriptions

Work package number [9]	WP1	**Lead beneficiary** [10]	1 - NTNU
Work package title	Project Management and coordination		
Start month	1	**End month**	48

Objectives

The aim of WP1 is to ensure sound management throughout the project period. including contractual and financial management, project documentation, monitoring and reporting, to ensure that the project achieves its objectives within the budget constraints and allocated time. WP1 has the following specific objectives:
• Coordinate the activities of the project so that the overall objectives, milestones, and deliverables are achieved to the highest possible quality, on time, and within budget.
• Manage the project's finances and accurately report them to the European Commission.
• Assist the project partners in adhering to their contractual obligations, as outlined in the Grant Agreement and the Consortium Agreement and associated Annexes.
• Systematically register, report and develop innovations from the demonstration projects and innovation clusters
• Coordinate and manage financial, contractual, ethical, and legal issues throughout all project phases including monitoring of progress and risks.
• Ensure effective exchange of information and knowledge sharing within the consortium by establishing a communication structure and regular consortium meetings.
• Coordinate with innovation cluster activities, external experts advisory and exploitation boards, and related projects.

Description of work and role of partners

WP1 - Project Management and coordination [Months: 1-48]
NTNU, ACE, CVUT, DTU, DANFOSS A/S, ENFOR, PROJECTZERO, EURAC, SINTEF, PALMA, IBAVI, IREC, MET, UAS Utrecht, HOUSING EUROPE, Buro de Haan, Center Denmark, SAB, GDFA, BOEX, Rc Panels B.V., UU, CITY OF UTRECHT, BOSGROEP, iwell, MEX, Mitros, KARV, DOL, DTTN, UNITN, POLITO, OBF, NANO, AIGUASOL SAEST
Task 1.1 (T1.1) Project Initiation: M1-M3. Task leader: NTNU
Organise the kick-off meeting (KOM) and the revised Overall Consortium Plan for the project including the detailed assignment of roles, responsibilities, and resources, the project timetable, and descriptions of each deliverable to be produced. This will be agreed with all the project partners at the kick-off meeting.

Task 1.2 (T1.2) Project Management M1-M48. Task leader: NTNU; Participants: All
This task will ensure project progress monitoring- and control and communication. It will manage administrative and contractual relationships of the Consortium and with the European Commission. The management consists of:
• Establishment of the liaison with the EU Commission through contacts with project advisors and officers, including periodic progress reports and response to any administrative or technical requests by the Commission.
• Draw up the Consortium agreement, ensure budget control, cost claims, legal, financial, administrative, and miscellaneous contractual management tasks.
• Securing information flow within the Consortium, coordination of technical activities and milestone control.
• Overseeing any ethical issues that could become relevant in the project.
• Production of Final Project Reports.

The PMT will establish a MS Teams project platform for day-to-day communication and document control. The PMT will organize regular teleconferences with the consortium to discuss work in progress, milestones deliverables, etc. The PMT is also responsible for regular communication with INEA and to keep the project officer up to date with any developments. The following meeting structure is envisaged:

Progress meetings in person will be scheduled at minimum annually with interim meetings every six months carried out either by electronic communication means or by a personal meeting. (Preliminary scheduling of these project events is set for Months 6, 12, 18, 24, 30, 36, 42).
• Final meeting (Month 47): Monitor the fulfilment of the whole Work Programme and the quality of the results obtained by the project during its duration, based on the general objectives of the project proposal

• Additional web-based teleconferences and meetings will be held on an 'ad hoc' basis to: i) address issues that may arise; ii) ensure common direction of the project research and innovations; iii) minimize travel costs.

Task 1.3 (T1.3) Innovation Management. M1-M48. Task leader: NTNU - Innovation Manager, Participants: Demo Leaders, Work Package Leaders
In this task, innovations from the demonstration projects and the innovation clusters will be registered and reported to realize up-scaling and commercialisation potentials of ARV innovations. The task will ensure discussions with all pilot representatives and partners. The Innovation Board will meet regularly with the ARV Exploitation Board in order to ensure early identification and scaling of commercially viable innovations Innovation management is important to ensure success in bringing ideas/innovations higher on the TRL scale and to have them adopted. It deals with measures to promote innovation in organizations and eventually bringing them to a larger market. The task will:
• Develop the best environment for innovation (internal).
• Provide regularly updates of the overall project Gantt chart and the resource matrix.
• Establish common approach to what innovation is and how to work with innovations within ARV.
• Develop a tool to register, monitor and report innovations, e.g. to support informed choices on future investments
• Analyse reported ideas including due diligence on ownership and user rights and regulations in relevant contracts: Prior art and patentability report and Patenting or other IPR protection
• Develop a commercialization strategy based on analysis of technology, market, partners, business model, team, and financing:
- Business development and possible establishment of a scalable spin-off company
- Project lead on commercial testing, verification, and prototyping.
- Identification of potential licensees and negotiation of license agreements based on NTNU standards.
- Establish Inter Institutional Agreements with other project partners on commercialization when needed.
• Bring all ARV innovations at least one step up the TRL scale, reaching TRL 7/8 by the end of the project period.

To align deliverables and expected innovations of the ARV project and the activities in the WPs, each Demo Project Leader (DPL) will provide an overview of joint challenges, opportunities, knowledge, and exchange questions for each WP. Each WP leader will provide plans for exchange and collaboration activities with the demo projects to create a collaboration framework which support the innovation clusters. This will follow a staged process:
• Starting with webinars on general topics followed with discussions
• Followed by peer-2-peer or expert-2-peer meetings on specific topics of relevance to demo-sites
• Followed by face-2-face workshops or site-visits to go deeper into the content
• Followed by joint publications and/or reports to really consolidate on the knowledge exchanged

The DPL and WPL will report on a quarterly basis to the Innovation Manager (IM) on the progress of the WPs and the demo projects, the status of the innovations, the compliance to and updates on the planning, potential problems, and their potential solution. This will help the IM keep track of the demo project status and the relations to the WP, in order to control the project, take timely measures and regularly update the overall project Gantt chart and the resource matrix.

Task 1.4 (T.1.4) Quality Assurance: M1-M48. Task leader: NTNU, Participants: All
The PMT will develop a comprehensive Quality Assurance Plan (QAP) in close collaboration with the Work Package Leaders. This will include a standard internal review process for all deliverables within the project to ensure that the standard of excellence for the ARV project is maintained. Regarding reporting, the PMT will keep an overview of deadlines and progress. They may remind partners of their obligations and request progress reports from work package leaders. The PMT will verify that all documents are complete and correct before they are submitted to the EC. The PMT will monitor the progress of the project activities focusing on:
• Method of work and integration of the partnership ensuring actual and timely implementation of the activities;
• Internal communication, using platforms described in Task 1.2;
• Project costs, to detect cases of potential overruns in due time and provide alternative solutions;
• The production of project deliverables and their quality;
• The action list produced at the end of each project meeting.

Task 1.5 (T.1.5) Risk Management: M1-M48. Task leader: NTNU, Participants: All
Update the Table of risks, outlined in Section 3.2 at each 6-month progress meeting review. Existing risks will be analysed. and their probability and severity rating modified if required, if any risk goes above medium, mitigation measures will be put in place to bring this risk back to a lower level. The Risk Management Plan (RMP) will be updated annually.

Task 1.6: Legal, Knowledge, and Data Management: M1-M48. Task leader: NTNU, Participants: All

This task will manage all IPR issues and set up a Legal, Knowledge, and Data Management Plans, to be updated annually. Data generated in the project will be made 'findable, accessible, interoperable and reusable (FAIR)', in line with the H2020 Guidelines on FAIR Data Management. The consortium will provide Open Data arising from the project to support benchmarking, dissemination, and exploitation, improving access and re-use of data generated within the project and knowledge sharing with citizens and other stakeholders. A private portal will be set up where all project partners will report progress and upload relevant project results. T1.6 will also analyse and describe GDPR, data and cybersecurity related aspects and reporting/feeding existing EU databases (e.g., EU building stock observatory). The task will be conducted in close collaboration with all WPs, but in particular WPs 7 and 8.

Participation per Partner

Partner number and short name	WP1 effort
1 - NTNU	77.00
2 - ACE	4.00
3 - CVUT	7.00
4 - DTU	4.00
5 - DANFOSS A/S	1.00
6 - ENFOR	1.00
7 - PROJECTZERO	7.00
8 - EURAC	2.00
9 - SINTEF	4.00
10 - PALMA	7.00
11 - IBAVI	1.00
12 - IREC	4.00
13 - MET	1.00
14 - UAS Utrecht	10.00
15 - HOUSING EUROPE	1.00
16 - Buro de Haan	0.50
17 - Center Denmark	1.00
18 - SAB	1.00
19 - GDFA	4.00
20 - BOEX	1.00
21 - Rc Panels B.V.	0.50
22 - UU	1.00
23 - CITY OF UTRECHT	1.00
24 - BOSGROEP	1.00
25 - iwell	1.00
26 - MEX	1.00
27 - Mitros	1.00
28 - KARV	1.00
29 - DOL	1.00

Partner number and short name	WP1 effort
30 - DTTN	2.50
Armalam	1.50
31 - UNITN	1.00
32 - POLITO	1.00
33 - OBF	7.00
34 - NANO	1.00
35 - AIGUASOL SAEST	1.00
Total	162.00

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D1.1	Overall Consortium Plan	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	3
D1.2	Progress report	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D1.3	Innovation Management Plan	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	6
D1.4	Demo Project Innovation Progress Reports (annually)	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	12
D1.5	Quality Assurance Plan QAP	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	3
D1.6	Risk Management Plan	1 - NTNU	Report	Confidential, only for members of the consortium (including the Commission Services)	3
D1.7	Legal & Knowledge Management Plan	1 - NTNU	Report	Confidential, only for members of the	3

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
				consortium (including the Commission Services)	
D1.8	ARV Data Management Plan DMP	1 - NTNU	ORDP: Open Research Data Pilot	Confidential, only for members of the consortium (including the Commission Services)	6

Description of deliverables

D1.1 : Overall Consortium Plan [3]

deliverable will ensure project progress monitoring- and control and communication. It will manage administrative and contractual relationships of the Consortium and with the European Commission. Overall Consortium Plan for the project including the detailed assignment of roles, responsibilities, and resources, the project timetable, and descriptions of each deliverable to be produced

D1.2 : Progress report [12]

Short interrim management report on project status Revisions; M12, 24, 36 and 48

D1.3 : Innovation Management Plan [6]

innovations from the demonstration projects and the innovation clusters will be registered and reported to realize up-scaling and commercialisation potentials of ARV innovations Revisions planned for M18, M30, M42

D1.4 : Demo Project Innovation Progress Reports (annually) [12]

innovations from the demonstration projects and the innovation clusters will be registered and reported to realize up-scaling and commercialisation potentials of ARV innovations. Revisions in, M24, M36, M48

D1.5 : Quality Assurance Plan QAP [3]

The PMT will develop a comprehensive Quality Assurance Plan (QAP) in close collaboration with the Work Package Leaders. This will include a standard internal review process for all deliverables within the project to ensure that the standard of excellence for the ARV project is maintained. Revisions in: M3, M15, M27, M39

D1.6 : Risk Management Plan [3]

Update the Table of risks, outlined in Section 3.2 at each 6-month progress meeting review. Existing risks will be analysed. and their probability and severity rating modified if required, if any risk goes above medium, mitigation measures will be put in place to bring this risk back to a lower level. The Risk Management Plan (RMP) will be updated annually Revisions M15, M27, M39

D1.7 : Legal & Knowledge Management Plan [3]

To manage all IPR issues and set up a Legal, Knowledge, and Data Management Plans, to be updated annually. Data generated in the project will be made ‘findable, accessible, interoperable and reusable (FAIR)’, in line with the H2020 Guidelines on FAIR Data Management Revisions in M15, M27, M39

D1.8 : ARV Data Management Plan DMP [6]

manage all IPR issues and set up a Legal, Knowledge, and Data Management Plans, to be updated annually. Data generated in the project will be made ‘findable, accessible, interoperable and reusable (FAIR)’, in line with the H2020 Guidelines on FAIR Data Management Revision in, M18, M30, M42

Schedule of relevant Milestones

Milestone number[18]	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS1	Project initiation	1 - NTNU	3	CA & Minutes of KOM

Work package number [9]	WP2	Lead beneficiary [10]	12 - IREC
Work package title	Framework and tools for effective implementation and assessment of CPCC		
Start month	1	End month	48

Objectives

The purpose of WP2 is to refine, deploy and test methods and tools for effective design, implementation, and assessment of CPCC. The WP will establish a common multi-criteria framework for the integrated assessment and evaluation of CPCC to be used throughout the different phases of planning, design, construction and operation of the different demos in the project in close collaboration with WP8. Specific objectives of the WP include:

• Define, integrate, and extend already available assessment frameworks for zero-energy/zero-emission neighbourhoods under a multidimensional perspective to characterize the impact of CPCC, improving the integration of missing aspects such as circularity & overall quality in renovation / new construction on district level projects.

• Alignment of the assessment CPCC framework and its Key Performance Indicators KPIs, to be tested and validated through the different demos in ARV and to be implemented in the monitoring procedures (WP8)

• Adaptation of methods and tools to model and assess the impact of existing and projected CPCC`s from a multidimensional and holistic perspective. This includes leveraging georeferenced urban available GIS-based data sets, multi-scale models and co-simulation techniques, ready to integrate in district digital twins

• Test of methods and tools in the design, implementation, and assessment of main interventions in the demo sites: Large Scale Retrofitting actions and implementation of Citizen Energy Communities in CPCC.

• Integration of Virtual Reality /Augmented Reality engines and environments connected to results of assessment tools and/or live sensors data to achieve an effective communication to the different stakeholders of the CPCCs. In connection with the integrated strategy in Living Labs (WP3), Virtual Reality environments will be tested in activities to facilitate social innovation, promote education and training for sustainability.

Expected impact of WP2 is to prove that the use and adoption of simulation and assessment tools in a clear and established assessment framework are key aspects for effective and accelerated adoption of CPCC, by simplifying and helping decisions in integrated design processes, while connecting relevant stakeholders (policy makers, financing bodies, industry, regulatory bodies, etc) and citizens in a human-centric approach.

Description of work and role of partners

WP2 - Framework and tools for effective implementation and assessment of CPCC [Months: 1-48]
IREC, NTNU, ACE, CVUT, DTU, PROJECTZERO, EURAC, SINTEF, PALMA, IBAVI, UAS Utrecht, HOUSING EUROPE, Center Denmark, KARV, DTTN, OBF, AIGUASOL SAEST

Task 2.1 (T2.1). Innovation forum for WP2: M1-M48. Task leader: IREC; Participants PALMA, HU, OBF, NTNU, CVUT, DTTN, PZ, EURAC

The aim of this task is to support the implementation of the assessment framework of CPCC, as well as the community / district level assessment tools in the demo projects. The forum will act as a connection hub between technical partners, testing and validating innovation in WP2, and demo developers, to enhance the exploitation across the innovation clusters. Task 2.1 will ensure effective cooperation between the different innovation clusters in the demo projects, towards the aim of mutual learning and feedback loops between the demos and the WPs. The work will encompass innovation workshops between the demos and results will be reported and integrated as part of the innovations report (D1.4) in WP1. Task 2.2 (T2.2). Assessment framework for Climate Positive Circular Communities: M1- M48. Task leader: IREC; Participants: PALMA, IBAVI, NTNU, CVUT, Housing Europe, AIGUA, CVUT, EURAC, HU, ACE, KARV, PZ, OBF

Based on already existing works for Zero Emission Neighbourhoods, Sustainable Plus Energy Neighbourhoods, Positive Energy Districts & Cities, an extended assessment framework will be defined considering the multidimensional perspective to characterize the impact of CPCC. The main categories that will be considered in the CPCC framework are energy, environment, economy, well-being, social aspects, smartness and circularity, addressing aspects at both building and neighbourhood level.

Task 2.2 will form a common starting point for the ARV, bringing main stakeholders from demo-sites and expert partners in the consortium together to jointly prepare and define a clear framework with the specification of addressed Sustainable Development Goals SDGs, ambition levels, boundary conditions, & KPIs for CPCC. Specific KPIs and metrics to assess each thematic area will be proposed in the framework to support CPCC implementation along the life cycle, from design

through implementation and operation. Work will be strongly connected to WP8 where KPIs defined in Task 2.2 will be the basis of defining the specification and guidelines for monitoring, the impact of CPPC. This task will have its most intensive workload during the first year of the ARV project, but will follow the demo projects development to monitor how the framework is implemented and used in the demos. This will be done in yearly workshops and through follow-up questionnaires in cooperation with WP8. A preliminary version of the assessment framework will be presented in M6 of the project to demo developers to gather their feedback and refine a final version. A number of KPIs will be assessed in all the demos sites, while a set of additional ones will be demo dependent. Based on testing (WP8) and experience gained, WP2 will revise & improve the framework during the course of the ARV project. The continuous process will lead to a well-proven, validated & consistent framework at the end of the project.

Task 2.3 (T2.3). Use and testing tools for Large Scale Retrofitting actions in CPCC: M4 – M46. Task lead: IREC; Participants: PALMA, DTU, Center Denmark, NTNU
The aim of this task is to improve and adapt District Energy Simulation tools to effectively plan, design and analyse large scale retrofitting actions of the built environment and the impact at district level. The tools integrate different modelling strategies of the building stock and new constructions in a district, based on the use of building archetypes through different approaches such as white box detailed models; grey-box models, data driven models, etc and availability of data at urban scale, e.g. GIS-based data. Cooperation and coordination will be established with WP4 where BIM tools & Digital twins (archetypes & CityGML format) of specific buildings in the demo sites will be generated. Specific coordination actions for mutual learning will be established with Task 5.2 (WP5) where digital methods will be used in pre-manufacturing workflow. Methods and algorithms to calculate relevant KPIs based on the results of Task 2.2 will be integrated to provide techno-socio-economic outputs. Collaboration with WP8 will be established to incorporate findings of co-benefits analysis in renovation processes. The main objective of the use of these tools is to take informed decisions, and to showcase their usefulness to accelerate the renovation of building stock in cities. Use cases will be reported to facilitate the replicability in other environments at EU scale.

Subtask 2.3.1 Innovative methods and tools for Large-Scale Retrofitting actions in the demo of Palma de Mallorca:
Test of methods and tools for the techno-socio-economic evaluation and implementation of Public Private Partnership business models for Large-scale renovation in the Llevant Innovation District (area of La Soledat Sud). It will used as a test platform for the carbon footprint assessment of retrofitting of building stock in urban plans as established in the pioneer Climate Change and Energy Transition law of the Balearic Islands. The methodology will be tested hand-by-hand in all the steps of the renovation process from the initial planning steps to the analysis of operation and use after renovation.

Subtask 2.3.2 Innovative methods and tools for Large-Scale Retrofitting actions in the demo of Sønderborg:
Models of representative archetypes of the building stock in the district heating network will be established using different modelling approaches, i.e., using available heat meter data for data-driven or grey-box models and for any buildings without sufficient data white box models will be created. These building models will be integrated with district heating network model to identify buildings in which retrofitting has large impact on energy efficiency of the entire energy system. For the identified buildings, different retrofitting options will be studied to optimize cost-effectiveness.

Task 2.4 (T2.4). Use and testing tools for the implementation of Citizen Energy Communities in CPCC. M7 – M42. Task lead: IREC; Participants: PALMA, CVUT, AIGUA
The aim of this task is to integrate existing methods and tools to evaluate local RES generation in an urban environment using available free surface in public buildings and public spaces and to link with individual and aggregated energy consumption of participants in Citizen Energy Communities. Although Directive (EU) 2019/944 has enable the creation of Citizen Energy Communities (CEC), there is a lack of integrated tools to be used in the planning, selection, design, implementation and assessment of new Local and RES Energy Communities. Decision-making tools that integrate available urban scale information, models for local RES production and estimate energy consumption of potential participants in CEC will be tested in the framework of ARV. Method and tools should be able to calculate PV & BIPV generation, energy demand of the community and to be adapted to local regulation context & different governance aspects and financial models. Methods and tools will be tested and validated in real use environments in the demo projects to evaluate the energy and economic aspects of different business models (WP9) of the energy flexibility strategies (WP7) leading to optimized economic & environmental aspects and the engagement of citizens in the area as participants in CEC.

Subtask 2.4.1 Innovative methods and tools for CEC implementation in the demo of Palma de Mallorca:
Use of Tool for the techno-socio-economic assessment of implementing CEC and private crowd-funded innovative mechanisms to generate Renewable energy in available public roofs in the area e.g., schools & other public buildings

Subtask 2.4.2 Innovative methods and tools for CEC implementation in the demo of Karvina:

CVUT will collaborate with the municipality of Karvina that is working on Positive Energy District framework. Performance of a solar potential study of the municipality-owned building using 3D modelling in Rhino with Ladybug Tools & Radiance for more precise analyses. The study will include economic & technical parameters with visualisations.

Task 2.5 (T2.5) Virtual Visualization Environments for training of planners and citizen awareness: M4 – M48. Task lead: SINTEF; Participants: IREC, PALMA, OBF
The objective of this task is to explore, integrate and use a diversity of 3D and/or visualization techniques of Virtual Reality (VR) and/or Augmented Reality (AR) for the results use cases in Task 2.3 and Task 2.4. The aim is to better communicate results of different scenarios analysis to different types of stakeholders and facilitate citizen engagement, As the development of VR and AR applications can be targeted toward several distinct stakeholders, such as city planners &policy makers to school children & end-users, different user groups & external stakeholders will be identified. Decision on technical aspect of the application development will be made to best achieve the dissemination goals for each user/stakeholder group. This includes: (1) defining if a VR or AR approach for the specific group/goal, and if desktop compatibility are required; (2) defining & design locomotion method in VR world; (3) define interaction design; (4) define & design user guidance approach for navigation through the virtual model or physical world based on dissemination goals and (5) define & design data visualisation of renovation results and any live sensor streams based on dissemination goals. The design and implementation will imply a user-centric approach in a living-lab setting. VR/AR environments are planned as an integral part of the overall methodology of Living Labs LLs (Task 3.2) and will be applied in suitable demos/contexts (Task 3.3). Implementation of AR/VR applications will be carried out in connection with activities of Task 3.4. As format & availability of BIM models, laser scans, digital twins, in addition to any available live sensor data streams, will frame the technical possibilities and limitations for the development of the applications. This task is connected closely with WP5, Task 5.2 and Tasks 2.3 and 2.4.

Subtask 2.5.1 Innovative AR/VR Environment in the demo of Palma de Mallorca.
3D Virtual Reality Environment / Digital Twin of the Llevant Innovation District Innovation Llevant by means of integration with game engine Unreal to create interactive visualization &experiences based on 3D city data in connection with Living Lab activities in WP3. Connection with data and results of Task 2.3 &Task 2.4 in Palma

Subtask 2.5.2 Innovative AR/VR Environment in the demo of Oslo.
Use of AR/VR tools and environments in connection with Living Lab activities in WP3. The use of such tools will ensure the 1) integration of the different stakeholders involved in the development of the Oslo demo, and 2) will simplify the planning of CPPCs.

Participation per Partner

Partner number and short name	WP2 effort
1 - NTNU	9.00
2 - ACE	1.00
3 - CVUT	6.50
4 - DTU	16.00
7 - PROJECTZERO	3.00
8 - EURAC	3.00
9 - SINTEF	12.00
10 - PALMA	47.00
11 - IBAVI	3.00
12 - IREC	67.00
14 - UAS Utrecht	3.00
15 - HOUSING EUROPE	1.00
17 - Center Denmark	4.00

Partner number and short name	WP2 effort
28 - KARV	2.00
30 - DTTN	3.50
33 - OBF	7.00
35 - AIGUASOL SAEST	9.50
Total	197.50

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D2.1	Assessment framework for CPCC	12 - IREC	Report	Public	9
D2.2	Description of methods and tools for Large-Scale Retrofitting in CPCC	4 - DTU	Report	Confidential, only for members of the consortium (including the Commission Services)	18
D2.3	Description of methods and tools for CEC in CPCC	12 - IREC	Report	Confidential, only for members of the consortium (including the Commission Services)	15
D2.4	Application of tools for Large-Scale Retrofitting actions. Uses cases and guidelines for replicability	12 - IREC	Report	Public	46
D2.5	Application of tools for implementation of Citizen Energy Communities. Uses cases and guidelines for replicability	12 - IREC	Report	Public	42
D2.6	Demos of Virtual Reality Environments	9 - SINTEF	Demonstrator	Public	36
D2.7	Description and lessons learnt from training & awareness sessions using Virtual Environments	9 - SINTEF	Report	Public	48
D2.8	Assessment framework for CPCC. Updated version	12 - IREC	Report	Public	48

Description of deliverables

D2.1 : Assessment framework for CPCC [9]

assessment framework will be defined considering the multidimensional perspective to characterize the impact of CPCC. The main categories that will be considered in the CPCC framework are energy, environment, economy, well-being, social aspects, smartness and circularity, addressing aspects at both building and neighbourhood level.

D2.2 : Description of methods and tools for Large-Scale Retrofitting in CPCC [18]

This deliverable will report on how to improve and adapt District Energy Simulation tools to effectively plan, design and analyse large scale retrofitting actions of the built environment and the impact at district level

D2.3 : Description of methods and tools for CEC in CPCC [15]

How to improve and adapt District Energy Simulation tools to effectively plan, design and analyse large scale retrofitting actions of the built environment and the impact at district level. The tools integrate different modelling strategies of the building stock and new constructions in a district, based on the use of building archetypes through different approaches

D2.4 : Application of tools for Large-Scale Retrofitting actions. Uses cases and guidelines for replicability [46]

The application of the methodology as presented in D2.3. Reporting in the form of guidelines for replicability

D2.5 : Application of tools for implementation of Citizen Energy Communities. Uses cases and guidelines for replicability [42]

Deliverable presenting experiences with integrating existing methods and tools to evaluate local RES generation in an urban environment using available free surface in public buildings and public spaces and to link with individual and aggregated energy consumption of participants in Citizen Energy Communities

D2.6 : Demos of Virtual Reality Environments [36]

integrate and use a diversity of 3D and/or visualization techniques of Virtual Reality (VR) and/or Augmented Reality (AR) for the results use cases in Task 2.3 and Task 2.4. The aim is to better communicate results of different scenarios analysis to different types of stakeholders and facilitate citizen engagement

D2.7 : Description and lessons learnt from training & awareness sessions using Virtual Environments [48]

3D Virtual Reality Environment / Digital Twin will be tested and Palma Demo and) integration of the different stakeholders involved in the development of the Oslo demo. This deliverable will focus on how to simplify the planning of CPPCs

D2.8 : Assessment framework for CPCC. Updated version [48]

See deliverable 2.1 description

Schedule of relevant Milestones

Milestone number[18]	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS2	ARV Assessment framework	12 - IREC	9	Assessment framework defined
MS3	Implementation of tools	12 - IREC	15	Implementation of tools for Large Scale Retrofitting actions started
MS4	Virtual Reality Environments	12 - IREC	36	Virtual Reality Environments used and implemented

Work package number [9]	WP3	Lead beneficiary [10]	9 - SINTEF
Work package title	Community engagement, environment, and well-being		
Start month	1	End month	48

Objectives

The objective of WP3 is to promote active citizen engagement in processes of sustainable neighbourhood transformation. It is imperative to channel citizens' competences and experiences, ensuring their active engagement in producing plans for buildings and neighbourhoods, that reduce energy demand and enhance energy efficient behaviour. Active and explicit citizen engagement and feedback are often a missing link towards sustainable neighbourhood transformation. Living labs (LL) approaches are known for engaging with multi-stakeholder groups in real-life contexts. A LL is an innovation environment where new solutions are designed & tested alongside users, bridging the gap between the social and technical context, applying a user-centred multi-method approach. ARV LLs will be established involving different perspectives on a citizen's role - such as citizens as building occupants, citizens as residents of CPCC, citizens as green ambassadors.WP3 will focus on enhancing citizens` engagement methods by paying attention to time & cost intensity, reducing under-representation as well as understanding tacit and hidden needs of citizens. The outcome of increased citizens` engagement is expected to have a positive impact on their level of satisfaction and well-being and ensure that energy efficient behaviour is firmly established as part of everyday life.

WP3 includes the following objectives:
• Plan and develop an overall methodology for demos to set up and run community activities and Living Labs.
• The WP targets occupants of transformation projects of all ages but will have a special focus on engaging and empowering young citizens as representatives of the future generations, involving schools at demo sites.
• Offer education and training about reducing energy demand and promoting energy efficient behaviour.
• Establish LLs with two thematic foci: social innovation & energy transition.
• Engage citizens in different roles and at different stages of the decision-making processes.
• Collect qualitative & quantitative data about the LL approaches & relevant citizen engagement tools & methods.
• Capture feedback and learnings from CPCC Living Labs. Identify and classify relevant citizen engagement methods, tools and processes based on time and cost intensity, level of inclusivity, and the potential to uncover tacit levels of experience and latent needs of occupants' preferred usage of the building and neighbourhood.
• Assess the barriers and drivers for citizen engagement in renovation processes.
• Demonstrate the potential for replication and up-scaling of the citizen engagement tools for future projects.

Description of work and role of partners

WP3 - Community engagement, environment, and well-being [Months: 1-48]
SINTEF, NTNU, ACE, CVUT, PROJECTZERO, EURAC, PALMA, IREC, MET, UAS Utrecht, HOUSING EUROPE, Center Denmark, SAB, GDFA, BOEX, CITY OF UTRECHT, Mitros, KARV, DOL, DTTN, OBF
Task3.1 (T3.1) Innovation forum for WP3. M1-48. Task lead: SINTEF, Partners: CVUT, PALMA, IREC, KARV, OBF, HU, EURAC, NTNU, PZ.
The aim of this task is to coordinate the development of concise and affordable citizen engagement tools and guidelines in conjunction with the demo projects and other WPs. T3.1 will ensure effective cooperation between the different innovation clusters in the demo projects, securing the aim of mutual learning and feedback loops between the demos and the WPs. The work will encompass innovation workshops between the demos within the WP and ensure links between the demos. Results will be reported and integrated as part of the innovations report (D1.4) in WP1

Task 3.2 (T3.2) Plan and develop overall methodology for community activities and Living Labs. M1-12. Task lead: SINTEF, Partners: CVUT, IREC, PALMA, EURAC, MET, SAB, City of Utrecht, Housing Europe, Center Denmark, NTNU, DTTN.
The aim of this task is to develop the overall methodology for CPCC Living Labs focusing on social renovation and energy transition. T3.2 will keep the methods and tools open, flexible, and diverse but with a clear focus on actions for enhancing the local user/citizen engagement, awareness raising and learning. Methods and tools relevant for the development of the overall methodology:
• Physical HUB in districts for organizing participatory processes and supplying general information.
• Co-creation workshops (at least one per demo) addressing different stakeholder segments such as elderly, families, energy poverty affected people, etc.

• Renovation surveys (pre and post) (with WP8 & Housing Europe)
• Positive energy champions, competitions, Green ambassadors, Influencers
• Citizen diaries and blogs/vlogs (ACE)
• VR visualization of different renovation scenarios as basis for need assessment and co-creation (with Task 2.5)
• Idea sharing session, world café method, board games, or similar (physical or/and online)
• Mental mapping engaging with and illustrating citizen knowledge, preferences, requirements, and ideas
• Testing of energy related prototype solutions, feedback, and iteration
• Home energy monitoring systems and energy coaching of occupants.
An important aspect is the Corona-proof level of certain measures. A hybrid approach using both digital communication platforms and tools, as well as approaches requiring physical encounters are planned. A stakeholder mapping is performed as basis for the planning community activities in the Living Labs.

Task 3.3 (T3.3) Implementation of community activities and Living Labs. M6-36. Task lead: PALMA, Partners: SINTEF, City of Utrecht, IREC, CVUT, ACE, GDFA, PZ, NTNU, MET, SAB, BOEX, MITROS, KARV, OBF, DTTN, EURAC, Center Denmark.
The aim of this task is to adapt the Living Labs methodology developed in 3.2 to the respective demo`s local, socio-economic, and cultural context. While Social Renovation LLs will focus on engaging the community before renovation, during design process and on innovative financing solutions, Energy Transition LLs will establish a physical space (HUB) and focus on new solutions regarding energy transition and circularity (storage, electrical vehicles, renewables, reuse, etc.), testing and iteration of innovative and prototype solutions, as well as on energy coaching of occupants. T3.3 will also work closely with Task 10.4.1 to coordinate the necessary training of green ambassadors and to prepare adequate communication materials to the target group. Each demo will conduct series of co-creation workshops and community activities related to their innovations envisioned. Innovations relating to the thematic topics addressed by the LLs will be:

Subtask 3.3.1 Innovations in Demo Oslo (OBF, SINTEF)
• Energy transition: The school is at the core of the Norwegian demo and will serve as a HUB for involvement, engagement, and teaching pupils about energy transition technologies and sustainability. The building will include a demo-space for citizen's and children's education with a focus on new technologies like storage, electrical vehicles, renewables, etc. Activities such as green ambassadors and influencers promoting energy efficient behaviour and circular solutions to their peers, participatory methods where play, engage, inform, and educating young people and through them also their parents, are envisioned here. Such activities will be developed and implemented with the help of ICT tools (AR/VR environments, Task 2.5) and will ensure a smooth process of integrating the local community in the district development.

Subtask 3.3.2 Innovations in Demo Sønderborg (PZ)
• Energy transition: Involvement of tenants and citizens in new developed smart home control system. The energy saving results of the planned innovative energy technologies depend significantly on the daily energy behaviour of the tenants in the demo buildings. Therefore, information and training activities are planned to secure, that the tenants and the maintenance staff receive sufficient information on the new smart control systems and learn to operate the new energy saving appliances. Green Ambassadors will be appointed, one ambassador for each of the 19 buildings, to be trained to assist their neighbours and colleagues.

Subtask 3.3.3 Innovations in Demo Utrecht (City of Utrecht, MITROS, BOEX)
• Social renovation: Before the actual renovation, the two Utrecht housing corporations will engage with tenants to explore and deal with social challenges (e.g., debt, poverty, health issues) and identify opportunities to create a more engaged community. This subtask will focus on the post-renovation follow-up of the social renovation activities. The expected impact is a greater degree of citizen empowerment, and a greater degree of support for the renovation, as well as improvements to both, the social and physical living environment.
• The City of Utrecht is running a human capital program called 'Bouw=Wouw!', focusing on attracting young people of the district to work in the construction and technology sector. The two housing corporations & involved building value chain companies will create job and internship places related to the implementation and maintenance of ARV demonstration activities. The expected impacts are lessons, internships, job creation, involving and empowering of young people into ambitious building and renovation projects.
• Energy transition: Predictions about reductions in energy bills for residents is often used to promote energy efficient retrofitting programs in social housing corporations. This, however, is highly dependent on the future behaviour of residents. Energy coaching of residents is a key action to support them in the use of their renovated homes. This action builds upon the energy coaching program implemented in the Positive Energy Building retrofit (executed before the start of ARV) and is complemented with real-time monitoring data of energy usage (through a Home energy management

system HEMS). In this social action some residents are engaged and educated to act as local change agents coaching their fellow residents.
• Physical Hub in district: in 2021 the construction of a circular pavilion in the district is expected. This circular pavilion will support community engagement & development with training, promotion & dissemination of the district energy transition and renovation programs. This hub will be used as the location in the district where the co-creation activities related to social renovation, Bouw=Wouw! & energy coaching will take place.

Subtask 3.3.4 Innovations in Demo Karviná, (KARV; CVUT)
• Energy transition: Karviná Mizerov Health Centre as a living lab for the City of Karviná & other municipalities within Czech Republic. The LL will educate citizens such as students, creating energy & resource efficient neighbourhoods that increase citizen and stakeholder awareness and engagement. Promote user-friendly innovative & sustainable building solution through education and other communicational channels, implement user-centred design of building systems. Support a creation of long-term stakeholder ecosystems concerned with energetic transformation and the role of individual projects in driving broader organizational and procedural changes.
• Community engagement actions with young people in the school (16-19 years), exploring co-creation methods. Change agents promoting sustainability to their peers, parents, and the community.

Subtask 3.3.5 Innovations in Demo Palma (Municipality City of Palma, IREC, MET)
• Social renovation: Private Public Partnership one-stop shop mechanism for the large-scale renovation of urban areas, including participative strategies that involve district residents in the LL & the planning process before the renovation starts.
• Energy transition: Centre for Energy Transition TE21 will act as a HUB, and exhibition space for citizen engagement towards the energy transition in urban spaces and new sustainable technologies. Linked to local energy communities around schools, which will enable a set of training actions and awareness raising campaigns with special attention to engagement with the younger generations. Activities will combine use of digital tools, VR visualization (task 2.5), testing of prototype solutions and open visits to living labs. New buildings will be used as LLs where tailored actions to residents will be designed to increase awareness of energy use and energy transition solutions.
• CEC – Citizen Energy Community, as private crowd-funded / innovative mechanism to generate renewable energy in available public roofs in the area e.g., schools, public buildings. Tailored workshops, energy cafés & engagement actions will be designed for direct involvement of district residents and families in the CEC.

Subtask 3.3.6 Innovations in Demo Trento (DTTN, EURAC, DOL)
• Energy transition: Implementation of a local energy community linked to geothermal structure using former highway tunnels as an art and exhibition gallery, while permitting extraction of geothermal energy. Engagement strategies will be applied for involvement of citizens when connecting to geothermal energy, so that lower tariffs can be attained.
• Social renovation: One-stop shop concept linked to innovative financing incentives to engage a critical mass of the community to advance refurbishment (timber-based facades) on a district scale. Engagement strategies will be applied for involvement of citizens to assess feasibility of community financing and to renovate the district from an urban point of view without compromising aesthetics or architectural qualities

Task 3.4 (T3.4) Monitoring and reporting of CPCC Living Labs in demo sites. M8-48. Task lead: CVUT, Partners: SINTEF, City of Utrecht, PALMA, IREC, ACE, NTNU, MET, SAB, BOEX, MITROS, KARV, OBF, Center Denmark, Housing Europe, DTTN, EURAC, DOL
The aim of this task is to monitor and report the developments in the LLs as well as to document the barriers & drivers encountered with the applied engagement methods. This task will require involvement with respective demo partners to monitor progress. T3.4 will also work with WP8 on the multiple benefits analysis and the ex-ante, interim, ex-post survey evaluation, as well as with WP10 to coordinate the necessary reporting mechanisms relevant for CPCC Living Labs.
• Document drivers and barriers related to the social innovation approach experimented with in each demo.
• Collect qualitative and quantitative data and results on each of the LLs.
• Background data: Understanding the socio-cultural-economic constitution of the demo communities, as well as interests and needs of the stakeholders involved.

Task 3.5 (T3.5) Feedback and learning to develop a new strategy for citizen engagement. M16-48. Task lead: SINTEF, Partners: CVUT, Housing Europe, PALMA, IREC, MET, ACE, SAB, KARV, OBF, Center Denmark, EURAC, DTTN
The aim of this task is to enhance the innovative social engagement approaches explored, based on the analyses of the barriers and drivers, their effectiveness, costs, and learning potential. The goal is to promote replicable, feasible tools across deep renovation projects in Europe to fully reap the potential of the upcoming European Renovation Wave. The outcome of increased citizen engagement will impact the level of satisfaction and well-being as well as anchoring energy efficient behaviours as an accepted part of everyday life from an early stage. Task 3.5 will require involvement of all

demo partners to analyse the feedback and learnings from Living Labs, and to channel the learnings into a guidance handbook for future projects.
• Analyse costs, extent of inclusiveness and the potential to draw out hidden needs of citizens, using a Citizen Design Science approach. (while WP2 and WP8 focus on the overall framework and evaluation for CPCCs)
• Based on mapping and surveys in cooperation with WP 8, evaluate the change in satisfaction, perceived well-being, and impact of measures on energy demand.
• Enhance and secure relevant citizen engagement tools and methods and deliver a digital guidance handbook to future projects beyond ARV (with WP10).

Participation per Partner

Partner number and short name	WP3 effort
1 - NTNU	12.00
2 - ACE	4.00
3 - CVUT	18.00
7 - PROJECTZERO	3.00
8 - EURAC	4.00
9 - SINTEF	37.00
10 - PALMA	50.00
12 - IREC	16.00
13 - MET	8.00
14 - UAS Utrecht	1.00
15 - HOUSING EUROPE	6.00
17 - Center Denmark	4.00
18 - SAB	3.00
19 - GDFA	1.00
20 - BOEX	5.00
23 - CITY OF UTRECHT	11.00
27 - Mitros	5.00
28 - KARV	7.00
29 - DOL	1.00
30 - DTTN	6.00
33 - OBF	11.00
Total	213.00

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D3.1	Plan and overall methodology design	9 - SINTEF	Demonstrator	Public	12

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
	for establishing CPCC Living Labs, including stakeholder mapping				
D3.2	Implementation plan of CPCC Living Labs per demo site, demonstration of LL	10 - PALMA	Demonstrator	Public	13
D3.3	CPCC Living Labs reports	3 - CVUT	Report	Public	24
D3.4	Analysis of citizen engagement tools and processes using a citizen science approach	9 - SINTEF	Report	Public	40
D3.5	Community-scale citizen engagement strategy and tools for the renovation wave	9 - SINTEF	Websites, patents filing, etc.	Public	48

Description of deliverables

D3.1 : Plan and overall methodology design for establishing CPCC Living Labs, including stakeholder mapping [12]

Plan for overall methodology for CPCC Living Labs focusing on social renovation and energy transition. the methods and tools open, flexible, and diverse but with a clear focus on actions for enhancing the local user/citizen engagement, awareness raising and learning. Methods and tools relevant for the development of the overall methodology

D3.2 : Implementation plan of CPCC Living Labs per demo site, demonstration of LL [13]

A physical space (HUB) and focus on new solutions regarding energy transition and circularity (storage, electrical vehicles, renewables, reuse, etc.), testing and iteration of innovative and prototype solutions, as well as on energy coaching of occupants

D3.3 : CPCC Living Labs reports [24]

Each demo will conduct series of co-creation workshops and community activities related to their innovations envisioned. The aim is to monitor and report the developments in the LLs as well as to document the barriers & drivers encountered with the applied engagement methods. This task will require involvement with respective demo partners to monitor progress Revisions M36, M48

D3.4 : Analysis of citizen engagement tools and processes using a citizen science approach [40]

analyses of the barriers and drivers, their effectiveness, costs, and learning potential. The goal is to promote replicable, feasible tools across deep renovation projects in Europe to fully reap the potential of the upcoming European Renovation Wave

D3.5 : Community-scale citizen engagement strategy and tools for the renovation wave [48]

As for deliverable "Analysis of citizen engagement tools and processes using a citizen science approach ", this will result in a guidance handbook for future projects

Schedule of relevant Milestones

Milestone number[18]	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS5	Overall methodology in T3.2	9 - SINTEF	9	Methodology corresponding with the deliverable completed
MS6	LL reports	9 - SINTEF	24	First LL reports completed

Work package number [9]	WP4	Lead beneficiary [10]	1 - NTNU
Work package title	Sustainable Building (re) Design		
Start month	1	End month	40

Objectives

WP4 deals with the (re) design of new and retrofitting of existing buildings as zero-emission positive energy-buildings in sustainable climate positive circular communities (CPCC). The main objectives are to (i) reduce the embodied energy & emissions, (ii) to increase the energy efficiency, and to (iii) match sustainability with aesthetics and quality of life, by integrated circular design processes. The activities in WP4 are divided into six main tasks that address design strategies of buildings integrated in CPCCs.
The ARV integrated circular design includes adaptation to local climate conditions, deep renovation with minimum disruption for buildings occupants, significant reduction of CO2 emissions, high energy efficiency with active/passive solutions, high focus on circularity i.e. reduce, re-use & recycle of materials, elements & modules, add value, and resource & energy efficient integration of PVs i.e. BIPV & BAPV, while satisfying occupant well-being and architectural considerations. The design considerations will address the scalability, flexibility, durability, maintainability, fire &seismic safety of the buildings. The circular positive energy buildings & neighbourhoods will be embedded in the spatial, economic, technical, environmental, regulatory and social context of the demo sites. The ultimate goal of WP4 is integrated circular design that cultivates the aesthetics and improves amenities for the building's occupants while improving the performance of the buildings in line with the new European Bauhaus strategy.

Description of work and role of partners

WP4 - Sustainable Building (re) Design [Months: 1-40]
NTNU, ACE, CVUT, PROJECTZERO, EURAC, SINTEF, PALMA, IBAVI, IREC, UAS Utrecht, BOEX, Rc Panels B.V., UU, BOSGROEP, MEX, KARV, DTTN, UNITN, POLITO, OBF, AIGUASOL SAEST
Task 4.1. Innovation forum for WP4. M1-M40. Task leader: NTNU, Participants: OBF SINTEF, HU, UU, IREC, PALMA, CVUT, KARV, EURAC, DTTN, PZ, ACE
The aim of this task is to support the implementation of design innovations in the demo projects, and to enhance the exploitation across the innovation clusters. The forum will act as an incubator for co-creation of socially & aesthetically promising green, energy positive and circular buildings/neighbourhoods with the utilization of digital design solutions, modules & technologies, for both new buildings and renovation projects. T4.1 will ensure effective cooperation between the different innovation clusters in the demo projects, towards the aim of mutual learning and feedback loops between the demos and the WPs. The work will encompass innovation workshops on Integrated Circular Design between the demos within the WP and ensure the link to the other WPs.
A key output of T4.1 will be the D4.6 on the design guidelines of ARV real-life demo projects for achieving sustainable positive energy buildings at the neighbourhood scale. The demos represent different ways of realizing CPCC including both new construction & renovation in different European contexts, climates, cultures & markets. Moreover, results will be reported and integrated as part of the innovations report (D1.4) in WP1.

Task 4.2. Integrated Circular Design of the Demo Project in Oslo. M1-M36. Task leader: SINTEF, Participants: NTNU, OBF
The main goal is the integrated circular design & evaluation of different concepts for zero-emission and positive energy buildings in a climate positive energy neighbourhood in Oslo. In T4.2, we will analyse different scenarios with combinations of state-of-the-art materials, components, technologies & smart control systems with regards to the ARV KPIs as defined in WP2. The following will be of focus for the Demo project in Oslo:
• Digital design for optimum life cycle performance. Design of new positive energy building with 50% reduced GHG emissions from materials. BIM & Digital Twins will be used to document and optimize the performance throughout the design process. The environmental and economic impact of different strategies, considering parameters such as LCA, LCC, and energy needs, but also cultural & social aspects, will be assessed. Multiuse design strategies of buildings will be part of the design strategy to engage and provide social meeting areas for the local community.
• Climate adapted design using an innovative open surface water solution. This is the starting point for the design of the school project. The concept is a green & different schoolyard where vegetation and surface water management are used as a resource to create good & varied outdoor spaces.
• Effective application of low-carbon concrete, achieving 40% lower embodied emissions than standard concrete.

• Circular renovation strategies, where most of the walls and windows in the old factory will be reused & upgraded to new energy performance standards. Mapping of locally available building materials & components from existing & going-to-be demolished buildings. Design strategies for use of reused materials & components in relation to technical and aesthetical constraints.
• High energy ambition renovation design of cultural heritage building using a circular renovation strategy. Some of the LCI inventory will be reused in the other projects.
• Novel heating/cooling system using low-temperature thermal heating & high temperature thermal cooling using the same infrastructure coupled with ground source heat pump (district heating used for peaks loads).
• Architecturally integrated PV system design for façades using novel, angular & coloured modules with high degree of standardized module sizes & fastening solutions, significantly reducing the time & costs of applying such system. Design strategies focusing on panel-to-panel and panel-to building-surface connection for easy installation/replacement of components and replication in other building/contexts.
• Integrated design of green solutions where vegetation & open surface water handling are resources to create attractive outdoor spaces that are integrated with the adjacent areas. Integrated strategies of greenery types focusing on the potential benefits on local climate i.e. reduction of heat island effect, abatement of pollutants.

Task 4.3. Integrated Circular Design of the Demo Project in Utrecht. M1-M36. Task leader: HU, Participants: UU, BOEX, RCP, Bos Groep, MEX.
The demo actions in Utrecht focus on resource efficient, systematic retrofitting of four mid residential apartment buildings from the 1960s into Positive Energy Buildings and 6 residential apartment buildings from into Nearly Zero Emission Energy Buildings (with the intent of building owners to move in the project towards Positive Energy Buildings using ARV innovations) embedded in a green neighbourhood. The innovations & research will assess the current HeMuBo retrofitting approach (applied to 6 buildings reaching Nearly Zero Emission Building targets) and the current Inside-Out 1.0 approach (previously applied in one nationally funded project ending in 2021) and develop result in the Inside-Out concept 2.0. The integrated design will include specific building components that result in 30% cost reduction compared to traditional systems and will reduce GHGs substantially. To achieve these goals the re-design will focus on roof, façade, and balcony systems by exploring the following subjects

• The retrofit solutions will be designed for industrialization and will be scalable to serve different post war building typologies, such as 4 story, 6 story &10 story high-rise and other façade characteristics, through modular & adaptable roof, façade & balcony sections.
- For four mid-rise residential apartment buildings (type Bredero-4) the Inside-Out 2.0 retrofit solution will be designed and tailor made.
- For four mid-rise residential apartment buildings (type Intervam-4) and two high-rise residential apartment buildings (type Intervam-10) the HeMuBo retrofit solution, that is in pre-planning in 2022, will be assessed and advancements to this retrofit solution will be designed based on Inside-Out components. The expected improvements relate to increased energy performance from NZEB to PEB and lower retrofitting time and costs through the application Inside-Out components (energy and HVAC installations facades using sandwich panels) produced off-site and installed plug-and-play on-site and the application of additional BIPV / BAPV. The decision to implement these changes depend on outcomes of this task and external factors, such as existing contractual agreements between Bo-Ex, Mitros and their contractors (outside of ARV consortium) and the required investment.
• Modular installation design which allows different types of heating & ventilation per dwelling related to the needs of the occupant &location.
• Renovation concepts to create the architectural diversity of appearance, adapted to the context. An important part is the architectural connection of design in post-war renovations and the design of the adaptable retrofitting solution.
• Design for standardization and flexibility of the interfaces connecting modules e.g., detailing. Including flexible façade fixing that gains a higher adaptation potential
• Design for infrastructure compactness, at the outside of the building & integrated in the roof, balcony & façade components, including connection of PV modules for optimal energy harvesting.
• Integration of material data storage in a resource track system i.e. materials passport.
• Design for minimal disruption: Users will have the choice to sleep in their apartments during the renovation.
Design for Integrated Plug & Play installation solutions to link multiple facades (including integrated energy a/o ventilation installations) enhance modularity and reduce the total cost of ownership.
• Demonstration of architectural and aesthetic plug-and-play integration of BIPV/BAPV solutions:
- Analysis of current and new solutions of integration of PV in building components. Innovative BIPV solutions will be assessed on aesthetics and energy performance, and on feasibility for prefabrication, industrialization, integration & cost reduction, with varying features such as shape and colour

- Definition & designing of BIPV in pre-manufacturing process aiming to integrate PV in factory, leading to reduction in construction time and construction cost. Link with WP5.4
- Definition and designing of plug-n-play BIPV, generating solutions for connecting cabling of PV-panels and monitoring equipment between building components

Task 4.4. Integrated Circular Design of the Demo Project in Palma. M1-M36. Task leader: IREC, Participants: PALMA, IBAVI, AIGUA.
The main goal is the integrated circular design & evaluation of different concepts for zero-emission and positive energy buildings within sustainable climate positive circular districts in Palma. The key actions in the district can be summarized as:
• Large scale retrofitting action in La Soledat Sud of 250 private dwellings by means of a novel Public Private Partnership mechanism
• New positive energy social housing building with 36 apartments
• Energy Renovation of a flagship heritage protected building from the 70's modern movement
The design of new highly energy efficient & positive energy social housing buildings project will focus on the use of innovative local materials. Integrated Circular Design Process based on cross-ventilation strategies, use of vernacular shading systems, high inertia & green-housed based spaces, with high architectural quality. Integrated Design will consider hybrid ventilation solutions driven by IAQ metrics both for cooling and heating e.g. use of east/west oriented greenhouses. In order to reduce embodied emissions, solutions based on the recovery of eco-friendly local artisan industries with km 0 raw materials will be tested. The main solutions to be assessed in the project will be:
• Neptune grass thermal insulation, a nature-based solution that will be performance at the demo building, which can be applied only on those places where the Posidonia Oceanica is a local resource.
• "Pedra de Marés", Marés local stone used in vernacular architecture and extracted from local & km0 sources.
• Certified timber for floors and shading elements
Cost-optimal solutions for Large-Scale retrofitting process aiming to achieve a 50% reduction in the energy demand and a significant improvement in the thermal comfort conditions. A catalogue of technical solutions for replicability will be derived. The range of year of construction of the buildings to be renovated is 1920 – 1980.
Integrated energy design for the retrofitting of protected and iconic heritage office building from the Modern Movement (1970). Pre-testing of several last generation of BIPV solutions i.e. cladding-based systems & semi-transparent PV glass, and modelling of the impact in the integrated design. Design the best solution for high glazed office buildings regarding aesthetics aspects, impact of the heating & cooling loads and energy production. The listed building is characterized for a glass curtain wall & integrated design solution for the envelope is a necessity to reduce the energy demand to 50% compared with the pre-retrofit status. Several HVAC solutions and strategies will be analysed & designed adapted to the local climate by means of integrated design linked with the envelope solutions in the façades i.e. smart skin solutions adaptive to season conditions

Task 4.5. Integrated Circular Design of Demo Project in Karviná. M1-M36. Subtask leader: CVUT, Participants: KARV.
The Czech demo case encompasses the renovation of Karviná Mizerov Health Centre in the city of Karviná. The following will be of focus for the Demo project in Karviná:
• Become positive energy building, achieved by passive house standard & renewable energy generation
• Digital design & 3D simulations, i.e. digital twins, for solar irradiation potential & design of optimum shading devices
• Small-scale pilots of climate resilient solutions – use of heat pumps for summer cooling
• LCA of HVAC systems with focus on carbon footprint
• BIPV, BAPV, PV-T, solar thermal, heat pumps, active shading systems with weather forecast, innovative cooling solutions. BIPV integrated into ventilated facades
• Green roof for mitigation of heat island effect, and rainwater management e.g. rain gardens, greenery

Task 4.6. Integrated Circular Design of Demo Project in Trento. M1-M36. Subtask leader: UNITN, Participants: DTTN, POLITO, EURAC.
The demo project in Trento covers both, new construction & renovation of existing buildings & structures. The ambition is zero emission & plus energy level and a high level of energy efficiency. The following will be of focus in Trento:
• Development of a catalogue of Integrated Circular Design solutions for refurbishment of buildings with 50% of energy reduction and positive energy new construction, utilizing building envelopes with active (BAPV/BIPV) and passive elements.
• Nature based solutions integration. Inform Industry 4.0 via digital surveys. Comfort improvement (psychological, physiological). One-stop-shop co-creation approach enabling diffusion of design technology: replicability of solutions. Fire and seismic resistance co-benefits of timber-based construction/refurbishment.
• Timber based (new) construction, refurbishment and superelevation scenarios (local & circular value chain). Simplified Life cycle inventory. Circular economy-based design process. Land uses reduction via superelevation

(scenario development) - New constructions, renovation of existing buildings & superelevation - additional (new) volumes on existing buildings.
• Natural and mechanical ventilation concept for climate responsive buildings.
• Heat pumps integration for heating and cooling (connection to NSGE – tunnels, foundations, roads). Passive heating systems integration in buildings envelopes. Active thermal mass, heat storage. Active/Passive systems integration via Building Automation Systems. Architectural and Aesthetic integration of BIPV/BAPV solutions. Materials selection. Integration between PV, Solar Thermal and CMV systems.
• Analysis of existing models for scenarios elaboration to inform hybrid Energy/Nature-based solutions on building/ urban surfaces. Innovative materials (new and waste/by-products).
• Architectural and Aesthetic integration of BIPV/BAPV solutions. Materials selection. Integration between PV, Solar Thermal and CMV systems.
- Definition of BIPV solutions with high levels of adaptability able to ensure performance, reliability, durability and replicability in a cost competitive way and a certain reduction of construction phases' times.
- Analysis of new solutions of energy integration in order to define the main features of BIPV components as a sustainable building's skin with high standards of solutions about geometrical modularity, levels of prefabrication, construction technologies, material surfaces, chromatic and material features of PV cells, dissimulation/ mimicry of the elements, etc.
- Identification of latest PV and PVT (PV + solar collectors) components in the European market in order to define new construction elements combining good aesthetics, multi-functionality, cost-effectiveness, mass customization, etc.
- Definition of a designing and manufacturing system for high adaptability of PV/PVT components to different contexts – building retrofit, new construction, etc – with high standards of efficient fabrication and installation, high levels of efficiency in energy production and thermal behaviour, environmental and economic sustainability

Participation per Partner

Partner number and short name	WP4 effort
1 - NTNU	25.50
2 - ACE	2.00
3 - CVUT	18.00
7 - PROJECTZERO	1.00
8 - EURAC	3.00
9 - SINTEF	14.00
10 - PALMA	22.00
11 - IBAVI	16.00
12 - IREC	23.00
14 - UAS Utrecht	19.00
20 - BOEX	1.00
21 - Rc Panels B.V.	13.00
22 - UU	5.00
24 - BOSGROEP	13.00
26 - MEX	6.00
28 - KARV	4.00
30 - DTTN	4.00
Armalam	3.00
X-LAM DOLOMITI	0.50
FANTI LEGNAMI	0.50

Partner number and short name	WP4 effort
31 - UNITN	22.00
32 - POLITO	20.00
33 - OBF	9.00
35 - AIGUASOL SAEST	23.00
Total	267.50

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D4.1	Design guidelines of zero-emission and positive energy buildings in a climate positive energy neighbourhood in Oslo	9 - SINTEF	Report	Public	12
D4.2	Design configuration for a modular, scalable, integrated retrofitting concept for Positive Energy Mid- & Highrise Buildings embedded in a green neighbourhood in Utrecht	14 - UAS Utrecht	Report	Public	12
D4.3	Design guidelines for zero-emission & positive energy refurbished and new buildings in Palma	12 - IREC	Report	Public	12
D4.4	Design guidelines for the zero-emission & positive energy renovation of the Health Care Centre in Karviná	3 - CVUT	Report	Public	12
D4.5	Design guidelines of timber-based construction & renovation of small-medium size buildings in Trento	31 - UNITN	Report	Public	12
D4.6	Design guidelines of new & retrofitting of existing buildings as zero-emission positive energy-buildings in climate positive circular communities	1 - NTNU	Report	Public	40

Description of deliverables

D4.1 : Design guidelines of zero-emission and positive energy buildings in a climate positive energy neighbourhood in Oslo [12]

Integrated circular design & evaluation of different concepts for zero-emission and positive energy buildings in a climate positive energy neighbourhood. Each demo will report on this in a separate deliverable. Will be revised annually (M24 and M36)

D4.2 : Design configuration for a modular, scalable, integrated retrofitting concept for Positive Energy Mid- & Highrise Buildings embedded in a green neighbourhood in Utrecht [12]

Integrated circular design & evaluation of different concepts for zero-emission and positive energy buildings in a climate positive energy neighbourhood. Each demo will report on this in a separate deliverable. Revisions M24 and M36

D4.3 : Design guidelines for zero-emission & positive energy refurbished and new buildings in Palma [12]

Integrated circular design & evaluation of different concepts for zero-emission and positive energy buildings in a climate positive energy neighbourhood. Each demo will report on this in a separate deliverable. Revisions M24 and M36

D4.4 : Design guidelines for the zero-emission & positive energy renovation of the Health Care Centre in Karviná [12]

Integrated circular design & evaluation of different concepts for zero-emission and positive energy buildings in a climate positive energy neighbourhood. Each demo will report on this in a separate deliverable. Revisions M24 and M36

D4.5 : Design guidelines of timber-based construction & renovation of small-medium size buildings in Trento [12]

Integrated circular design & evaluation of different concepts for zero-emission and positive energy buildings in a climate positive energy neighbourhood. Each demo will report on this in a separate deliverable. Revisions M24 and M36

D4.6 : Design guidelines of new & retrofitting of existing buildings as zero-emission positive energy-buildings in climate positive circular communities [40]

A collected report with findings from deliverables D4.1 to D4.5. The ultimate goal of WP4 is integrated circular design that cultivates the aesthetics and improves amenities for the building's occupants while improving the performance of the buildings in line with the new European Bauhaus strategy

Schedule of relevant Milestones

Milestone number[18]	**Milestone title**	**Lead beneficiary**	**Due Date (in months)**	**Means of verification**
MS7	Integrated circular design progress	1 - NTNU	20	Design reports zero-emission & positive energy buildings in CPCCs D4.2-4.6

Work package number [9]	WP5	Lead beneficiary [10]	14 - UAS Utrecht
Work package title	Resource Efficient (Pre)Manufacturing and Construction Workflows		
Start month	1	End month	48

Objectives

WP5 aims to create and test resource efficient retrofit and new built workflows in the construction industry of skins of medium/high-rise buildings and similar typologies. The "business as usual" or traditional sales, design, engineering & construction workflow is too expensive, does not deliver on performance (design/built performance gap), uses large amount of specialized and increasingly scarce workforce, causes transport, congestion & use of space in cities, and is a nuisance for occupants (in retrofit). Therefore, we aim to reduce the overall cost by 30%, the CO2 emissions, and the nuisance for occupants substantially. To achieve these goals, we will explore the following:

- Realizing retrofits & new built skins aiming at and suitable for energy neutral or even energy plus, without overlooking the value of design
- Reducing the on-site construction costs
- Developing advanced ICT tools / processes for automated gathering & recognition of retrofit building- and site data. As well as a new zero engineering approach, which reduces costs & time in the pre-production phase.
- Construct to maintain. Demonstrating that maintenance is one of the primary objectives for the demos.
- Reducing CO2 emissions of the construction process & economic valorization (carbon trading).
- Reducing transport related nuisance &CO2 emissions.
- Reducing waste on-site and off-site ((pre)-manufacturing).

The performance gap needs to be diminished by integrating smart technological solutions to monitor & control the indoor air climate, the energy performance and degradation of (moving)parts.WP5 further aims to improve adoption of the retrofit technology during the construction phase in deep retrofit projects. The objectives of WP5 are to apply, develop, redesign & validate new workflows in an industry 4.0 approach for resource efficient (pre)manufacturing and constructing (deep)retrofit and new built concepts in both the virtual &the physical world. In this WP we identify three phases, 1) Pre-Manufacturing, 2) Manufacturing and 3) Construction. By developing innovative tools and processes in this workflow, a market worthy retrofit or new built concept can be realized that could be seriously disruptive in the market. In the Pre-Manufacturing phase IT-innovations aim to improve building component production & construction processes by a Project independent method of digital data harvesting by recognizing and classifying specific building characteristics & connecting these with typological data in a parametric information (BIM) system. On the basis of the typological data the configuration of the retrofit solutions is automated. When the project is acquired, drones & other techniques are used directly in the "file2factory" manufacturing. In the manufacturing phase by prefabricating & even integrating installations in building components and connections between them, we significantly reduce both the amount of workforce needed on site and the specialized skills needed: plug & play. In the construction phase we aim to realize the designed innovations in the demo's by developing innovative processes to minimize the amount of effort in constructing, carbon footprint & nuisance for occupants & all are aiming for a resource efficiency in this process.

Description of work and role of partners

WP5 - Resource Efficient (Pre)Manufacturing and Construction Workflows [Months: 1-48]
UAS Utrecht, NTNU, ACE, CVUT, EURAC, SINTEF, PALMA, IBAVI, IREC, Buro de Haan, BOEX, Rc Panels B.V., UU, CITY OF UTRECHT, BOSGROEP, MEX, KARV, DTTN, UNITN, POLITO, OBF
Task 5.1 Innovation forum WP5. M1-M48. Task leader: HU, Participants: NTNU, ACE, EURAC, PALMA, DTTN, UNITN, POLITO, OBF
This task will ensure effective cooperation between the different innovation clusters in the demo projects, towards the aim of mutual learning and feedback loops between the demos and the WPs. The work will encompass innovation workshops between the demos within the WP and ensure the link to the other WPs. The aim of this task is to support the implementation and integration of the sub-tasks in relation to the production & construction processes in the demo projects, and to enhance the exploitation across the innovation clusters. The forum will act as an incubator for co-creation of innovative production & construction processes. Results will be reported and integrated as part of the innovations report (D1.4) in WP1.

Task 5.2 Pre-Manufacturing workflow M1-M48. Task leader: HU, Participants: Buro de Haan, Bos Groep, MEX, UU, BOEX, EURAC, UNITN

T5.2 aiming at the digital workflow to create decisions for NetZero energy retrofits. In previous projects, the concept was developed of a Zero Engineering process and a harvesting of project independent characteristics & automated configuration. All the steps of subtasks from 5.2.1 till 5.2.5 are already developed for the ground-based housing typology in European projects (e.g., InduZero) and national projects (e.g., Factory Zero, Inside Out, IEBB). In ARV, this knowledge will be transferred to the high-rise apartment building typologies. T5.2 is linked to WP2 where the framework for Pre-Manufacturing workflows will be explored, while in WP5 will be applied & tested.

Subtask 5.2.1 Pre-recognition of façade, roof and context typologies and performance prediction
For a basically ground-based houses developed identification of building typologies, we will extrapolate and adapt this knowledge to the high-rise apartment building typologies.
In 5.2.1 we will identify and register specific characteristics of apartment building typologies, focusing on the outer shell. The harvested data will be used to create user-friendly integration of building-configuration in BIM models.

Subtask 5.2.2 Location and orientation identification using GIS
GIS and other data sources such as aerial photographs & drone-based local photos of facades will be used to identify buildings with similar characteristics. Data of these buildings will be used to enhance the models which can be used to improve knowledge of the variation within specific building typologies. Recognition of building types (apartments) in the demo countries will support the upscaling, industrialization of integrated renovation concepts.

Subtask 5.2.3 Automated configurations of roof and façade solutions
To assist during the design for manufacturing of the retrofit, a software generator helps in creating design alternatives. These will be presented to housing corporations, associations of private apartments and tenants, but also to the factory.

Subtask 5.2.4 Zero-engineering at project level
In the traditional processes it takes many hours to engineer the high-rise retrofit solutions on the existing building. Shortening this process will result in cost reduction, while increases the success rate during the decision stages for the project. It will as well as open up new markets: smaller projects will become feasible for prices of larger ones (from economy of scale towards mass customization). Therefore, the goal is to create a Zero Engineering process aiming at File2Factory. This ultimately will lead towards a process without the involvement of human engineering capacity. To achieve this the following steps will be explored in the demo projects:
• 3D point cloud scanning using drones and automated correction of the BIM model
• Appling AI recognition of building components and possible replacement solutions
• Automated calibration of prognosed maintenance performance
• Automated integration into BIM of building renovation technology through Parametric design tools (automated configuration)
• Feed-in to industrial production facility (File2Factory and production process support systems)

Task 5.3 Off-site manufacturing M1-M48. Task leader: UNITN, Participants: DTTN, UNITN, POLITO, Bos Groep, RCP, HU, IREC, IBAVI, PALMA, SINTEF, EURAC
All the demo projects aim to apply prefabrication. In T5.3, we will jointly identify the production methodologies and create an outlook on Industrie 4.0 within the manufacturing processes. The analysis is based on the EU projects InduZero & Build-in-wood. Also, we will identify which activities can be moved to the prefabrication phase through a workflow analysis. By identifying the limitations in production, we will take the next step to integrating installations (e.g., ventilation units, ducts, systems) into façade & roof modules. Thus, it is possible to transfer traditional onsite production & installation cost & time largely to off-site production. This reduces disturbing the environment within cities. It also reduces failure costs both by controlled industrial production and by smart plug & play connections on site. Through applying, validating & knowledge developing the following topics are explored:
• Identification of off-site production methodologies for MMC (Modern Methods of Construction) in dry tech, based on the main system used for panels production: CLT and/or framed wall
• Definition of standard modules (shape and dimension) with some flexibility (dimension, materials, layers) for easy adaptation to existing buildings (fabric and systems)
• Identification of BIM procedures for the panels design, to be fully compatible with production and control software, directly linked to client order handling, inventory management etc.
• Definition of possible layers and materials (bio-based and/or recycled): outer finishing (including green solutions, nano-based materials, reflective finishes, PV panels), ventilated façade, insulation, system/facilities passage (within the module or intra modules), inner finishing (including PCM and massive solutions)
• System integration: passage for pipes and electrical system (plug and play: correlation with existing systems), BAPV and BIPV, mini MV machine near windows
• Correlation with existing doors and windows (easy replacement and non-intrusive construction works)

• Fixing system of the panel to existing wall to be simple, fast, safe, reversible (wood/wood, wood/steel, steel/steel joints) considering installation and adjustment: particular attention will be paid to out-of-square walls and non-standard elements (corner, ground and roof joints, balconies etc.)
Definition of watertight and airtight sealing: panels-panels and panels-walls

Task 5.4 Optimization of on-site construction processes for the retrofit of occupied buildings and new built buildings M1-M48. Task leader: HU Participants: All listed under 5.4.1 - 5.4.5
In this sub task logistics management and assembly planning and monitoring tools are generated for coordinating the supply of the components from different sources and locations. The goal is rapid (re-)planning and simulation of alternative assembly sequences, managing nuisance and assessing status of completion. Different demos have content that applies to the construction phase to contribute to the goals set by each site.

Subtask 5.4.1 On-site construction Utrecht demo M1-M48. Task leader : HU, Participants: Bos Groep, BOEX, City of Utrecht, MEX, RCP
The Circular HUB: Closing supply chains that integrate local/regional production/assembly facilities into circular hubs allowing harvested materials and construction and demolition waste to be processed into new (sustainable) materials and reused in (integral) building components. Components are engineered and manufactured following the proposed off-site production solution as described in the previous paragraph.
Optimization of construction, material and work methods on-site of all contractors and subcontractors that prevent material loss and reduce waste produced (through integrated BIM). One-piece flow and the one at a time (N=1) workflow processes will be designed, tested & evaluated such that an occupant-friendly construction process is implemented and validated for full-scale retrofitting of medium and high-rise buildings in occupied state. The Circular HUB will be used to coordinate the flow of delivering of components and the return of demolished materials. Just in time and directly mounting of the retrofit components will be the goal.
Construct to maintain towards “energy and comfort” As a Retrofit Service solution. Through quick maintenance response. Plug and Play equipment (changeability) are there for exceptionally important.
Overall, in the Utrecht Demo Construction process the aim is to reduce the amount of human resource and decrease the variety of companies needed to apply/mount the retrofit solution. Relatively small multi-functional teams are necessary

Subtask 5.4.2 On-site construction Palma demo M1-M48. Task leader: PALMA, Participants: IBAVI, IREC
Integrated workflow for the Large-Scale Renovation of urban dense areas through Public Private Partnerships (PPP)
- Partner PALMA– Palma City Council. Validate and demonstrate the reduction of execution time and costs in a large-scale renovation process (200-300 dwellings; several building) in an integrated process with one Project Manager / Contractor in comparison with a process that goes one building by one building.
- Palma (IBAVI) New Social Housing 36 Apartments Building. To demonstrate and validate the use of repetitive construction modules for 3-floor apartment buildings with massive walls based on local harvested “marés” stone and minimum material use. Integration and manufacturing of pre-fabricated wooden floors offsite with the aim to reduce execution construction time by 2 months. The process will be documented, monitored & analysed.

Subtask 5.4.3 On-site construction Oslo demo M1-M48. Task leader: SINTEF, Participants: OBF
Carbon neutral construction process: Electric- and bio-based fuel construction machinery will be tested to reduce emissions in construction. Strategies/systems for electric heating of construction site will also be tested. Monitoring results from WP8 will be used to analyse power demands and presence of machinery to dimension power-supply for the construction site. As part of the Circular HUB, material HUBs can be established outside the construction site, so that large vehicles can de-load goods there and smaller (electric) vehicles will provide transport for the last leg to construction site. This will also reduce noise and local air-pollution. Such activities are part of the implementation of the Circularity ARV pillar in the Oslo demo.

Subtask 5.4.4 On-site construction Karviná demo M1-M48. Task leader: CVUT, Participants: KARV
On-site construction during building operation will be piloted in Karviná at installation of climate change adaptive measures that include summer cooling by heat pumps and green roof sample for cooling of heat islands and local rainwater management (rain gardens, greenery). Installation of swappable façade-integrated RES (flexible solution enabling easy application of PV/PV-T/solar thermal/façade heat exchangers for possible coupling with heat pumps).

Subtask 5.4.5 On-site construction Trento demo. M12-M48. Task leader: DTTN, Participants: UNITN, POLITO, EURAC
Timber and bio-based on-site construction/renovation (modular/plug&play) during building operation will be piloted in Trento at installation of climate change adaptive measures that include summer cooling by heat pumps and green roof sample for heat island mitigation and local rainwater management (rain gardens, greenery). Installation of swappable façade-integrated BAS controlled RES (flexible solution enabling easy application of PV/PV-T/solar thermal/façade

heat exchangers for possible coupling with heat pumps). Passive/Active solutions for improved comfort linked to psychological and physiological aspects. Carbon credit scheme linked to carbon stock in timber-based solutions

Participation per Partner

Partner number and short name	WP5 effort
1 - NTNU	3.50
2 - ACE	1.00
3 - CVUT	19.00
8 - EURAC	3.50
9 - SINTEF	7.00
10 - PALMA	16.00
11 - IBAVI	8.50
12 - IREC	10.00
14 - UAS Utrecht	35.00
16 - Buro de Haan	15.00
20 - BOEX	5.00
21 - Rc Panels B.V.	6.00
22 - UU	2.00
23 - CITY OF UTRECHT	2.00
24 - BOSGROEP	13.00
26 - MEX	9.00
28 - KARV	5.00
30 - DTTN	6.00
Armalam	12.00
X-LAM DOLOMITI	11.50
FANTI LEGNAMI	7.50
31 - UNITN	22.00
32 - POLITO	8.00
33 - OBF	4.00
Total	231.50

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D5.1	Manufacturing configurator for high-rise apartment buildings to directly start production	14 - UAS Utrecht	Report	Public	24

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
	(File2Factory) process partly validated in participating European demo countries.				
D5.2	Workflow analyses and advise on how to move towards more prefabricated components and reduce work on-site.	14 - UAS Utrecht	Report	Public	36
D5.3	Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Utrecht	14 - UAS Utrecht	Report	Public	48
D5.4	Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Palma	12 - IREC	Report	Public	48
D5.5	Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Oslo	33 - OBF	Report	Public	48
D5.6	Resource Efficient (Pre)Manufacturing &Construction Workflows – Demo Karviná	3 - CVUT	Report	Public	48
D5.7	Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Trento	31 - UNITN	Report	Public	48
D5.8	Demonstration case of CPCC in Utrecht	14 - UAS Utrecht	Demonstrator	Public	36
D5.9	Demonstration case of CPCC in Palma	10 - PALMA	Demonstrator	Public	36
D5.10	Demonstration case of CPCC in Oslo	33 - OBF	Demonstrator	Public	36
D5.11	Demonstration case of CPCC in Karviná	3 - CVUT	Demonstrator	Public	36
D5.12	Demonstration case of CPCC in Trento	31 - UNITN	Demonstrator	Public	36

Description of deliverables

D5.1 : Manufacturing configurator for high-rise apartment buildings to directly start production (File2Factory) process partly validated in participating European demo countries. [24]

A configurator tool. The aim is to reduce the overall cost by 30%, the CO2 emissions, and the nuisance for occupants substantially.

D5.2 : Workflow analyses and advise on how to move towards more prefabricated components and reduce work on-site. [36]

Decisions for NetZero energy retrofits. In previous projects, the concept was developed of a Zero Engineering process and a harvesting of project independent characteristics & automated

D5.3 : Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Utrecht [48]

WP2 will develop the framework for Pre-Manufacturing workflows will be explored. This deliverable will applie & test the framework for the respective demo case.

D5.4 : Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Palma [48]

WP2 will develop the framework for Pre-Manufacturing workflows will be explored. This deliverable will applie & test the framework for the respective demo case.

D5.5 : Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Oslo [48]

WP2 will develop the framework for Pre-Manufacturing workflows will be explored. This deliverable will applie & test the framework for the respective demo case.

D5.6 : Resource Efficient (Pre)Manufacturing &Construction Workflows – Demo Karviná [48]

WP2 will develop the framework for Pre-Manufacturing workflows will be explored. This deliverable will applie & test the framework for the respective demo case.

D5.7 : Resource Efficient (Pre)Manufacturing & Construction Workflows – Demo Trento [48]

WP2 will develop the framework for Pre-Manufacturing workflows will be explored. This deliverable will applie & test the framework for the respective demo case.

D5.8 : Demonstration case of CPCC in Utrecht [36]

"Each demo case will report separately on the following topics which will be explored in the demos. • Realizing retrofits & new built skins aiming at and suitable for energy neutral or even energy plus, without overlooking the value of design • Reducing the on-site construction costs • Developing advanced ICT tools / processes for automated gathering & recognition of retrofit building- and site data. As well as a new zero engineering approach, which reduces costs & time in the pre-production phase. • Construct to maintain. Demonstrating that maintenance is one of the primary objectives for the demos. • Reducing CO2 emissions of the construction process & economic valorization (carbon trading). • Reducing transport related nuisance &CO2 emissions. • Reducing waste on-site and off-site ((pre)-manufacturing)."

D5.9 : Demonstration case of CPCC in Palma [36]

"Each demo case will report separately on the following topics which will be explored in the demos. • Realizing retrofits & new built skins aiming at and suitable for energy neutral or even energy plus, without overlooking the value of design • Reducing the on-site construction costs • Developing advanced ICT tools / processes for automated gathering & recognition of retrofit building- and site data. As well as a new zero engineering approach, which reduces costs & time in the pre-production phase. • Construct to maintain. Demonstrating that maintenance is one of the primary objectives for the demos. • Reducing CO2 emissions of the construction process & economic valorization (carbon trading). • Reducing transport related nuisance &CO2 emissions. • Reducing waste on-site and off-site ((pre)-manufacturing)."

D5.10 : Demonstration case of CPCC in Oslo [36]

"Each demo case will report separately on the following topics which will be explored in the demos. • Realizing retrofits & new built skins aiming at and suitable for energy neutral or even energy plus, without overlooking the value of design • Reducing the on-site construction costs • Developing advanced ICT tools / processes for automated gathering & recognition of retrofit building- and site data. As well as a new zero engineering approach, which reduces costs & time in the pre-production phase. • Construct to maintain. Demonstrating that maintenance is one of the primary objectives for the demos. • Reducing CO2 emissions of the construction process & economic valorization (carbon trading). • Reducing transport related nuisance &CO2 emissions. • Reducing waste on-site and off-site ((pre)-manufacturing)."

D5.11 : Demonstration case of CPCC in Karviná [36]

"Each demo case will report separately on the following topics which will be explored in the demos. • Realizing retrofits & new built skins aiming at and suitable for energy neutral or even energy plus, without overlooking the

value of design • Reducing the on-site construction costs • Developing advanced ICT tools / processes for automated gathering & recognition of retrofit building- and site data. As well as a new zero engineering approach, which reduces costs & time in the pre-production phase. • Construct to maintain. Demonstrating that maintenance is one of the primary objectives for the demos. • Reducing CO2 emissions of the construction process & economic valorization (carbon trading). • Reducing transport related nuisance &CO2 emissions. • Reducing waste on-site and off-site ((pre)-manufacturing)."

D5.12 : Demonstration case of CPCC in Trento [36]

"Each demo case will report separately on the following topics which will be explored in the demos. • Realizing retrofits & new built skins aiming at and suitable for energy neutral or even energy plus, without overlooking the value of design • Reducing the on-site construction costs • Developing advanced ICT tools / processes for automated gathering & recognition of retrofit building- and site data. As well as a new zero engineering approach, which reduces costs & time in the pre-production phase. • Construct to maintain. Demonstrating that maintenance is one of the primary objectives for the demos. • Reducing CO2 emissions of the construction process & economic valorization (carbon trading). • Reducing transport related nuisance &CO2 emissions. • Reducing waste on-site and off-site ((pre)-manufacturing)."

Schedule of relevant Milestones

Milestone number[18]	**Milestone title**	**Lead beneficiary**	**Due Date (in months)**	**Means of verification**
MS8	First iteration of recognized typologies	14 - UAS Utrecht	12	Amount and quality of recognized typologies
MS9	Final iteration of recognized typologies and the Pre-Manufacturing workflow.	14 - UAS Utrecht	24	Verification of automated delivered input for File2Factory
MS10	First iteration of manufacturing workflow analyses	14 - UAS Utrecht	30	Amount of activities changed to the off-site manufacturing.
MS11	Manufacturing principles realized	14 - UAS Utrecht	36	Analyses output manufacturing. Delivered modules to construction site
MS12	Realization of demo projects	14 - UAS Utrecht	36	Construction of the projects completed

Work package number [9]	WP6	Lead beneficiary [10]	3 - CVUT
Work package title	Integrated renewables and storage systems		
Start month	1	End month	46

Objectives

WP6 deals with the system design, deployment & evaluation of the overall ARV innovative solutions in the different demonstration sites with respect to renewable energy sources (RESs) & energy storage systems (ESSs) implemented in buildings & neighbourhoods. This is essential to achieve the ambitions of the ARV project in creating net positive energy and zero emission communities, as well as, accelerating the wide-scale deployment of CPCCs around Europe.
There is a strong collaboration between WP6 and other work packages in terms of collecting feedbacks and providing inputs for the design (to WP4), citizen participation (WP3), simulation models (to WP2), as well as the effective operation of the innovative solutions (to WP7). Thus, the final innovative RESs & ESSs solutions will cover different aspects related to aesthetics, environmental, user's acceptance, life cycle economic & flexibility. Furthermore, this WP will share experiences & knowledge between the six demo-sites along the project development in order to overcome issues which may occur during the implementation of the innovative solutions.
The evaluation of the innovative ESSs & RESs solutions is carried out through advanced simulations enforced with real measurements data and KPIs defined in WP2. The obtained results from the evaluation of the demo-sites will allow to build holistic approaches for the improvement of building and district energy systems, and the replicability/scalability of the solutions at other locations with different climate conditions. The main objectives of this WP are the following:
• Integrated energy design for the implementation of RESs & ESSs solutions to fulfil the electrical & thermal needs of buildings/neighbourhoods
• Provide processes for implementation, design, scalability, & recirculation of energy systems in buildings & neighbourhoods
• Support & knowledge sharing during the development of all RESs & ESSs innovative solutions in the demos

Description of work and role of partners

WP6 - Integrated renewables and storage systems [Months: 1-46]
CVUT, NTNU, DTU, DANFOSS A/S, ENFOR, PROJECTZERO, EURAC, SINTEF, PALMA, IREC, UAS Utrecht, Center Denmark, SAB, BOEX, Rc Panels B.V., UU, BOSGROEP, MEX, Mitros, KARV, DOL, POLITO, OBF, NANO
The work in this WP brings together the contribution of ARV demo-sites that aim to implement innovative renewable energy & storage solutions. Apart from the T6.1 task where all the demos are involved, each task from T6.2 to T6.6 will be dedicated to a specific demo project & will implicitly include the activities related to the main objectives of this WP.

Task 6.1 Innovation forum for RES and storage implementation in CPCC. M1-M46. Lead: CVUT, Partners: KARV, HU, PALMA, PZ, OBF, DTTN, NTNU, IREC, SINTEF, DTU, EURAC, GDFA, ACE
The aim of this task is to support the implementation of innovative RESs & storage solutions in the six demo sites of the ARV project & highlights the role of RESs in the wide-scale deployment CPCCs around Europe. T6.1 will encompass workshops to ensure cooperation & share of knowledge between the partners involved in the design, construction and operation of the innovative solution of each demo. The results from this task will be added to the deliverables D1.4 / WP1.

Task 6.2 Integrated innovative RESs & ESSs solution in demo Oslo. M1-M42. Lead: SINTEF, Partners: OBF, NTNU, ENFOR
• Electricity: The on-site renewable energy generation system consists of innovative BIPV &BAPV. Innovation lies in different colourings & vertical orientation of the photovoltaic panels, to ensure an optimized balancing between PV energy production & aesthetic expression & appearance. Regarding local energy storage, ARV will seek to design & construct an innovative system using recycled batteries. An alternative & environmentally friendly solution to new batteries is to build up the battery storage from recycled electric car batteries. Normally, the electric car's battery is replaced when its capacity has been reduced to less than 70-80% of starting capacity, which it is still a lot of storage capacity. This solution is cost effective & environmentally friendly as it is expected to reduce 50% of GHG emissions across the battery production process & 20% of their environmental impact. Moreover, it may become an increasingly relevant alternative when a number of electric cars have to replace their batteries in the near future.

• Thermal: Innovative heating/cooling system, i.e. LowEx system, using low-temperature thermal heating & high temperature thermal cooling using the same infrastructure coupled with the ground source heat pump and district heating as peak load plant. This type of super-efficient thermal energy technology may supply the thermal needs with very low use of primary energy, typically in the order of 3 to 10 kWh/m2year, for delivering heating & cooling in near-zero energy, zero energy ZEB or positive buildings. The solution enables a greatly reduced peak load on the electricity grid, and it also permits higher self-use of locally produced renewable energy, which makes local electricity production more economically advantageous with current electricity tariffs. Moreover, it produces a very stable thermal indoor climate throughout the year, which increases the thermal comfort & IAQ. The LowEx system will be integrated in the Oslo demo by using the existing infrastructure, thus saving cost & embodied energies from the material use.

Task 6.3 Integrated innovative RESs and ESSs solution in demo Sønderborg. M1-M26. Lead: PZ, Partners: ENFOR, SAB, DTU, DAN, Center Denmark
• Electricity: Roof integrated PV system combined with new developed flow-batteries for maximizing the consumption of locally harvested energy. In 2017, more than 3.000 m2 solar PV panels were integrated in the roofs of all 19 apartment buildings chosen as demo site. The solar PV system can produce 460 kW solar electricity corresponding to 408.000 kWh per year covering 37 % of the total electricity consumption. The solar PV system has performed very well during the last three years, and it planned to install battery systems together with the solar PV panels in each block. At the beginning of 2021, batteries with a capacity of 15 kWh/4 kW each will be implemented in each of the 19 blocks. Installation of the 19 batteries means, that extra 60.000 kWh solar electricity can potentially be used in the buildings per year instead of exporting the solar electricity to the grid. The innovation remains in the operation of the batteries based on self-consumption forecasting, and calculation of available flexibility for grid support
• Thermal: Domestic hot water boosted by heat pump: Normally the district heating return temperature is too high due to a necessary high temperature in the domestic hot water circulation system. The district heating return temperature can be lowered by implementing a small heat pump (3-5 kW) in the system. The heat pump extracts heat from the circulation pipe circuit, and thereby reduces the return temperature. Depending on actual electricity costs and value of district heating return bonus, the operation of the heat pump can be optimized (on/off) resulting in fuel shift option between district heating and electricity.

Task 6.4 Integrated innovative RESs and ESSs solution in demo Utrecht. M1-M44. Lead: UU, Partners: Bos Groep, MITROS, HU, MEX, RCP, BOEX, DTU, ENFOR
• Electricity: An innovative solution consisting of BIPV/BAPV for maximizing solar energy harvesting combined with local & district electricity storage providing support to the grid as well as EV-V2G will be demonstrated in buildings embedded in green neighbourhood. Prior to ARV, a high-rise building is retrofitted to become a PEB, implementing BAPV & BIPV along with heat pumps to generate heating and hot tap water and battery storage contributing to peak shaving in the building (TRL5-6). This first positive energy high-rise retrofitted building provides the opportunity to deduct design parameters for retrofitting approaches that integrate prefabricated building components with energy installations pre-installed in a plug-and-play design. This optimized approach will be underpinned by forecasting the PV energy production, through the utilization of cloud detection cameras & meteorological station data together with a fast network of sensors that measure irradiation & temperature of approximately 1100 BAPV/BIPV-panels, and electricity demand and will be demonstrated at other building types, i.e. different heights & construction types, to create an industrialized approach bringing it to TRL7-8. Actions in T6.4 consist of energy analysis of the demonstration buildings & implementation of BIPV/BAPV in the renovation workflow process, and direct usage of DC power outage from BIPV/BAPV to reduce energy losses.
• Thermal: Implementation & demonstration of a modular heating ventilation & cooling infrastructure for high-rise buildings. This modular HVAC system is compatible for multiple heating sources such as: Low- & mid-temperature district heating, geothermal heat pump systems, and air to water heat pump systems. In addition, this solution is compatible for all-electric solutions such as infrared or combined electrical & ventilation heating. The implications for ventilation & heat recovery solutions & insulation requirements are deducted, aiming to retrofit the apartment buildings at a business-as-usual cost level, while raising the energy performance of the building & comfort levels for the tenants.

Task 6.5 Integrated innovative RESs and ESSs solution in demo Karviná. M1-M42. Lead: CVUT, Partners: KARV, NANO
• Electricity: Implementation of innovative PV system, combining BIPV & BAPV, will be considered in the demo Karviná. The PV system will consist of high efficiency panels providing enough energy to the building. Moreover, the PV system will contribute in improving the indoor environment by supplying energy to drive external shading elements limiting the sunlight access to the interior, while keeping architectural aesthetics of BIPV at top level. A central second-life energy storage will be designed adequately in order to operate the demo as a local microgrid, which supports various functionalities related to building energy flexibility, load-shifting and peak shaving. Additionally, EV charging stations & the implementation of V2G/V2H services are also considered. Finally, local sensors for solar irradiance and

temperature as well as sky imager solution will be installed for accurate predictions of the PV generation & operation of the whole system assured by WP7.
• Thermal: Implementation of innovative heat pump system for building refurbishment providing heating & cooling energy. The system will combine heat pump with PVT and use of waste heat. Additionally, a thermal storage design will be considered for balancing the heat pumps, providing potential for heating demand flexibility in building and provides necessary heating energy in winter and cooling during summer and to target positive energy district requirements. Local weather station will be implemented with indoor temperature measurements for effective operation of the HVAC systems.

Task 6.6 Integrated innovative RESs and ESSs solution in demo Trento. M1-M46. Lead: EURAC, Partners: ENFOR
• Electricity: EURAC will work on integrated concepts of PV designed for heat-pump operation.1st and 2nd life batteries will be considered including vehicle-to-home (V2H) applications in refurbished buildings. Piedicastello Destra Adige is characterized by integrating innovative solutions and approaches for sustainable urban development, like using second-life batteries, the vehicle-to-grid/home (V2G/V2H) technology. DOL will consider including this area in the infrastructure plan for V2G EV charging stations in the Ex-Zuffo exchange parking lot.
• Thermal: DOL and POLITO will work to implement a new prototype of energy tunnel in the existing Piedicastello tunnel composed of two twin tunnels, approximately 200 m long, running parallel with a separation of few meters and a maximum cover of around 130 m. A section of 15 m length of the tunnels located at 100 m from the portals (i.e. in the area of maximum cover) is to be transformed into a prototype of energy tunnel to demonstrate the technology in the relevant environment. The characteristics of the prototype will be:
- Installation of radial borehole heat exchangers, 30m length, at the contour of the crown (3 per cross section, at 15°, 60° &105° from the crown vertical). One section every 7m for a total of 3 sections of radial BHE that will be installed.
- Installation of a circuit of pipes at the intrados of the tunnel crown, along the same 15m length, covered by a 5cm thick sprayed reinforced concrete and isolating foam.
- Pipes for connection to a heat pump system located at the portal.
- Secondary system used for heating and cooling in the exhibition hall.
- Measurement plan including temperature sensors in the ground, in the tunnel, heat flow, etc.
The system is expected to allow for an exploitation of thermal power in the order of 25kW and will serve the refurbished buildings block. It is envisaged that the system may serve both in winter and in summer season. To support the project scope of the creation of a nearly zero energy buildings in the area 1 (former Ex-Italcementi area), energy geostructures will be adopted. The following characteristics can be envisaged:
- thermal activation of the foundation thanks to the installation of a circuit of pipes in the foundation slab.
- thermal activation of the retaining walls by means of the GeothermSkin elements (patent priority n°. 102016000020821).

Participation per Partner

Partner number and short name	WP6 effort
1 - NTNU	15.00
3 - CVUT	37.00
4 - DTU	20.00
5 - DANFOSS A/S	1.00
6 - ENFOR	18.00
7 - PROJECTZERO	3.50
8 - EURAC	2.00
9 - SINTEF	4.00
10 - PALMA	1.00
12 - IREC	1.00
14 - UAS Utrecht	2.00
17 - Center Denmark	4.00

Partner number and short name	WP6 effort
18 - SAB	2.00
20 - BOEX	2.00
21 - Rc Panels B.V.	2.00
22 - UU	14.00
24 - BOSGROEP	10.00
26 - MEX	2.00
27 - Mitros	6.00
28 - KARV	6.00
29 - DOL	15.00
32 - POLITO	11.00
33 - OBF	4.00
34 - NANO	10.00
Total	192.50

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D6.1	Guidelines for integrated design and implementation of RESs and ESSs for building/ neighbourhood's energy needs in Oslo	9 - SINTEF	Demonstrator	Public	42
D6.2	Guidelines for integrated design and implementation of RESs and ESSs for building/ neighbourhood's energy needs in Sønderborg	7 - PROJECTZERO	Demonstrator	Public	26
D6.3	Guidelines for integrated design and implementation of RESs and ESSs for building/ neighbourhood's energy needs in Utrecht	22 - UU	Demonstrator	Public	44
D6.4	Guidelines for integrated design and implementation of RESs and ESSs for building/ neighbourhood's energy needs in Karviná	3 - CVUT	Demonstrator	Public	44
D6.5	Guidelines for integrated design and	8 - EURAC	Demonstrator	Public	46

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
	implementation of RESs and ESSs for building/ neighbourhood's energy needs in Trento				

Description of deliverables

D6.1 : Guidelines for integrated design and implementation of RESs and ESSs for building/neighbourhood's energy needs in Oslo [42]

The deliverables brings together the contribution of ARV demo-sites that aim to implement innovative renewable energy & storage solutions. Each demo case will report separately as Guidelines for integrated design and implementation of RESs and ESSs for building/neighbourhood's energy needs

D6.2 : Guidelines for integrated design and implementation of RESs and ESSs for building/neighbourhood's energy needs in Sønderborg [26]

The deliverables brings together the contribution of ARV demo-sites that aim to implement innovative renewable energy & storage solutions. Each demo case will report separately as Guidelines for integrated design and implementation of RESs and ESSs for building/neighbourhood's energy needs

D6.3 : Guidelines for integrated design and implementation of RESs and ESSs for building/neighbourhood's energy needs in Utrecht [44]

The deliverables brings together the contribution of ARV demo-sites that aim to implement innovative renewable energy & storage solutions. Each demo case will report separately as Guidelines for integrated design and implementation of RESs and ESSs for building/neighbourhood's energy needs

D6.4 : Guidelines for integrated design and implementation of RESs and ESSs for building/neighbourhood's energy needs in Karviná [44]

The deliverables brings together the contribution of ARV demo-sites that aim to implement innovative renewable energy & storage solutions. Each demo case will report separately as Guidelines for integrated design and implementation of RESs and ESSs for building/neighbourhood's energy needs

D6.5 : Guidelines for integrated design and implementation of RESs and ESSs for building/neighbourhood's energy needs in Trento [46]

The deliverables brings together the contribution of ARV demo-sites that aim to implement innovative renewable energy & storage solutions. Each demo case will report separately as Guidelines for integrated design and implementation of RESs and ESSs for building/neighbourhood's energy needs

Schedule of relevant Milestones

Milestone number[18]	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS13	Integrated renewables and storage systems progress	3 - CVUT	20	Process reports on integrated renewables and storage systems in CPCCs D6.2-6.6

Work package number [9]	WP7	Lead beneficiary [10]	4 - DTU
Work package title	Efficient Operation and Flexibility		
Start month	1	End month	48

Objectives

This WP focuses on the deployment of solutions for optimizing the performance during the operation of the six demo sites in ARV. The performance will be measured by a user-oriented preference metrics related to energy efficiency, flexibility, and cost efficiency while serious considerations are taken in the direction of energy positive districts and buildings. This is realized using a hierarchy of nested digital solutions spanning from a central ARV Cloud Hub (Center Denmark), national hubs, and local building centred energy management systems. The digital solutions will reflect the geographical structure and hereby valuable experiences on how to operate neighbourhoods efficiently in different European climate zones will be obtained. The ARV Cloud Hub will also make it possible to test and optimize the regulatory framework for enabling an efficient and accelerated path towards a low-carbon society.
In the future weather-driven energy system, end-user flexibility will play an important role, and consequently we will interact with the individual demo sites in ARV to maximize engagement, transparency, fairness, and acceptance. This will be facilitated by non-energy related benefits like indoor air quality, health, comfort, and cooperative interactions to be monitored and evaluated in collaboration with WP3, WP6, WP8 and WP9. Deployment of the ARV digital Cloud Hub will be instrumental in harmonizing the building, district, and occupants` interaction.
A next generation of building energy management systems (BEMS) optimized for interactions with the energy grid, local energy generation, demand response and user interactions will be deployed. The BEMS will be based on grey-box and digital twin models to be used for model-based control, which takes user preferences and constrains into account. The smartness of the individual buildings will be described by the Smart Readiness Indicator (SRI). The practical and observed smartness of buildings and districts will be described by Flexibility Functions (FFs) and Flexibility Indices (FIs). The flexibility index for a building can be optimized for the climate zone specific challenges. Consequently, WP7 will interact with WP4 on optimal design of energy efficient buildings and CPCCs.
Flexibility functions and the concepts of virtual power plants (VPPs) will be employed for the management of geographically dispersed resources at various levels (e.g., building, district & city level). In both cases we will deploy hierarchical optimization & control that enables the provision of flexibility at all relevant scales. Economic & technical aggregators will be used for the coordination and for creating an interface between the districts and energy market/grid operators. In summary, WP7 will focus on digital solutions & infrastructures for efficient operations in ARV. The focus is on unlocking the available flexibility in all the six demo sites for optimizing the self-consumption and minimizing the carbon footprint by data-driven and intelligent operations. WP7 will take advantage of the information and description of energy storage solutions from WP6, design optimal solutions from WP4 and the information about sensors and actuators from WP8. The solutions will respect privacy, GDPR & aim at creating robust and resilient systems by design.

Description of work and role of partners

WP7 - Efficient Operation and Flexibility [Months: 1-48]
DTU, NTNU, CVUT, DANFOSS A/S, ENFOR, PROJECTZERO, EURAC, SINTEF, PALMA, IREC, MET, UAS Utrecht, HOUSING EUROPE, Center Denmark, SAB, BOEX, UU, CITY OF UTRECHT, iwell, Mitros, KARV, DOL, DTTN, UNITN, OBF, NANO
The work in this WP gathers contribution from all the demonstration sites considered in the ARV project and the work is organized based on the following tasks:

Task 7.1 Innovation forum for data handling and efficient operation. M1-M48. Lead: Center Denmark, Partners: all demos
The aim of this task to ensure an efficient cooperation between the innovation clusters in the six demo sites. This includes aims towards mutual learning and feedback loops between the clusters and the central ARV cloud hub (Center Denmark) on data storage, communication, computing, and software. The innovation forum will arrange a mixture of open innovation activities and innovation workshops and activities between the six clusters. The activities will enhance the exploitation across the innovation clusters and act as an incubator for co-creation of efficient and flexible innovative solutions for large-scale deployment at CPCCs across different climate zones in Europe.

Task 7.2 European digitalisation hub for smart buildings and districts. M1-M48. Task Lead: Center Denmark, Partners: DTU, UU, ENFOR, IREC, PALMA, CVUT, NTNU, SINTEF

Federated data lake setup including data analytics pulling from fog, edge, and cloud computing environments including GDPR, cyber security, data ethics compliance. ARV will deploy the centralized European digitalization hub (cloud level) connected to sub-hubs (fog level) at the individual demo sites, which again are connected to building and occupant systems or apps (edge level). By using a state-of-the-art data lake principle, the ARV cloud hub will provide storage for monitoring data and allow efficient use of data on various scales. It will also provide user interfaces for occupants, operators, building owners, and other stakeholders. Establishment of a data lake setup for software, data management and storage (D7.1).

Task 7.3 Models for energy-efficient operation of buildings and districts. M1-M36. Lead: CVUT, Partners: DTU, all demos, IREC, UU, SINTEF, NTNU
Identification of models for energy efficient management of buildings and districts. Models for indoor climate, state estimation, and virtual (software) sensors. Models with integrated HVAC and battery characteristics. APP- and WEB-based interactions with the occupants. Models for PV integration and integration with local meteorological stations. Models with integrated short-term weather forecasts (including sky imagers). This task will be based on information on storage systems WP6. Archetype building models (D7.2).

Subtask 7.3.1 Deployment of low-order models optimised for low-temperature district heating networks (Sønderborg demo)
Subtask 7.3.2 Model with a seasonal focus for urban energy geostructure in former 400-m highway tunnels for long term storage to supply a new city district with heating and cooling energy (Trento demo)
Subtask 7.3.3 Low-order models tailored for centralized HVAC systems in multifamily apartment buildings (Palma demo)
Subtask 7.3.4 Deployment of PV forecasting for modelling the operation of BAPV/BIPV and battery storage in building (Karviná demo and Utrecht demo)
Subtask 7.3.5 Deployment of low-order models for the LowEx system control (Oslo demo)

Task 7.4 Deployment of solutions for forecasting. M4-M42. Lead: ENFOR, Partners: DTU, Center Denmark, all Demos, CVUT, KARV, UU, IREC, SINTEF
This task will deploy and evaluate methods for local weather forecasting based on municipality or city operated local weather stations combined with meteorological weather forecasts. Fine resolution forecasting of city and district climate. Implementation using the central ARV cloud hub in combinations with local city hubs. Forecasting of local and aggregated PV production. Use of combined forecasting for optimized accuracy. Forecasting of energy prices. Forecasting of CO2 profile of the power mix. Consideration to Global Geodetic Observing System GGOs contracts. Probabilistic forecasting. Generation of scenarios for decision making under uncertainty. Joint and multivariate forecasting of all relevant parameters (wind power, solar power, load, prices, emission, ...). Best practice on fine resolution city weather foresting (D7.3). Implementation at the ARV cloud hub and at local clouds related to some of the demo sites (D7.4).

Subtask 7.4.1 Deployment of sky-imaging solution for very short-term solar irradiance forecasting (Karviná demo)
Subtask 7.4.2 Deployment and evaluation of local weather forecasting (all demos)
Subtask 7.4.3 Forecasting of local PV generation (Sønderborg demo, Utrecht demo, Karviná demo, Oslo demo)
Subtask 7.4.4 Forecasting of electricity and heat load profiles (ARV Demos: Sønderborg, Utrecht, Palma, Karviná, Oslo)
Subtask 7.4.5 Forecasting of energy generation for BIPV and BAPV sites (ARV Demos: Utrecht, Palma, Karviná, Oslo)
Subtask 7.4.6 Deployment of PV forecast with respect to specific city environment weather conditions (Karviná demo)

Task 7.5 Deployment and evaluation of control algorithms. M4 - M44). Task Lead: DTU. Contributors: UU, IWELL, Bos Groep, MITROS, BOEX, City of Utrecht, IREC, MET, Center Denmark, NANO, CVUT, KARV, SINTEF
Model Predictive Controllers (MPCs) with integrated weather and load forecasts. Controllers for district and BEMS. Controllers with built-in forecast of occupancy. Input from monitoring (WP8). Optimal control of BIPV and BAPV systems. Control of heat pumps in buildings and city scale systems. Predictive control of indoor comfort. Multi-objective controllers (e.g., cost, energy, and emission). Stochastic controllers. Controllers taking into account app- and web-based user feedback. Implementation at the central ARV cloud hub, local hubs and in BEMS. Guidelines (D7.5).

Subtask 7.5.1 Controllers for building energy management systems (BEMS) (all demos)
Subtask 7.5.2 Controllers for low-temperature district heating operation (Sønderborg, ...)
Subtask 7.5.3 Controllers for operating temperature zones in district heating network (Sønderborg, ...)
Subtask 7.5.4 Control of battery systems (Utrecht, Sønderborg, Karviná, ...)
Subtask 7.5.5 Control of Heat Pumps and temperatures in centralized HVAC systems in multifamily buildings (Palma)
Subtask 7.5.6 Control of Heat Pumps and operating temperatures in centralized HVAC LowEx system in educational and multifunctional buildings (Oslo)

Task 7.6 Describe energy flexibility functions and measures (M6-M46) Task Lead: NTNU. Task Contributors: DTU, ENFOR, all Demos, IREC, PALMA, UU, SINTEF.
The task deploys methods for description and identification of energy flexibility related to demand response solutions. With input from WP6 & WP5, the task formulates Flexibility Functions (FFs) for providing local grid support or other power system services. Based on the operational data of the demo projects, task evaluates the Flexibility Index (FI) and the Smart Readiness Indicator (SRI). This is tailored and designed for optimized local flexibility for the climate zones related to the six demo projects and implemented through the central ARV Cloud Hub. Methodologies for operational description of flexibility (D7.6). Guideline on climate related design principles (D7.7).

Subtask 7.6.1 Flexibility functions for heat pumps in district heating networks (Sønderborg)
Subtask 7.6.2 Seasonal flexibility function for city tunnel (Trento)
Subtask 7.6.2 Identification of flexibility in buildings (Utrecht)
Subtask 7.6.3 Flexibility functions in LowEx system (Oslo)

Task 7.7 Smart communities and optimisation. M18-M48. Task Lead: UU. Contributors: IWELL, Bos Groep, City of Utrecht, MITROS, BOEX , Center Denmark, DTU, DAN, PZ, CVUT, KARV, NTNU, SINTEF
This task will integrate the modelling, forecasting, and control solutions for smart energy buildings and communities from T7.3-T7.6. A hierarchical control framework will be employed to exploit the flexibility, which is inherent in an aggregation of distributed resources, for both market optimisation purposes and the provision of ancillary services to the system (see T7.8). It will enable interaction between local communities and energy networks, and optimal use of local renewable energy generation including EV/V2G charging algorithms. The employed framework will be generic and scalable framework enabling the provision of flexibility in power systems operations through aggregators. Emphasis is given on both wholesale energy trade functions and the provision of ancillary services to the system such as fast operating reserves for system balancing, and local network support. The BEMS of the various buildings participating in the demonstrations will be connected via aggregators, which will use either the Virtual Power Plat (VPP) principles or the concept of hierarchical controllers to activate the flexibility. Peer-to-Peer (P2P) trading among positive and regular buildings will also be explored as follows: i) design P2P market features for each demo site, ii) test and simulate the P2P frameworks, iii) implement the P2P markets in each demo site and monitor their suitability and economic viability to reach TRL6-7. The methods will integrate input from grid sensors (WP8), user preferences (WP3, WP5) and interaction with flexibility markets. The implementation at the central ARV cloud hub. Handbook for Smart Communities (D7.8).

Subtask 7.7.1 Optimization of district heating networks for optimal use of excess heat from supermarkets (Sønderborg)
Subtask 7.7.2 Optimal operation of interconnected battery storage and EVs (Utrecht, Sønderborg, Karviná)
Subtask 7.7.3 Connecting the various BEMS platforms for aggregating flexibility and enabling flexibility at district scale (Utrecht, Sønderborg, Karviná)
Subtask 7.7.4 Optimal operation of LowEx system (Oslo)

Task 7.8 Market interfaces. M24-M48. Task Lead: DTU. Contributors: UU, IWELL, Center Denmark, IREC, PALMA
Linking of conventional markets with aggregated flexibility for buildings and districts. Interface to balancing and flexibility markets. Guidelines on new business models for energy communities. Markets for energy system integration (heating, cooling, gas, electricity). Models for auctions related to long term contracts. V2G/V2B solutions. Tools for investment and energy systems planning. Methods for CEC-DSO interactions to solve possible DSO issues and conflicts. Interaction with WP9 on financial instruments (including P2P trading/DLTs such as blockchain among CECs). Business models and guidelines. Principles for CEC-DSO interactions (D7.9)

Subtask 7.8.1 Peak load reductions and congestion management in collaboration with DSOs (Utrecht)
Subtask 7.8.2 V2G-EV-charging network and battery storage for providing grid flexibility and balancing reserves at different scale levels (Utrecht, Sønderborg)
Subtask 7.8.3 Evaluation of different investment, optimization policies and market structures for CEC (Palma)

Participation per Partner

Partner number and short name	WP7 effort
1 - NTNU	14.00
3 - CVUT	23.50
4 - DTU	46.00

Partner number and short name	WP7 effort
5 - DANFOSS A/S	9.00
6 - ENFOR	18.00
7 - PROJECTZERO	4.00
8 - EURAC	3.00
9 - SINTEF	7.00
10 - PALMA	5.00
12 - IREC	20.00
13 - MET	4.00
14 - UAS Utrecht	1.00
15 - HOUSING EUROPE	2.00
17 - Center Denmark	33.00
18 - SAB	3.00
20 - BOEX	3.00
22 - UU	19.00
23 - CITY OF UTRECHT	2.00
25 - iwell	17.00
27 - Mitros	3.00
28 - KARV	5.00
29 - DOL	1.00
30 - DTTN	2.00
Armalam	1.00
31 - UNITN	2.00
33 - OBF	2.00
34 - NANO	4.00
Total	253.50

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D7.1	Establishment of ARV central digitalization hub and data lake	17 - Center Denmark	Demonstrator	Confidential, only for members of the consortium (including the Commission Services)	18
D7.2	Archetype building models	3 - CVUT	Report	Public	32

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D7.3	City fine resolution weather forecasting at demo sites	6 - ENFOR	Demonstrator	Confidential, only for members of the consortium (including the Commission Services)	12
D7.4	Forecasting of wind, solar, load, prices at demo sites	17 - Center Denmark	Demonstrator	Confidential, only for members of the consortium (including the Commission Services)	18
D7.5	Controllers with interface to provide user preferences	4 - DTU	Demonstrator	Confidential, only for members of the consortium (including the Commission Services)	32
D7.6	Guidelines on descriptions of smartness and flexibility	4 - DTU	Report	Public	24
D7.7	Guidelines on climate zone related design principles	1 - NTNU	Report	Public	32
D7.8	Handbook for smart communities	22 - UU	Report	Public	42
D7.9	Principles for CEC-DSO interactions	4 - DTU	Report	Public	46

Description of deliverables

D7.1 : Establishment of ARV central digitalization hub and data lake [18]

Federated data lake setup including data analytics pulling from fog, edge, and cloud computing environments including GDPR, cyber security, data ethics compliance. ARV will deploy the centralized European digitalization hub (cloud level) connected to sub-hubs (fog level) at the individual demo sites, which again are connected to building and occupant systems or apps (edge level). By using a state-of-the-art data lake principle, the ARV cloud hub will provide storage for monitoring data and allow efficient use of data on various scales. It will also provide user interfaces for occupants, operators, building owners, and other stakeholders. Establishment of a data lake setup for software, data management and storage

D7.2 : Archetype building models [32]

Identification of models for energy efficient management of buildings and districts. Models for indoor climate, state estimation, and virtual (software) sensors. Models with integrated HVAC and battery characteristics. APP- and WEB-based interactions with the occupants. Models for PV integration and integration with local meteorological stations. Models with integrated short-term weather forecasts (including sky imagers). This task will be based on information on storage systems WP6. Archetype building models

D7.3 : City fine resolution weather forecasting at demo sites [12]

Best practice on fine resolution city weather foresting. deploy and evaluate methods for local weather forecasting based on municipality or city operated local weather stations combined with meteorological weather forecasts. Fine resolution forecasting of city and district climate. Implementation using the central ARV cloud hub in combinations with local city hubs.

D7.4 : Forecasting of wind, solar, load, prices at demo sites [18]

Implementation at the ARV cloud hub and at local clouds related to some of the demo sites. deploy and evaluate methods for local weather forecasting based on municipality or city operated local weather stations combined with meteorological weather forecasts. Fine resolution forecasting of city and district climate. Implementation using the central ARV cloud hub in combinations with local city hubs

D7.5 : Controllers with interface to provide user preferences [32]

Model Predictive Controllers (MPCs) with integrated weather and load forecasts. Controllers for district and BEMS. Controllers with built-in forecast of occupancy. Input from monitoring (WP8

D7.6 : Guidelines on descriptions of smartness and flexibility [24]

Methodologies for operational description of flexibility based on the operational data of the demo projects, task evaluates the Flexibility Index (FI) and the Smart Readiness Indicator (SRI). This is tailored and designed for optimized local flexibility for the climate zones related to the six demo projects and implemented through the central ARV Cloud Hub.

D7.7 : Guidelines on climate zone related design principles [32]

Guideline on climate related design principles, based on the operational data of the demo projects, task evaluates the Flexibility Index (FI) and the Smart Readiness Indicator (SRI). This is tailored and designed for optimized local flexibility for the climate zones related to the six demo projects and implemented through the central ARV Cloud Hub. Methodologies for operational description of flexibility (D7.6).

D7.8 : Handbook for smart communities [42]

The methods will integrate input from grid sensors (WP8), user preferences (WP3, WP5) and interaction with flexibility markets. The implementation at the central ARV cloud hub. Handbook for Smart Communities

D7.9 : Principles for CEC-DSO interactions [46]

Methods for CEC-DSO interactions to solve possible DSO issues and conflicts. Interaction with WP9 on financial instruments (including P2P trading/DLTs such as blockchain among CECs). Business models and guidelines. Principles for CEC-DSO interactions (D7.9

Schedule of relevant Milestones

Milestone number[18]	**Milestone title**	**Lead beneficiary**	**Due Date (in months)**	**Means of verification**
MS14	Efficient & flexible operation	4 - DTU	34	Efficient & flexible operation at demo sites

Work package number [9]	WP8	Lead beneficiary [10]	8 - EURAC
Work package title	Monitoring, Evaluation and Impact Assessment		
Start month	1	End month	48

Objectives

This WP will: (OB.1) develop and implement the frameworks for monitoring, evaluation and impact assessment of the ARV Demos; (OB.2) perform the quality check, rating and final reporting of the overall performance of ARV Demos; (OB.3) create and deploy the interface between monitored, collected and processed data, and final users; (OB.4) perform the environmental, social and economic impact assessment of the ARV interventions, both to support the design and implementation of solutions during the project, and provide a detailed assessment of the results, with a cradle-to-cradle perspective, and with (OB.5) a multiple-benefit analysis.

Description of work and role of partners

WP8 - Monitoring, Evaluation and Impact Assessment [Months: 1-48]
EURAC, NTNU, ACE, CVUT, DTU, DANFOSS A/S, PROJECTZERO, SINTEF, PALMA, IBAVI, IREC, MET, UAS Utrecht, Center Denmark, SAB, GDFA, BOEX, Rc Panels B.V., UU, CITY OF UTRECHT, BOSGROEP, iwell, MEX, KARV, DOL, DTTN, UNITN, POLITO, OBF, NANO
This WP starts at the beginning of the project with (i) the design and development of the frameworks for monitoring, evaluation and impact assessment of six ARV Demos. Second, (ii) an ex-ante evaluation (i.e., before intervention) will take place (incl. monitoring of existing buildings to be retrofitted). Then, (iii) a streamlined assessment of environmental impacts and costs of alternative solutions (scenarios) will be performed to support the design of interventions. Moreover, (iv) the continuous monitoring and feedback to demos and stakeholders during the deployment in the demos and (v) an interim monitoring and evaluation of the on-site construction activities will take place. After implementation, (vi) an ex-post evaluation of the ARV Demos will be performed, including a detailed life-cycle environmental, economic and social impact assessment, with a cradle-to-cradle perspective, and (vii) a multiple benefit analysis. Drawing on the results, (viii) a synthesis will be provided, including interpretation, guidelines and recommendations for replication.
This WP has a strong link with WP2, as it builds on its KPIs, methods and tools; with WP3 on informing users (and their energy behaviours); with WP4 informing stakeholders during the integrated design and deployment phases; with WP5 informing the production process; with WP6 on monitoring of energy production, electricity grid and storage systems, and with WP7 in the connection between occupants' behaviour, building energy management (BEM) and control systems.

Task 8.1 Development of monitoring, evaluation and impact assessment specifications and guidelines. M01 – M12. Task leader: EURAC; Participants: IREC, PZ

Subtask 8.1.1. Elaboration of specifications and guidelines for the data monitoring
This subtask will set the standards, specifications and guidelines for the monitoring systems in the six ARV demos. Specifically, it will establish a common data monitoring framework and quality requirements for the specific monitoring systems, which will be tailor made according to needs of each demo (defined in Task 8.2), and facilitate the harmonisation of demos' data in a centralized data warehouse, in the ARV cloud hub. To support the evaluation and impact assessment of interventions, monitored data will include building energy consumption and production, indoor environmental quality (IEQ), users' behaviour, noise, dust and other emissions during on-site construction activities, and outdoor (external) micro-climate conditions. Inputs are expected from WP7 on the management of building energy systems.

Subtask 8.1.2 Elaboration of specifications and guidelines for the evaluation
This subtask will define the goal, scope, data sources and methods used for the evaluation of ARV demo interventions. In particular, it will select and define: the processes that will be addressed in the evaluation; how building performance gaps will be evaluated; how to estimate the construction and/or retrofitting time (to ensure a reduction > 30%), as well as the associated noise, dust and other emissions (which should be reduced by > 30%); how to analyse potential factors affecting the performance and results of the interventions, seismic behaviour of the construction systems, the evaluation of IEQ (to ensure an improvement of >30%) and the evaluation of the overall quality and rating of the ARV demos.

Subtask 8.1.3 Elaboration of specifications and guidelines for the impact assessment

This subtask will define the goal, scope, materials and methods of the impact assessment of ARV demos. Environmental, social and economic impacts will be assessed, building on internationally standardized and scientifically sound methodologies, e.g., life-cycle assessment (LCA), life-cycle costing (LCC) and social life-cycle assessment (SLCA). Two frameworks will be established, one comparing alternatives at an early stage, informing the design and development of ARV interventions, and another assessing the implemented interventions. The assessment will ensure the reduction of GHG emissions (in t CO2-eq/year) and ambient air pollution (e.g., kg PM2.5/year), among other impacts, in comparison with a baseline. Lastly, a multiple-benefit approach will be defined addressing environmental, economic and social aspects (see T8.5). For retrofit interventions, the impact assessment will compare pre- and post-intervention monitoring; for new construction, baselines will be defined based on legal requirements, standards or average performance (for new/ recent construction), depending on the scope and data availability.

Task 8.2 Static and dynamic data collection and monitoring. M01 – M48. Task leader: Center Denmark; Participants: EURAC, PZ, IBAVI, PCC, MET, IREC, HU, UU

Subtask 8.2.1 Description of monitoring systems in the six ARV demos
This subtask will define and describe the monitoring systems in each of the ARV demos, complying with the requirements (subtask 8.1.1). This description will include a list of technologies, data requirements and sources, covering the physical architectures of monitoring systems, their network architectures, the sensors to be installed, the functioning of data collection processes (frequency of the measurements, local storage, backup systems), and the data-related protocols. The monitoring system of each demo will be tailor-made and consider the inputs from demo lead partners. The following aspects will be monitored in each demo: (i) Energy production (on-site monitoring), (ii) Energy distribution (on-site monitoring), (iii) Energy consumption (on-site monitoring), (iv) Comfort (indoor) (TH – CO2), (v) User behaviours (i.e., opening of windows, CMV, etc.), and (vi) External micro-climate conditions (at district scale).

Subtask 8.2.2 Data architecture design
In this subtask, the data architecture will be designed, building on the results of subtask 8.2.1 and applying open standards. First, database technologies to use will be selected. Then, common protocols to adopt for data collection will be defined together with the demo leaders, and the data coming from each monitoring system will be unified into a unique database. EURAC will provide a platform for the centralized collection of monitored data produced by each ARV Demo.

Subtask 8.2.3 Data quality assessment (applying open standards)
This subtask will comprise regular data quality checks and provide feedback to respective ARV demos on the quality of the data they send, to ensure high quality and consistency of data. To identify the monitoring systems malfunction we will integrate a specific alert system in the automated workflow that evaluates the data quality, checking the completeness of the data (e.g., missing data) and the presence of anomalies (e.g., outliers).

Subtask 8.2.4 Data warehouse implementation and population
This subtask will integrate the data from demos in a centralized data warehouse, in the ARV Cloud Hub, incl. extraction, transformation and loading processes. We will include data on, construction activities and occupancy, in new buildings; retrofit activities, pre- and post-intervention occupancy, in case of retrofitted buildings; applied surveys; and simulations.

Task 8.3 Evaluation of the interventions and analysis of building performance gaps. M06-M48. Task leader: NTNU; Participants: EURAC, DAN, IBAVI, PCC, MET, IREC, UU, iWell, HU, RC, Bos Groep, MEX

Subtask 8.3.1 Quality of the intervention
This subtask will evaluate the quality of the interventions, building on the KPIs provided by WP2, together with monitored, project and literature data. It will address several aspects, incl.: IEQ, primary energy savings, investment in sustainable energy, production of energy from RES and design quality. Indoor environmental quality and comfort will be analysed incl. air quality, natural ventilation, lighting and acoustic indicators. This analysis will be linked to WP7 on building energy management (BEM) systems. The operational primary energy savings will be calculated, disaggregated into renewable and non-renewable energy (in GWh/year), incl. space heating, domestic hot water (DHW) and electricity demand. The investment in environmentally sustainable energy (in M€) and the share of energy and electricity supplied from RES (local production and grid supply) will also be estimated for all ARV demos. Lastly, building on the Design quality indicator (DQI), selected interventions in ARV Demos will be evaluated (through stakeholder engagement) in terms of functionality (user experience), construction quality, and architectural image (incl. form, design and integration).

Subtask 8.3.2 Building performance gaps evaluation and analysis

This subtask will evaluate building performance gaps (i.e., deviations between planned and actual building performance). Building energy performance gaps will be evaluated for the six ARV Demos, comparing the energy simulation and project targets (planned or expected energy performance and operational requirements) and monitored data. Other performance gaps, including IEQ and operation costs, will also be addressed in selected demos, according to data availability. An analysis of potential factors contributing to the performance gaps (e.g., occupants' behaviour, technological issues) will be performed, based on site-specific and literature data, and recommendations will be provided (incl. countermeasures).

Subtask 8.3.3 Evaluation of on-site construction and retrofit activities
An evaluation of on-site construction and/or retrofit activities will be performed, incl. (i) time, (ii) noise, dust and other emissions to air, and (iii) other selected indicators from the literature on construction productivity/efficiency. On-site construction/retrofit time and cost should be reduced by at least 30%, in order to enable market uptake and social affordability. Evaluation of on-site construction/retrofit activities regarding noise, dust and other emissions will be performed to ensure improved final indoor environment quality and reduction of dust and noise (by at least 30%), leading to higher rate of users' satisfaction, demonstrated with the relevant CEN standard (or equivalent).

Subtask 8.3.4 Analysis of factors that influence the monitored indicators and evaluation results
This subtask consists of an analysis of the factors that influence (cause-effect and/or correlation links) with the monitored indicators and evaluation results, such as: (i) factors that might influence energy consumption (indicators incl. monitored electricity, space and DW heating): occupancy, household characteristics; windows, solar exposure, indoor temperature, etc.; and (ii) factors influencing indoor environmental quality (indicators incl. temperature, CO2, PM, noise): use patterns and behaviour (e.g., opening windows, time at home, occupancy, natural ventilation).

Task 8.4 Assessment of environmental, social and economic impacts. M06-M48. Task leader: EURAC; Participants: NTNU, IREC, IBAVI, PCC, HU, BOEX, MU

Subtask 8.4.1 Streamlined environmental impact and cost assessment at support ARV interventions at design stage
In this subtask, an integrated streamlined LCA-LCC assessment model will be developed, with a cradle-to-cradle perspective, specifically oriented to inform and support the design of solutions for the ARV demos. The assessment will focus on potential non-renewable energy (NRE) requirements, GHG emissions and costs, per living area over a year (m2•year). To overcome the limited availability and quality of data on interventions, the approach will incorporate a building attribute to impact algorithm. Moreover, a multiple scenario analysis will be carried out to compare alternative strategies and solutions, potential shifts and trade-offs, and identify cost-optimal solutions and tipping points between reducing operational requirements and increased embodied environmental impacts and costs.

Subtask 8.4.2 Comprehensive life-cycle environmental and cost assessment of implemented ARV solutions
This subtask will perform a comprehensive assessment of potential life-cycle environmental impacts and costs (LCA and LCC) of the final (implemented) solutions in each ARV demo, within a cradle-to-cradle perspective. The assessment will address a wide range of impact categories, incl. primary non-renewable and renewable energy requirements, GHG emissions, ambient air pollution (e.g., PM2.5), acidification and eutrophication. Two functional units will be used, per person•year and per m2•year, to ease interpretation and comparability. A sensitivity analysis will provide insight on the influence of critical parameters on the results (e.g., occupancy, behaviour; electricity mix; and an uncertainty analysis. The assessment should demonstrate (i) high building energy performance (nearly zero-energy, Directive 2010/31/EU); (ii) reduction of GHG emissions (in t CO2-eq); (iii) reduction of embodied energy by 50%, without trade-offs in energy use and comfort (in connection to T8.3); and reduction of air pollution (in kg).

Subtask 8.4.3 Social life-cycle assessment of implemented ARV solutions
A SLCA will be performed building on UNEP/SETAC guidelines, considering impacts on four stakeholder groups: workers (incl. raw material extraction, manufacturing of building products and on-site construction), building occupants, local communities (i.e., living near production/construction sites) and society (general public in ARV Demo regions). The impact categories (selected based on existing social impact assessments of buildings and data availability) will include: (i) workers: health & safety, fair salary, working hours, discrimination, forced labour; (ii) building occupants: functionality/usability, health & comfort, accessibility; (iii) local communities: health & safety, accessibility, local employment; and (iv) society: technology development, public commitment to sustainability issues. These categories will be addressed through quantitative and semi-quantitative indicators, using both generic and site-specific data.

Task 8.5 Multiple-benefits analysis and assessment. M1-M48. Task leader: EURAC; Participants: POLITO; SINTEF, IREC, GDFA, demo leaders
The development of urban regeneration projects and activities related to CPCC implies a broad range of interventions, exceeding new buildings and energy infrastructure development (and/or refurbishment/upgrade of existing ones). Such

projects aim at social inclusion, increasing the quality of life of citizens, enhancing the valorisation of local social and cultural assets, protecting the environmental resources, boosting sustainable economic development, and so on. Under this perspective, other impacts, costs and benefits must be addressed within a multiple benefits approach (Ürge-Vorsatz et al. 2016) (Bisello, 2020) to provide a comprehensive overview on their magnitude. This task will apply the multiple benefits concept and its practical application towards the achievement of UN SDGs. The theoretical background will be developed by POLITO and EURAC. The goal is to maximize interdisciplinary and inter-sectoral collaboration (urban planning, social sciences, economics, buildings physics).

Subtask 8.5.1 Multiple benefits analysis: testing and fine tuning on ARV demo cases
With the collaboration of SINTEF (WP3 leader), IREC, and in close cooperation with the ARV demo leaders, and according to the framework defined in 8.1.3, a multiple benefits analysis will be performed at the local level (demo / CPCC / city scale). Thanks to stakeholders' engagement and active involvement, roadmaps to impact and multiple benefits mind maps will be locally defined and compared, to produce a shared framework.

Subtask 8.5.2 Measuring the success of ARV, towards an impact investing approach
The commonly accepted definition for impact investing is an investment that creates social or environmental benefits while also providing a return of principal, with returns ranging from zero to market. The subtask aims to sustain an impact investing approach, where the success of the project (investment) is measured through financial and economic criteria alongside Environmental, Social, and Governance (ESG) criteria, to leverage further investments, contributing to scale up and replication. An impact investing approach tailored on the outcomes of ARV project is tested, taking into account results of subtask 8.5.1, gathering data and analysing KPIs from demos, and in close cooperation with WP9 – GDFA.

Participation per Partner

Partner number and short name	WP8 effort
1 - NTNU	15.00
2 - ACE	0.50
3 - CVUT	19.50
4 - DTU	9.00
5 - DANFOSS A/S	3.00
7 - PROJECTZERO	5.00
8 - EURAC	36.00
9 - SINTEF	6.00
10 - PALMA	25.00
11 - IBAVI	21.00
12 - IREC	15.00
13 - MET	8.00
14 - UAS Utrecht	3.00
17 - Center Denmark	8.00
18 - SAB	3.00
19 - GDFA	2.00
20 - BOEX	1.00
21 - Rc Panels B.V.	1.00
22 - UU	2.00
23 - CITY OF UTRECHT	1.00

Partner number and short name	WP8 effort
24 - BOSGROEP	1.00
25 - iwell	1.00
26 - MEX	1.00
28 - KARV	9.00
29 - DOL	1.00
30 - DTTN	2.00
Armalam	1.00
31 - UNITN	8.00
32 - POLITO	10.00
33 - OBF	7.00
34 - NANO	3.00
Total	228.00

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D8.1	Monitoring, evaluation and impact assessment frameworks	8 - EURAC	Report	Public	12
D8.2	Data architecture, including description of monitoring systems in the ARV demos	17 - Center Denmark	Report	Public	18
D8.3	Structure and use of the data warehouse	17 - Center Denmark	Report	Public	48
D8.4	Evaluation results reports (including recommendations and guidelines for future projects)	1 - NTNU	Report	Public	48
D8.5	Streamlined LCA-LCCA comparing alternative solutions & scenarios	8 - EURAC	Report	Public	24
D8.6	LCA and LCC of the implemented solutions and social component	8 - EURAC	Report	Public	48
D8.7	Report on Multiple Benefits analysis and assessment	8 - EURAC	Report	Public	48
D8.8	Guidelines and recommendations for	8 - EURAC	Report	Public	48

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
	replication and/or future research				

Description of deliverables

D8.1 : Monitoring, evaluation and impact assessment frameworks [12]

guidelines for the monitoring systems in the six ARV demos. Specifically, it will establish a common data monitoring framework and quality requirements for the specific monitoring systems, which will be tailor made according to needs of each demo. Deliverable should be seen in context opf D2.1

D8.2 : Data architecture, including description of monitoring systems in the ARV demos [18]

This description will include a list of technologies, data requirements and sources, covering the physical architectures of monitoring systems, their network architectures, the sensors to be installed, the functioning of data collection processes (frequency of the measurements, local storage, backup systems), and the data-related protocols. The monitoring system of each demo will be tailor-made and consider the inputs from demo lead partners. The following aspects will be monitored in each demo: (i) Energy production (on-site monitoring), (ii) Energy distribution (on-site monitoring), (iii) Energy consumption (on-site monitoring), (iv) Comfort (indoor) (TH – CO2), (v) User behaviours (i.e., opening of windows, CMV, etc.), and (vi) External micro-climate conditions (at district scale).

D8.3 : Structure and use of the data warehouse [48]

integrate the data from demos in a centralized data warehouse, in the ARV Cloud Hub, incl. extraction, transformation and loading processes. We will include data on, construction activities and occupancy, in new buildings; retrofit activities, pre- and post-intervention occupancy, in case of retrofitted buildings; applied surveys; and simulations

D8.4 : Evaluation results reports (including recommendations and guidelines for future projects) [48]

quality of the interventions, building on the KPIs provided by WP2, together with monitored, project and literature data. It will address several aspects. Demos will be evaluated (through stakeholder engagement) in terms of functionality (user experience), construction quality, and architectural image

D8.5 : Streamlined LCA-LCCA comparing alternative solutions & scenarios [24]

an integrated streamlined LCA-LCC assessment model will be developed, with a cradle-to-cradle perspective, specifically oriented to inform and support the design of solutions for the ARV demos

D8.6 : LCA and LCC of the implemented solutions and social component [48]

comprehensive assessment of potential life-cycle environmental impacts and costs (LCA and LCC) of the final (implemented) solutions in each ARV demo, within a cradle-to-cradle perspective. The assessment will address a wide range of impact categories

D8.7 : Report on Multiple Benefits analysis and assessment [48]

apply the multiple benefits concept and its practical application towards the achievement of UN SDGs. The theoretical background will be developed by POLITO and EURAC. The goal is to maximize interdisciplinary and inter-sectoral collaboration (urban planning, social sciences, economics, buildings physics).

D8.8 : Guidelines and recommendations for replication and/or future research [48]

"Summarizing report with findings from activities in WP8. This WP has a strong link with WP2, as it builds on its KPIs, methods and tools; with WP3 on informing users (and their energy behaviours); with WP4 informing stakeholders during the integrated design and deployment phases; with WP5 informing the production process; with WP6 on monitoring of energy production, electricity grid and storage systems, and with WP7 in the connection between occupants' behaviour, building energy management (BEM) and control systems. These interconnections will be central here "

Schedule of relevant Milestones

Milestone number[18]	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS15	Preliminary LCA-LCC assessment	8 - EURAC	18	Preliminary report will be sent to relevant partners, on each demo, to have their review and feedback

Work package number [9]	WP9	Lead beneficiary [10]	19 - GDFA
Work package title	Business models, financial instruments, policy and exploitation		
Start month	3	End month	48

Objectives

Buildings energy efficiency is not moving fast enough to meet the Paris Agreement goals. Innovative business models and financial instruments are urgently needed. The benefits of the smart energy positive real estate of the demo sites go beyond energy/cost reductions and direct CO2 savings, but also enable energy flexibility to be commoditized and traded by the citizens as prosumers. The current low interest rate environment limits the ability to offer discounts on green loans and Energy Efficient Mortgages (EEMs), which acts as a disincentive to scale marked-based energy efficiency finance. Integration of flexible energy solutions in real-estate portfolios offers a new pathway to address this barrier by offering tools to strengthen returns on energy retrofit financing, whereby offering an innovative pathway to scale. In short, the work aims to use smart flexible energy solutions to accelerate the scaling of existing market-based financing, such as Energy Efficient Mortgages (EEMs), as well as to design entirely new financing mechanisms based on the citizen as prosumer.
Objective: Leverage the benefits of energy positive neighbourhoods to create new incentives for citizens and financial service institutions to invest in energy efficiency via business model and financial instrument innovation.

Description of work and role of partners

WP9 - Business models, financial instruments, policy and exploitation [Months: 3-48]
GDFA, NTNU, ACE, CVUT, DTU, DANFOSS A/S, ENFOR, PROJECTZERO, EURAC, SINTEF, PALMA, IBAVI, IREC, MET, UAS Utrecht, HOUSING EUROPE, Buro de Haan, Center Denmark, SAB, BOEX, Rc Panels B.V., UU, CITY OF UTRECHT, BOSGROEP, iwell, MEX, Mitros, KARV, DOL, DTTN, UNITN, POLITO, OBF, NANO, AIGUASOL SAEST
Task 9.1 Climate Positive Circular Communities Innovation Forum. M3-M48. Task Lead: NTNU, GDFA; Contributors: All
This task will collect, analyse, & disseminate demonstrated innovations across WPs 2-8 (intra-project & externally), collated into an annual ARV Innovation Intel for Impact (AI3) report. In addition, T9.1 will facilitate knowledge exchange with the ARV Exploitation Board to ensure early identification & scaling of commercially viable innovations (D9.1, D9.2, D9.3, & D9.4). As “demo-site leader Utrecht cluster” will ensure connection & collaboration with WP9-leader and demo-site clusters.

Task 9.2 Map scalable business models and financial instruments adaptable to EU. M3-M9. Task Lead: GDFA, Contributors: All
This task will first map existing market, policy and regulatory practices of real estate linked to EE financing for different real-estate asset classes (social housing, rental and privately owned) and of flexible energy solutions/practices/concepts both in and outside of the EU. Focus will be on practices that have proven ability to scale in other regions. Analysis of transferability of the practices to the six jurisdictions will be undertaken as well as analysis of how to link revenue from flexible energy assets to the real-estate financing models to strengthen return potential. The mapping will be conducted via interviews and web search. Additionally, regulatory and policy instruments at the EU level will be integrated into the mapping, including the Blockchain Observatory, SET PLAN Action 3.2, Clean Energy for All Europeans, and the Renovation Wave (D9.5). The results will be issued as a practice catalogue to be shared with European policy makers and FI in the six demo site countries.

Task 9.3 Design new bankable business models for energy positive neighborhoods. M9-41. Task Lead: GDFA. Contributors: City of Utrecht, DAN, PALMA, DTU, iWell, Bos Groep, UU, RCP, BOEX, HU, IREC, IBAVI, MET, AIGUA SINTEF, SAB, MEX, OBF ACE, NTNU
Building directly on Task 9.2, Develop, deploy, and evaluate new scalable for-profit and not-for-profit business and community models for design of flexibility/RES markets via smart trading platforms. Successfully working business models for different real-estate ownership structures (social housing, rental and privately owned) will be co-designed with the ARV demo sites to be trialled, evaluated and finally, working closely with WP7 and the six demo sites, design novel flexibility/RES markets and trading platforms (D9.6). Focus on a scaled approach that highlights simplification, ease of use/application via automation.

Subtask 9.3.1—Design Scalable Business Models (GDFA, contributors all listed in T9.3)

The work will design and test easily replicable innovative business models for the retrofitting and energy operation value chain. Design and tests will be undertaken on different ownership structures hereunder social and privately owned real estate (e.g., Netherlands in Utrecht demo-cluster for social housing and for private real estate in Spain). Focus will be on creating incentives for large scale retrofit including modes of demand aggregation. Business models to be explored include: Product-Service combinations (e.g., lease models) in the field of energy, safety, comfort, and renovation (WP4, WP5). Energy performance contracting based on the KPIs and Building Energy Management monitoring system (WP7) as well as new ways to overcome the split incentive problem in rented real-estate. For privately owned multi-family real-estate in Spain. Results of business model innovation work will be captured in business model blueprints as modules for replication in other jurisdictions across the EU.

Subtask 9.3.2—Design Platform Based Prosumer Business Models (GDFA, contributors all listed in T9.3)
Existing prosumer models in the EU are often not for profit. Current prices and tariff structures are not always geared to create sufficiently high margins to increase attractiveness of local energy market trading. The work will experiment with platform-based business model and market design that increase incentives to boost investments. Design and experimentation will be based on demo site conditions in jurisdictions with regulatory readiness e.g., in Spain where a Royal Decree allows residents in multi-occupancy buildings and local communities to establish 'collective auto-consumption' models that the local grid operator enables by close management of prosumers meter data. Also, the Netherlands, where specific tax breaks for co-operative prosumers have been secured. The work will identify barriers (technological, policy and regulatory) as well as avenues to replication into other EU markets on policy and regulatory environments and pathways from niche to mainstream, while safeguarding citizen participation and transparency on digital trading platforms.

Subtask 9.3.3 Economic viability and supporting market uptake (NTNU, contributors all listed in T9.3)
Select the most suitable business models and prepare a market analysis to elaborate strategies to support market uptake. To understand market uptake and replicability opportunities, this sub-task performs an economic analysis (quantifying revenues, cost-benefits, long-term viability, etc.) to set guidelines on the exploitation and commercialization CPCC related business models while considering regulatory and policy aspects reviewed in Task 9.2

Task 9.4 Design innovative financial instruments for energy positive real estate and communities. M15-M46. Task Lead: GDFA. Contributors: Housing Europe, DTU, PALMA, IREC, MET, SINTEF, OBF, NTNU

Subtask 9.4.1: Design building-linked financing solutions (GDFA, contributors all listed in T9.4)
The work will design innovative financing solutions that best accelerate transition to energy positive real-estate while being affordable and effective for buildings' owners and users. The work will collaborate with demo sites to design financing instrument to scale energy positive retrofits of different asset classes (social, rental, &privately owned). This will be done by experimentation and testing different ways to leverage surplus tradable energy (e.g. local markets or P2P frameworks) to innovate finance through strengthening collateral, allocating energy profits to internal fund structures in social housing tied to net-positive outcome retrofits, or use income from energy traded to service capital costs of EEMs.

Subtask 9.4.2 — Design digital bonds to scale prosumer flexible energy markets (GDFA, contributors all listed in T9.4)
This work will use demo site data to calculate cost and offer an overall design of a standard STO (green digital bond) for financing of flexible energy. Currently, the EU does not have a green Security Token Offering (STO) standard or principles equivalent to the EU green bond principles for centralized green bond issuances. GDFA will build on its work on digitalization of green bonds to demonstrate the potentials of using automation to enable cost efficient issuance of STO for flexible energy and retrofits. This will be done on a bank/or none bank managed "Do-It-Yourself" small bond issuance platform. The results will be captured in a green STO guide. A future foresight element will be built into this work which will be to explore the potential to use future carbon credits as collateral for energy efficiency finance discussing with banks on the structure and requirements for carbon credit future to be included into a financing instrument design (green loans, EEMs or green STOs). The timing is right as the European & international market infrastructure for trading carbon credits is growing making it inevitable that lenders will increasingly be asked to consider taking carbon credits as collateral. Hence, pushing forward this awareness among European FI can accelerate the interests in EE financing.

Task 9.5 CPCC pathways for scaling through the Exploitation Board. M27 – M46 Task Lead GDFA, Contributors All
An exploitation board will be established as a vehicle for scaling the business models and financing instruments. The Exploitation Board will be composed in part by strong innovation clusters as well as financial sector players that will spread the green building and renovation concepts to provide momentum to the 'renovation wave' that will be politically underpinned. GDFA will link the work to European Banks through UNEP FI as well as through the banking federations in the six living lab countries for market adoption of the new instruments. The demo clusters will setup a regional scale-up advisory groups of stakeholders and multipliers from the regional innovation cluster, such as regional housing

corporations, national housing corporation branches, construction (branches) organizations, other municipalities, to prepare replication and scale-up of the ARV CPCCs.

Participation per Partner

Partner number and short name	WP9 effort
1 - NTNU	11.00
2 - ACE	0.50
3 - CVUT	0.50
4 - DTU	8.00
5 - DANFOSS A/S	3.00
6 - ENFOR	1.00
7 - PROJECTZERO	0.50
8 - EURAC	1.00
9 - SINTEF	2.00
10 - PALMA	9.00
11 - IBAVI	1.50
12 - IREC	5.00
13 - MET	2.00
14 - UAS Utrecht	5.00
15 - HOUSING EUROPE	3.00
16 - Buro de Haan	1.50
17 - Center Denmark	1.00
18 - SAB	2.00
19 - GDFA	58.50
20 - BOEX	2.00
21 - Rc Panels B.V.	3.00
22 - UU	3.00
23 - CITY OF UTRECHT	4.00
24 - BOSGROEP	3.00
25 - iwell	3.00
26 - MEX	3.00
27 - Mitros	2.00
28 - KARV	0.50
29 - DOL	1.00
30 - DTTN	2.50
Armalam	2.50
31 - UNITN	0.50

Partner number and short name	WP9 effort
32 - POLITO	1.00
33 - OBF	6.00
34 - NANO	0.50
35 - AIGUASOL SAEST	1.50
Total	155.00

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D9.1	Develop an annual ARV Innovation Intel for Impact (AI3) report.	19 - GDFA	Report	Public	12
D9.2	Develop catalogue of business and financing models proven in other markets for adaptation in the EU to accelerate the renovation wave.	19 - GDFA	Report	Public	6
D9.3	Design business model blueprints for energy positive retrofits for different asset classes as modules for replication across the EU.	19 - GDFA	Report	Public	36
D9.4	Design Platform Based Prosumer Business Models with clear policy and regulatory recommendations.	19 - GDFA	Demonstrator	Public	41
D9.5	Design Building-linked financing instruments for FI adoption in re-estate portfolios	19 - GDFA	Demonstrator	Public	36
D9.6	Develop green digital bonds guide to scale prosumer flexible energy markets.	19 - GDFA	Other	Public	45
D9.7	Enable scaling across EU markets of energy positive renovation.	19 - GDFA	Other	Public	46

Description of deliverables

D9.1 : Develop an annual ARV Innovation Intel for Impact (AI3) report. [12]

collect, analyse, & disseminate demonstrated innovations across WPs 2-8 (intra-project & externally), collated into an annual ARV Innovation Intel for Impact (AI3) report. In addition, T9.1 will facilitate knowledge exchange with the

ARV Exploitation Board to ensure early identification & scaling of commercially viable innovations. Revisions: M12, M24, M36, M48

D9.2 : Develop catalogue of business and financing models proven in other markets for adaptation in the EU to accelerate the renovation wave. [6]

As for D9.1: To collect, analyse, & disseminate demonstrated innovations across WPs 2-8 (intra-project & externally), collated into an annual ARV Innovation Intel for Impact (AI3) report. In addition, T9.1 will facilitate knowledge exchange with the ARV Exploitation Board to ensure early identification & scaling of commercially viable innovations.

D9.3 : Design business model blueprints for energy positive retrofits for different asset classes as modules for replication across the EU. [36]

As for D9.1: To collect, analyse, & disseminate demonstrated innovations across WPs 2-8 (intra-project & externally), collated into an annual ARV Innovation Intel for Impact (AI3) report. In addition, T9.1 will facilitate knowledge exchange with the ARV Exploitation Board to ensure early identification & scaling of commercially viable innovations.

D9.4 : Design Platform Based Prosumer Business Models with clear policy and regulatory recommendations. [41]

As for D9.1: To collect, analyse, & disseminate demonstrated innovations across WPs 2-8 (intra-project & externally), collated into an annual ARV Innovation Intel for Impact (AI3) report. In addition, T9.1 will facilitate knowledge exchange with the ARV Exploitation Board to ensure early identification & scaling of commercially viable innovations.

D9.5 : Design Building-linked financing instruments for FI adoption in re-estate portfolios [36]

A mapping conducted via interviews and web search. Additionally, regulatory and policy instruments at the EU level will be integrated into the mapping, including the Blockchain Observatory, SET PLAN Action 3.2, Clean Energy for All Europeans, and the Renovation Wave

D9.6 : Develop green digital bonds guide to scale prosumer flexible energy markets. [45]

Develop, deploy, and evaluate new scalable for-profit and not-for-profit business and community models for design of flexibility/RES markets via smart trading platforms vSoftware development

D9.7 : Enable scaling across EU markets of energy positive renovation. [46]

Made up of several sub-topics: Design building-linked financing solutions, — Design digital bonds to scale prosumer flexible energy markets. CPCC pathways for scaling will be utilized through the Exploitation Board

Schedule of relevant Milestones

Milestone number[18]	**Milestone title**	**Lead beneficiary**	**Due Date (in months)**	**Means of verification**
MS16	Business model blueprints finalised	19 - GDFA	36	Blueprints available
MS17	Prosumer models proven	19 - GDFA	41	Model design ready and disseminated
MS18	Digital bond guide and digital structure ready	19 - GDFA	45	Guide distributed and digital bond interface ready

Work package number [9]	WP10	Lead beneficiary [10]	2 - ACE
Work package title	Communication, disseminations and stakeholder outreach		
Start month	1	End month	48

Objectives

The main objective of WP10 is to guarantee professional and public coverage of the project results and achievements, via the adoption of a large variety of distribution channels. A dual approach will be followed for this purpose, addressing through appropriate strategies a) the project as a whole and b) each CPCC demo in particular. In this view, carefully planned activities will be carried out so as to successfully outreach the whole of the stakeholder value chain needed to achieve a transformation to CPCC. ARV will contribute, upon invitation by the CINEA, to common information and dissemination activities to increase the visibility and synergies between H2020 supported actions. In particular, Communication and Dissemination(D&C) activities will aim to:

• Develop a comprehensive D&C plan, setting up an effective communication and dissemination strategy that will be contextualised to the specific communities at each CPCC Living Lab (LL).
• Enable-at local level- stakeholder engagement and outreach activities, supporting the co-creation process (WP3) by providing for each demo tailor-made packages.
• Identifying Green Ambassadors and facilitating their training (WP3) so they can act as multipliers.
• Increase awareness and promote the scalability and uptake of the developed innovative solutions -at a wider level- by addressing industry, academia, policy makers, governance and civil society
• Foster synergies -at EU level- contributing to common activities under the Green Deal initiatives
• Accelerate the impact of ARV innovative solutions, creating optimal conditions for their exploitation, among others through an e-marketplace platform.

Description of work and role of partners

WP10 - Communication, disseminations and stakeholder outreach [Months: 1-48]
ACE, NTNU, CVUT, DTU, DANFOSS A/S, ENFOR, PROJECTZERO, EURAC, SINTEF, PALMA, IBAVI, IREC, MET, UAS Utrecht, HOUSING EUROPE, Center Denmark, SAB, GDFA, UU, KARV, DOL, DTTN, UNITN, POLITO, OBF, NANO, AIGUASOL SAEST
Task 10.1 (T10.1) ARV project visual design. M1-M3Lead: NTNU, Participants: ACE
To ensure a common visual identity for the project, a corporate visual identity package will be developed, including a project logo, templates for presentations and newsletters and as a website eye-catcher. The visual elements will be formulated taking into account the need to incorporate existing graphic illustration of logos of related projects and partners. Professionally conceptualized and designed, the visual identity will not fail the test of time, thus, ensuring consistency and longevity for the initiative. The logo, the colors, the typeface, the imagery and photography will be in harmony and will be graphically representative of all objectives on all developed materials and strategies. Due consideration to the Graphical Guidelines of the European Commission will be given.

Task 10.2 (T10.2) Dissemination and Communication plan. M1-M48 Lead: ACE, Participants: ALL
Subtask 10.2.1 Core Dissemination and Communication strategy. Lead: ACE, Participants: ALL
A detailed D&C plan will be delivered within M6. This Plan will constitute the core document outlining the objectives and processes on the basis of the project's dissemination and communication activities. Additionally, this document addressing the two thematic areas (of social innovation and energy transition) will describe the strategy to effectively reach key stakeholders (identified in WP3), at local and European level, so as to create optimal conditions for the exploitation and market uptake of the developed solutions, building upon and supporting WP9 objectives. It will be subject to revision on a yearly basis and thus also report on undertaken dissemination/ communication activities and audience reached by all partners.

Subtask 10.2.2 Contextualized Dissemination and Communication strategies per CPCC Living Lab demo. M1-M48 Lead: SINTEF, Participants: ALL
The representatives of the CPCC Living Lab demos with the support of SINTEF and using the Core Dissemination and Communication strategy as a roadmap, will develop tailor-made Dissemination and Communication strategies, addressing the specific communities at neighborhood level for each of the 6 CPCC LLs. The first tailor made D&C strategies will be developed by M8 and will be revised in M20 and M38. They will specify the key stakeholders per demo to be targeted, as well as the key messages, outreach activities and tools devised to reach them. Customised

marketing tools and material will be described to support the tailor-made D&C strategy, such as press releases, vlogs, local language mini websites, LLs video diaries, podcasts, etc. The number and type of audience outreached will be monitored and reported at every revision of the document, following gender-equality and ethical considerations.

Task 10.3 (T10.3) ARV communication channels and dissemination material. M1-M48 Lead: Housing Europe, Participants: ALL

Subtask 10.3.1 Project website. Lead: ACE, Partners: ALL
The project will set up a website that shall be used as the main interface towards the stakeholders, who are interested in training possibilities, and information and outputs of the project. The website will act as a communication and dissemination channel for the results and for involving and enlarging the stakeholder's community.

Subtask 10.3.2 E-marketplace area. M1-M48 Lead: Housing Europe, Participants: ALL
An e- marketplace area will be set up and embedded on the website, as a "one stop shop". There, all project results will be merged, providing guidelines for end users, links to different resources, information on product suppliers, software, spreadsheets and datasets. Training material and technical guidance will also be included. Information will be easily filtered by type, topic, scale, country, license, etc. This area will also serve as a contact point for all demonstration projects targeting Climate Positive Circular Communities, enabling virtual connectivity and collaboration.

Subtask 10.3.3 Social Media channels. M1-M48 Lead: ACE, Participants: ALL
In addition to the website and e-marketplace area, Social media channels will be set up. These networks will acquire high importance thus bridging the gap in international and national communication. Social media: Twitter, LinkedIn Group, Facebook Community, YouTube Channel. The content of these media channels will be constantly updated with demo-site focused news (among others video diaries, citizen journalism, storytelling, etc.)

Subtask 10.3.3 Newsletters and dissemination material. M1-M48 Lead: Housing Europe, Participants: ALL
• A bi-annual e-Newsletter providing information on project progress and results, links to press and news releases, articles and interviews. The newsletter will in turn address different stakeholder groups e.g.: a) stakeholders in construction value chain b) housing providers, property owners and occupiers and c) local authorities. This will allow for a differentiation between groups adapting the knowledge transfer channels.
• Information on the project will also be provided by a project leaflet produced in English and in all languages in the consortium to guarantee a wider geographical coverage.
• 1 A0 poster and 1 roll-up poster will be produced to be displayed during workshops, fairs and conferences. 1 infographic (M36) will summarize the main objectives and solutions implemented in the 6 CPCC LLs. Relevant project partners will be responsible for the translations of the above-described material.
• A subtitled video for the 6 CPCC demos will present the local context and the solutions developed by ARV project, as well as the feasibility, reliability and replicability of the solutions proposed. The video will show the interactions of the activities around the demos with the local community. It will be shared widely on the website and the relevant social network channels, supporting the sustainability of the project results beyond the project's lifetime. The key deliverables of the project will be presented briefly in short video recordings representing the relevant partners, summarizing their reports. These videos will be uploaded on the project's YouTube channel and website and will be widely promoted through the project's Social Media. Additionally, informational factsheets illustrating project progress and published deliverables will be developed regularly to be distributed to the relevant target groups. Based on the informational factsheets, a project result booklet containing description of all the results achieved in ARV will be produced with the contributions of all partners involved in the 6 CPCC demos.

Task 10.4 (T10.4) Stakeholder outreach and capacity building. M1-M48 Lead: Housing Europe, Participants: ACE, All

Subtask 10.4.1 Outreach and engagement of Citizens with workshops, training and socio/cultural events. Lead: Housing Europe Partners: All
Engagement activities within WP3 need the support of WP10 in order to successfully outreach and engage citizens. The tailor-made D&C Strategies developed in T10.2 will address the thematic focus areas of the Living Labs in the demo sites. They will include support packages with decision support tools, description of processes for mentoring of the LLs managers, and training material (e.g., board games), to be devised in WP3 citizen engagement activities. Special focus will be given to high school students and young researchers to be targeted through local seminars. Open days and interactive guided tours will be organised, showcasing the demos in detail. A series of programmes, including talks, workshops and festivals will take place at local level, in order to make the experience of each CPCC LL demo more engaging and accessible. Alternatively, online events will be used if physical gatherings are not possible. Moreover, each CPCC LL demo will build on local initiatives and participate at local social and cultural events as part of more general outreach and public engagement activities, aiming to maximize visibility of the project. Citizens will be invited to

follow social media and will receive relevant dissemination material. They will also be invited to share their experiences and viewpoints through video diaries and podcasts. This material will be widely disseminated through the project communication channels. Furthermore, each CPCC LL demo will setup a regional scale-up advisory group from the regional innovation cluster, such as regional housing corporations, national housing corporation branches, construction (branches) organisations, other municipalities, to prepare replication and scale-up of the ARV demonstration tested in the CPCC LL demos. These identified stakeholders, (four per regional advisory group) will form the "Local Green Ambassadors" and will receive training in order to ensure the scalability of the developed solutions and systems (T3.3).

Subtask 10.4.2 Outreach and engagement with municipalities and policy makers M1-M48 Lead: Housing Europe Partners: All
The CPCC Living Labs will engage the local councils and municipalities (WP2 & WP3) working closely with them in order to better address their needs combined within a framework linked to potential governance models. Through the participation in international events and other activities, municipalities outside the already established network will be reached to show the replication potential. The CPCC Living Lab results and technologies, will be widely communicated aiming to multiply implementation of ARV solutions while policy briefs and recommendations will be highlighted.
Subtask 10.4.3 Outreach and engagement with industry and civil society. M1-M48 Lead: ACE Participants: Housing Europe, DAN, MET, AIGUA, PALMA, OBF, City of Utrecht, PZ, KARV, DTTN
- Two conferences- one technological and the other more political- will be held towards the end of the project where innovative solutions, the CPCC and recommendations will be highlighted, addressing SMEs/ industry, end-users, as well as developers and cities.
- Targeted events will be organized by each of the participating umbrella organizations (ACE and Housing Europe) in order to promote through awareness raising workshops the ARV approach and support further exploitation. Workshops can be coupled with site visits of the demos if applicable. ACE: Four awareness raising events will be organized throughout Europe with a workshop and poster display (of demonstration buildings) with an aimed attendance of 25-50 people per event. The National Member Organizations will be invited to participate in these events in order to enhance the impact. The main aim is to raise awareness on Citizen Engagement and the Co-creation process, advocating the importance of the architects' role from the early stages of every process. Housing Europe: Four workshops aiming at awareness raising will be organized for the Housing Europe Member Associations. The main aim is to promote the acceptance and market uptake of the CPCC models, promote and raise awareness on the Citizen Engagement (2x) and Market Uptake (2x) and get feedback of the members of the usefulness of these outputs.

Subtask 10.4.4 Outreach and engagement with academia. M1-M48 Lead: CVUT, Partners: NTNU, DTU, HU, UU, UNITN, POLITO, IREC
Project results will be published and presented in at least 10 scientific conferences. The academic/ research partners will publish a minimum of 14 Open Access papers in high impact scientific journals to spread the ARV results to the specialist and wider research community.

Task 10.5 (T10.5). Clustering and contribution to common H2020 Activities and other EU events. M1-M48 Lead: ACE, Partners: ALL This task covers resources to contribute, in mutual agreement with EASME, to common dissemination activities to increase synergies between, and the visibility of H2020 supported actions. ARV will be present at the EU Sustainable Energy week, and other EU initiatives or supported activities (e.g., Sustainable Places conference series) ARV will contribute upon invitation to EASME to common information and dissemination activities to increase synergies & visibility of EC supported actions. Moreover, we will gather lessons learned from the ARV demo projects, and innovations in all WPs to produce a guide for stakeholders to implement successful CPCC.

Participation per Partner

Partner number and short name	WP10 effort
1 - NTNU	10.00
2 - ACE	12.00
3 - CVUT	2.00
4 - DTU	2.50
5 - DANFOSS A/S	1.00
6 - ENFOR	0.50

Partner number and short name	WP10 effort
7 - PROJECTZERO	3.00
8 - EURAC	2.00
9 - SINTEF	5.00
10 - PALMA	7.00
11 - IBAVI	1.50
12 - IREC	4.00
13 - MET	1.00
14 - UAS Utrecht	2.00
15 - HOUSING EUROPE	22.00
17 - Center Denmark	1.00
18 - SAB	3.00
19 - GDFA	0.50
22 - UU	2.00
28 - KARV	1.00
29 - DOL	0.50
30 - DTTN	0.50
31 - UNITN	0.50
32 - POLITO	1.00
33 - OBF	0.50
34 - NANO	0.50
35 - AIGUASOL SAEST	0.50
Total	87.00

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
D10.1	ARV corporate identity	1 - NTNU	Other	Public	3
D10.2	i) Core Communication and Dissemination Plan & ii) tailored strategies for the 6 CPCC LL demos	2 - ACE	Report	Confidential, only for members of the consortium (including the Commission Services)	8
D10.3	Project website, e-marketplace &Social Media	15 - HOUSING EUROPE	Websites, patents filing, etc.	Public	6
D10.4	Newsletters & dissemination material:	15 - HOUSING EUROPE	Websites, patents filing, etc.	Public	6

List of deliverables

Deliverable Number[14]	Deliverable Title	Lead beneficiary	Type[15]	Dissemination level[16]	Due Date (in months)[17]
	Leaflet, Posters, Video, Infographic				
D10.5	Project booklet summarising results achieved in ARV	15 - HOUSING EUROPE	Report	Public	42
D10.6	Final report on dissemination and communication activities	2 - ACE	Report	Public	48
D10.7	Report on contribution to common H2020 Activities	2 - ACE	Report	Public	44
D10.8	A blueprint for planning, (re)design, (re)construction, operation and use of CPCCs	1 - NTNU	Report	Public	12

Description of deliverables

D10.1 : ARV corporate identity [3]

To ensure a common visual identity for the project, a corporate visual identity package will be developed, including a project logo, templates for presentations and newsletters and as a website eye-catcher. Due consideration to the Graphical Guidelines of the European Commission will be given

D10.2 : i) Core Communication and Dissemination Plan & ii) tailored strategies for the 6 CPCC LL demos [8]

A detailed D&C plan will be delivered within M6. This Plan will constitute the core document outlining the objectives and processes on the basis of the project's dissemination and communication activities. The second part is to develop tailor-made Dissemination and Communication strategies, addressing the specific communities at neighborhood level for each of the 6 CPCC LLs. The first tailor made D&C strategies will be developed by M8 and will be revised in M20 and M38

D10.3 : Project website, e-marketplace &Social Media [6]

The project will set up a website that shall be used as the main interface towards the stakeholders, who are interested in training possibilities, and information and outputs of the project. The website will act as a communication and dissemination channel for the results and for involving and enlarging the stakeholder's community Revisions planned for M6, M12, M24, M436, M48

D10.4 : Newsletters & dissemination material: Leaflet, Posters, Video, Infographic [6]

"• A bi-annual e-Newsletter providing information on project progress and results, links to press and news releases, articles and interviews. The newsletter will in turn address different stakeholder groups e.g.: a) stakeholders in construction value chain b) housing providers, property owners and occupiers and c) local authorities. This will allow for a differentiation between groups adapting the knowledge transfer channels. • Information on the project will also be provided by a project leaflet produced in English and in all languages in the consortium to guarantee a wider geographical coverage. • 1 A0 poster and 1 roll-up poster will be produced to be displayed during workshops, fairs and conferences. 1 infographic (M36) will summarize the main objectives and solutions implemented in the 6 CPCC LLs. Relevant project partners will be responsible for the translations of the above-described material. • A subtitled video for the 6 CPCC demos will present the local context and the solutions developed by ARV project, as well as the feasibility, reliability and replicability of the solutions proposed. The video will show the interactions of the activities around the demos with the local community. It will be shared widely on the website and the relevant social network channels, supporting the sustainability of the project results beyond the project's lifetime. • The key deliverables of the project will be presented briefly in short video recordings representing the relevant partners, summarizing their

reports. These videos will be uploaded on the project's YouTube channel and website and will be widely promoted through the project's Social Media. Additionally, informational factsheets illustrating project progress and published deliverables will be developed regularly to be distributed to the relevant target groups. Based on the informational factsheets, a project result booklet containing description of all the results achieved in ARV will be produced with the contributions of all partners involved in the 6 CPCC demos." Several sub-deliverables. M6 & M30 (Leaflet) M9 (Posters) M18 (Video) M36 (Infographic)

D10.5 : Project booklet summarising results achieved in ARV [42]

Project booklet summarising results achieved in ARV

D10.6 : Final report on dissemination and communication activities [48]

The final report on dissemination and communication activities.

D10.7 : Report on contribution to common H2020 Activities [44]

Report on contribution to common H2020 Activities

D10.8 : A blueprint for planning, (re)design, (re)construction, operation and use of CPCCs [12]

A blueprint for planning, (re)design, (re)construction, operation and use of CPCCs Revisions M12, 24, 36, 48

Schedule of relevant Milestones

Milestone number[18]	**Milestone title**	**Lead beneficiary**	**Due Date (in months)**	**Means of verification**
MS19	ARV Website	2 - ACE	6	Website Up and running
MS20	E-marketplace platform launched	2 - ACE	6	E-marketplace platform operational with the full structure defined and first contents uploaded, with a plan for continuous updating

1.3.4. WT4 List of milestones

Milestone number[18]	Milestone title	WP number[9]	Lead beneficiary	Due Date (in months)[17]	Means of verification
MS1	Project initiation	WP1	1 - NTNU	3	CA & Minutes of KOM
MS2	ARV Assessment framework	WP2	12 - IREC	9	Assessment framework defined
MS3	Implementation of tools	WP2	12 - IREC	15	Implementation of tools for Large Scale Retrofitting actions started
MS4	Virtual Reality Environments	WP2	12 - IREC	36	Virtual Reality Environments used and implemented
MS5	Overall methodology in T3.2	WP3	9 - SINTEF	9	Methodology corresponding with the deliverable completed
MS6	LL reports	WP3	9 - SINTEF	24	First LL reports completed
MS7	Integrated circular design progress	WP4	1 - NTNU	20	Design reports zero-emission & positive energy buildings in CPCCs D4.2-4.6
MS8	First iteration of recognized typologies	WP5	14 - UAS Utrecht	12	Amount and quality of recognized typologies
MS9	Final iteration of recognized typologies and the Pre-Manufacturing workflow.	WP5	14 - UAS Utrecht	24	Verification of automated delivered input for File2Factory
MS10	First iteration of manufacturing workflow analyses	WP5	14 - UAS Utrecht	30	Amount of activities changed to the off-site manufacturing.
MS11	Manufacturing principles realized	WP5	14 - UAS Utrecht	36	Analyses output manufacturing. Delivered modules to construction site
MS12	Realization of demo projects	WP5	14 - UAS Utrecht	36	Construction of the projects completed
MS13	Integrated renewables and storage systems progress	WP6	3 - CVUT	20	Process reports on integrated renewables and storage systems in CPCCs D6.2-6.6
MS14	Efficient & flexible operation	WP7	4 - DTU	34	Efficient & flexible operation at demo sites
MS15	Preliminary LCA-LCC assessment	WP8	8 - EURAC	18	Preliminary report will be sent to relevant partners, on each demo, to have their review and feedback
MS16	Business model blueprints finalised	WP9	19 - GDFA	36	Blueprints available

Milestone number[18]	Milestone title	WP number[9]	Lead beneficiary	Due Date (in months)[17]	Means of verification
MS17	Prosumer models proven	WP9	19 - GDFA	41	Model design ready and disseminated
MS18	Digital bond guide and digital structure ready	WP9	19 - GDFA	45	Guide distributed and digital bond interface ready
MS19	ARV Website	WP10	2 - ACE	6	Website Up and running
MS20	E-marketplace platform launched	WP10	2 - ACE	6	E-marketplace platform operational with the full structure defined and first contents uploaded, with a plan for continuous updating

1.3.5. WT5 Critical Implementation risks and mitigation actions

Risk number	Description of risk	WP Number	Proposed risk-mitigation measures
1	Delay of technical deliverables (general risk)	WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	WP1 will ensure the project schedule & deal with obstacles as soon as they arise. WP leaders and partners have proven their ability to deliver on time in other projects.
2	Design errors & barriers in the integration of different technologies & components (general risk)	WP4, WP5, WP6, WP7	To ensure that technologies fit together properly, integrated energy design with modelling will be applied for design, evaluation & optimization.
3	District Digital Twin models may be complex and heavy (general risk)	WP2, WP4, WP5, WP6, WP7, WP8	This risk will be mitigated by the distributed nature of the ARV digital cloud hub. If performance issues still are encountered, these will be addressed by developing additional levels of detail.
4	Unclear formulation of goals or deliverables (general risk)	WP1	WP1 will ensure clearly formulated goals and milestones. Involvement from stakeholders in other projects show their ability to formulate goals and design a project accordingly.
5	Delay in the demonstration cases (demonstration cases)	WP4, WP5, WP6	Building owners and stakeholders have confirmed commitment in a Letter of Support. If a project cannot continue due to external factors, the ARV consortium will propose measures and provide a replacement with equal quality.
6	Insufficient financing to pursue/scale-up the demo innovations (demonstration cases)	WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Financial incentives in countries and the EU as a whole will be mapped and pursued by demos.
7	Low interest/involvement among occupants (demonstration cases)	WP3	Make it simple and attractive for occupants to get involved, e.g. arrange competitions, integrate living labs in existing arenas, games, apps, etc.
8	Failure to reach TRL 7-8 of innovations (demonstration cases)	WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	All innovations are relatively mature (TRL 5-6)
9	Underestimated resources for demonstration activities (demonstration cases)	WP2, WP3, WP4, WP5, WP6	Funding for demos are committed by stakeholders. The reserved budget in ARV will be dedicated to support innovative activities (e.g implementing Cloud Hub)
10	Inability to collect data and ensure its quality for evaluation (demonstration cases)	WP8	A dedicated WP8 will ensure success for data collection in the demos
11	National/EU-wide regulations leading to sub-optimal innovation implementation (demonstration cases)	WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Innovations will be adapted to necessary regulations – ARV Innovation Forum and dedicated tasks in WP9

Risk number	Description of risk	WP Number	Proposed risk-mitigation measures
12	Consultant or contractor delays/errors (demonstration cases)	WP4, WP5, WP6	The lead time will be included in the schedule and communicated as early as possible.
13	Poor performance of a beneficiary (Management)	WP1, WP10, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	The project management team will monitor compliance of partners. If performing unsatisfactory, they will be formally notified and given one month to correct. If the situation does not improve, the partner may be voted defaulting by the General Assembly
14	Unclear allocation of tasks and responsibilities by partners and countries (management)	WP1, WP10, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	All meetings in the ARV project will include a mandatory list of tasks along with a proposal of who will follow up on each task
15	A key project staff could change their position in their organisations (management)	WP1	All key persons are highly committed to ARV. Coordinator and WP leaders are from highly competent organisations able to replace a key person.
16	Technical / administrative disagreement among consortium partners. (management)	WP1	All partners are experienced in EU research projects. Many have collaborated previously. All have signed a collaboration agreement and will sign a Consortium Agreement (w/conflict resolution clauses).
17	Lack of communication, causing lack of clarity (Management)	WP1, WP10, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	A communication plan which includes frequency, goals and the target group of each communication will be set up.
18	Unauthorized decision making or delays causing poor deliverable quality (Management)	WP1, WP10, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	A dedicated task in WP1 ensure frequent status meetings between researchers, partners, and management to minimize uncertainty of obstacles.
19	Inadequate market uptake acceleration caused by unclear exploitation and business plans (Other)	WP9	Business model design in WP9 will be undertaken in dialogue with financial service institutions and the exploitation board to ensure alignment to requirements of financiers and cross jurisdiction market needs.
20	Limited coverage of communication to disseminate the innovation (Other)	WP10	The PMT and the communication experts in WP10 will use the Communication Plan actively to ensure dissemination. ARV's consortium is well represented in EERA Smart Cities, ECTP, many IEA Annexes & Clusters, maximising impact.
21	Insufficient quality of deliverables and dissemination (Other)	WP1, WP10, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	The QAP, the communication experts and project stakeholders have precious experience in disseminating high quality deliverables from many projects.

1.3.6. WT6 Summary of project effort in person-months

	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	WP9	WP10	Total Person/Months per Participant
1 - NTNU	77	9	12	25.50	3.50	15	14	15	11	10	192
2 - ACE	4	1	4	2	1	0	0	0.50	0.50	12	25
3 - CVUT	7	6.50	18	18	19	37	23.50	19.50	0.50	2	151
4 - DTU	4	16	0	0	0	20	46	9	8	2.50	105.50
5 - DANFOSS A/S	1	0	0	0	0	1	9	3	3	1	18
6 - ENFOR	1	0	0	0	0	18	18	0	1	0.50	38.50
7 - PROJECTZERO	7	3	3	1	0	3.50	4	5	0.50	3	30
8 - EURAC	2	3	4	3	3.50	2	3	36	1	2	59.50
9 - SINTEF	4	12	37	14	7	4	7	6	2	5	98
10 - PALMA	7	47	50	22	16	1	5	25	9	7	189
11 - IBAVI	1	3	0	16	8.50	0	0	21	1.50	1.50	52.50
12 - IREC	4	67	16	23	10	1	20	15	5	4	165
13 - MET	1	0	8	0	0	0	4	8	2	1	24
14 - UAS Utrecht	10	3	1	19	35	2	1	3	5	2	81
15 - HOUSING EUROPE	1	1	6	0	0	0	2	0	3	22	35
16 - Buro de Haan	0.50	0	0	0	15	0	0	0	1.50	0	17
17 - Center Denmark	1	4	4	0	0	4	33	8	1	1	56
18 - SAB	1	0	3	0	0	2	3	3	2	3	17
19 - GDFA	4	0	1	0	0	0	0	2	58.50	0.50	66
20 - BOEX	1	0	5	1	5	2	3	1	2	0	20
21 - Rc Panels B.V.	0.50	0	0	13	6	2	0	1	3	0	25.50
22 - UU	1	0	0	5	2	14	19	2	3	2	48
23 - CITY OF UTRECHT	1	0	11	0	2	0	2	1	4	0	21

	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	WP9	WP10	Total Person/Months per Participant
24 - BOSGROEP	1	0	0	13	13	10	0	1	3	0	41
25 - iwell	1	0	0	0	0	0	17	1	3	0	22
26 - MEX	1	0	0	6	9	2	0	1	3	0	22
27 - Mitros	1	0	5	0	0	6	3	0	2	0	17
28 - KARV	1	2	7	4	5	6	5	9	0.50	1	40.50
29 - DOL	1	0	1	0	0	15	1	1	1	0.50	20.50
30 - DTTN	2.50	3.50	6	4	6	0	2	2	2.50	0.50	29
· Armalam	1.50	0	0	3	12	0	1	1	2.50	0	21
· X-LAM DOLOMITI	0	0	0	0.50	11.50	0	0	0	0	0	12
· FANTI LEGNAMI	0	0	0	0.50	7.50	0	0	0	0	0	8
31 - UNITN	1	0	0	22	22	0	2	8	0.50	0.50	56
32 - POLITO	1	0	0	20	8	11	0	10	1	1	52
33 - OBF	7	7	11	9	4	4	2	7	6	0.50	57.50
34 - NANO	1	0	0	0	0	10	4	3	0.50	0.50	19
35 - AIGUASOL SAEST	1	9.50	0	23	0	0	0	0	1.50	0.50	35.50
Total Person/Months	162	197.50	213	267.50	231.50	192.50	253.50	228	155	87	1987.50

1.3.7. WT7 Tentative schedule of project reviews

Review number [19]	**Tentative timing**	**Planned venue of review**	**Comments, if any**
RV1	21	Brussels or online	
RV2	39	Brussels or online	
RV3	48	Brussels or online	

1. Project number

The project number has been assigned by the Commission as the unique identifier for your project. It cannot be changed. The project number **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

2. Project acronym

Use the project acronym as given in the submitted proposal. It can generally not be changed. The same acronym **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

3. Project title

Use the title (preferably no longer than 200 characters) as indicated in the submitted proposal. Minor corrections are possible if agreed during the preparation of the grant agreement.

4. Starting date

Unless a specific (fixed) starting date is duly justified and agreed upon during the preparation of the Grant Agreement, the project will start on the first day of the month following the entry into force of the Grant Agreement (NB : entry into force = signature by the Agency). Please note that if a fixed starting date is used, you will be required to provide a written justification.

5. Duration

Insert the duration of the project in full months.

6. Call (part) identifier

The Call (part) identifier is the reference number given in the call or part of the call you were addressing, as indicated in the publication of the call in the Official Journal of the European Union. You have to use the identifier given by the Commission in the letter inviting to prepare the grant agreement.

7. Abstract

8. Project Entry Month

The month at which the participant joined the consortium, month 1 marking the start date of the project, and all other start dates being relative to this start date.

9. Work Package number

Work package number: WP1, WP2, WP3, ..., WPn

10. Lead beneficiary

This must be one of the beneficiaries in the grant (not a third party) - Number of the beneficiary leading the work in this work package

11. Person-months per work package

The total number of person-months allocated to each work package.

12. Start month

Relative start date for the work in the specific work packages, month 1 marking the start date of the project, and all other start dates being relative to this start date.

13. End month

Relative end date, month 1 marking the start date of the project, and all end dates being relative to this start date.

14. Deliverable number

Deliverable numbers: D1 - Dn

15. Type

Please indicate the type of the deliverable using one of the following codes:

R	Document, report
DEM	Demonstrator, pilot, prototype
DEC	Websites, patent fillings, videos, etc.
OTHER	
ETHICS	Ethics requirement
ORDP	Open Research Data Pilot
DATA	data sets, microdata, etc.

16. Dissemination level

Please indicate the dissemination level using one of the following codes:

PU	Public
CO	Confidential, only for members of the consortium (including the Commission Services)
EU-RES	Classified Information: RESTREINT UE (Commission Decision 2005/444/EC)
EU-CON	Classified Information: CONFIDENTIEL UE (Commission Decision 2005/444/EC)
EU-SEC	Classified Information: SECRET UE (Commission Decision 2005/444/EC)

17. Delivery date for Deliverable

Month in which the deliverables will be available, month 1 marking the start date of the project, and all delivery dates being relative to this start date.

18. Milestone number

Milestone number:MS1, MS2, ..., MSn

19. Review number

Review number: RV1, RV2, ..., RVn

20. Installation Number

Number progressively the installations of a same infrastructure. An installation is a part of an infrastructure that could be used independently from the rest.

21. Installation country

Code of the country where the installation is located or IO if the access provider (the beneficiary or linked third party) is an international organization, an ERIC or a similar legal entity.

22. Type of access

TA-uc	if trans-national access with access costs declared on the basis of unit cost,
TA-ac	if trans-national access with access costs declared as actual costs, and
TA-cb	if trans-national access with access costs declared as a combination of actual costs and costs on the basis of unit cost,
VA-uc	if virtual access with access costs declared on the basis of unit cost,
VA-ac	if virtual access with access costs declared as actual costs, and
VA-cb	if virtual access with access costs declared as a combination of actual costs and costs on the basis of unit cost.

23. Access costs

Cost of the access provided under the project. For virtual access fill only the second column. For trans-national access fill one of the two columns or both according to the way access costs are declared. Trans-national access costs on the basis of unit cost will result from the unit cost by the quantity of access to be provided.

CLIMATE POSITIVE CIRCULAR COMMUNITIES — ARV

History of changes

Revision date	Change:	Justification for change
21.05.2021	Table of Content added. Tables and sections removed.	As requested by the Agency according to GAP Preparation procedure.
21.05.2021	Table 2.10: Revision of targets have been made	The change was implemented to address the following comment from the Evaluation Summary Report: "Some targets in Table 2.10 are not fully ambitious."
21.05.2021	Section 2.2.5 Communication activities have been updates with # of visits to schools, seminars etc.	The change was implemented to address the following comment from the Evaluation Summary Report: "The quality of the communication measures is very good, however, some activities are not clearly quantified."
21.05.2021	Information on PV-system added to the section on the Norwegian Demo case.	The change was implemented to address the following comment from the Evaluation Summary Report: "There is not sufficient clarity on the size of some actions (e.g. the area of installed photovoltaics in Norway)."
21.05.2021	Following text added to section 3.4: All depreciation costs for equipment, infrastructure or other assets in the project are in compliance with Article 6 and will be recorded in the appropriate beneficiary's accounts, purchased in accordance with Article 10 of the grant agreement and written off in accordance with international accounting standards and the beneficiary's usual accounting practices.	As requested by the Agency.
03.06.2021	Increased number of PMs for P33 POLITO in WP4 (from 12 to 20 PMs), WP6 (from 9 to 11 PMs), WP8 (from 8 to 10 PMs). Budget unchanged. Relevant tables updated accordingly.	Justification from partner: "We did not (erroneously) foresee this in the budget preparation as at the time of the submission of the proposal the team included only senior personnel and it was not foreseeable that younger scientist could be enrolled. The post pandemic governmental actions now do allow us to consider this."
03.06.2021	CFS costs for P10 Palma added to Table 3.4b.	As requested by the Agency.
09.06.2021	Beneficiary short-names have been changed as following: : - HAB replaced with DTTN - HE replaced with Housing Europe - BdH replaced with Buro de Haan - EUDIH replaced with Center Denmark - UTR replaced with City of Utrecht	As requested by the Agency in order to ensure consistency between Part A and Part B.

	- BOS replaced with Bos Groep - MITR replaced with MITROS - PORT replaced with Portaal - OBY replaced with OBF - UITR replaced with UNITN	
09.06.2021	GANNT-chart updated: - D3.3 moved to M13 - D3.4 moved to M24 as first delivery date - D5.2 renumbered to D5.1 - Deliverables D5.2 and 5.8-5.12 in M36	As requested by the Agency in order to ensure consistency between Part A and Part B.
11.06.2021	For the third parties involved in the project, updated the tables in Section 4.2: - To include the WP, the task and/or subtask that work is being subcontracted - To include amounts of subcontracts - To include the following sentence: "Subcontractor t.b.d. The subcontract will be awarded according to the principles for best value for money and absence of any conflict of interest (according to Articles 10, and 13 of AMGA)."	As requested by the Agency.
11.06.2021	DTTN has introduced two additional linked third parties: X-LAM Dolomiti and Fanti Legnami. Relevant tables in 3.4 Use of resources and 4.2: Third parties involved in the project updated	Justification from partner: "The purpose to involve 3 LTPs instead of a single one was conceived in a logic of cost reduction. […] Nonetheless, at the proposal stage of the ARV project, it was not possible to set a proper definition of the design, prototyping, construction, and installation phases among the potential Linked Third Parties, basically due to the shortage of time and the strict schedule to comply with the deadline for submission. […] The actual cost and task distribution reflect the fine-tuning process and enhancement of the specific expertise which each Linked Third Party may offer in the framework of the Trento Demo."
11.06.2021	Updated Table 3.4b: 'Other direct cost' items (travel, equipment, other goods and services, large research infrastructure) for the following partners: - P1 NTNU: shifted €7 700 to NTNU as a result of a €11 000 reduction in Total Eligible Costs for DANFOSS, as explained below. This is added to the pots for publication costs and translation costs for the consortium.	As requested by the Agency.

	- P5 DANFOSS: split up costs between categories Equipment and Other goods and services, and removed ineligible part of Equipment costs initially included (€11 000 for electricity use, which is covered by indirect costs). Due to the 70% reimbursement rate for DANFOSS, this freed up €7 700 in Max EU Contribution that was shifted to NTNU. - P31 DTTN: shifted costs between newly introduced Linked Third Parties, as detailed below. All amounts have been shifted from linked third party Armalam: o PMs: 0.5 to X-LAM Dolomiti and 0.5 to Fanti Legnami (WP4), 11.5 to X-LAM Dolomiti and 7.5 to Fanti Legnami (WP5). o Direct personnel costs: €64 826 to X-LAM Dolomiti, €41 127 to Fanti Legnami o Other goods and services: €454 000 to X-LAM Dolomiti, €285 000 to Fanti Legnami.	
24.06.2021	Added - Standard text to the opening of Section 4.2. - Standard text for the description of subcontracting for partners IBAVI, Mitros, Portaal in Table 4.2. - Task and WP reference to the description of subcontracting for partner RC Panels in Table 4.2.	As requested by the Agency.
24.06.2021	All references to Portaal have been removed throughout the document	Due to Portaal leaving the consortium
24.06.2021	Section 1.4.2 - Table 1.7 :revision of key innovations for WP4 due to Portaal exit - Dutch demo descriptions have been revised due to Portaal leaving.	Due to Portaal leaving the consortium. Further details can be found in formal letter from Portaal
24.06.2021	Gantt-chart updated	To accommodate for consistency between Sygma and this document
24.06.2021	Task references added for Linked Third Parties in description in Section 4.2.	As requested by the Agency.
24.06.2021	Budget reallocations due to Portaal leaving the consortium, also resulting in revised descriptions in Section 3.4b and Section 4.2. The Max EU Contributions remains the same. Detailed breakdown of budget increases for relevant partners: - NTNU: added 4 PMs in WP1 and 4.5 PMs in WP4. Added €2 541 to Other goods and	Justification for NTNU: increased PMs in WP1 for project management and for implementation of risk reducing payment schedules. Increased PMs in WP4 for close follow-up of demonstration buildings/communities,

	services, allocated to translation and publication costs for the consortium. - UAS Utrecht: added 2 PMs in WP4, 2 PMs in WP5, 1 PM in WP9. - Buro de Haan: 1 PM in WP9. - BOEX: 1 PM in WP3, €25 000 in subcontracting in WP3, €15 000 in subcontracting in WP4, €75 000 in equipment costs in WP5, €30 000 in equipment costs in WP6, €77 000 in equipment costs in WP7. - RC Panels: 4 PMs in WP4, 1 PM in WP5, 1 PM in WP9. - UU: 2 PMs in WP4, 1 PM in WP9. - City of Utrecht: 1 PM in WP3, 1 PM in WP9. - BOESGROEP: 4 PMs in WP4, 2 PMs in WP5, 1 PM in WP9. - iWell: 1 PM in WP9. - MEX: 1PM in WP9. - Mitros: 1 PM in WP3, €25 000 in subcontracting in WP3, €15 000 in subcontracting in WP4, €75 000 in equipment costs in WP5	for continuously risk and performance monitoring/management. Justification from Dutch partners: On increased personnel efforts: "With the introduction of the new retrofitting buildings we are also adding a new innovation to the project: the HeMuBo renovation concept. This […] leads to an evaluation of the Inside Out and the Hemubo renovation concepts. The evaluation leads to optimizations in both concepts, both in energy performance, construction runtime and logistics. The evaluation itself and the implementation of its results in design and construction phases takes extra personnel effort […]"
28.06.2021	Pie charts and description at the beginning of Section 3.4 updated after the removal of Portaal from the consortium.	
28.06.2021	Total number of partners in consortium corrected to 35 after Portaals exit	
28.06.2021	Minor adjustments to layout and illustration sizes	Small editorial changes to fit chapters and/or paragraphs onto pages
30.06.2021	Numbering of beneficiaries updated to match the numbering in Annex 2	Double-checked and updated on Agency's suggestion
30.06.2021	Shortened table in Section 4.2 concerning subcontracting for IBAVI and BOEX to make visible the standard text in the end	As requested by the Agency.
30.06.2021	Table 3.4b updated with budget for CFS costs for Mitros	As requested by the Agency.

Contents

1. Excellence

The energy and building sectors are vital to Europe's environment and energy policies, since buildings are responsible for 40% of total EU energy use and 36% of greenhouse gas emissions[1]. However, fast and disruptive changes are challenging to achieve, given the conservative nature of the industry, and the multitude of stakeholders and end-users that need to be addressed. In particular, the required deep energy renovation of the existing building stock, remains a major challenge[2]. Investment costs are a significant barrier, since the willingness and ability to pay for energy/climate measures are generally low, and due to the structural mismatch between risks and economic rewards. Moreover, energy poverty is becoming a pressing issue, with more than 30 million Europeans unable to keep their homes adequately warm[3]. Finally, the renewal of the construction and energy sectors are hampered by highly path-dependent characteristics with high sunk costs and extensive network/coordination effects.

Thus, we are faced with the challenge to find **attractive, resilient, and affordable solutions** that will **significantly speed up** the deep energy renovations and the deployment of energy and climate measures in the construction and energy industries.

The technologies and knowledge to make these changes happen, do exist. The ARV consortium has experience from several decades of R&D projects on low energy buildings, zero emission buildings (ZEB), plus energy buildings, and zero emission neighbourhoods (ZEN), ref. Table 1.5. The partners been involved in developing and testing a wide range of promising solutions for such buildings and neighbourhoods and have supervised real life pilot demonstrations of ZEBs and ZENs. Thus, we know that it is possible, the challenge is to make these solutions exploitable and scalable.

The ARV project will answer to these challenges by employing a novel concept relying on a combination of 3 conceptual pillars, 6 demonstration projects, and 9 thematic focus areas.

Working with innovation clusters ARV will provide ground-breaking innovations that will answer to the EU climate ambitions and the Renovation Wave and fulfil the **ARV** vision of a rapid and wide scale implementation of **Climate Positive Circular Communities (CPCC)** where people can thrive and prosper for generations to come.

The pillars, the demonstration projects, and the thematic focus areas are introduced in the following sections.

6 Demonstration Projects of Climate Positive Circular Communities[4] across Europe

[1] COM (2020): Stepping up Europe's 2030 climate ambition. Investing in a climate-neutral future for the benefit of our people. 562 final, Brussels 17.9.2020.
[2] COM (2020): A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives. 662 final, Brussels 14.10.2020
[3] Data from 2018, Eurostat SILC. Commission Recommendation of 14.10.2020 on Energy Poverty.
[4] The definition of CPCC is outlined on page 6

The core of the ARV projects relies on **6 large-scale demonstration projects, with 35 ARV partners representing the whole value chain of the building and energy sectors, and an extensive network of innovation clusters**. In order to ensure replicability and scalability, the ARV demonstration projects have been carefully selected to represent the climates and context of Europe and with ambitions to contribute with outstanding innovations in all the needed thematic areas of CPCCs. **They are urban transformation/regeneration projects that include different types of buildings** (residential, public, educational, and health care), including **133,400 m^2 of renovation** and **25,700 m^2 of new construction**. The projects are carefully selected to address all of the thematic focus areas of the call. They are also selected to complement each other, i.e. each of them has particularly outstanding innovations in selected focus areas to be 'leading stars' for other projects. For example, the Dutch demo has particularly outstanding innovations in thematic focus area no 5) Resource efficient (re)construction and renovation workflows. However, all of the demos address all of the focus areas. The demo projects and related innovations and clusters are further described in sections 1.4.2 and 2.1.1.

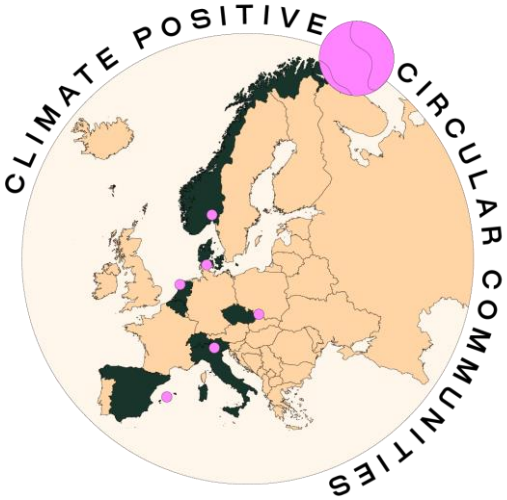


Figure 1.1 Map with demo projects and ARV countries.

The 3 conceptual pillars: Integration, Circularity, and Simplicity

The successful innovations of Climate Positive Circular Communities will rely on the application of 3 conceptual pillars as follows:

1) Integration means that we have to address several aspects in combination. It is not sufficient to make a very energy efficient building if nobody can afford it or if the indoor environment is not good. **Architectural quality, affordability, and people's well-being** are therefore vital aspects to address. In the ARV project, we address this by focusing on 3 different levels in combination: **1) people, 2) buildings, and 3) community energy systems** (see Figure 1.2). By focusing on people, we address the multitude of values of different stakeholders in the value chain, from end-users to manufacturers and financing institutions. ARV will engage **community platforms for awareness raising, occupant engagement, and co-creation**. When we demonstrate solutions for energy-efficient building designs, we show at the same time how the ARV buildings are integrated into its cultural and social environment in line with the **New Bauhaus vision**[5]. Finally, the users and buildings are **smartly linked up to community energy systems and materials hubs** for effective energy and resource management within and beyond the neighbourhood. The concept of integration involves the integration of different stakeholders and expertise along the value chain of CPCC, and **the use of novel ICT solutions** to facilitate the integration between the different systems, the stakeholders, and the people in the community. This is further described in section 3.

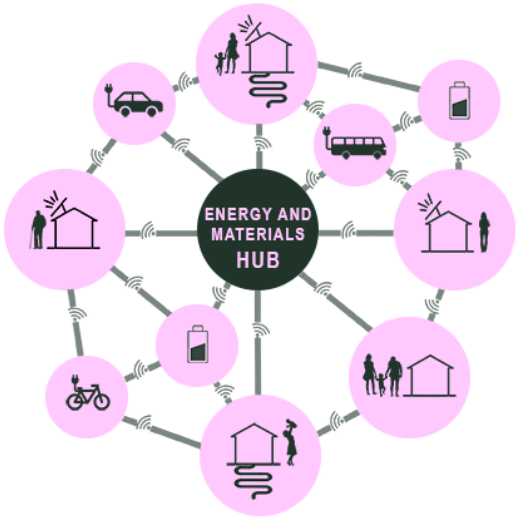
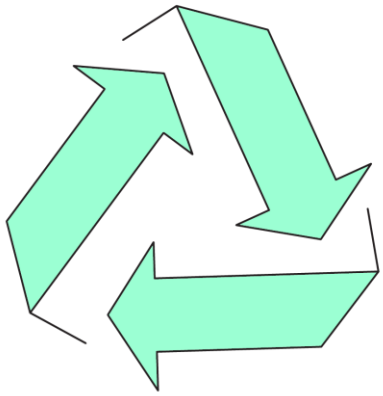


Figure 1.2 The integration between people, buildings, and the energy systems in a CPCC.

[5] https://ec.europa.eu/commission/presscorner/detail/en/AC_20_1916

2) Circularity has only recently begun to gain momentum in the construction sector, but is vital to sustainable development, as global consumption of materials is expected to double in the next forty years[6]. As emphasized by the new EU Circular Economy Action Plan[7], the construction sector requires vast amounts of resources and accounts for about 50% of all extracted materials. The sector is also responsible for over 35% of the EU's total waste generation. In ARV, we will address this challenge in a practical way, by **focusing on efficient renovation and construction of buildings** and by systematically applying the **EU Circular Economy Principles for Buildings Design**[8]. This means that ARV will apply the key principles of circular economy, i.e. *engaging all actors along the value chain* in circular economy, *exploit financial incentives and total life cycle costs*, create viable *business models* considering the distribution of burdens and costs, enhance and apply *appropriate tools and skills*, and target *durability, flexibility, adaptability, reuse, and recycling*. **Deep renovation** of existing buildings is especially targeted (WP5). The use of **digital tools** is vital to achieving the cost, time, and simplicity targets (WP2-9). ARV will also boost the development and deployment of **digital material banks/logbooks** (WP4, WP8) that track material use in existing and new buildings and their potential for reuse, coupled with cost and environmental indicators for embodied energy and emissions.



3) Simplicity. Addressing simplicity in the processes of planning, design, construction and use of CPPCs, is very powerful in untangling the challenges towards their fast and widespread use. This is because simple solutions have several important advantages: 1) they are more robust, 2) they are easier to produce, 3) they have lower costs due to less materials use and simpler production processes, 4) they are easier to understand, use and operate, 5) they have lower life cycle energy use and emissions (if designed intelligently), and 6) they have lower risks. To be able to produce simple solutions, ARV will address several challenges experienced by the different stakeholders, from investors, public authorities, construction companies, and end-users. Complexity management is a key **to producing simple solutions.** ARV will manage this by **the use of intelligence (digitalisation)** in integrated planning, design, construction, and operation/use, as well as by showcasing resource efficient integrated construction and renovation workflows by employing **intelligent industrialization and prefabrication**.

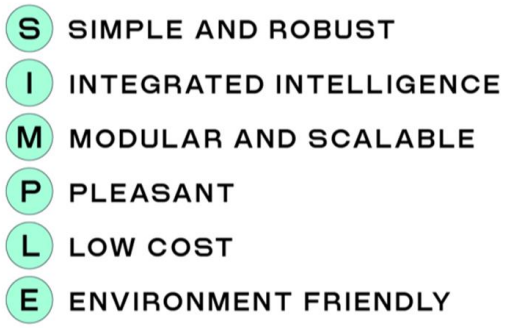


Figure 1.3 The Simplicity concept of ARV.

The 9 thematic focus areas are selected to address the specific challenges in the call. They are mapped into 9 work packages described in Section 2, and answer to the objectives as described in Section 1.1 below. The thematic focus areas are 1) Framework for CPCC planning and implementation, 2) Community engagement, environment and well-being, 3) Sustainable building (re)design, 4) Resource efficient manufacturing and construction workflows, 5) Integrated renewable and storage systems, 6) Efficient energy management and flexibility, 7) Validation by monitoring, evaluation, and impact assessment, 8) Business models, financial instruments, policy and exploitation, and 9) Communication, dissemination and stakeholder outreach. The 9 thematic areas are further described in Section 1.3(b) and in the work plan (Section 3).

[6] OECD (2018), Global Material Resources Outlook to 2060.
[7] COM (2020), A New Circular Economy Action Plan. For a cleaner and more competitive Europe.
[8] COM (2020), Circular Economy Principles of Buildings Design.

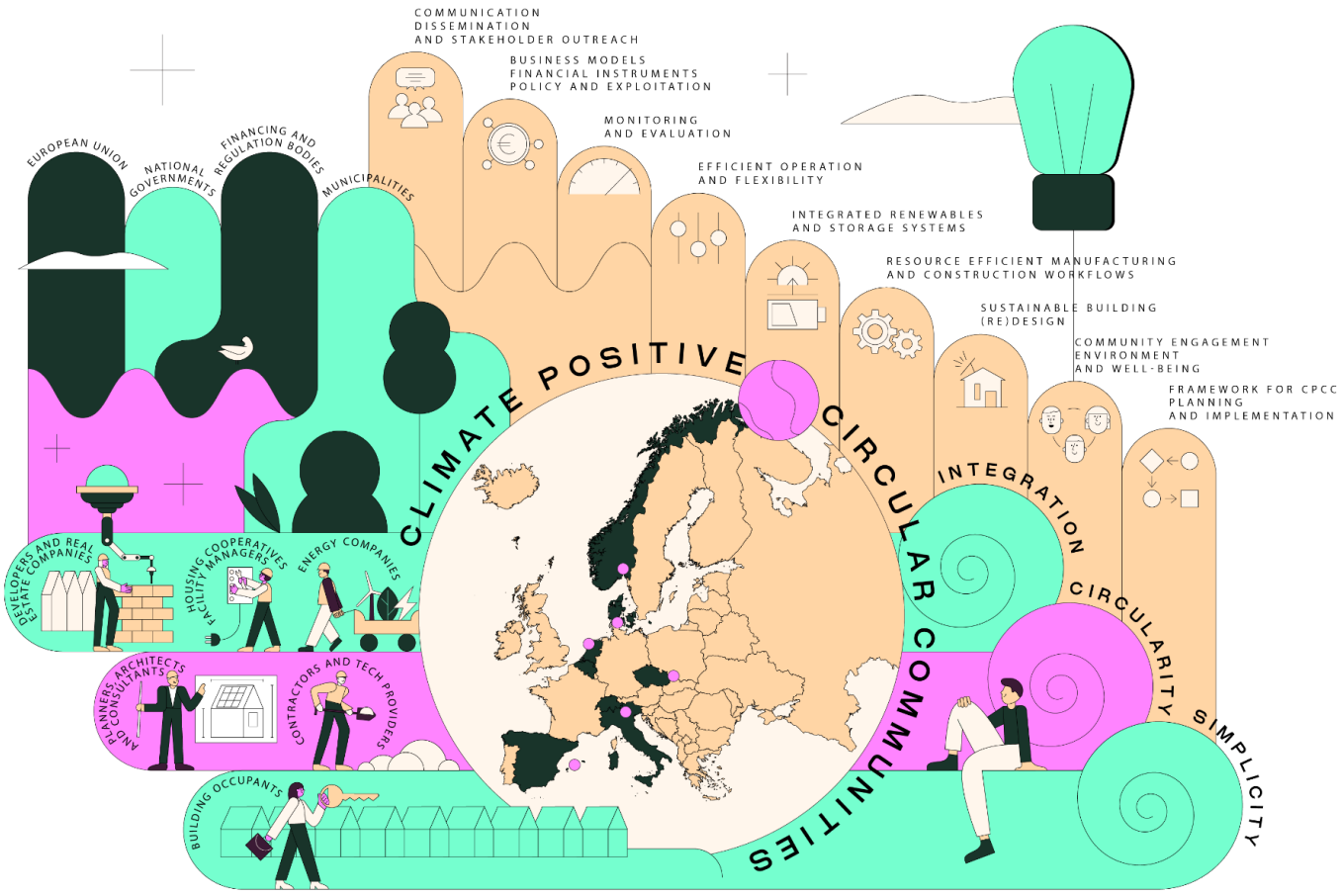


Figure 1.4 The concept of ARV with the **6** demonstration projects of Climate Positive Circular Communities riding on the renovation wave (**3** waves containing the pillars of integration, circularity, and simplicity) supported by the different stakeholders working together to make innovations in **9** thematic focus areas.

1.1 Objectives

The overall aim of the ARV project is to **boost the building renovation rate and to enable rapid and wide-scale deployment of CPCCs** around Europe. ARV will facilitate a **fast market uptake and cost-efficient replication** of the CPCC concept, and thus significantly contribute to the full decarbonisation of Europe by 2050. The specific objectives of ARV are aligned with the overall objectives of the call and are designed to reach the target values shown in Table 1.1:

Objective 1: Deliver a blueprint for effective planning, design, construction, operation and use of CPCCs (involves all WPs and demo projects, managed and delivered through WP10).

Objective 2: Demonstrate a replicable planning framework for efficient design and successful implementation of CPCC (WP2).

Objective 3: Demonstrate community engagement platforms for awareness raising, occupant insight and well-being, and co-creation (WP3).

Objective 4: Design and demonstrate integrated circular buildings for high energy performance, low emissions, low cost, good indoor climate and high architectural quality (WP4).

Objective 5: Demonstrate seamless construction/renovation processes for quick, simple, and efficient workflows (WP5).

Objective 6: Demonstrate innovative on-site energy generation and storage for renewable, local, and clean energy supply (WP6).

Objective 7: Demonstrate smart and flexible operation of buildings and energy systems for secure, user-oriented, and cost-efficient energy performance (WP7).

Objective 8: Monitor and validate the ARV solutions through secure and continuous measurements and evaluations of the demonstration activities (WP8).

Objective 9: Facilitate speedy scale up of ARV innovations by addressing key policy incentives and regulations, and creating innovative and effective financing mechanisms, and business models (WP9).

Objective 10: Communicate and disseminate activities carried out in ARV and engage stakeholders and accelerate the exploitation of the ARV solutions (WP9, WP10).

Table 1.1 Overview of target values for new and renovated buildings in ARV CPCCs**.**

Assessment criteria	New construction	Renovated buildings
Energy	**At least 50% reduction in energy needs** compared to current country building code. **Positive energy** level based on primary energy	**At least 50% reduction in energy needs** compared to pre-renovation levels. At least **nZEB** standard.
IEQ	High levels of indoor environment quality according to EU norms.	**At least 30% improvement** compared to pre-retrofitting levels according to EN 16798-1:2019
Noise and dust levels	According to the EU health, safety, and environment standards.	**At least 30 % reduction** in occupant disruption during retrofitting compared to local current practice
Embodied emissions	**At least 50% reduction** compared to local current practice	
Construction/retrofitting time	**At least 30% reduction** compared to local current practice	
Life Cycle Costs	**At least 20% reduction** for the community compared to local current practice	
Construction/retrofitting costs	**At least 30% reduction** compared to local current practice	

Definition of Climate Positive Circular Communities (CPCC)

The working definition of CPCCs is as follows, but will be further refined based on lessons learnt from the ARV project and through interaction with other H2020 projects and EU policy initiatives.

A CPCC is aligned with the concepts of *Positive Energy District (PED)* as described in the SET Plan Action WG 3.2[9] and working groups within the IEA[10], the definition of *Sustainable Plus Energy Neighbourhoods (SPEN)* as defined by the synikia.eu project[11], the definition of *Zero Emission Neighbourhoods (ZEN)*[12] as defined by the research centre on Zero Emission Neighbourhoods in Smart Cities (www.fmezen.no), and the EU circular economy principles. Like in PEDs, **the CPCC concept focuses strongly on the interaction and integration between the buildings, the users, and the regional energy, mobility and ICT systems**. However, CPCCs go beyond that by also including **socio-environmental aspects and highlighting circularity as a key aspect**. A CPCC can be an urban area, a city district, and consists of several interconnected buildings with associated infrastructure like grids and technologies for generation, storage, and exchange of electricity and heat.

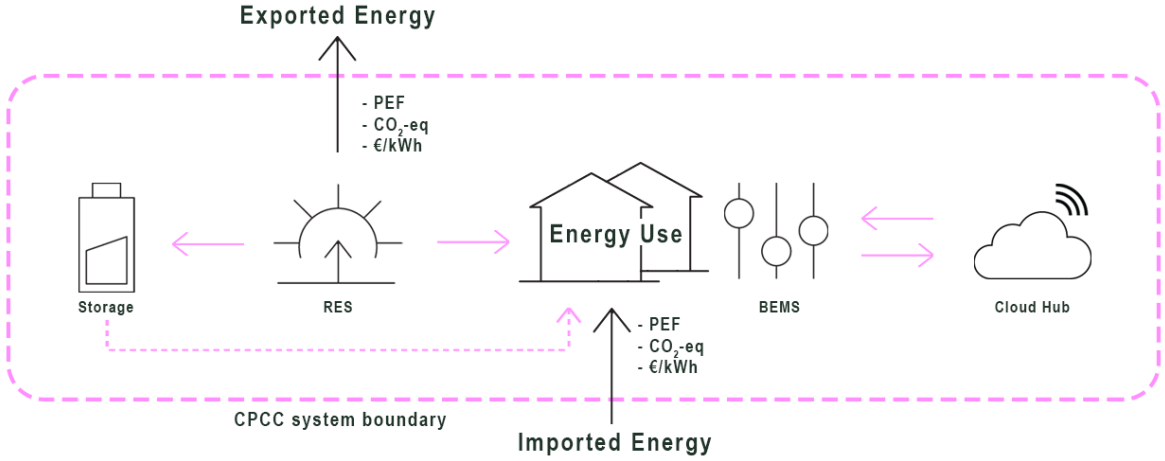


Figure 1.5 Illustration showing the main elements of a CPCC (storage, energy generation, energy use, energy management), and the energy flows within and in/out of the CPCC, managed by the ARV digital cloud hub.

A CPCC focuses on three core topics, (1) **Energy and Emissions**, (2) **Circularity**, and (3) **Socio-environmental** issues as shown in Table 1.2.

Table 1.2 Working definition of CPCCs with main topics and related goals and KPIs. The topics and KPIs along with target values are further described in Section 2.1

Topic	No.	Description	KPIs
Energy and Emissions	1.1	A CPCC has annual **net zero energy and GHG emission balance,** working towards an annual local surplus of renewable energy production.	Imported, exported and generated energy in kWh/a and kWh/m²/a. GHG emissions from imported energy and avoided GHG emissions from renewable energy generation and export in $kgCO_{2e}/m^2/a$ and tCO_{2e}/a
	1.2	The **system boundary** for calculating the import/export balance of a CPCC is determined by the buildings and energy infrastructure that are connected through a common hub that manages and controls the overall energy performance.	Total floor area and site area in m²
	1.3	For calculating the energy and emission balances, all building operational **EPBD energy uses** are considered as well as **integration with associated electromobility.**	Energy use per type and energy carrier (EC) in kWh/a and kWh/m²/a. Greenhouse gas emissions in tCO_{2e}/a and $kgCO_{2e}/m^2/a$. Primary Energy Factors (PEF) per energy carrier
	1.4	A CPCC is **embedded within an urban and a regional grid** to ensure optimal use of locally produced renewable energy, **flexibility, consumption management, storage capacities** and at the same time guaranteeing security of supply.	Net load profile, duration curve, peak load, peak export and import, and daily net load profile in kW; Utilisation factor in %. Share of self-consumption and self-generation in %.

[9]SET-Plan Working Group: SET-Plan ACTION n°3.2 Implementation Plan, June 2018.
[10] IEA EBC Annex 83 on PED - https://annex83.iea-ebc.org/about, the JPI Urban Europe Working group on PED - https://jpi-urbaneurope.eu/ped/, and the COST Action 19126 on PED.
[11]Salom and Tamm (2020): syn.ikia deliverable 3.1 Methodology framework for plus energy buildings and neighbourhoods, 30.09.2020, synikia.eu.
[12] Wiik et al. (2018): Zero Emission Neighbourhoods in Smart Cities. Definition, key performance indicators and assessment criteria: Version 1.0. Bilingual version, ZEN Report No. 7, NTNU/SINTEF, Norway.

	1.5	A CPCC **highly energy efficient** and will make use of **smart** home services and controls, smart building components, and smart but simple systems for user interaction/involvement.	Reduction in total energy and power needs (kWh/m^2 and W/m^2). Smart Readiness Indicator (SRI)[13]
Circularity	2.1	A CPCC **supports the transition to a circular economy** by implementing regenerative systems in which resource input and waste, emissions, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops.	Ref Level(s)[14] indicators (all)
	2.2	Building components are designed to be **long-lasting, easy to repair, reused, remanufactured, refurbished, and recycled.** Where possible, **local and second-hand materials** are used.	Ref Level(s) indicators 2.1, 2.2, 2.3 and 2.4
Socio-environmental	3.1	CPCCs **put people in focus**, i.e. their specific needs, interaction, and wellbeing, and will provide excellent indoor environmental conditions, spatial qualities and equal accessibility for persons with disabilities and senior citizens.	Ex-ante and ex-post evaluation of user satisfaction. Common definition of multiple criteria framework.
	3.2	A CPCC will **minimize the disruption for occupants** during the construction/renovation process, i.e. construction/renovation time, noise, dust, etc.	Time of construction/renovation compared to local current practice in %
	3.3	CPCCs organize frequent **awareness raising** activities linked to sustainable behaviour that foster social innovation and promote education as well as training for an environmentally friendly and respectful energy use.	Number and scope of activities per year
	3.4	With regard to the changing climate, CPCCs seek to provide **comfortable outdoor conditions** that invite people to stay outdoors and promote outdoor activities.	Solar access; shared space in % of site area; area of playgrounds and other places for activities in m² and % of site area

1.2 Relation to the work programme

The ARV project proposal addresses the specific challenges and scope of the Call as described in Tables 1.3 and 1.4 below.

Table 1.3 Relation to the challenges of the Call.

Challenges (text from Call)	How ARV addresses the challenges
Firstly, a transition in designing and constructing buildings to *reduce their embodied emissions and to increase the energy efficiency* of their operation; the same applies to retrofitting existing buildings to increase their efficiency.	ARV will employ methods of **integrated design and construction**, using **digital tools**, **life cycle analysis** to minimize the embodied energy and emissions. We will apply the principles of **circular economy** for the (re)design and (re)construction processes, focusing on local bio-based materials, reuse, recycling, durability, resiliency to achieve **at least 50% reduction in embodied emissions needs** compared to current country building standards (**WP4-5**).
Secondly, a transition to *energy-positive buildings* (producing electricity, covering their heating and cooling needs and contributing to the energy grid stability) with sustainable, renewable energy technologies.	All ARV demonstrations will contribute towards the goal of **net-positive energy balance** with optimized on-site RES and storage systems (**WP6**). The design and management of RES will be optimized (**WP7**) with respect to energy, GHG emissions, and life cycle costs.

Table 1.4 Relation to the scope of the Call

Scope (text from Call)	How ARV addresses the scope
Proposals are expected to deliver *at least two (residential and non-residential, new and/or retrofitted) large-scale, real-life demonstrations* of promising technology, process and social innovations, in different regions of Europe.	With **6 large-scale demos across Europe** covering new and retrofit residential, commercial, and institutional building types, ARV solutions will deploy and evaluate a range of building and energy system innovations as well as social innovations designed to radically reduce the cost and time of transitioning to CPCCs (**WP 2-9**).
Scalable design of green, positive energy neighbourhoods well embedded in the spatial, economic, technical, environmental, regulatory and social context of the demonstration sites.	ARV will develop a **framework** for efficient planning and implementation of CPCC and a **blueprint** for design, construction, operation, and use of CPCC in different contexts, cultures, climates, and markets in Europe (**WP 2-9**).
Energy and resource efficient, seamless industrial construction/renovation workflows from design to eventual offsite manufacturing, installation and post-construction monitoring	With a dedicated Work Package (**WP5**), ARV demos will ensure efficient workflows that **reduce the construction/renovation time and cost by at least 30%** The work includes zero-engineering during construction/renovation with 3D point cloud scanning and AI building typology identification.

[13] European Commission Directorate-General for Energy. Final Report on the Technical Support to the Development of a Smart Readiness Indicator for Buildings. Luxembourg: Publications Office of the European Union; 2019.
[14] European Commission: Level(s) – The European Framework for Sustainable Buildings

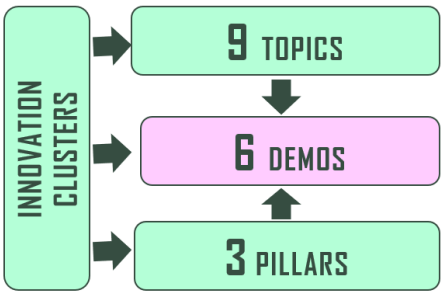
Recycling/reuse of construction materials (or industrial by-products) or reduction of the amount of materials and components used, in order to reduce the embodied energy of buildings	ARV will reduce waste with a "Just in Time" (JiT) design strategy (**WP4**) and enable future demountable parts using modular renovation/construction materials and circular design across all demos (**WP5**). **This will lead to at least 50% reduction in** embodied energy and life cycle greenhouse gas emissions compared to current practice.
Demonstrating high replicability, reduced maintenance costs and long-term performance, as well as socio-environmental performance (e.g. air quality/natural ventilation, natural lighting, etc.) and potential for adaptation, reuse or deconstruction in the future	All ARV demo projects will be systematically monitored and evaluated (**WP8**) for at least 1 year using a capturing ex-ante and ex-post cost and performance data across a range of indicators. Socio-environmental performance will be ensured by the **multiple benefits approach** of the project (**WP2, WP3 and WP8)**
Ensuring that proposed solutions do not influence negatively the fire and seismic safety of the buildings	All innovative solutions deployed within ARV will have been vetted and approved by the local authorities ensuring fire and seismic safety compliance prior to installation (**WP5**)
Minimizing disruption for building's occupants and the time spent on site	A central pillar of the ARV design framework includes protocols and standards for near-zero disruption of building occupants, in line with the Build4People partnership goal (**WP4, WP5**).
Delivering post-construction/renovation monitoring of both operational energy performance (minimizing design-built performance gap) and durability of the construction/renovation components.	Extensive post-construction monitoring and evaluation of all demos in ARV will ensure robust, comparable data sets across the project (**WP8**). The data will be made available to the ARV partners and EU communities through the Cloud Hub (**WP7**) and Data Warehouse (**WP8**). Lessons learned will be implemented in the Blueprint for CPPCs (**WP10**)
Digital and EGNSS-based methods of design and construction, smart monitoring and tracking of building and renovation processes (e.g. Building Information Modelling, digital twins and augmented reality, robotics, etc.)	A multitude of cutting-edge digital tools will be used in planning, designing and implementing the ARV solutions (**WP2-7**). ARV moves beyond the state-of-the-art in the **integration of the different tools including different stakeholders:** computer simulations, EGNSS, GIS, BIM, VR, digital logbooks, digital twins, 3D point cloud scanning, grey box models, AI, etc.
Innovative and more energy-efficient BIPV converting the building envelope into electricity-producing surfaces and aesthetic considerations.	ARV will integrate BIPV (**WP6**) in the building envelope that are architecturally pleasing (new Bauhaus) and easy to implement (**WP4-5**), such as a novel "Inside-Out" renovation method.
Renewable power generation and H&C systems (e.g. charging facilities) and heating-ventilation-air conditioning (HVAC) solutions.	ARV will demonstrate innovative on-site RES, including BIPV and efficient HVAC integrated with the building envelope and efficiently integrated with local daily (second life EV batteries + stationary batteries) and seasonal thermal storage and surrounding energy system (**WP4-7**).
HVAC solutions (e.g. reversible heat pumps with refrigerants that are not greenhouse gases, or less developed clean heating options such as hydrogen).	The ARV HVAC solutions will be designed using life cycle analysis to minimize their greenhouse gas emissions (**WP4-6**). Refrigerants with global warming potential will not be used.
Energy storage systems with bidirectional charging functionalities, that do not limit the use of living space (e.g. neighbourhood optimized storage including management systems for optimal integration, flexibility and interoperability with the grid).	ARV demos will deploy a range of storage systems for variable RES (**WP6**) including V2G/V2B and stationary batteries (1st gen and 2nd gen), low exergy on-site ground storage systems and novel seasonal thermal storage by utilizing urban tunnel infrastructures.
Highly energy-efficient building operation at reduced maintenance costs and long-term performance with the help of digital technologies to optimise energy generation, consumption, storage and flexibility at neighbourhood scale, as well as digital solutions to increase the usability, energy efficiency and secure operation of building systems and appliances, ensuring optimal comfort for users and a healthier living environment. Optimal dynamic matching of on-site renewable energy generation and building or neighbourhood consumption; integrated demand-response, considering also non-energy benefits (e.g. occupant security; indoor/outdoor air quality, etc.)	ARV demos will deploy and evaluate energy system integration, including dynamic feed-in tariffs, hedonic pricing models, and AI-enabled load balancing across energy carriers (electricity, heating, cooling, liquid fuels, gas). ARV will deploy the centralized European digitalization hub (cloud level) connected to sub-hubs (fog level) at the individual demo sites, which again are connected to building and occupant systems or apps (edge level). By using a state-of-the-art data lake principle, the ARV cloud hub will provide storage for monitoring data and allow efficient use of data on various scales. It will also provide user interfaces for occupants, operators, building owners, and other stakeholders. This will enable exchange of data between people, buildings and energy systems to unlock the flexibility potential and ensure occupant comfort, safety, and minimize pollution. Models will be adapted for different climates and context across Europe through a Handbook for Smart Communities (**WP7**).
Smart home services, advanced automated controls, i.e., smart meters, smart water control, smart EV charging, smart elevators, smart security, etc.; based on inclusive design, understanding the occupants preferred usage of the building and harmonising the building - occupants interaction	ARV demos will apply smart home system controls for increased energy efficiency and occupant comfort and interaction, including heating, ventilation, lighting, electrical appliances, access control, and burglar alarms (**WP7**). The systems will be design through **co-creation** between end-users and professionals, ensuring that occupants needs are addressed (**WP3, 4, 5**) and evaluated by post-occupancy surveys (**WP8**), validating 30% improvement in user's satisfaction for the renovated buildings.
Integration between building energy management systems/building automation control systems, renewable electricity/energy generation, storage, urban service facilities and the grid.	Integration across building features is addressed through ARV integrated approach (**WPs 3, 4, 5, 6, 7, 8**)
Potential for local flexibility to be aggregated and bundled; possibility to trade and commoditise energy	ARV demos will design and apply novel scalable Local Energy and Flexibility Markets (LEFMs) to trade RES and flexibility across energy systems (electricity and district heating) along with new business models,

flexibility creating new services and revenue streams for building owners/tenants	financial mechanisms such as green digital bonds, and hedonic pricing mechanisms for CPCCs, and make them accessible to different stakeholders around Europe (real-estate, energy companies, financial institutions, policy makers) (**WP7, WP9, WP10**).
Citizen awareness raising activities linked to green neighbourhood living labs (led by 'green schools'), to facilitate social innovation, promote education and training for sustainability, conducive to competences and positive behaviour/good habits for a resource efficient and environmentally respectful energy use.	ARV demos will host living labs (**WP3**) where citizens and occupants are engaged in the transformation process of the ARV communities. Key activities include creating and hosting exhibition spaces for energy education, coaching of tenants in energy use through Home Energy Management Systems, and appointing "Green Ambassadors" among the tenants.
Coordination on standards and regulatory aspects to ensure operational efficiency of buildings and HVAC technologies also addressing the design-built performance gap.	ARV solutions will address the design-built performance gap by systematically monitoring and evaluation of the planning, design, construction, operation and use of the CPCC and crating systems for feed-back throughout the whole value chain. This will result in recommendations for improved tools and processes and give input to policy measures and revised codes and regulations (**WP2, WP8, WP9, WP10**).

1.3 Concept and methodology

(a) Concept

As described in Section 1.1 (and illustrated in Figure 1.4) the concept of ARV relies on the combination of **3 conceptual pillars** (integration, circularity and simplicity), **6 large scale demonstration projects** and **9 thematic focus areas** (as shown in the figure below), supported by **innovation clusters** from the whole value chain of CPCCs (ref Figure 2.10 in Section 2.2)



In this way, ARV will **boost the building renovation rate (scale & depth) and increase the overall energy efficiency, energy flexibility, social sustainability, and climate-resiliency of neighbourhoods in a holistic way**.

The ARV partners' experiences from other projects (see Table 1.5) have shown that real-life demonstration cases are effective arenas to successfully integrate solutions. Inter-disciplinary innovations are realised when end-users, researchers and industry work together as active participants in the entire process, from the definition, design, construction, to the final evaluation[15,16]. Close cooperation and the exchange of knowledge between the project stakeholders will create innovation hubs for co-creation in the demo cases, serving as lighthouses for replication in the respective cities, countries, and the rest of Europe. This is ensured by the different climatic and geographical contexts of the demo cases, as well as the active engagement of **European wide innovation clusters**, as described in Section 2.2.

Thus, in short, the concept of the ARV is to simplify the adoption of increased energy performance of buildings to ensure wide-spread implementation with outstanding socio-economic performance. The ARV project aims to improve the uptake of already feasible and promising solutions (from TRL 5/6) towards their simplified integration in building and renovation projects (achieving TRL 7/8**). The demonstration sites will thus become living examples of the how the ARV solutions are seamlessly, affordably, and successfully adopted in Climate Positive Circular Communities.**

In this, ARV aligns and responds to a number of EU directives and policies calling for decarbonisation, sustainability, affordability, resource efficiency, and resilience in the built environment and beyond, including: 1) Revised Energy Performance of Buildings Directive EPBD[17]; 2) the Renovation Wave[18]; 3) SET-PLAN Action 3.2 Implementation

[15] Meistad, T. (2015). Sustainable building – From role model projects to industrial transformation, Doctoral Thesis, Norwegian University of Science and Technology, Trondheim, Norway.
[16] Berker and Bahrati (2012). Energy and Buildings Research: Challenges from the New Production of Knowledge, *Building Research & Information*, Vol. 40, pp. 473-80.
[17] Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (2010)
[18] European Commission (2020): A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives. Brussels, Belgium.

Plan[19]; 4) Clean Energy for All Europeans[20]; 5) the Paris Agreement[21]; 6) Clean Energy Transition – Technologies and Innovations[22]; and UN Sustainable Development Goals[23] SDG7, 8, 9, 11, 12, 13, and 17. Furthermore, ARV fosters civic engagement and supports occupants in CPCCs to take an active role in shaping their communities (WP3). The ARV demonstration projects will be organized to allow efficient exchange between occupants/tenants and different stakeholders in the project. With digital platforms and frequent workshops, ARV will seek the active involvement, ideas, and feedback of the citizens in CPCCs. In line with the European Commission's Digital Strategy[24,25], ARV will integrate a smart urban infrastructure and easy-to-use digital solutions to improve and simplify people's daily lives while at the same time valuing privacy and guaranteeing excellent cybersecurity (WP6-7).

Relevant ongoing research projects

The ARV project includes actions to facilitate cooperation with other projects, and the project will build upon and interact with many projects where the ARV partners are participating, including national, European, and international projects. An overview of the projects and their relevance to ARV is presented in the table below.

Table 1.5 Overview of relevant national-, EU- and international projects where ARV partners are involved.

ARV partner	Relevant projects on national-, European- and international level	Relevance to ARV and joint activities/synergies
NTNU (lead) *SINTEF, DTU, IREC, HE, ENFOR*	**syn.ikia:** Sustainable Plus Energy Neighbourhoods (H2020)	Demonstration of four sustainable plus energy neighbourhoods, energy efficiency, flexibility, integration of RES, innovation management, business models, social sustainability, communication and stakeholder outreach.
NTNU (lead) *SINTEF*	**FME ZEN:** Research Centre on Zero Emission Neighbourhoods in Smart Cities (Research Council Norway & Industry)	Demonstration of 9 real-life large-scale pilot projects in different locations in Norway, flexible components, RES, dissemination, innovation management, business models
NTNU (lead)	**+CityxChange:**Smart Cities and CommunitiesH2020	Innovation, demonstration, IT, RES, knowledge exchange
NTNU (lead)	**ECHOES:** Energy CHOices supporting the Energy union and the Set-plan (H2020)	Synergies in consumer/prosumer energy behaviours and SET-plan
NTNU	**INVADE:** INtegrated EVs and batteries to empower mobile, Distributed and centralised Energy storage in the distribution grid (H2020)	Technology development Cloud-based flexibility management system to increase share of RES
NTNU, DTU	**openENTRANCE**: open ENergy TRansition ANalyses for a low-Carbon Economy (H2020)	Analysis of the impact of multiple future paths and policies, and the development of stakeholder dialogue
NTNU (lead)	**SMARTEES:** Socio-economic perspectives in realizing the Energy Union (H2020)	Social innovation and socio-economic perspectives
NTNU (lead)	**FME NTRANS:** Norwegian Energy Transition Studies (Research Council Norway & Industry)	Dissemination and citizen awareness
NTNU (lead)	**BEYOND:** Blockchain based electricity trading for the integration of national and decentralized local markets (H2020)	Energy trading platforms and concepts
NTNU	**Solar Energy in Urban Planning:**IEA SHC Task51	Solar technologies; Planning strategies
NTNU	**IEA Annex 63:** Implementation of energy strategies in communities	Planning strategies; Stakeholder engagement
NTNU (lead)	**EIP SCC:** "From Planning to Implementation", including Smart City Guidance Package	Smart city solutions, dissemination
NTNU (lead) *SINTEF, DTU, CTU, IREC, EURAC*	**EERA JP Smart Cities:** Developing action plans for smart cities	Contribute to SET-Plan of developing 100 Smart Positive Energy Districts
NTNU SINTEF, EURAC	**IEA EBC Annex 83:** Positive Energy Districts.	Framework and definition, Demo Projects
NTNU (lead)	**ChiNoZEN Project:** A collaborative project between Norway and China on low-carbon building and neighbourhoods	Technology development. Demonstration of combined cooling, heating and clean power generation for low-carbon neighbourhoods/buildings. Energy flexibility.
NTNU	**Iclima:** Open innovation Test Beds for materials and building envelopes (H2020)	Innovative materials and building envelopes. Testing and demonstration.
SINTEF (lead)	**FlexBuild:** The value of end-use flexibility in the future Norwegian energy system.	Energy flexibility in buildings

[19] European Commission Joint Research Centre (2018): SET-Plan ACTION no 3.2 Implementation Plan. Europe to become a global role model in integrated, innovative solutions for the planning, deployment, and replication of Positive Energy Districts. European Commission. Brussels, Belgium.
[20] European Commission Directorate-General for Energy (2019): Clean energy for all Europeans. Luxembourg: Publications Office of the European Union.
[21] United Nations Framework Convention on Climate Change (2015): Adoption of the Paris Agreement. Proposal by the President. Paris, France.
[22] International Energy Agency (IEA). Perspectives for the Clean Energy Transition: The Critical Role of Buildings. France; 2019.
[23] https://sdgs.un.org/goals
[24] https://ec.europa.eu/digital-single-market/en/content/european-digital-strategy
[25] European Commission (2020): Shaping Europe's Digital Future. Luxembourg: Publications Office of the European Union.

NTNU, DTU		
DTU (lead)	**SmartNet**: Smart TSO-DSO interaction schemes, market architectures and ICT Solutions (H2020)	Synergies in demand side management and distributed generation.
DTU (lead)	**FLEXCoop:** Demand response for energy cooperatives democratising energy (H2020)	Demand response tools and novel business models.
DTU (lead) *ENFOR, PZ, DAN*	**CITIES**: Centre for IT – Intelligent Energy System in Cities (Danish Strategic Research Council)	Forecasting and optimisation techniques for wind, solar energy, and district heating
IREC (lead)	**INCITE:** Innovative controls for renewable source integration into smart energy systems (H2020)	Energy flexibility in buildings
IREC (lead)	**SABINA**: SmArt BI-directional multi eNergy gAteway (H2020)	Energy flexibility in buildings and districts
IREC	**GrowSmarter:** transforming cities for a smart, sustainable Europe (H2020)	Smart city solutions
IREC	**EFFICIENT BUILDINGS:** Interreg MEDFull Horizontal project.	MED hub for energy efficiency innovative and shared solutions in buildings
IREC	**TRI-HP**: Trigeneration heat pump systems with natural refrigerants and renewable sources (H2020)	Synergies in advanced controls development and use of heat pumps with natural refrigerants in apartment buildings
IREC	**WEDISTRICT:** Smart and local reneWable Energy DISTRICT heating and cooling solutions for sustainable living (H2020)	Integration of renewables and energy management in DHC networks
SINTEF (lead)	**DATABYGG:** Smart prediction of energy use in buildings (Norwegian Research Council)	Demand response energy use. Smart prediction models
SINTEF (lead)	**OPPTRE:** Energy upgrading wooden dwellings to nZEB level **(**Norwegian Research Council)	Concepts for energy upgrading of single-family housing, building envelope, architectural attractiveness
SINTEF	**REZBUILD:** Innovative refurbishment ecosystem for Near Zero Energy building in Europe (H2020)	Refurbishment decision making platform through advanced technologies for near Zero Energy Building Renovation
SINTEF (lead)	**KLIMA 2050:** Risk reduction through climate adaptation of buildings and infrastructure (Norwegian Research Council & partners)	Reduce the societal risks associated with climate change: enhanced precipitation and flood water exposure within the built environment.
ACE	**ABRACADABRA:** Assistant Building's addition to Retrofit, Adopt, Cure and Develop the Actual Buildings up to zeRO energy, Activating a market for deep renovation (H2020)	Integration of Renewable Energy Sources systems with new volume additions or new buildings' construction to go beyond the minimum energy performance and aim at achieving Nearly Zero Energy Buildings (nZEBs)
ACE	**RenoZEB:** Accelerating nearly zero energy renovation for buildings and neighbourhoods(H2020)	Plug and play facades for deep nZEB renovation
ACE,Housing Europe	**Triple A-Reno:** Attractive, Acceptable and Affordable deep renovation by a consumer orientated and performance evidence-based approach (H2020)	Occupant focused through new consumer and end-user centred business models and decision support tools, using evidence-based performances that facilitate decision-making
ACE	**Cultural-E:** Climate and culture-based design and market valuable technology solutions for PEB (H2020)	Design tools, smart technologies, methodologies and policy recommendations for Plus Energy Buildings
ACE,Housing Europe	**Drive0: D**ecarbonization of the EU building stock by enhancing a consumer centred renovation (H2020)	Circular building renovation with focus on end-users.
ACE	**DigiPLACE:** Towards a European Digital Platform for Construction (H2020)	A common European digital construction ecosystem of digital services supporting innovation, commerce, etc.
PZ (lead) *SAB*	**SmartEnCity:** Energy retrofitting measures in three housing associations in Sønderborg (H2020)	Design, implementation, and monitoring of integrated renewable energy systems in buildings.
DTU (lead)	**FED:** Flexible Energy Denmark (Innovation Fund Denmark)	Flexibility of buildings and districts, and link to the local energy communitive.
DTU	**ebalanceplus:** Smart Energy Flexibility for Distribution Grids (H2020)	Integration of renewable energy in local grid; markets and business models, economic and social aspects.
DTU	**SCA:** Smart City Accelerator (EU Interreg)	Optimize the energy efficiency and acceptance of smart energy solutions in smart cities
DTU, *DAN*	**HEAT 4.0** (Innovation Fund Denmark)	Digital solutions for district heating and local thermal grids
DTU	**REBUS:** Renovating Buildings Sustainably (Innovation Fund and Landowners Investment Fund)	Societal partnership for sustainable renovation. Strengthening the innovation force in renovation.
EURAC	**STARDUST:** Holistic and Integrated Urban Model for Smart Cities (H2020)	Low carbon, efficient, intelligent, and citizen-oriented cities with green solutions and innovative business models.
EURAC	**VARCITIES:** Visionary Nature Based Actions for Health, Wellbeing & Resilience in Cities (H2020)	Cities with the human community at the centre: Innovative ideas, sustainable models, and shared public spaces to improve health and well-being in diverse climatic conditions.
EURAC	**SINFONIA:** Smart INitiative of cities Fully cOmmitted to iNvest In Advanced large-scaled energy solutions (FP7)	Large-scale, integrated, and scalable energy solutions in mid-sized European cities: energy savings, RES, retrofit, electricity grid optimisation, and district heating and cooling
EURAC	**CA19126:** Positive Energy Districts (PEDs) European Network (COST Action)	Harmonising, sharing, and disseminating knowledge/breakthroughs on PEDs
EURAC, NTNU	**IEA SHC Task 63** – Solar Neighborhood Planning	Design of communities based on solar energy utilization

BOEX, HU, UU, BOS GROEP	**IRIS:** Co-creating smart and sustainable cities (H2020)	Applied innovation, planning with citizen participation, energy efficiency, intelligent ICT, business models.
BOEX, HU, UU, BOS GROEP	**TKI:** Henriëttedreef District of Overvecht in Utrecht (National innovation project)	Modular renovation system
HU	**Actions to Mitigate** Energy Poverty in the Private Rented Sector (H2020)	Address energy poverty in the private rented sector
HU, UU	**Smart Solar Charging** (Over EFRO)	Locally generated solar energy is stored in shared cars via a smart and dynamic system (V2G)
HU	**Energy Transition** in the Existing Building Stock	Affordable and user-friendly renovation concepts
HU	**Future Factory** (MMIP3 & 4)	Modules to make row housing sustainable on a large scale.
UU	**PVP4Grid**: PV-Prosumers4Grid (H2020)	Better power market integration of PV and prosumers
UU	**PARENT**: PARticipatory platform for sustainable ENergy management (ERA-NET)	Energy savings with a software-based solution that is extensible, reusable, socially acceptable, and marketable.
UU	**CESEPS:** Co-Evolution of Smart Energy Products and Services (ERA-NET)	Energy behaviour, local energy trading, demand side management, local RES, e-mobility, and forecasting
SAB	**HAPPI**: Housing Association's Energy Efficiency Process Planning and Investments (H2020)	Energy refurbishment of homes: Best technologies and methods to be used, and smart funding of major renovations.
PALMA (lead)	**EDUSI:** Litoral de Ponent - Integrated Sustainable Urban Development Strategies (FEDER)	Lasting and long-term improvement of the social, economic, and environmental conditions of an urban area.
PALMA	**INCIRCLE** European Regional Development Fund	Waste management
PALMA	**REGENERATE:** Unlocking the Market for Eco-Sustainable Renovation on Balearic Islands (H2020)	Business models and renovation financing
DAN	**REWARDHeat:** Smart networks, integrating renewable and waste energy sources (H2020)	Development and demonstration of ambient loop district heating substation for multi flat building.
DAN	**RE-INVEST:** Renewable Energy Investment Strategies (Innovation Fund Denmark)	Innovative research-based endeavour towards a 100% renewable energy system in Europe
HE	**HEART:** Holistic Energy and Architectural Retrofit Toolkit (H2020)	Multifunctional toolkit integrating components to transform existing buildings into energy efficient smart buildings.
HE	**HOUSEFUL:** Innovative circular solutions and services for the housing sector (H2020)	11 circular solutions co-created by stakeholders in current housing value chain.
CENTER DENMARK (lead), *DTU, DAN*	**Center Denmark:** Intelligent Energy (European Commission and Innovation Fund Denmark)	To unify and embed results from digitalization of energy systems, data intelligence for disposal for commercial use
DTTN	**Build-in-wood** (H2020)	Drastically increasing the proportion of timber construction

(b) Methodology

The main methodology of the ARV project will be to **co-create, implement, operate and evaluate 6 urban regeneraton projects** to demonstrate how promising innovations towards Climate Positive Circular Communities (CPCCs) can become wide-spread.

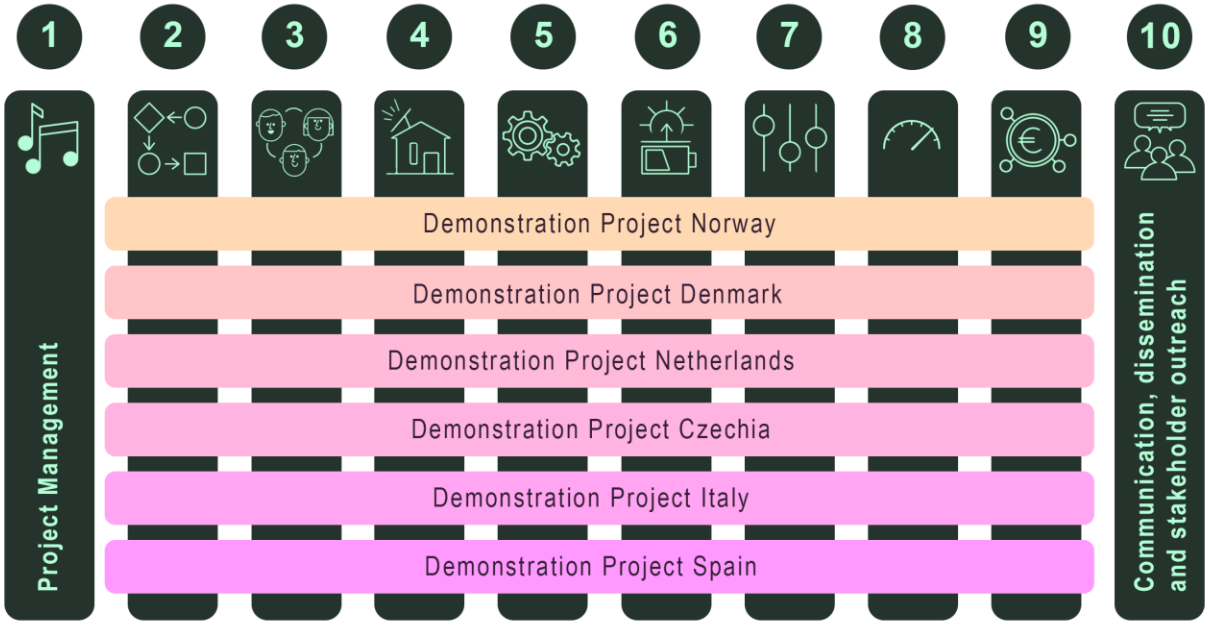


Figure 1.6 The integration of the thematic work packages (1-10) and the ARV demo projects.

The demonstration projects have been carefully selected to adress the main thematic areas of the call, and will be explored in a matrix structure that integrates the thematic areas (Work Packages) with the implementation of the regeneration projects (Demos), as shown in Figure 1.6. This matrix structure enhances knowledge exchange and co-creation between thematic expertise (in the WP) and the practical implementaiton (in the demo projects). As mentioned in the introduction, each of the demos are chosen to be 'leading stars' in one or more of the thematic focus areas. **The matrix structure ensures replication and scaling by trialing similar demo elements in different planning, socio-economics, financial, and social contexts.** It avoids each demo and thematic work areas being isolated silos, and ensures that the relative strenghts and weaknesses of the different partners are covered in a coherent and complementary fashion. Regional, cultural, and lingusitic homophily is a significant driver of knowledge transfer and has been explicitly included in chossing the demonstration sites to ensure a higher degree of scalability and replication.

The following is a summary of the composition and outstanding performance of the ARV demo projects:

- They are part of **urban transformation and regeneration projects** representative for different **climates and contexts** in Europe, spanning from north to south, and east to west.
- They include **innovation clusters** and stakeholders representing **the whole value chain needed to achieve a transformation to CPCC**, including municipalities, developers, owners, urban planners, architects, engineers, contractors, suppliers of materials, components and services, energy companies, facilities managers, occupants, NGOs, and research/educational institutes.
- They have a high emphasis on **efficient renovation processes**, including a large portion of **social housing to be upgraded to NZEB standard or better**. Moreover, the demonstration projects also include the construction of new buildings that demonstrates the ambition of **positive energy performance.**
- They have **high ambitions** with respect to energy performance, energy/power flexibility, utilization of RES, minimisation of greenhouse gas emissions, low investment and operational costs, circular economy, high architectural qualities, while achieving high levels of safety, security, and well-being of the occupants and users.
- They include **substantial innovations** that addresses all the focus areas in the call (ref Table 1.7). Moreover, each of the demonstration projects have particularly outstanding innovations in at least one of the 9 thematic focus areas: The Spanish Demo has outstanding innovations in focus areas no. 2) Framework and tools for effective implementation of CPCCs and 3) Community engagement. The Norwegian demo has outstanding innovations in focus area 4) Sustainable building (re)design. The Dutch demo has outstanding innovations in thematic focus area no. 5) Resource efficient (re)construction and renovation workflows. The Italian and the Czechian demos have outstanding innovations in focus area no. 6) Integration of renewable and storage systems. The Danish demo has outstanding innovations in focus area 7) Efficient operation and flexibility. Finally, they all contribute to the integrated approaches in focus areas 8) Measurement and evaluation and 9) Business models, financial instruments, policy and exploitation.
- They host **Living Labs** where citizens and occupants are engaged in the transformation process of the ARV communities. They aim to become smarter by addressing the citizens, businesses, workforce/commuters, entrepreneurs, academia, public authorities, and non-profit organizations and actively engage in bottom-up co-creation to identify, develop and implement suitable solutions.

In sum, the ARV demos will deliver innovations with a **large potential for replication and scaling up** throughout Europe.

The **main methods and tools** and the **workflow** to be applied in the project, are as follows:

A **number of different methods and tools** will be used, including the following:
Innovation management (WP1), inter-disciplinary workshops and co-creation (all WPs), demo site visits (all WPs), living labs (WP3,10), integrated design (WP4-7), AR/VR (WP2,3), EGNSS/GIS/BIM/digital twins (WP2, 4-6), digital logbooks and material databases (WP4,5,8), parametric design (WP4,5), LCA (WP4,5,8), Industry 4.0/Zero engineering/file-to-factory and lean low carbon construction (WP5), multiple benefit analysis (WP2,8), computer simulation of energy and indoor/outdoor environment (WP2, 4, 5, 6), grey box models (WP7), forecasting (WP7), digital cloud hub (WP7), APIs (WP8), Blockchain observatory (WP9), STO (WP9), social media (WP10), games

(WP10), web-platforms (WP10), etc. The application of the methods and tools is further described in the work plan (Section 3).

Workflow: The ten work packages will be regularly interacting with each other and the demos to produce integrated, circular, and simple solutions for CPCCs. WP1 focuses on project and innovation management and coordination. WP2 will be dedicated to establishing an easy-to-use planning framework for the CPCC implementation. Engaging and interacting with occupants will be the focus of WP3, which will connect especially with planning (WP2), design (WP4), execution (WP5), and smart energy operation (WP7) of the CPCCs. To demonstrate efficient building design and construction workflows, ARV will have dedicated WPs for sustainable building (re)design (WP4) and resource efficient manufacturing and construction processes (WP5). WP 6 focuses on the integration of renewable on-site energy generation and storage on the neighbourhood level, with links to EV charging. As the community comes into operation, smart monitoring (WP8) will connect people, buildings and energy systems to enable smart and cost-efficient operation and use with special focus on flexibility and energy exchange (WP7). To trigger fast and efficient replication of the CPCC solutions, WP9 will focus on financial mechanisms, business models, policy and exploitation. Finally, WP10 focuses on stakeholder outreach and dissemination, with the construction of an e-marketplace for the ARV solutions and the production of a blueprint for planning, (re)design, (re)construction, operation and use of CPCCs.

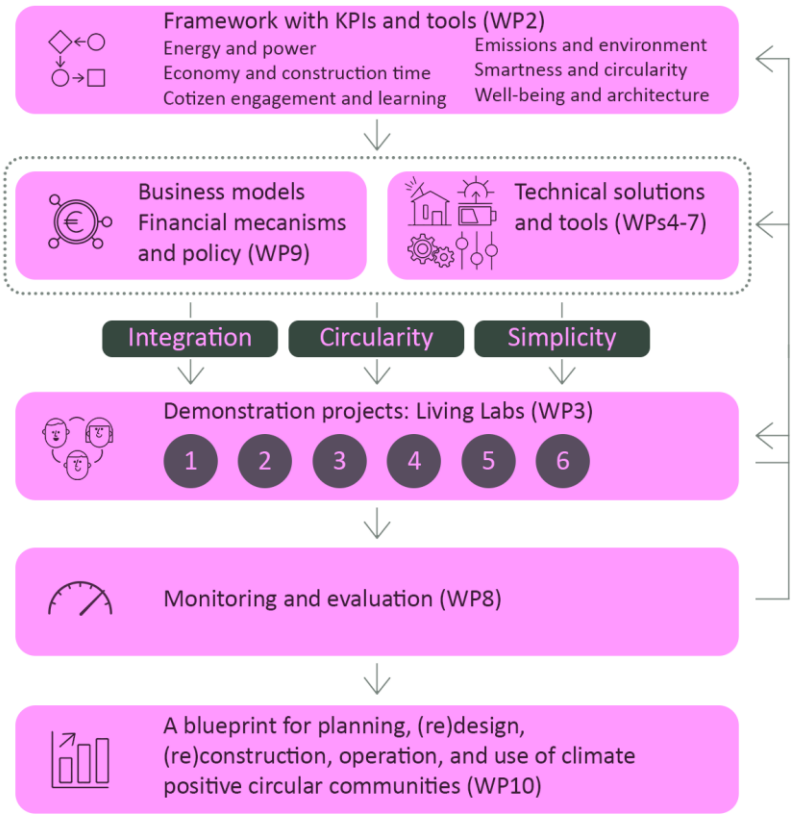


Figure 1.7 Illustration of the workflow in ARV.

Gender Analysis

The integration of gender and diversity considerations in the project is addressed using a framework for **stakeholder engagement** (e.g. by including best practices in leveraging inclusive engagement), and guidance for **Open Data Management** (e.g. by including sex-segregated data whenever possible and identifying gender bias in available data). Integrating gender considerations at all stages of the project is therefore important for achieving optimal performance, as well as successful market uptake and replication.

The deployment of Circular Climate Positive Communities will play a key role in shaping the solutions to be implemented and understanding their impact. Their success depends on the ability of local partners to involve citizens to overcome popular perceptions as something relevant only to technical experts and engineers. To this end, gender and diversity considerations will be included in all stages of implementation, from shaping the innovations to monitoring the effect of the demonstration projects. Special focus will be on ensuring **fair and diverse representation** in all participatory processes implemented in the framework of the ARV project.

With a focus on the development of market uptake and replication strategies, gender considerations will be included in the start-up promotion activities. Cross-project interaction, communication and dissemination will to the largest extent possible use **gender-impartial language and settings** to encourage gender mainstreaming, i.e. all genders can participate in, benefit from, and influence the ARV activities. Adapting ARV solutions to different geographic and cultural contexts will include awareness raising activities, emphasizing the importance of **inclusive integrated energy and sustainable planning**.

ARV will pay attention to **language and visual representation** used in all project materials, in order to help remove unconscious gender assumptions and create an appealing and empowering vision of an inclusive neighbourhood model striving for gender balance in project-related events and other representative functions. If necessary, additional expertise will be mobilised using existing networks, e.g. via the European Centre for Women and Technology and other resources.

The ARV project will have a female Project Coordinator, 5 out of 10 WP leaders are women, and 50% of the staff registered in the Participant portal are female. The General Assembly and Executive Board will also have a balanced gender representation. In addition, the Project Coordinator is committed to ensure a gender balance in project and administrative positions by offering dedicated support programs (http://www.ntnu.edu/genderbalance).

1.4 Ambition

1.4.1 State-of-the-art and ARV ambitions beyond state-of-the-art

Table 1.6 shows an overview of the current state-of-the-art and ARVs ambitions beyond state-of-the-art, organized to address the topics of the call and the related innovations in ARV. A further description of the ARV innovations is given in Section 3 with respect to the work plan, and in Section 1.4.2 with respect to the ARV demos.

Table 1.6 Overview of the state-of-the-art and ARV ambitions beyond state-of-the-art.

Topic	State-of-the-Art	ARVs ambition beyond State-of-the-Art
Zero and Plus Energy Buildings	Some net zero energy buildings and even plus energy buildings have been realized. Also, some net zero emission buildings have been realized. However, they are far from mainstream, and suffer from high investment costs, and complicated operation and use, resulting in higher energy use and/or lower environmental quality than predicted.	ARV goes beyond the state-of-the-art by taking a life cycle perspective on both energy and emissions, as well as a strong focus on people's well-being and awareness, cost-effectiveness, and architectural qualities. An ARV CPCC is designed to avoid sub-optimizing and overcoming the performance gap.
Topic	**State-of-the-Art**	**ARVs ambition beyond State-of-the-Art**
Planning and design	There is a wide range of tools available for performance prediction of energy and indoor environment. A few tools are designed to model neighbourhoods and districts. However, the tools are complicated and time-consuming to use, and do not address all performance indicators of a CPPC in an integrated way. There is also a lack of tools that give reliable performance predictions of life cycle emissions in the early planning phase, and tools that can model flexibility throughout the life cycle.	ARV will develop and demonstrate a framework with tools for effective planning and evaluation of CPCC. This will build on existing tools for ZEBs and PEDs, but will be expanded to take into account **circularity and flexibility topics and the human perspective**. Life cycle costs and trade-offs between different measures (such as investing in building renovations vs new energy systems) will be addressed. It will be designed to be integrated with digital tools such as EGNSS, GIS, BIM, to better assess all qualities of the neighbourhood and make it comprehensible for all stakeholders including occupants.
Topic	**State-of-the-Art**	**ARVs ambition beyond State-of-the-Art**
Construction/ renovation workflows	Europe's building stock is unique and heterogeneous, but it is largely old and inefficient, and changes are slow. Across the EU, deep renovations that reduce energy use significantly are carried out only in 0.2% of the building stock per year. The reasons are manifold, high investment costs, lack of specialized workforce, disruptions and nuisances to the occupants, etc. A few deep energy renovation projects have been carried out, but most do not meet all criteria needed to become widespread (costs, disruption, architectural quality).	ARV will develop, demonstrate and validate new workflows in an **industry 4.0 approach** for resource efficient manufacturing and construction for deep energy renovations. It applies advanced tools such as **digital data harvesting, automation, and zero-engineering** techniques. This will result in **prefabricated elements** that include energy efficient services and low carbon building materials that can be seamlessly installed without disruptions and nuisance for occupants. The ARV elements will be cost-efficient, reduce waste and transport, and ensure high architectural quality. The process is replicable to a wide range of buildings throughout Europe.
Topic	**State-of-the-Art**	**ARVs ambition beyond State-of-the-Art**
Operation and use	Efficient operation and use of buildings require technical solutions that are seamlessly integrated, and that addresses occupant behaviour and needs. Several studies show that ignoring the occupants result in the so-called design-built performance gap. At the same time, new digital technologies such as smart home systems and AI enabled EV charging offer opportunities for customized control and optimization of energy, costs and environmental performance while providing occupant comfort. In a plus energy neighbourhood perspective, there are added benefits to gained by load/generation forecasting, balancing, and energy flexibility management. These challenges require a multi-disciplinary and integrated approach to design and operation of buildings and neighbourhoods. The multiple benefits and strategies for unlocking all potentials remains to be fully understood and demonstrated.	ARV will engage and demonstrate solutions for **active citizen engagement** in the design, operation and use of CPCCs. **Living Labs** will be developed and tested in the demonstration projects to enhance engagement, awareness raising, and learning, **bridging the gap between the technical and social contexts**. Tools such as co-creation workshops, AR/VR, green ambassadors and change agents, energy and circularity coaching, and serious games, involving a wide range of stakeholders. A special focus will be put on young citizens (linked to schools) as future citizens and ambassadors of the CPCCs. Thee feedback and learning from the ARV demonstration projects will be used to provide replicable approaches. ARV will develop and demonstrate **digital, data-driven solutions and infrastructure to unlock the flexibility potential** of the CPCCs and optimize for self-consumption, minimizing CO_2-emissions and costs, without sacrificing safety or well-being of the citizens. This includes tailored Smart Readiness Indicators and Flexibility Functions for different types of buildings in CPCCs around Europe. ARV will also deliver a centralized data warehouse ensuring a common data framework for CPCCs.
Topic	**State-of-the-Art**	**ARVs ambition beyond State-of-the-Art**
Passive and bioclimatic building design	Passive building design / bioclimatic design have long traditions across Europe. Still, the potential of this powerful approach is not being fully harvested in current practice. This is despite the fact that modern passive design has an even higher potential, by using new knowledge of environmental issues such as	ARV will develop and demonstrate a new paradigm of '**integrated circular design** of CPCCs', by taking a **multi-disciplinary** approach to (re)design buildings with maximize energy efficiency, minimize life cycle greenhouse gas emission and costs, optimizing occupant well-being and ensure high architectural qualities. This will be accomplished by using

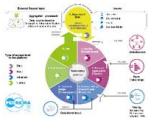
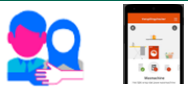
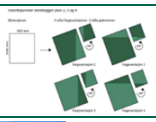
	greenhouse gas emissions and low carbon materials, as well as the use of modern digital tools. The reasons to this are primarily the time and resource limitations in the early design stages, and the interdisciplinary skills needed. Thus, an efficient and integrated design approach is needed from the early design stage, involving modern digital tools and a systematic holistic design process.	modern **digital tools** (BIM, Digital Twins) in a multi-stakeholder cooperation to design for: • Integration of active/passive solutions (solar, natural/hybrid ventilation, thermal storage, effective heat/cool distribution) • Industrialization, modularity and standardization • Plug-and-play integration • Material data storage (digital logbooks and passports) • Architectural diversity (design to context) • Flexibility, longevity, and low maintenance • Reduction, reuse, and recycling • Fire and seismic safety
Topic	**State-of-the-Art**	**ARVs ambition beyond State-of-the-Art**
RES and Storage	A range of renewable and storage systems for different uses exist on the market. Their continuous decline in costs, along with increased digitalization and the growth of EVs, offer an opportunity to accelerate, over the next two decades, a profound transformation of our energy system and its structure. The main innovation potential lies in the efficient integration of the different energy systems, as well as the integration with the buildings and the users. This has the potential to minimise the costs of transition towards climate neutrality and opens new opportunities for reducing consumers energy bills and their active participation in new markets.	*ARV innovation lies in the **smart*** **integration** of the most efficient RES and storage systems for different building types, uses, climates and context, given **the new paradigm of flexibility and trading**. ARV will focus on the most promising technologies such as ground source heat pumps, building integrated photovoltaics, electric batteries (stationary and in EVs), seasonal thermal storage (using natural reservoirs), and efficient utilisation of district heating. Integration of the technologies in a CPCC perspective will be realised by optimizing costs, emissions, and occupant well-being. Optimisation will be done using state-of-the-art methods and **digital tools** including forecasting, skyimaging, grey box models, and parametric design.
Topic	**State-of-the-Art**	**ARVs ambition beyond State-of-the-Art**
Financial instruments and business models	Financing sustainable development is one of the greatest challenges of our time. Meeting this challenge will require the mobilization and redeployment of substantial resources. Yet despite its overhaul following the financial crisis, today's global financial system is not fit for this purpose. Today, too little capital flows to meet the financing needs of the sustainable development goals, and too much capital continues to finance unsustainable development. The current era of low interest rates limits the ability to offer discounts on green loans and Energy Efficient Mortgages (EEMs), which acts as a disincentive to scale marked-based energy efficiency finance. Integration of flexible energy solutions in real-estate portfolios offers a new pathway to address this barrier by offering tools to strengthen returns on energy retrofit financing, whereby offering an innovative pathway to scale. Digital finance, which includes a broad range of technologies such as big data, artificial intelligence, blockchain and the Internet of Things (IoT), offers innovative solutions to scale up sustainable finance, and the prospect of a more efficient, accessible and less vulnerable financial system.	ARV aims to leverage the benefits of energy positive neighbourhoods to create new incentives for citizens and financial service institutions to invest in energy efficiency. The benefits go beyond energy/cost reductions and direct CO_2 savings, but also **enable energy flexibility to be commoditized and traded** by the citizens as prosumers. ARV will apply smart flexible energy solutions to accelerate the scaling of existing market-based financing, such as **Energy Efficient Mortgages (EEMs)**, as well as to design entirely new financing mechanisms based on the citizen as prosumer**.** Focus will be on creating **incentives for large scale retrofit** including modes of demand aggregation. ARV innovations include: **Product-Service combinations** (e.g., lease models) in the field of energy, safety, comfort, and renovation. **Energy performance contracting** based on the KPIs and Building Energy Management monitoring system as well as new ways to overcome the split incentive problem in rented real estate. It also includes the application of the **one-stop-shop** concept linked to innovative financing incentives to **engage a critical mass to advance deep energy refurbishments on a district scale**. Results will be captured in business model blueprints as modules for replication in across the EU.
Topic	**State-of-the-Art**	**ARVs ambition beyond State-of-the-Art**
Policy, codes and regulations	Building codes currently only focus on energy performance, although several countries are planning to implement requirements with regards to GHG emissions in the coming years. However, methods for how to document and assess this, are still under development. The European Electricity Regulation and Directive provide the basis for an ambitious European Green Deal and Green Recovery[26]. Many articles in both the Electricity Regulation and Directive are crucial in removing existing regulatory barriers to demand-side flexibility, and for enabling active participation of energy consumers in order to increase efficiency and in the transition to clean energy.	ARV will apply LCA approach and material logbooks and banks to assess and document life cycle emissions of the demos. This will provide basis for benchmarks and target values for policy and regulations. ARV aim at releasing the barriers for demand side efficiency and flexibility by sustainable design, data-driven renovation, and a hierarchy of digitalization setups in order to enable customers and local communities to act as active customers without being subject to disproportionate technical requirements, administrative requirements, procedures and charges. ARV aim at demonstrating how to remove existing regulatory barriers to demand-side flexibility, to enable an active participation of all energy consumers in the clean energy transition and increase efficiency at all levels.

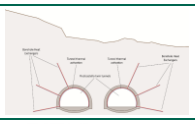
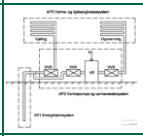
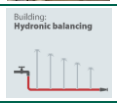
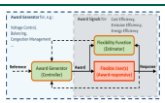
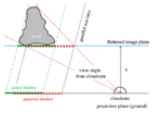
[26] SmartEn - Smart Energy Europe, Nov. 2020: The implementation of the electricity market design to drive demand-side flexibility.

1.4.2 ARV Innovations

An overview of key ARV innovations is given in Table 1.7, providing a short description of each innovation, the current Technology Readiness Levels (TRL) and the targeted TRL's, the key stakeholders, and the expected impacts. More detailed descriptions (as well as more innovations) are given in Sections 1.4.2 and 3.

Table 1.7 Overview of the ARV innovations (a detailed description is given in Section 1.4.2)

	Key innovation	TRL	Main impacts/ goals	Illustration
WP2: Framework and tools for CPCC	Modelling & Assessment Tool for Planning CPCC	5/6→8/9	Connect and integrate the solutions in a CPCC allowing a simplified and scalable design. Connect stakeholders in a construction/renovation process facilitating the co-creation of CPCCs. The framework will be simple to use and highly replicable at different demonstration sites.	
	VR/AR Empowered Environments	5→7	Citizens empowerment; Increased understanding and acceptance of energy retrofitting solutions; Smoother dialogue between residents and professional stakeholders.	
WP3: Community engagement, environment, and well-being	CPCC Living Labs and citizen engagement tools.	6→ 8	Community engagement for social renovation, energy transition and circularity, involving green ambassadors and energy coaching.	
	One-stop-shop platform for CPCC refurbishments	6→ 8	Co-creation approach enabling diffusion of design technology and replicability of solutions; fire and seismic resistance co-benefits of timber-based construction/refurbishment.	
	Centre for Energy Transition TE21	5/6→7/8	Increased citizen awareness, engagement and knowledge about energy performance and energy transition in urban environments.	
	Citizen Energy Communities (CECs)	5/6→7/8	Crowd-funding mechanism for increased renewable generation using PV in the district and guideline for replicability	
	Human Capital program BouwisWouw	7→8	Jobs & internships created in the local building and renovation sector.	
	Social renovation with housing tenants	7→8	Citizen empowerment and improvement of social and physical living environment	
	Energy coaching of residents to reduce energy poverty	4/5→7	Citizen empowerment and satisfaction, lower energy consumption and lower energy costs for tenants	
WP4: Sustainable Building (re) Design	Positive Energy Building Social Housing with local materials	6/7→8/9	Increased use of local materials with low embodied energy and emissions. Replicable design solutions for PEB in the Mediterranean climate	
	Use of recycled materials in green roofs	6→7	Reducing embodied energy and heat islands, improved rainwater management.	
	Architectural and aesthetic plug-and-play BIPV/BAPV solutions	6→8	Citizen satisfaction with building design; Increase in RES production (BI/BAPV) at building level.	
	Deep energy retrofitting of heritage buildings	6/7→8/9	Process for deep energy retrofit while conserving cultural heritage values and improving indoor comfort. Architectural integration of PV.	
	Digital Logbook for CPCC and Material Hub	6→8	Documenting Integrated Circular Design solutions for building refurbishment with 50% of energy reduction and positive energy new construction, inform Industry 4.0 via digital surveys, comfort improvement.	
	HeMuBo retrofitting (NZEB) with Inside-Out system design components for high-rise social housing retrofit to PEB	6→8	Shortened retrofitting time and cost; Increased energy ambitions from the NZEB HeMuBo approach towards the ZEB and PEB approach of Inside-Out. Goal is to create a future-proof concept and higher comfort levels for tenants.	

WP5: Resource Efficient (Pre)Manufacturing and Construction Workflows	Swappable energy façade	4/5→6	Enabling easy application of PV/PV-T/solar thermal/façade heat exchangers for possible coupling with heat pumps	
	Timber/bio-based plug-and play modules	6→8	Reduction of CO_2 -emissions in materials use and on-site, longer service lifetimes, shorter construction times, and reduced on-site noise and pollution.	
	Inside-Out system design for high-rise social housing retrofit to PEB.	6→8	Shortened retrofitting time and cost; Increased energy ambitions achieving net-zero to positive energy values.	
	Pre-recognition of façade-typologies	4/5→7	Shortened retrofitting time and cost; Improved flexibility for tailor-made retrofitting system; High potential for replication in existing building stock.	
	Zero-engineering of manufacturing process	4/5→7	Shortened retrofitting time and cost; Improved flexibility for retrofitting systems; Increased potential for replication for existing building stock	
	Circular hub for optimized construction	4/5→7/8	Upcycling of demolition material decrease tCO2 and embodied energy of retrofitted building; Decrease in air pollution and retrofitting costs due to optimized logistics.	
	One-piece flow optimized construction workflow	4/5→7/8	Reduction of nuisance (dust, noise, emissions) for residents during retrofitting; Decrease in air pollution and retrofitting costs due to optimized logistics.	
WP6: Innovative RES + storage	Integration of second-life battery storage system and V2G	5→8	Repurposing car battery saves materials; building energy flexibility, load-shifting, and peak shaving, cost reduction.	
	Urban Energy Geostructure in highway tunnels	6→8	To provide seasonal thermal storage to the CPCC using existing (abandoned) infrastructure. Reducing power needs, costs and emissions.	
	LowEx System	6/7→8/9	Extremely low temperature heating and high temperature cooling distribution using thermal mass, and optimized ground source heat pump with SCOPs heating 6-7 and SCOP cooling >30. Increased thermal comfort, higher architectural quality, lower energy/power need	
	Circulation Booster for Domestic Hot Water in District Heating (DH)	4/5→7	DH temperature reduction from 45 to 25 °C causing higher utilization of energy for final heating purposes and better comfort	
	Return Temperature Optimizing	6/7→8/9	DH temperature reduction from 45 to 30 °C causing higher utilization of energy for final heating purposes and better comfort	
WP7: Efficient operation and flexibility	CPCC Cloud HUB	6/7→8/9	Digital Hub for data storage and control of energy performance, unlocking the flexibility potential at the neighbourhood level. Will also be hosting the Data Warehouse (see WP8).	
	CPCC SRI	5/6→7/8	Smart Readiness Indicators adapted for buildings in CPCC in different climates and contexts, for improved energy management	
	Flexibility Functions for CPCCs	5→7	Flexibility functions to unlock the flexibility potential of CPCC in different climates and contexts, reducing power needs, CO_2, and costs.	
	nZEB Multifamily buildings centralized systems	5/6→7/8	Optimal operation and monitoring for increased performance of centralized systems in nZEBs by means of energy flexibility.	
	Automated energy performance analyses for PEB retrofitting	4/5→7	Improved building RES self-consumption, through reduction in primary energy savings. and increase in RES production (BI/BAPV) at building level	
	Deployment of solutions for forecasting (city weather, solar, load)	4/5→7	Increase in self-consumption through optimization of RES generation, storage, and use	

	Smart building control optimisation	4/5→7	Increased self-consumption; Improved indoor environment quality; Enhanced citizen awareness and engagement through user-interfacing	
	Smart community optimisation and market interfacing	4/5→7	Primary energy savings by district and city scale exchange of energy; Triggering of further investments in sustainable energy due to revenues from market trading.	
WP8: Monitoring, evaluation, and impact	Post-Occupancy Evaluation for CPCCs	6/7→8/9	More holistic and long-lasting solutions ensuring that occupant quality is not compromised by energy performance	CPCC-POE 
	CPCC Data Warehouse	6→8	Systemized data architecture and storage for tracking, validating and dissemination of energy, emissions, materials, comfort, pollution, user behaviour, and micro-climate. Contribute to overcoming design-built performance gaps.	
	Multiple Benefit Framework	6→8	Framework for integrated assessment of CPCCs toward UN sustainable development goals.	
WP9: Financing and buisiness models	Bankable business models for CPCCs	6/7→8/9	Successful working business models for different real-estate ownership structures: social housing, rental and privately owned. Scalable and including for profit and non-for-profit.	
	Scalable financing instruments for green real estate	6/7→8/9	Innovative financing solutions that accelerate the transition to energy positive real-estate while being affordable and effective for building owners and users.	
	Green Security Token Offering (STO)	6/7→8/9	The use of green digital bonds to exploit the potential of STO for flexible energy and retrofits. Awareness raising among European Financial Institute to accelerate interest in EE financing.	
	One-Stop-Shop mechanism for the large-scale renovation of urban areas	6/7→8/9	Decreased barrier for renovation projects, increased the involvement of end-users for long-lasting solutions	

1.4.2 ARV Demonstration Projects of CPCCs

The Spanish demo case is the *Llevant Innovation District* in Palma de Mallorca in a neighbourhood with approx. 2500 inhabitants. It encompasses a mixed used development area including residential, tertiary, and educational buildings, with both new construction and renovation activities. The set of actions that will be undertaken by the ARV project will encompass resource efficient renovation processes and district energy analysis and operation, highlighting social, educational, and digital aspects to enhance citizens involvement. Key actions in the district can

be summarized with by following numbers:

1) Large Scale retrofitting action in La Soledat Sud of 250 private dwellings (26 800 m^2) by means of a novel Public Private Partnership mechanism. Total built area is 191 000 m^2;
2) New Positive Energy Social Housing Building promoted by IBAVI: 36 apartments; 1750 m^2;
3) New high efficiency Residential Multifamily Buildings. Demo project involves 2 buildings; 114 + 88 apartments 14 400 m^2;
4) Energy Renovation of a flagship heritage protected building from the 70's modern movement: 16 600 m^2;
5) The creation of a Citizen Energy Community (CEC), a private crowd-funded, innovative mechanism to facilitate the deployment of renewable energy using available public and private roofs in the area.

Key data:

Size (floor area): 936 935 m^2	**Building/renovation timeline:** 2021-2025
Investment cost: € 104 million	**Project developers:** City council (Ajuntament de Palma de Mallorca) with the collaboration of Regional Government and University

Key innovations:

WP	Innovations
WP2	The adaptation, testing, and use of a **District Energy Simulation Tool** to analyse, design, and study energy flows in the neighbourhood. This will serve to optimize the interaction with the surrounding energy infrastructure, define pathways for energy transition in the District and assess the impact of actions. Subsequently, link to 3D twin district models using Virtual Reality by establishing connection to the Digitalization Hub in the area.
WP3	**Centre for Energy Transition TE21** will act as a demo and exhibition space and a hub for citizen engagement towards energy transition in urban spaces and new sustainable technologies. Linked to local energy communities around schools, TE21 will engage a set of training actions and awareness increasing campaigns with special attention for the education of younger generations actions. Activities will combine use of digital tools, VR visualization, testing of prototype solutions and open visits **Adaption and evaluation POE for assessment of occupant satisfaction**. **The creation of a Citizen Energy Community (CEC) platform**: a private crowd-funded, innovative mechanism to generate renewable energy using available public and private roofs in the area. The CEC platform will be developed with special focus on educational aspect and replicability.
WP4	Design, construction, and monitoring of 36 apartments multifamily building with the ambition level of being a Positive Energy Buildings in 2023 by a Public Social Housing promoter. Strong focus on the use of **innovative local materials and resilience against climate change.** **Cost-optimal solutions for retrofitting** of buildings in large-scale renovation process (200-300 dwellings) aiming to achieve a 50% reduction in the energy demand and a significant improvement in the thermal comfort conditions **Energy Renovation of a flagship heritage protected office building** (Antic Edifici GESA) along with testing and monitoring of several BIPV solutions regarding aesthetics aspects and energy production.
WP5	Showcase the **reduction of execution time** and costs in a large-scale renovation process (200-300 dwellings; several building) in an integrated process with one Project Manager in comparison with a process that goes one building by one building. Testing solutions based on the **recovery of eco-friendly local artisan industries** which are in danger of extinction, along with the use and improvement of a Catalogue of Sustainable Local Materials.
WP7	**Advanced control and monitoring** of shared HVAC assets in multifamily dwellings Data aggregation in a hierarchical setting using cloud, fog and edge computing. **European digitalization Hub** (CENTER DENMARK) are established to ensure low-cost operations in different climate zones. **Flexible operation of a Citizen Energy Community (CEC)** to generate renewable energy using available public and private roofs in the area.
WP9	**Private Public Partnership one-stop shop mechanism** for the large-scale renovation of urban areas providing the instrument to facilitate large scale renovation initiatives **The creation of a Citizen Energy Community (CEC)** by means of **private crowd-funded, innovative mechanism** to generate renewable energy using available public and private roofs in the area. The CEC model will be developed with special focus on educational aspect and replicability -

The Italian demo case is called *Piedicastello Destra Adige* and located in the Northern Italian city of Trento. The demo case consists of four areas:

Area 1, the former Italcementi industrial site, will host an entirely new mixed-use district of Trento, containing residential and tertiary buildings. The aim is to develop the district as self-sufficient, by using the very high geothermal potential in the area and its excellent orientation to the southeast for PV production to power the geothermal heat pumps.

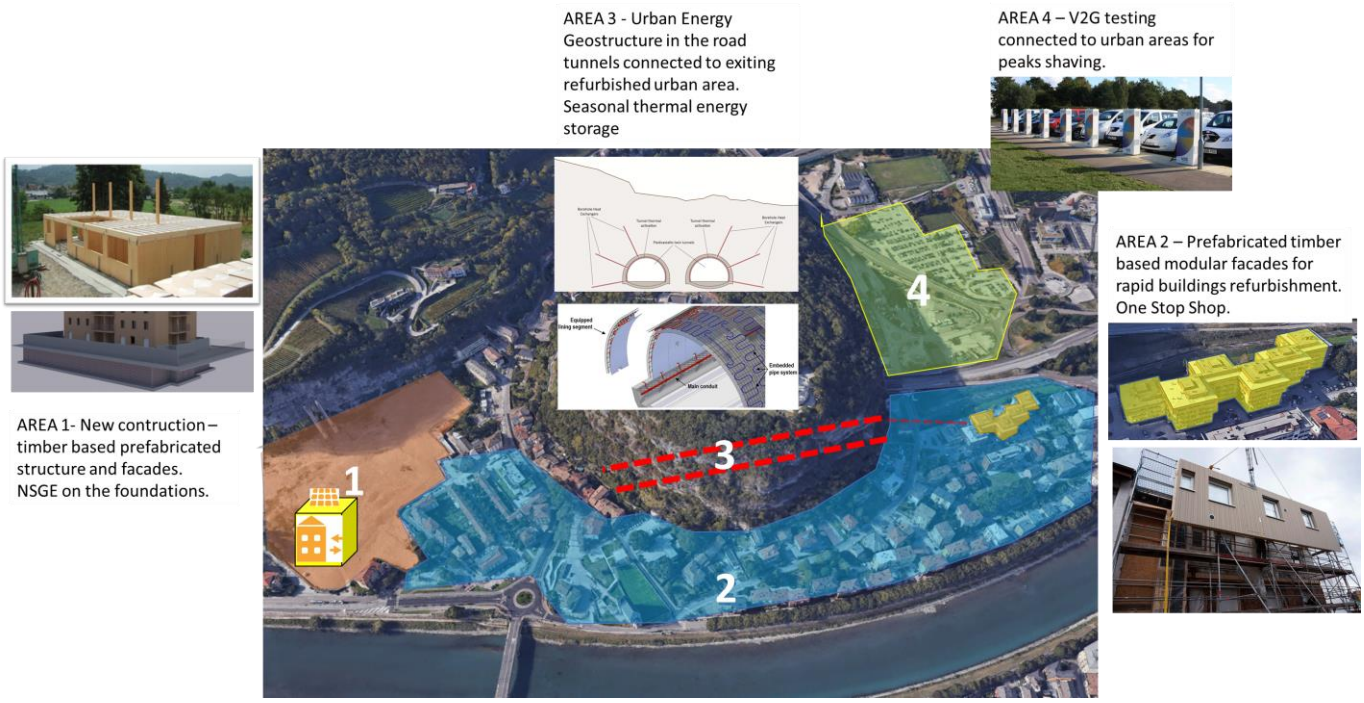
Area 2 is an urbanization from the 50s–70s. Most of the buildings are close to or have already reached the end of their life cycle. The area was developed with a strong focus on social housing and is largely still owned by the Trentino Institute for Social Housing. These residences are to be renovated by using standardized prefabricated timber-based façade elements, implementing the so-called "One-Stop-Shop" which provides technical support at all stages of design and realization, also the private owners of the area are invited to associate themselves in the redevelopment process, thus guaranteeing a high degree of replicability also for other areas of Trento.

Area 3 includes the former Piedicastello highway tunnels encompassing two 250-m holes in the Dos Trento mountain which are currently used as an art and exhibition gallery. This geostructure is intended to supply and store energy for the new city district in areas 1 and 2.

Area 4 which is currently used as a parking lot, will be redeveloped with a service HUB for the district and city. It will connect commuter flows to commercial services and will host an energy storage system, following the V2G approach, simultaneously promoting the market penetration of electric mobility.

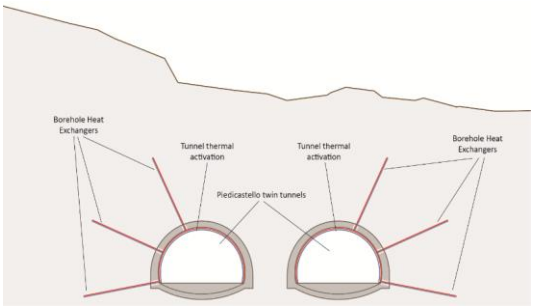
Key data:

Size: Total built surface in Area 2 to be renovated - 40.000 m^2, Financed within ARV: 6000 m^2 New built surface in Area 1 to be built – 10.000 m^2, Financed by ARV: 550 m^2	**Building/renovation timeline:** 2021-2025
Investment costs: Potential investment cost in Area 2: 16M€ - direct investment cost during ARV 2.7M€ Potential investment cost in Area 1: 10M€. Direct investment costs during ARV 1.1M€ Potential investments costs in Area 3: 2.5M€ Direct investment costs during ARV: 350k€	**Project developers:** Province of Trento, Private landowners, Trento Municipality, ITEA, Dolomiti Energia



Key innovations:

WP	Innovations
WP3	• One-stop-shop platform for refurbishment, to invite private owners in the area to associate themselves in the renovation activities i.e. by providing technical support at all stages of design and execution. Co-creation approach enabling diffusion of design technology and replicability of solutions; fire and seismic resistance co-benefits of timber-based construction/refurbishment. • Development of a local energy community approach linked to NSGE and district heating services, local RES production and sharing. • Involvement of local stakeholders in the co-design phase considering multiple impact of the CPCC being developed.
WP4	Both new construction and refurbishment of urbanization of the 60s and 70s (Social Housing and private) is foreseen with an Industry 4.0 spill-over approach where the integration between the 2 sectors will create new opportunities for companies and economy of scale in the solutions. The main objective is to make the urban expansion energy self-sufficient. The innovation proposed are: • A catalogue of **Integrated Circular Design solutions** for building refurbishment with 50% of energy reduction and positive energy new construction, mainly acting on: building envelopes with active (BAPV/BIPV) and passive elements, nature-based solutions integration, inform Industry 4.0 via digital surveys, comfort improvement (psychological, physiological). • **Timber based (new) construction, refurbishment and superelevation scenarios** (local and circular value chain); simplified Life Cycle Inventory; circular economy-based design process; land uses reduction via superelevation (scenario development) for new constructions; renovation of existing buildings; additional (new) volumes on existing buildings. • **Natural and mechanical ventilation concept**s for climate responsive buildings. • Heat pumps integration for H&C (connection to NSGE – tunnels, building foundations, roads); passive heating systems integrated in buildings envelopes; active thermal mass, heat storage; active/passive systems integration via Building Automation Systems.

	• Analysis of existing models for scenarios elaboration[27] to inform **hybrid Energy/Nature-based solutions** on building/urban surfaces; innovative materials (new and waste/by-products). • Architectural and aesthetic integration of **BIPV/BAPV/PVT** solutions; materials selection; integration between PV, Solar Thermal and CMV systems.
WP5	• Timber and bio-based on-site construction/renovation (modular – plug&play) during building operation will be piloted in Trento at installation of climate change adaptive measures that include summer cooling by heat pumps and green roof sample for cooling of heat islands and local rainwater management (rain gardens, greenery). Installation of swappable façade-integrated BAS controlled RES (flexible solution enabling easy application of PV/PV-T/solar thermal/façade heat exchangers for possible coupling with heat pumps). Passive/Active solutions for improved comfort linked to psychological and physiological aspects. Carbon credit scheme linked to carbon stock in timber-based solutions. • Identification of off-site production methodologies for MMC (Modern Methods of Construction) in dry tech, based on the main system used for panels production: CLT and/or framed wall • Definition of standard modules (shape and dimension) with some flexibility (dimension, materials, layers) for easy adaptation to existing buildings (fabric and systems) • Identification of BIM procedures for the panels design, to be fully compatible with production and control software, directly linked to client order handling, inventory management etc. • Definition of possible layers and materials (bio-based and/or recycled): outer finishing (including green solutions, nano-based materials, reflective finishes, PV panels), ventilated façade, insulation, system/facilities passage (within the module or intra modules), inner finishing (including PCM and massive solutions) • System integration: passage for pipes and electrical system (plug and play: correlation with existing systems), BAPV and BIPV, mini MV machine near windows • Fixing system of the panel to existing wall to be simple, fast, safe, reversible (wood/wood, wood/steel, steel/steel joints) considering installation and adjustment: particular attention will be paid to out-of-square walls and non-standard elements (corner, ground and roof joints, balconies etc)
WP6	• Using **second-life batteries and V2G technology** at a commuter parking lot. • **Urban Energy Geostructure in former 2x250-m highway tunnels as seasonal storage** to supply a new city district with heating and cooling energy. A new prototype of energy tunnel in the existing Piedicastello tunnel, currently used as an exhibition hall after having been dismissed from transportation purposes. The innovation will comprise: 1) Installation of radial borehole heat exchangers, 30 m length, at the contour of the crown. 2) Installation of a circuit of pipes at the intrados of the tunnel crown, 3) Pipes for connection to a heat pump system located at the portal. 4) Secondary system used for heating and cooling in the exhibition hall. 5) Measurement plan including temperature sensors in the ground, in the tunnel, heat flow, etc.  • **Energy geostructures for the new building for area 1 t**o support the project scope of the creation of a nearly zero energy buildings in the area 1 (former Ex-Italcementi area), energy geostructures will be adopted. The following solutions are planned: 1) thermal activation of the foundation thanks to the installation of a circuit of pipes in the foundation slab, 2) thermal activation of the retaining walls by means of the GeothermSkin elements (patent priority n°. 102016000020821).
WP7	• Establishment of an Energy Community management and its standardization for the refurbishment process.
WP8	• One-stop-shop platform business model connected to Italian national incentives for refurbishment, to invite private owners in the area to engage in the renovation activities, i.e. by providing technical support at all stages of design and execution.

The Dutch demo case consists of two clusters of residential buildings in the *Overvecht-Noord district* and the *Kanaleneiland-Zuid district* in the city of Utrecht. Both districts were built in the 1960s and 1970s to account for the quick rise in urban population and are in general of low-quality. Both districts share the characteristics of lively multi-cultural districts, with high share of social housing, schools and shops. The residential areas are densely populated district, home to a majority of low-income households. Both districts have a triple energy infrastructure: a district heating network, gas infrastructure for home-boilers and an electricity grid.

[27] CUSP.UO Observatory

In Overvecht-Noord the district stakeholders have ambitions to become fossil-free by 2030, which is supported by the National Government. Two social housing corporations Mitros and Bo-Ex together with their partners and other housing corporations are faced with the challenge of renovating approximately 5,000 social housing units in the coming years, while at the same time increasing the public space, quality of life, safety, mobility and culture in the area. Similar challenges are urgent in the Kanaleneiland Zuid district in Utrecht. The majority of homes are 1960s and 1970s system-build high-rise flats, of which there are approximately 15 000 to 20 000 in North-Western Europe offering a huge market potential for a systematic approach. It is a major challenge to renovate these apartment buildings to Nearly Zero or Positive Energy Buildings in a cost-efficient way Important obstacles are the lack of integrated, generically applicable, affordable solutions, the limited possibilities for renewable energy generation in and around the high-rise flats, the extra space required in the homes and public space, the organization of innovation and collaboration with the construction value chain partners, the required renovation time, inconvenience for residents and limited confidence of residents in long-term (energy) performance.

The demonstration actions that will be undertaken by the ARV project are the resource efficient, systematic retrofitting of: a) 6 apartment buildings to Nearly Zero Energy Buildings (with the ambition to improve the energy performance to Positive Energy Building through the tailor making of ARV innovations); b) 4 residential apartment buildings from the 1960s into Positive Energy Buildings embedded in a green neighbourhood. Positive Energy Buildings is the ambition put forward, but in case that this ambition is not feasible to achieve due to outside developments (such as the 100% sustainability of the District Heating network operated by external organisations) the buildings will be retrofitted in a Positive Energy-ready way, meaning that the retrofitted building will become positive energy buildings once the external heating sources are 100% renewable. In both districts, an interconnected smart grid will be demonstrated with (BI)PV, battery storage and V2G storage assets in connection to the DSO grid will be created including the 8 mid-rise residential buildings and 2 high-rise Intervam-10 story residential buildings.

Figure 1.8 The first retrofitted high-rise Positive Energy Building in Europe completed in Overvecht-Noord Utrecht in 2020.

Key data:

Total size (floor area):	63 600 m^2	**Building/renovation timeline:**	2021-2024
Investment cost:	€ 85 million	**Project developers:**	Bo-Ex & Mitros (ARV partners)

Owner	District	Type	Ambition	Planning	Retrofit	Dwellings	M2
Bo-Ex	Kanaleneiland	Bredero-4	PEB	2022	2023	65	5500
Bo-Ex	Kanaleneiland	Bredero-4	PEB	2022	2023	65	5500
Bo-Ex	Kanaleneiland	Bredero-4	PEB	2023	2024	65	5500
Bo-Ex	Kanaleneiland	Bredero-4	PEB	2023	2024	65	5500
Bo-Ex	Kanaleneiland	Intervam-4	NZEB to PEB	2022	2023	48	4900
Bo-Ex	Kanaleneiland	Intervam-4	NZEB to PEB	2022	2022	48	4900
Bo-Ex	Kanaleneiland	Intervam-4	NZEB to PEB	2022	2023	48	4900
Bo-Ex	Kanaleneiland	Intervam-4	NZEB to PEB	2022	2024	48	4900

Mitros	Overvecht	Intervam-10	NZEB to PEB	2023	2024	125	11000
Mitros	Overvecht	Intervam-10	NZEB to PEB	2023	2024	125	11000

Key innovations:

WP	Innovation
WP3	**Social renovation with housing tenants:** before the actual renovation the housing corporation will engage with tenants to explore social challenges and opportunities of the tenants, and support tenants in dealing with these social topics. The key innovation of ARV includes also the post-renovation coaching to improve tenant's long-term resilience for social challenges and opportunities. In addition, the application of a technical and social voucher system for tenant home improvement flexibility will be analysed and reviewed. **Human Capital program Bouw=Wouw!:** key innovation is connecting the innovative ARV demonstrators to the training of youngsters in the district in the installation and maintenance of smart solutions. The new approach offers both social opportunities for district residents and answers to required capacities for scale-up and replication of energy renovations in the Utrecht region. **Energy coaching of residents to reduce energy poverty**: Innovation includes both digital and social innovation. Through smart the visualization of monitoring data from the monitoring systems installed in buildings (see also WP7 innovation) through a Home Energy Management System (HEMS)-device or website personalized energy data is prepared. Coaching will be done by local energy change agents and tenants will be coached to understand the energy performance by adjusting their behavior and/or better using demand response technologies. **Physical Hub in district**: in 2021 the construction of a circular pavilion in the district is expected. This circular pavilion will support community engagement and development with training, promotion and dissemination of the district energy transition and renovation programs. As part of this ARV subtask this hub will be used as the location in the district where the co-creation activities related to social renovation, Bouw=Wouw! and energy coaching will take place.
WP4	**Inside-Out system design for retrofitting of mid/high-rise social housing to Positive Energy Buildings:** the innovative design elements of the integrated and modular building components are: • Rooftop: integrates the collective heat pumps, buffer vessels, (BA/BI)PV panels, insulation system. • Facades: integrates heat recovery for LT heating and ventilation, DC-ready cabling and (BA/BI)PV panels • Panels will be modular and adaptable to different building typologies, connecting to different façade and balcony sections. • Identifying the needed diversity of the renovation concept to create the architectural appearance which can be adapted and applied to the context. • Standardization and flexibility of the interface connecting above modules that offer a higher adaptation potential in full life cycle and create less waste trough net assembly. **Architectural and aesthetic plug-and-play BIPV/BAPV solutions:** innovative elements are included in the plug-n-play integration of PV components in façade roof, balcony, railing and balustrade building components generating solutions for connecting cabling of PV-panels and monitoring equipment and optimizing the yield of electricity production. • HeMuBo NZEB retrofitting: the innovative elements are: • NZEB retrofitting including energy system shift from heating by gas boilers to (low/mid temp) district heating • Universal façade retrofitting system: timber frame construction and innovative thermal bridge solutions; • NZEB to PEB through application of Inside-Out modular components. Exploration to possible integration of modular façade solutions (Inside Out 2.0: energy and HVAC installations facades using sandwich panels) produced off-site and installed plug-and-play on-site and the application of additional BIPV / BAPV*.
WP5	**Pre-recognition of façade-typologies**: innovative elements include the pre-recognition of façade-typologies through 3D point cloud scanning (by drones, Lidar, etc) and automated identification of building typologies through AI-algorithms. **Automated energy performance analyses for Positive Energy Building retrofitting**: AI-based prediction of the amount of RES (PV, heat sources) to achieve net-zero or positive energy balance. **Zero-engineering of construction process**: Parametric design tools the reconstruction components can be designed and fed to industrial production facility saving engineering cost and time. **Circular hub for optimized construction**: Optimization of construction, material and worker flows of all contractors and subcontractors through integrated BIM and circular construction hubs. Integrate local production facilities into the hubs allowing new (sustainable) and harvested materials processed into new (integral) building components. **One-piece flow optimized construction workflow**: application of data-driven approach to just-enough and just-in-time operational and logistics workflows reducing waste, space, costs and nuisance on construction site.
WP6	**Design and implementation of RES and storage solutions for buildings/neighbourhoods' thermal needs**: Implementation and demonstration of a cost-effective, one-size fits all, modular heating ventilation and cooling infrastructure for high-rise buildings, compatible for multiple heating sources. **Design and implementation of RES and storage solutions for buildings/neighbourhoods' electricity needs**: BIPV/BAPV for maximizing solar energy harvesting combined with local and district electricity storage providing support to the grid as well as EV-V2G. Direct usage of DC power outage of BIPV/BAPVI
WP7 and WP8	**Deployment of solutions for forecasting (city weather, solar, load):** Forecasting PV energy production with cloud detection cameras and weather station together with a fast network of sensors that measures irradiation and temperature of BAPV/BIPV-panels and energy usage **Smart building control optimisation**: Use of model predictive controllers (MPCs) to integrate weather and load forecasts and controllers for district and BEMS, BIPV and BAPV systems taking into account app- and web-based user feedback. **Smart communities' optimisation and market interfacing**: Integrating modelling, forecasting, and control solutions for smart energy buildings and communities. A hierarchical and distributed control framework will enable local communities and energy networks optimal use of local renewable energy generation including EV/V2G charging algorithms. Linking of conventional

	markets with aggregated flexibility for buildings and districts. Interface to balancing and flexibility markets. Guidelines on new business models for energy communities. The innovation is the distributed control approach of decentralised assets, coordinated by an aggregator, without violating the user's privacy.
WP9	**Innovative business models**: Product-Service combinations (e.g. lease models) in the field of energy, safety, comfort and renovation (WP4, WP5). Energy performance contracting based on the KPIs and Building Energy Management monitoring system (WP7). Business models and FI related to optimized self-consumption and/or energy trading of renewable electricity at the building level and/or district level and/or country level (WP6 & WP7)

* The building owners (Bo-Ex and Mitros) intent to lift performance of the HeMuBo approach (applied by parties external to the ARV consortium) from NZEB to PEB. The decision to implement changes will depend on outcomes of WP4 / WP6 and external factors, such as existing contractual agreements between Bo-Ex, Mitros and their contractors (not part of the ARV consortium) and required investment for achieving the higher energy performance. .

The Czech demo case encompasses the *Karviná Mizerov Health Centre* in the city of Karviná. It is a 5-storey building that was built in late 80s. It is owned by the Municipality of Karviná and partly rented to private practices that specialize in a variety of different medical professions, i.e. immunology, dentistry, dermatology, radio diagnostics etc. The use of RES and building envelope retrofitting will ensure to reach the ZEB standard after renovation. For that, a combination of heat pumps, PV, as well as hybrid PVT solar panels and waste heat and energy storages will be utilized. An advanced building energy monitoring system (BEMS) and the monitoring of the IAEQ will ensure the effectivity of the measures. EV charging facilities both, for private and company cars as well as the ambulances promote the market penetration of electro mobility in the area.

Key data:

Size (floor area): 11 130 m^2	**Building/renovation timeline:** 2022-2024
Investment cost: € 2.06 million	**Project developer:** City of Karviná

Key innovations:

WP	Innovation
WP3	**Energy transition**: Karviná Mizerov Health Centre as a living lab for the City of Karviná and other municipalities within Czech Republic. The LL will educate citizens such as students in an effective way, creating energy and resource efficient neighbourhoods that increase citizen and stakeholder awareness and engagement. Promote user-friendly innovative and sustainable building solution through education and other communicational channels, implement user-centred design of building systems. Support a creation of long-term stakeholder ecosystems concerned with energetic transformation and the role of individual projects in driving broader organizational and procedural changes. **Community engagement** actions with young people in the school (14-19 years), exploring co-creation methods. Change agents promoting sustainability to their peers, parents, and the community.
WP4	The Czech demo case encompasses the renovation of Karviná Mizerov Health Centre in the city of Karviná. The following will be of focus for the Demo project in Karviná: • Become positive energy building, achieved by passive house standard and renewable energy generation. • Digital design and 3D simulations (digital twins) for solar irradiation potential and design of optimum shading devices. • Small-scale pilots of climate change resilient solutions – use of heat pumps for summer cooling. • LCA of HVAC systems with focus on carbon footprint. • BIPV BAPV PV-T, solar thermal, heat pumps, active shading systems with weather forecast, innovative cooling solutions. BIPV integrated into ventilated facade. • Green roof sample for reducing heat islands, rainwater management (rain gardens, greenery).
WP5	On-site construction during building operation will be piloted in Karviná at installation of **climate change adaptive measures** that include summer cooling by heat pumps and green roof sample for cooling of heat islands and local rainwater management (rain gardens, greenery). Installation of **swappable façade-integrated RES** (flexible solution enabling easy application of PV/PV-T/solar thermal/façade heat exchangers for possible coupling with heat pumps).
WP6	**Electricity**: Implementation of innovative PV system combining BIPV and BAPV will be considered in the demo Karvina. The PV system will provide high performance and contribute in improving indoor environment by supplying energy to drive external shading elements blocking the excess of sunlight to the interior, while keeping architectural aesthetics of the BIPV at top level. A central second-life energy storage will be designed adequately in order to operate the demo as a local microgrid which supports various functionalities related to building energy flexibility, load-shifting and peak shaving. Additionally, EV charging stations and the implementation of V2G/V2H services are also considered. Finally, local sensors for solar irradiance and temperature as well as skyimager solution will be installed for accurate predictions of the PV generation and operation of the whole system.

	Thermal: Implementation of innovative heat pump system for building refurbishment providing heating and cooling energy. The system will combine heat pump with PVT and use of waste heat. Additionally, a thermal storage design will be considered for balancing the heat pumps, providing potential for heating demand flexibility in building and provides necessary heating energy in winter and cooling during summer and to target positive energy district requirements. Local weather station will be implemented with indoor temperature measurements for effective operation of the HVAC systems.
WP7	• BEMS with cooperation with forecasting and smart metering will ensure the efficient operation and management of RES, storage systems and actual energy demand. • PV forecasting for modelling the operation of BAPV/BIPV and battery storage in building • Forecasting of local PV generation and Sky-imaging solution for very short-term solar irradiance forecasting for building energy system operation • Forecasting of electricity and heat load profiles • Forecasting of energy generation for BIPV and BAPV sites • Control of battery systems • Optimal operation of interconnected battery storage and EVs • Connecting the various BEMS platforms for aggregating flexibility and enabling flexibility at district scale
WP8	IAQ monitoring platform: Sensors to inform users, directly control technology (AHU, HVAC), or provide necessary data to a superior system
WP9	The experiences from Karviná Mizerov Health Centre will serve as a living lab for Karviná and will act as a role model for other municipalities within the Czech Republic.

The Danish demo case is called *SAB Department 22: Kløvermarken/Hvedemarken* and is located in the central part of the City of Sønderborg. It includes 19 apartment blocks of 3 floors, in total 432 apartments with a floor area of 32,000 m^2. The apartment blocks were constructed in 1970-1973. In 2010, the buildings were renovated with more insulation, new low-energy windows, new radiator systems and new district heating substations with heating controls connected to Danfoss Portal. There are 9 substations covering the 19 apartment blocks. In 2017, more than 3,000 m^2 solar PV panels were integrated in the roofs of all 19 apartment buildings. The solar PV system can produce 460 kW solar electricity corresponding to 408,000 kWh per year covering 37 % of the total electricity consumption in the 432 apartments. At the same time new LED outdoor lamps were implemented in the area around the 19 apartment blocks and in the corridors and basement.

Key data:

Size (floor area): 35 600 m^2	**Building/renovation timeline:** 2021-2022
Investment cost: € 0.4 million	**Project developer:** Sønderborg Andelsboligforening (Sonderborg Housing Association)

Key innovations:

WP	Innovation
WP3	Involvement of tenants and citizens: The energy saving results of the planned innovative energy technologies depend significantly on the daily energy performance of the tenants in the demo buildings. Therefore, a number of information and training activities are planned to secure, that the tenants and the maintenance staff learn the new smart control systems and learn to operate the new energy saving appliances. Green Ambassadors will be appointed among the tenants, one ambassador for each of the 19 buildings, to be trained to assist their neighbours and colleagues saving energy.
WP4	Innovative design of heating automatic systems reducing district heating return temperature from radiators in the apartment. Innovative design of heat pump systems in local internal domestic hot water circuits in order to reduce the return temperature for the district heating system. Focusing on low carbon intensive materials used in the buildings. Focusing on indoor climate challenges in combination with new heating automatic reducing the return heat temperature. Demonstration and monitoring existing building integrated PV panels in combination with battery solutions.

WP6	Neighbourhood scale smart battery system: The existing solar PV system in the DEMO project has performed very well during the last 3 years, and it planned to install battery systems together with the solar PV panels in each block. In the beginning of 2021, batteries with a capacity of 15 kWh/4 kW each will be implemented in each of the 19 blocks. Installation of the 19 batteries means, that extra 60.000 kWh solar electricity can potentially be used in the buildings per year instead of exporting the solar electricity to the grid. Monitoring and evaluation of the integrated PV+battery system will be a part of this project.
WP7	Leanheat intelligent heating control system: Sensors installed in the apartments enable Leanheat`s artificial intelligence to register the building`s thermodynamic behaviour and to optimally control the heating system in the buildings. Leanheat also reduces the necessary maximum power usage. The artificial intelligence learns the domestic hot water consumption profile in the apartments and adjust the heating to charge and discharge energy accordingly. The load-shifting system is designed to move consumption of energy to periods, when it is most economic to use. The performance of the Leanheat intelligent control system in SAB Department 22 will be monitored and reported in the ARV project. Reduction of district heating return temperature from the buildings: Focusing on the heat radiator system and the domestic hot water system. Lower district heating return temperatures result in higher efficiency of the heat production plant. Furthermore, a higher share of renewable low-grade sources will be available and can be utilized. Danfoss Solo system will be implemented as demonstration in 2 buildings with 50 apartments in SAB 22. Solo system can control the temperature difference over the radiator for system optimization. At the same time the hydronic balance of the radiator is better, the flow being dictated by real heat demand. Domestic hot water boosted by heat pump: Normally the district heating return temperature is too high due to a necessary high temperature in the domestic hot water circulation system. The district heating return temperature can be lowered by implementing a small heat pump (3-5 kW) in the system. The heat pump extracts heat from the circulation pipe circuit, and thereby reduces the return temperature. The business case for this system is the tradeoff between an economic bonus due to reduced district heating return temperature and electricity consumption of the heat pump. Depending on actual electricity costs and value of district heating return bonus, the operation of the heat pump can be optimized (on/off) resulting in fuel shift option between district heating and electricity. The performance of this new system will be monitored, evaluated and reported in the project. Intelligent and flexible management of the electricity/district heating network (building on CITIES project): The temperature in the local district heating network is often unnecessary high resulting in a high heat loss, because the operator has no secure forecast of the actual heat demand in the buildings and therefore need to distribute the district heat with a relative high temperature, again resulting in a high return temperature. To lower the flow and the return temperature in the network, a method for a data-intelligent prediction of the local heat demand in the buildings and a prediction of the heat loss in the network will be introduced. The method is based on intelligent data from the digitized heat meters in the apartments combined with weather forecast, predicted heat demand, temperatures in critical positions in the network etc. With this method the district heating network can function as a heat storage facility. Furthermore, the methods can be used to operate with a with temperature zones within a city and local adaption of heat pumps and use of heat from e.g., supermarket cooling, could be optimized. The digitization of the system is also very important for the future electrification of the district heating. Flexible configuration and operation of heat pumps (building on CITIES project): Today the focus is on integrating heat pump at the user level. However, the above-mentioned digital operation of DH systems implies that methods for integration of heat pumps on various levels in the DH system should be analysed. Integrating larger heat pumps on district level will increase the flexibility of integrated power2heat system, and consequently the options for demand response solutions will be enlarged. The zonal operation of DH systems facilitated by digitalization will pave the way for using the existing DH system as a part of a local energy cooperative, where also excess heat from industry and/or supermarket cooling can be integrated. Local Energy/Flexibility Market: High level controllers in ARV will be able to generate forecasts of the available flexibility on aggregated level. This flexibility is used directly for providing grid services, but in addition the flexibility can be bid into relevant markets by balance responsible parties (BRPs). In ARV specialized smart home aggregators will be developed to trade and commodities energy flexibility at building or district level. Smart electricity and lighting control in homes: A new developed smart home control system will be demonstrated in the buildings and apartments. The smart home system controls the heating, ventilation, lighting, electrical appliances, access control, burglar alarms etc.
WP9	Design of innovative financing models for implementation of energy retrofitting measures in social housing associations

The Norwegian demo case is the *Voldsløkka School and Cultural area*. The project includes the construction of a secondary school for 810 students, a new culture hall, a dance hall, and rehearsal space. The project includes the construction of new buildings and the **renovation of an existing listed building**, in total about 14.000 m^2 floor area. The area has high environmental ambitions and will be built as Oslo's first plus energy school, with a surplus of energy generated, covering all energy needs included appliances/plug-loads. The total area of the PV-installation is 1556m^2 and a yearly estimated production of 192 MWh. The new school facility will be **integrated as part of the surrounding local area**, which complements the area with new functions and activities and strengthens the area's green structure. The set of actions that will be undertake by the ARV project will encompass **resource efficient renovation processes and district energy analysis and operation**, highlighting **social, educational, and digital aspects** to **enhance citizens involvement** and generating **Citizen Energy Communities**.

Key data:

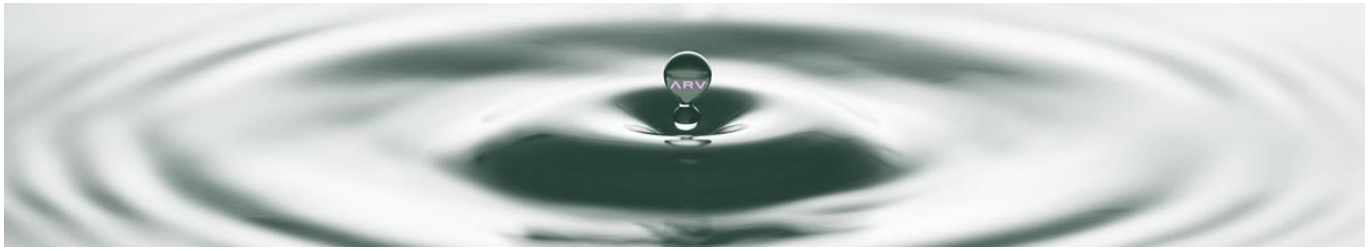
Size (floor area):	14 000 m^2	**Building/renovation timeline**	2021-2024
Investment cost	€ 88.2 million	**Project developer**	OsloBygg KF

Key innovations:

WP	Innovation
WP3	**Implementation of AR/VR tools and platform in decision-making process**. Various 3D and/or visualization techniques of Virtual Reality (VR) and/or Augmented Reality (AR) are used during the renovation and development of the demonstration district to better communicate results of different scenarios analysis to different types of stakeholders, to facilitate citizen engagement, promote education and training for sustainability. The development of VR and AR applications are targeted toward several distinct stakeholders (city planners and policy makers) and citizen user group types (school children, common public, inhabitants and infrastructure users, service personnel). **Raising climate awareness through education** and **local community engagement.** Making use of physical educational facilities for sustainability teaching of students. **Social Renovation** will focus on engaging the community before renovation, whereas Energy Transition will establish a physical space and focus on new solutions regarding energy transition and circularity, testing of innovative and prototype solutions, and energy coaching of occupants. A demo-space **for citizen's and children's education** will be implemented with a focus on new technologies like storage, electrical vehicles, renewables, etc. The project includes multi-use meeting areas for engaging the local community more actively in the use of the buildings.
WP4	**Climate adapted design** using an innovative open surface water solution. This is the starting point for the design of the school project. The concept is a green and different schoolyard where vegetation and surface water management are used as a resource to create good and varied outdoor spaces. **Effective application of low-carbon concrete** with 40% lower embodied emissions than standard. **Digital design for optimum life cycle performance**. BIM and Digital Twins will be used to optimize the performance of the building development from the environmental and economic perspective. A comprehensive evaluation of the buildings will be made by considering their lifecycle environmental impact, cost, and energy use, the inclusivity of the local community, the use of indoor and outdoor space, water management, noise and pollution, and aesthetic. **Climate adapted design** by an innovative open surface water solution. The design of the outdoor green area will ensure the use of vegetation to optimize the water management and at the same time create a varied and appealing outdoor environment. The use of pollutant-absorbing plants is planned. **Circular renovation design strategies** will be developed by mapping of locally available building materials and components from existing and going-to-be demolished buildings. Specifically, most of the walls and windows in the old factory will be reused and upgraded to new energy performance standards to save embodied GHG emissions from building material use. This is part of the energy renovation design of cultural heritage building using a circular renovation strategy. Design strategies for the (re)use of building materials and components will be defined in relation to technical, functional, and aesthetical constraints.
WP5	Implementing a **Carbon neutral construction process.** Electric- and bio-based fuels construction machinery will be used in the construction phase to reduce GHG emissions, air pollutants, and noise. These will be linked to systems for electric heating of the construction site. To optimize the construction site management from an environmental perspective and maximizing the use of electric vehicles, materials HUBs are to be established outside the construction site, where large vehicles can de-load goods, which will be transported to the site by smaller electric vehicles.
WP6	Local Renewable energy generation using innovative **BIPV and BAPV**

	Local energy storage: In the preliminary project, space has been set aside for a separate battery room for a possible separate installation of this. ARV will seek to design and construct an innovative system using recycled batteries. **Local Renewable energy generation using building integrated photovoltaics (BIPV) and building applied photovoltaics (BAPV).** Coloured PV panels will be installed on the roof and façade of the buildings allowing for a higher degree of flexibility in terms of architectural expression and integration. The challenge is to balance an optimal energy production with aesthetical requirements. Design solutions with angular modules will be tested too. A mounting system that ensures an easy installation and replacement of components (panel-to-panel and panel-to-building) will be tested. **Local energy storage.** A battery storage room is planned in the renovation process. As part of the general strategy of reusing building materials and components, recycled car batteries will be used. It is expected to reduce 50% of GHG emissions across the battery production process and 20% of their environmental impact, and at lower cost. **Low-temperature thermal heating and high temperature thermal cooling (LowEx) HVAC system.** A novel heating/cooling system which delivers low-temperature thermal heating and high temperature thermal cooling by using the same infrastructure coupled with the ground source heat pump. Low energy needs the order of 3 to 10 kWh/m^2 year and greatly reduced power peak. By reducing the energy need for heating/cooling, the local renewable energy production can be used for addressing other buildings end-uses (lighting, ventilation, appliances) which are less dependent on the seasonal need, thus reducing the yearly mismatch between PV production and buildings' energy use. The LowEx system is integrated by using the existing infrastructure, thus saving cost and embodied energies from the material use.
WP7	WP7 focuses on the optimal performance of the operation of the demonstration buildings. Within WP7, the models for energy generation forecasting and control of the LowEx system are tested.
WP8	**Climate awareness and citizens engagement:** Multiple benefits approach for evaluating the intervention **Carbon neutral construction process:** Energy and materials mass flows during the construction phase and monitoring phase, Usage schedule and power consumption of electric machinery and appliances during the construction phase, Construction time (on-site monitoring with devices and/or evaluations based on visits/reports) and dust and noise production, Building site environmental quality (PM10, PM2.5, Noise level) **Climate adapted design:** Outdoor and Indoor environmental quality (temperature, relative humidity, CO2 concentration, PM10, PM2.5, Noise level). **Circular renovation design strategies:** Energy and materials mass flows during the construction phase and monitoring phase. **Local Renewable energy generation and LowEx system:** Energy production (on-site monitoring) e.g. Energy from PV, HP (geothermal - electric kWh absorbed by the HP and thermal kWh produced), Energy consumption (on-site monitoring). Final energy consumption due to space heating, cooling, and DHW. Final electric consumption of the buildings.
WP9	Establishment of an Energy Community management and its standardization for the refurbishment process.

2. Impact



The key project outcome is the establishment and systematisation of streamlined processes and services for a simple and integrative approach towards more sustainable buildings in Europe. In Section 2, we demonstrate how the activities and expected outcome of ARV project will directly address all the Expected Impacts from the Call – **EICs** and other relevant impacts not mentioned in the call text (cf. Section 2.1.2). In Section 2.1.3 we identify the potential barriers that may hinder achieving such impacts and present measures to overcome those barriers. In Section 2.2. we provide a draft plan for the Dissemination, Exploitation and Communication strategies (cf. Sections 2.2.1, 2.2.2 and 2.2.5, respectively) that will realise the expected impacts of the project. We particularly highlight the involvement of key stakeholders across the value chain at local level and the participation of the relevant communities for the development of active and living neighbourhoods.

2.1 Expected Impacts

2.1.1 Expected impacts of the call

Table 2.1 gives an overview of ARV's expected impacts. The sub-sections below provide a comprehensive and detailed explanation of how each impact have been calculated, including baselines, methods, calculations, and target values.

Table 2.1 – Alignment of the project with the expected impacts dictated in the LC-GD-4-1-2020 call text.

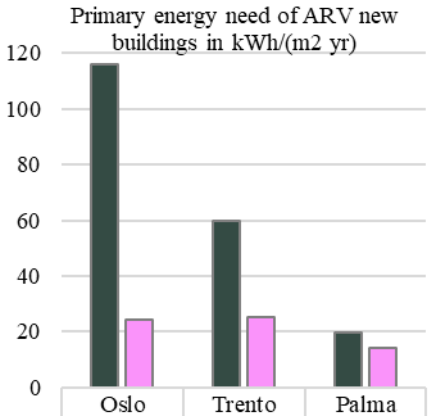
EXPECTED IMPACT of the CALL	SUMMARY OF ARV PROJECT'S IMPACTS
EIC1 - Primary energy savings triggered by the project	Total accumulated savings of 846 GWh in 5 years after project (year 2029).
EIC2 - Investments in sustainable energy triggered by the project	Accumulated investments 1080 M€ 5 years after the project (year 20209)
EIC3 - Demonstration sites that go beyond nearly-zero energy building performance and **EIC4** - High energy performance (nearly zero-energy level within the meaning of Directive 2010/31/EU for retrofitted / positive-energy level buildings for new constructions);	All the demonstrations within the ARV project are defined as "high energy performance" being either at least 'nearly zero-energy level' (renovations) or 'positive-energy level' (new construction).
EIC5 - Reduction of greenhouse gas emissions towards zero (in tCO2-eq/year) for the total life cycle compared to current situation shown through cradle-to-cradle LCA	Total accumulated savings of about 235 000 tCO_{2eq} in 5 years after project (year 2029).
EIC6 - Reduction of the embodied energy in buildings by 50 % without concessions with respect to energy consumption and comfort;	50-55% reduction compared to baseline, ref table 2.2 and associated explanation.
EIC7 - Reduction of air pollutants towards zero (in kg/year) for the total life cycle compared to current situation shown through cradle-to-cradle LCA	Total accumulated reduction of pollutants of 4 544 500 kg in 5 years after the project (year 2029)
EIC8 - Demonstration of high potential for replicability using new or existing innovation clusters incorporating the whole value chain	From the foreseen 8580 ARV projects, we estimate that the Innovation Clusters will be directly responsible for the commission of 4760 projects (55 %).
EIC9 - Shortened construction/retrofitting time and cost by at least 30%, in order to allow market uptake and social affordability	Key strategies will be employed to enable achieving a 34 % reduction in time and 32 % reduction in cost.
EIC10 - Improved final indoor environment quality by at least 30% and reduction of dust and noise during retrofitting by at least 30%, leading to higher rate of users' satisfaction, demonstrated according to the relevant CEN standard (or equivalent).	Key strategies will be employed to enable achieving a 30% reduction in dust and noise during retrofitting.

In the following, we detail how the ARV project will address the expected impacts of the call (**EICs**). In addition, for each EIC, we estimate the global impacts beyond this project within a 5-year period, based on the assumption that the ARV concept and outcomes will be adopted in 8580 projects and cover a total area of 12 417 000 m^2 (cf. Table 2.12 in Section 2.2.2.1). The rationale and data behind this assumption is further detailed in Section 2.2.2.

EIC1) Primary energy savings triggered by the project

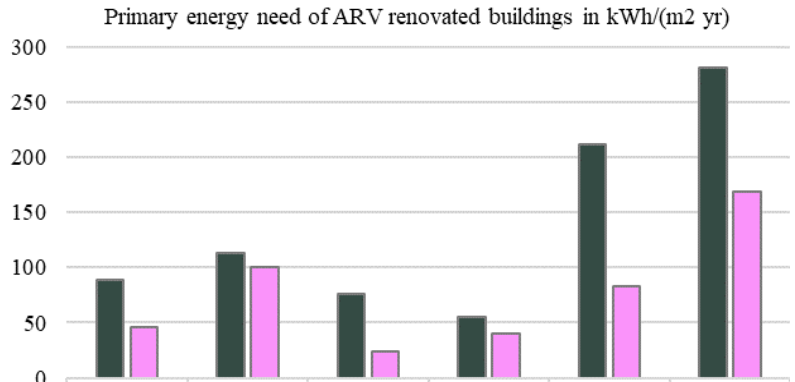
ARV will deliver highly efficient buildings (WP4-5), significantly exceeding the respective countries' building regulations (in new construction) and pre-renovation levels (in renovated buildings). Figure 2.1 shows the calculated primary energy need of the new buildings in ARV compared to the respective countries' building regulations (baseline). The results show that on average, the newly constructed ARV demo buildings use 67 % less primary energy than required in the building codes.

Figure 2.2 shows the calculated primary energy need of the renovated buildings within ARV. A significant improvement compared to the pre-renovation situation (44 % on average) can be achieved here as well. The rather small improvement of the Danish demo in Sønderborg where no upgrade of the building envelope is foreseen, is achieved by efficiency measures in the building energy system and management only. Such measures have a high potential for replicability and can be implemented very fast and cost-efficient.



	Oslo (NO)	Trento (IT)	Palma (SP)
Baseline	116	60	20
ARV	24	25	14

Figure 2.1 Primary energy need of new buildings in ARV compared to reference values from similar buildings according to the specific countries' building codes and local primary energy factors**.**



	Oslo (NO)	Sønderborg (DK)*	Utrecht (NL)	Karviná (CZ)	Trento (IT)	Palma (SP)
Baseline	89	113	76	55	212	281
ARV	46	100	23	40	83	169

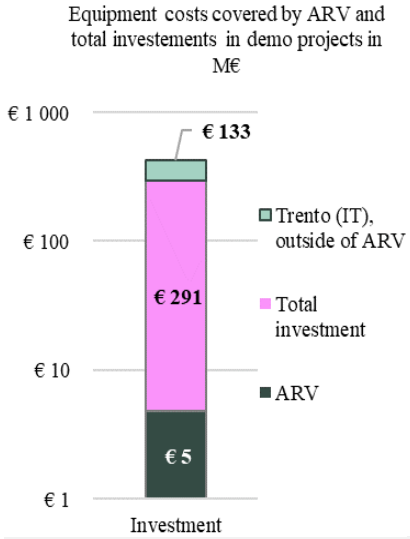
Figure 2.2 Primary energy need of renovated buildings in ARV compared to the situation before the renovation according to local primary energy factors. *Only from efficiency measures.

Thus, as a direct result of the ARV demonstration projects, 9.2 GWh of primary energy are avoided per year. Scaling up the impact of ARV considering building renovation, construction and demolition rates as an average of the countries reported Sandberg et al.'s work on dynamic building stock modelling in Europe[28], a total of 402 TWh of primary energy use can be avoided until 2030, and 1326 TWh until 2050.

The ARV project will provide a very significant contribution towards the EU aim of a 30 % cut in its annual primary energy consumption by 2030. The 6 demonstrations in the project are expected to contribute with total savings of about ***9.2 GWh/year.*** *Considering the market penetration/adoption detailed in Section 2.2.2, the ARV concept is expected to contribute with a total of* ***846 GWh in total accumulated energy savings in the first 5 years post project****.*

[28] Simplified projection, assuming the EU building stock is developing as an average of the countries in Sandberg, Nina Holck; Sartori, Igor; Heidrich, Oliver; Dawson, Richard; Dascalaki, Elena; Dimitriou, Stella et al. (2016): Dynamic building stock modelling: Application to 11 European countries to support the energy efficiency and retrofit ambitions of the EU. In Energy and Buildings 132, pp. 26–38. DOI: 10.1016/j.enbuild.2016.05.100.

EIC2) Investments in sustainable energy triggered by the project (in million Euro)



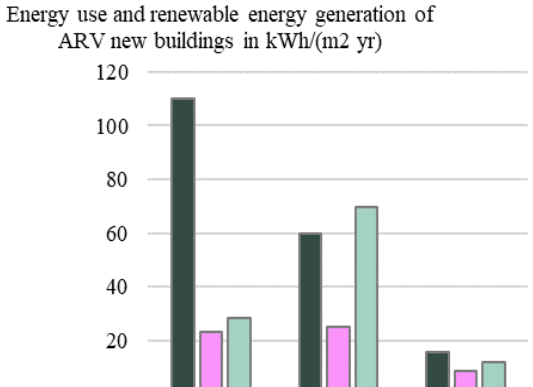
ARV will greatly contribute to increase investments in sustainable energy (considering energy system efficiency, and new renewable energy generation), with investments of 1.9 M€ (NO), 0.1 M€ (DK), 5.8 M€ (NL), 0.2 M€ (CZ), 1.2 M€ (IT), and 4.6 M€ (SP), in total of 13.8 M€. Considering that our demonstrations cover an area of 159,000 m^2, this equals an investment of 87 €/m^2. The total installation capacity in the ARV demo areas will be 3.3 MW. However, total investments in the demo projects triggered by ARV will be much higher. With investing about 5 M€ in equipment costs through ARV, a total of 291 M€ will be invested in the ARV demos by the partners. Including the part of the Trento (IT) demo which is not directly part of ARV but will still benefit from it, additional 133 M€ will be invested (see Figure 2.3).

Figure 2.3 Determined equipment costs covered by ARV and total investments in all demo projects by the partners.

Through dissemination, communication, and exploitation activities (during and after project) the ARV consortium will demonstrate the socio-economic and environmental benefits of using different sustainable energy technologies in residential and non-residential buildings. Therefore, based on the different technologies used, their current market maturity the level of penetration that we expect for the ARV concept, and with an estimated target area of about 12 417 000 m^2 within 5 years, ***the expected impact of ARV on investments in sustainable energy triggered by the project is 1080 M€****. The ARV concept is not based on a single sustainable energy source, which will maximize the potential for investments in sustainable energies.*

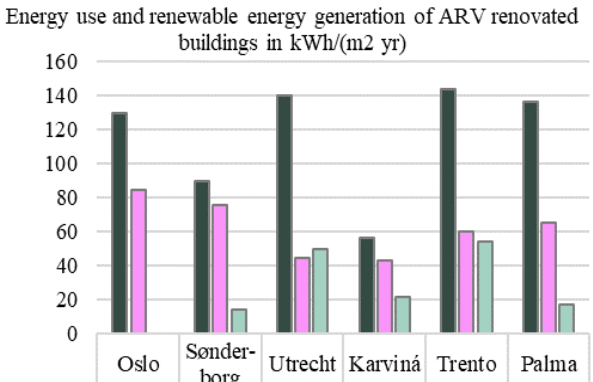
EIC3) Demonstration sites that go beyond nearly-zero energy building performance and

EIC4) High energy performance - nearly zero-energy level within the meaning of Directive 2010/31/EU for retrofitted and positive-energy level buildings for new constructions.



	Oslo (NO)	Trento (IT)	Palma (SP)
Baseline energy use	110	60	16
ARV energy use	23	25	8
ARV on-site generation	28	70	12

Figure 2.4 Calculated yearly energy use and renewable energy generation of new buildings in ARV compared to the baseline energy use taken as the minimum requirement from the respective national building codes.



	Oslo (NO)*	Sønder-borg (DK)**	Utrecht (NL)	Karviná (CZ)	Trento (IT)	Palma (SP)
Baseline energy use	130	90	140	57	144	137
ARV energy use	84	76	45	43	60	66
ARV on-site generation	0	14	50	22	55	17

Figure 2.5 Calculated yearly energy use and renewable energy generation of the renovated buildings in ARV compared to the baseline pre-renovation energy use. *Protected as historic monument, no PV possible. **Through the installation of a battery storage system, annual self-consumption will be increased by 60,000 kWh/year.

ARV will showcase high-performance buildings, both new constructed and renovated. The high level of energy efficiency and the implementation of smart energy management systems, renewable energy sources and passive design measures enables the three new constructions in Oslo (NO), Trento (IT) and Palma (SP) to become plus energy buildings (see Figure 2.4). Not only is the minimum building codes' requirements for energy use (baseline energy

use) expected to be reduced by an average of 61 %, but on-site renewable energy generation will exceed the obtained energy use in ARV by on average 80 % on an annual basis, corresponding to an annual surplus of renewable energy generation of 53 kWh/m^2 or in total 1.4 MWh.

In addition, the buildings to be renovated within ARV exhibit an excellent energy performance, reducing the baseline energy use (pre-renovation level) by an average of 42 % and generating 49 % of the obtained energy demand on-site from renewable energy sources (see Figure 2.5).

Scaling up the potential impact of ARV to a European scale, considering building renovation, construction and demolition rates as an average of the countries reported in Sandberg et al.'s work on dynamic building stock modelling in Europe[28], a total of 389 TWh of delivered energy can be saved until 2030, and 1281 TWh until 2050. Furthermore, renewable on-site energy generation across Europe would be increased by 177 and 580 TWh until 2030 and 2050, respectively. In the six ARV countries alone, the savings amount to 130 and 433 TWh, and the renewable on-site energy generation to 60 and 196 TWh until 2030 and 2050 respectively.

EIC5) Reduction of greenhouse gas emissions (in tCO$_2$-eq/year) for the total life cycle compared to current situation shown through cradle-to-cradle Life Cycle Assessment

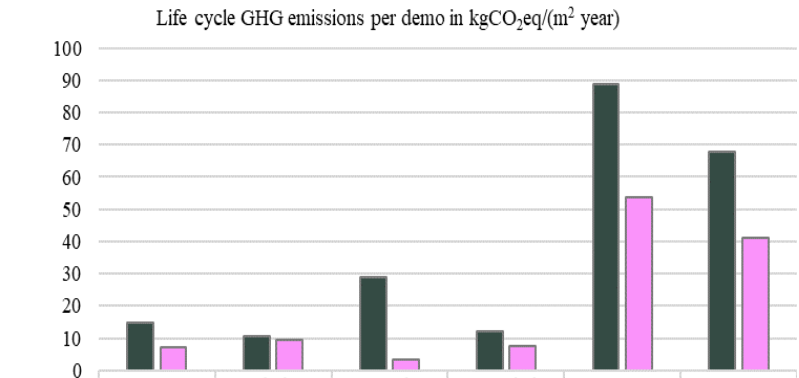


Figure 2.6 Calculated annualized life cycle GHG emissions in kgCO$_2$eq/(m^2 year) for the six ARV demos. For the baseline, the operational GHG emissions for new buildings are calculated from the minimum requirements for energy use according to national building codes for new buildings and typical national average values. For the renovated buildings, the situation pre-renovation was used as a baseline.

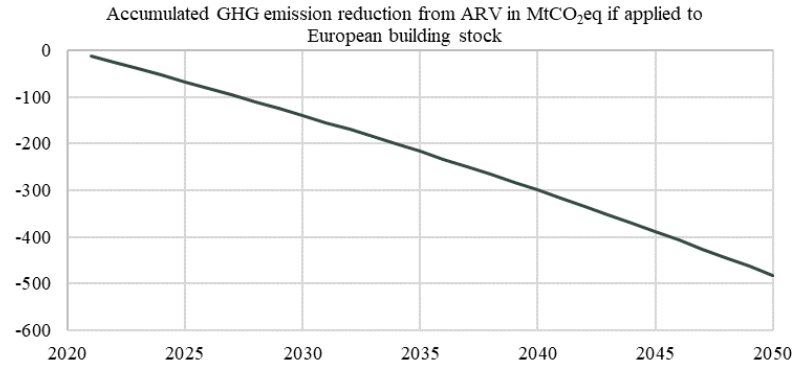


Figure 2.7 Accumulated GHG emission reduction from ARV in MtCO$_2$eq, using building renovation, construction and demolition rates as an average of the countries reported in Sandberg et al.'s work on dynamic building stock modelling

The data depicted in the following was obtained through a preliminary LCA analyses based on a simplified approach, since a comprehensive set of detailed data is needed to make a full cradle-to-cradle LCA. More detailed LCAs will be carried out in the ARV project, to fully assess and compare ex-ante and ex-post performances (WPs 4-8).

Figure 2.6 shows the project-averaged savings in kgCO$_2$eq/(m^2 year) for new construction and renovation. In ARV, the overall life cycle GHG emissions compared to the baseline are expected to be reduced by 48% or 2979 CO$_2$eq/(m^2 year). Scaling up these numbers, considering building renovation, construction and demolition rates as an average of the countries reported in Sandberg et al.'s work on dynamic building stock modelling in Europe[28], a total emission of 153 MtCO$_2$eq can be avoided until 2030 and 496 MtCO$_2$eq until 2050 (see Figure 2.7).

Considering the average of all energy renovations across EU28 that took place between 2012 and 2016, the relative annual GHG reduction per residential renovation is estimated to be roughly 9%, which represents an average reduced emission of roughly 11MtCO$_2$eq per year during this period[29]. ARV will enable an annual reduction of GHG in the demonstration sites of about 2979 tCO$_2$eq per year, which corresponds to an average of about 50% compared to the baseline emissions. Considering the average of the savings normalized to the area of each demonstration and considering the progressive implementation of the ARV concept within a total of about 12 417 000 m^2 in 5 years, we estimate ***total accumulated savings of about 235 400 tCO$_2$eq in 5 years****. We are therefore in the positive direction to achieve the EU goals of building related GHG emissions by 2050.*

[29] Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU. Final Report. EC. November 2019.

EIC6) Reduction of the embodied energy in buildings by 50 % without concessions with respect to energy consumption and comfort

Table 2.2 below highlights several ARV strategies to reduce the embodied energy (GJ/m^2) and embodied emissions ($kgCO_2eq/m^2$) of buildings, as well as the reduction achieved compared to the baseline, that will enable effective reduction of building materials' contribution to climate change. For Oslo (NO), Sønderborg (DK) and Trento (IT), the embodied emissions were used as a baseline, as the availability of data did allow for determining a representative baseline value for embodied energy in these countries. The baseline value used for the Oslo (NO) demo is an average of 39 school buildings in Norway[30]. For Sønderborg (DK) and Trento (IT), average embodied emissions from 34 residential buildings in Denmark[31] and 28 residential buildings in Italy[32] with a 50-year life span were used. For the Czech Republic and Spain, neither representative country-specific values for embodied energy nor emissions could be obtained, so average European embodied energy values from IEA Annex 57[33] for refurbishments (in case of Czech Republic) and an average of refurbishment and new construction (in case of Spain) was used. For the Dutch baseline, Koezjakov et al.'s reported value of 4.7 GJ/m^2 in their publication on embodied energy in the Dutch building stock was used[34]. The expected reduction of these baseline values is between 50 and 55% in the ARV demos.

The fact that reliable, representative data on embodied energy and embodied emissions for existing or even new buildings is so difficult to obtain, highlights ARV's exceptional importance in contributing to a better understanding of the building stock in Europe. During the course of the project, ARV will explore methods and report reliable data on embodied energy and emissions.

Table 2.2 Expected impact of ARV on reduction of embodied energy (*) and/or embodied emissions (**).

Demonstration	Baseline	Reduction	Examples of strategies triggering reduction of embodied energy
Oslo (NO)**	4.5	50 %	Application of low-carbon concrete with 40% lower embodied emissions than standard. Carbon neutral construction process. Wood based façade construction. Reuse of building parts and recycled materials
Sønderborg (DK)**	7.2	50 %	Renovation of existing building – reuse of building parts and reduced waste
Utrecht (NL)*	4.7	50 %	Reduce waste by Just Enough & JiT design strategy. Plug and play design: demountable parts. Circular hub for harvesting materials from demolition waste and processing for reuse in (integral) building components
Karviná (CZ)*	4.4	50 %	Components designed for easy mounting, removal, and recycling. Prefabricated wood-based elements.
Trento (IT)**	4.6	50 %	Prefabricated wood-based elements. Reuse of urban dismissed geostructure. Renovation with reuse of building parts.
P. de Mallorca (SP)*	5.3	55 %	Integrated design process & catalogue of solutions for refurbishment of buildings with 50% of energy reduction. Local bio-based materials. Renovation with reuse of building parts.

The ARV project will provide a significant contribution towards the EU aim of reducing the embodied energy in buildings by 50-55 % without concessions with respect to energy consumption and comfort.

[30] Wiik MK, Selvig E, Fuglseth M et al. Klimagasskrav til materialbruk i bygninger: ZEN Report No. 24, 2020

[31] Zimmermann, R. K., Andersen, C. M. E., Kanafani, K., & Birgisdottir, H. (2020). Klimapåvirkning fra 60 bygninger: Muligheder for udformning af referenceværdier til LCA for bygninger. Polyteknisk Boghandel og Forlag. Forskning i det byggede miljø, SBi Bind 2020:04 https://sbi.dk/Pages/Klimapaavirkning-fra-60- bygninger.aspx

[32] Freja Nygaard Rasmussen, Sara Ganassali, Regitze Kjær Zimmermann, Monica Lavagna, Andrea Campioli & Harpa Birgisdóttir (2019) LCA benchmarks for residential buildings in Northern Italy and Denmark – learnings from comparing two different contexts, Building Research & Information, 47:7, 833-849, DOI: 10.1080/09613218.2019.1613883

[33] Birgisdóttir, H.; Houlihan-Wiberg, A.; Malmqvist, T.; Moncaster, A.; Rasmussen, F. N. (2016): Evaluation of Embodied Energy and CO2eq for Building Construction (Annex 57). Available at: http://www.iea-ebc.org/Data/publications/EBC_Annex_57_ST4_Case_Studies_Recommendations.pdf

[34] Koezjakov, A.; Urge-Vorsatz, D.; Crijns-Graus, W.; van den Broek, M. (2018): The relationship between operational energy demand and embodied energy in Dutch residential buildings. In Energy Build. 165, pp. 233–245. DOI: 10.1016/j.enbuild.2018.01.036.

EIC7) Reduction of air pollutants towards zero (in kg/year) for the total life cycle compared to current situation shown through cradle-to-cradle Life Cycle Assessment

The data depicted in Table 2.3 was obtained from Eurostat from the source sector 'Residential: stationary'[35] unless marked otherwise. As in EIC6, finding reliable and representative data for all the air pollutants in all the demos is a challenging task and will be carried out during the project.

Table 2.3 Expected impact of ARV in the reduction of air pollutants for the total life cycle. *Baseline reported by partners.

	PM2.5					
	NO	DK	NL	CZ	IT	SP
Baseline air pollutants (in kg/year)	12.2	811.6	66.9	15.8	201.9	1258.2
Estimated air pollutants (in kg/year)	6.1	730.5	13.4	11.1	121.1	622.8
Reduction in air pollutants (in kg/year)	6.1	81.2	53.5	4.8	80.8	635.4
Savings air pollutants normalized to demo area	0.001	0.002	0.001	0.0004	0.0154	0.011
Savings potential in 5 years	11 500	60 175	35 925	11 272	387 758	284 717
Total accumulated savings in 5 years (kg)	**791 183**					
	PM10					
	NO	DK	NL	CZ	IT	SP
Baseline air pollutants (in kg/year)	14.0	826.5	69.9	20.6	204.5	452.4
Estimated air pollutants (in kg/year)	7.0	743.8	14.0	14.4	122.7	223.9
Reduction in air pollutants (in kg/year)	7.0	82.6	55.9	6.2	81.8	228.5
Savings air pollutants normalized to demo area (kg/m²)	0.001	0.002	0.001	0.0006	0.015	0.004
Savings potential in 5 years	13 197	61 277	37 574	14 653	392 557	102 370
Total accumulated savings in 5 years (kg)	**621 705**					
	NOx					
	NO	DK	NL	CZ	IT	SP
Baseline air pollutants (in kg/year)	25.8	777.5*	275.4	903.7	510.2	1556.2*
Estimated air pollutants (in kg/year)	12.9	701.4	55.1	632.6	306.1	770.3
Reduction in air pollutants (in kg/year)	12.9	76.1	220.3	271.1	204.1	785.9
Savings air pollutants normalized to demo area (kg/m²)	0.001	0.002	0.006	0.024	0.037	0.013
Savings potential in 5 years	24 321	56 409	147 969	642 953	979 474	352 156
Total accumulated savings in 5 years (kg)	**2 203 233**					
	Sox					
	NO	DK	NL	CZ	IT	SP
Baseline air pollutants (in kg/year)	12.1	67.2*	14.8	390.7	63.9	1888.8*
Estimated air pollutants (in kg/year)	6.1	60.5	3.0	273.5	38.4	934.9
Reduction in air pollutants (in kg/year)	6.1	6.7	11.9	117.2	25.5	953.9
Savings air pollutants normalized to demo area (kg/m²)	0.001	0.0002	0.0003	0.011	0.005	0.016
Savings potential in 5 years	11 406	4 980	277 940	267158.5	122 374	427 435
Total accumulated savings in 5 years (kg)	**851 950**					
	CO					
	NO	DK	NL	CZ	IT	SP
Baseline air pollutants (in kg/year)	0.5	14.8	52.8	27.2	9.1	43.5
Estimated air pollutants (in kg/year)	0.3	13.3	10.6	19.0	5.5	21.5
Reduction in air pollutants (in kg/year)	0.3	1.5	42.2	8.2	3.6	22.0
Savings air pollutants normalized to demo area (kg/m²)	2.1E-05	4.2E-05	0.001	0.0007	0.001	3.7E-04
Savings potential in 5 years	471	1096	28 360	19 348	17 276	9 840
Total accumulated savings in 5 years (kg)	**76 412**					
TOTAL ACCUMULATED SAVINGS in 5 years after project (kg)				**4 544 483**		

Taking into account the average of the savings normalized to the area of each distribution and considering the implementation of the ARV concept within a total of 12 417 000 m^2 in 5 years, the ARV concept is expected to contribute with ***total accumulated savings in pollutants of 4 544 483 kg*** *within the 5 years after project. The 6 demonstrations in the project, are expected to contribute with total savings of* ***4093 kg/year****.*

[35] https://ec.europa.eu/eurostat/databrowser/view/ENV_AIR_EMIS__custom_355943/default/table?lang=en

EIC8) Demonstration of high potential for replicability using new or existing innovation clusters incorporating the whole value chain

Even though the activities and demonstrations within this project target specific buildings and sites, they are representative of climates, regions, and architectural styles found across Europe. ARV will demonstrate simple and integrative strategies that can be applicable with minimal constraints to other regions. Ensuring actual replicability requires the commitment of established **Innovation Clusters as part of the exploitation strategy** (cf. Section 2.2.2), where the knowledge and strategies will be concentrated and disseminated within the local value chain, and will play a significant role in the Exploitation, Dissemination, and Communication activities. Specifically, each demo site will engage with the corresponding municipalities, housing associations, and scientific & technological partners, creating a convergency point for easier exchanges amongst local partners, but also with higher level partnerships with European coverage, e.g., at the level of technology distributing companies, that will enable cross-links amongst the Innovation Clusters. It will facilitate solution sharing e.g., for the distribution of prefabricated components or the dissemination of novel innovative energy management solutions.

By establishing highly replicable and simple/integrative approaches, with direct links to local Innovation Clusters and aggregated with the e-market area, we ensure that not only the knowledge and experience is maintained, but also that the network and resources amongst relevant local stakeholders are strengthened. This is a key step into ensuring that new projects will arise beyond the timeframe of this project. We anticipate that in the first year of commercialization 100% of the projects will be commissioned directly to the Innovation Clusters (469 projects), this percentage will decrease gradually over the years when the e-market ramps up. ***In total, from the foreseen 8580 ARV projects, we estimate that 4760 will be commissioned via the Innovation Clusters.*** *A detailed overview of the projects commissioned via Innovation Clusters is further detailed in Section 2.2.2.*

EIC9) Shortened construction/retrofitting time and cost by at least 30%, in order to allow market uptake and social affordability

Building owners have highlighted construction times and costs to be important decision factors when considering constructing or retrofitting buildings. A stakeholder consultation on the renovation wave initiative showed that **92%** of respondents indicate **lack of or limited resources** to finance building renovations as a barrier to do building renovations, as well as the **complex and lengthy processes** and capacity of construction contractors to deliver[36]. Therefore, it is expected that reducing time and cost of sustainable construction strategies would have a tremendous impact in boosting building renovation rates and depth, thus increasing demand that would benefit all relevant stakeholders, including constructors, tenants, and building owners.

ARV cost reductions result from several measures related to the various ARV demos: NO: implementation of the circular renovation strategy, optimizing the construction site (Circular Hub and Material Hub), use of electric construction machineries; DK: cost reductions for design, manufacturing and construction of the Circulation Booster equipment. NL: early engagement of the tenants at start of renovation (social renovation), and use of pre-fabricated and modular Inside-Out building elements; CZ: using digital construction solutions during the construction value chain, off-site prefabrication, use of just-in-time-concept, maximizing use of skilled workforces that can multitask, and minimize construction reworks; IT: off-site standardized prefabrication, more precise survey techniques that reduces errors and inform off-site prefabrication, and reduced on-site construction time; SP: off-site prefabrication and integrated design since the beginning of the project.

ARV time reductions are a result of: NO: early engagement and better communication of planning (use of AR/VR environments) to the local community in the planning process, implementation of the integrated circular design strategy in the early design phase, using pre-fabricated and modular solutions, and optimization of the construction site management; DK: more efficient installation of automatic equipment and more efficient use of simulation/software; NL: using zero-engineering, and prefabricated and modular Inside-Out building elements; CZ: using digital construction solutions during the construction value chain, close collaboration in the project design phase and engagement of all stakeholders involved in the processes, education of workforce that can multitask, and minimize construction reworks; IT: use lean construction; SP: implementation a Public Private Partnership between the city council and a main company to manage the process entirely while also implementing a participative strategy that involves end-users (i.e. district residents) in the project.

[36] Stakeholder consultation on the renovation wave initiative. Synthesis Report. European Commission, Directorate-General for Energy. October 2020.

The estimated current times of construction are in the range of 12-72 months, depending on the extent of the construction/renovation and the complexity of the project. Average reductions in both time and cost for all the six demonstration sites in ARV are given in Table 2.5. The numbers are obtained by comparison of time and cost estimations for ARV processes and solutions to average construction/retrofitting times and costs for traditional construction processes and solutions achieving the same energy performance. Further reductions are expected when the procedures and solutions are implemented in other projects after ARV, because of more experience and larger volumes. For some of the demos these reductions are included in the table.

Table 2.5 Expected impacts of ARV in the reduction of construction/retrofitting time and cost. The table shows expected reductions during the ARV project period and after the ARV project has completed (in parenthesis), where this has been estimated, i.e. when the solutions have been scaled up and fully integrated in the market.

Demonstration	Time reduction	Cost reduction
Oslo (NO)	33%	30%
Sønderborg (DK)	38%	35% (up to 40%)
Utrecht (NL)	40%	35%
Karviná (CZ)	33% (38%)	31% (34%)
Trento (IT)	35% (up to 50%)	30% (35-40%)
Palma (SP)	25%* (35-38%)	32% (40%)
AVERAGE REDUCTION OF TIME & COST (%)	**34 & 32**	

Making cost-effective and time-effective construction and renovations to result in social affordability and market uptake is in the core of ARV concept. In average, the adoption of ARV concept, is expected ***to reduce time and costs by 34% and 32%*** *(on average within ARV project), respectively.* *For the demo in Spain the renovation time reduction is 35% and newbuilt time reduction is 15% (i.e., an average of 25%). The new built time reduction of 15% will increase to 30% when the innovative solutions are standardised in the market.

EIC10) Improved final indoor environment quality by at least 30% and reduction of dust and noise during retrofitting by at least 30%, leading to higher rate of users' satisfaction, demonstrated according to the relevant CEN standard (or equivalent).

Indoor Environmental Quality (IEQ) is a fundamental component in the construction and renovation process and leads to healthy and comfortable environments. Building designs that accommodate appropriate ventilation systems, with environmentally friendly materials, and that take into consideration air pollution (see EIC 7) are very important to establish a good IEQ. The six demonstration sites have employed diverse strategies to **achieve at least 30% reduction of dust and noise during retrofitting, leading to an improvement of IEQ of at least 30%**. Such strategies include clever designed connections will help to reduce noise and dust levels over a shorter period, optimized HVAC, industrial produced components mounted on the outer façade to avoid inside construction activities, and architecturally integrated noise reducing façade elements for natural ventilation. New buildings will at least reach IEQ_I, refurbished buildings at least IEQ_{II} according to ISO 17772-1:2017. Pre- and post-occupancy evaluations will be carried out in all ARV renovation demos to **ensure at least 30 % improvement in IEQ**, where the pre-occupancy IEQ was evaluated as IEQ_{II} or worse.

2.1.2 Other expected impacts beyond the 10 EICs specified in the call

Table 2.6. Summary of ARV key impacts that go beyond the 10 EICs specified in the call text.

Impact category	How ARV will contribute to achieving the impacts	Targets	KPIs
1) Circular Economy and Resiliency	Maximizing reuse of buildings by lean renovation applying life cycle analyses (WP5, 8), minimize waste and pollution by prefabrication and industrialization (WP5), design for long-lasting, easy to repair, reuse and recycling of building components (WP4, 5). Use of local bio-based materials (WP4, 5). Design for flexibility of building use (WP4), and flexible and secure energy systems and storage (WP6,7).	50% reduction in life cycle GHG emissions compared to ex-ante condition or current practice. Apply all relevant *Level(s)*[37] *CEIs.*	kg CO_2-eq/m^2 over 60-100-year lifetime. # of Level(s) CEIs applied.
2) Social-environmental qualities	Design for well-being and good indoor environment qualities including good daylight and visual qualities, indoor air quality, thermal comfort, acoustics, and accessibility for persons with disabilities and senior citizens (WP4-5). Included in multiple benefit analysis (WP3 and WP8)	At least 30% improvement compared to ex-ante condition	% of users moving up the satisfaction scale

[37] https://ec.europa.eu/environment/topics/circular-economy/levels_en

	Design for comfortable outdoor conditions, i.e. solar and daylight access, visual qualities, and shielding from wind and noise (WP4-5).	At least 30% improvement compared to ex-ante condition	% of users moving up the satisfaction scale.
	Minimize disruption to occupants during renovation by off-site prefabrication and minimizing the time spent on site (WP5).	30% reduced construction time. Close to zero disruption	Construction time and intervention
	Awareness raising, engagement and education by arranging Living Labs with co-creation, (WP3), creation of Citizen Energy Communities (WP2)	At least 12 activities per year involving at 1000 people.	Number and scope of activities per year
3) Smartness	Design for high energy efficiency and make use of smart home services and controls, smart building components, and smart but simple systems for user interaction/involvement (WP4-7).	Average impact score more than 70%.	Smart Readiness Indicator (SRI)
4) Energy flexibility and security of supply	Design for high energy efficiency and make use of smart home services and controls, smart building components, and smart but simple systems for user interaction/involvement. Exchange of data between buildings, energy systems and people through community digital hub. Automated algorithms for weather and performance forecasting. (WP4-7)	At least 30% improvement compared to ex-ante performance	Daily net load profile in kW; utilisation factor in %, share of self-consumption / self-generation in %.
5) Affordability and alleviation of energy poverty	ARV will demonstrate scalable solutions for renovation of social housing and public buildings that will give significant reductions in construction and operation costs, while provide good indoor climate and architectural qualities (WPs 2-9).	30% reduction in construction costs and at least 50% reduction in energy/power bills.	Reduction in Euro compared to current standards.
6) Job creation, innovation capacity and industrial competitiveness	All stakeholders: reinforce or establish new collaborations in the value chain of CPCC, PPPs, increased understanding of customer needs (all WPs). Increased health and well-being of citizens (WP2-8), value creation from reduced energy and power use (WP3,4,5), use of on-site RES and storage + EVs (WP6), and increased flexibility (WP7, 9), human capital program for job creation (WP3), standardization and industry 4.0 processes (WP5),	At least 20% increase in value creation of ARV partners and the creation of about 12-20 000 new jobs per year[38] (based on the investment of the ARV developers 2022-2024).	Revenue in Euros, # of jobs created
7) Standards and regulations	ARV will contribute to revised building and energy regulations, in particular on benchmarks and documentation needs for GHG accounting and for revised energy/power performance codes, and to the SRI. For financing ARV will contribute to a new standard for green digital bonds (green STOs).	Provide input to national and EU level through at least 20 meetings and publications	# of publications and meetings with regulation bodies
8) Knowledge creation	ARV will contribute to knowledge creation among all stakeholders in the consortium, to the group of associated innovation clusters, to the occupants in the demo projects through Living Labs (WP3), Energy Communities (WP2), and to a wider audience through communication and dissemination activities (WP10)	Ref dissemination and communication plan (section 2.2.1)	Number and scope of events (section 2.2.2)
9) Contribution to key EU policy goals	The renovation wave[39]: ARV will demonstrate a streamlined, efficient and replicable workflow for resource efficient renovation of social housing and cultural heritage public buildings (WP5).	133 400 m^2 of buildings renovated to nZEB standard or better	# of m^2 buildings and energy
	Climate targets: ARV will contribute to the targets of 50-55% reduction of GHG emission by 2030 and 90-95% by 2050, by demonstrating and validating scalable CPCCs.	50% reduction in life cycle GHG emissions compared to ex-ante condition/current practice.	kg CO_2-eq/m^2 over 60 years lifetime.

Specific impacts for the participating partners

The ARV project will advance the innovation in the construction and renovation sector through a comprehensive portfolio of strategies suitable for different climatic conditions, in different cultural context targeting social housing and public buildings. Fig. 2.8 outlines the positioning of the industrial partners and their respective contribution to the post-project exploitation of the project results from a value-chain perspective. As shown in the figure, the consortium partners cover the entire value chain from material providers to final customer and building users. The industrial partners will have a key role post-project for the successful market uptake of the developed solutions, not only creating new market opportunities but also strengthening competitiveness and the growth of the companies (cf. Section 2.2.2 for details on the Exploitation strategy). In the following, we briefly describe the expected impacts from the project for each of the industrial partners involved.

[38] 12-18 local jobs per million Euros invested in energy efficiency, IEA, Sustainable Recovery, June 2020.
[39] https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

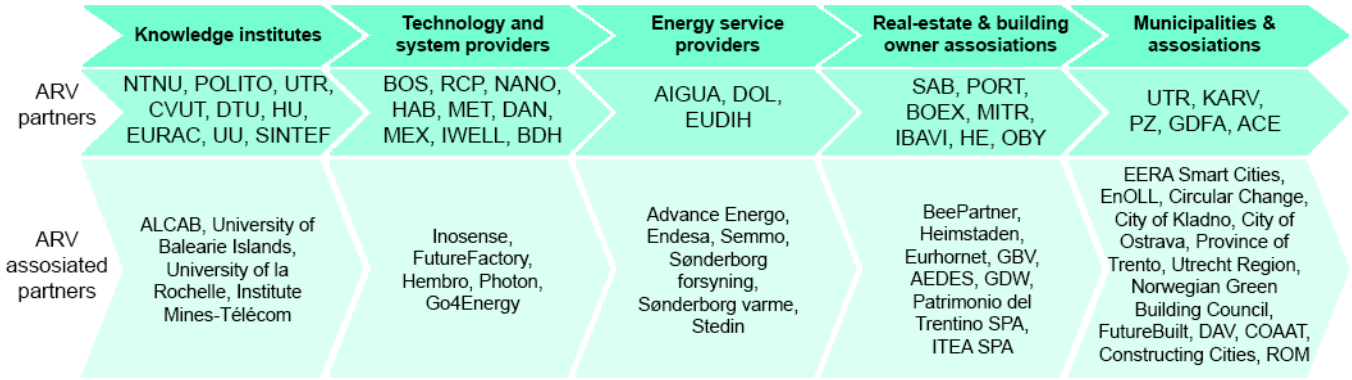


Figure 2.8 ARV value chain, highlighting the role of all consortium partners and the associated partners documented through Letters of Support.

Table 2.7 Expected benefits for the ARV **industrial** partners

Partner	Expected Impacts
ENFOR	*Direct benefits*: The improved forecasting model should help ENFOR double its sales within 3 years. ENFOR estimates hiring 1 new development engineer during the project, and the increase of revenue should bring 3-6 new employees in 5 years. The tools developed within this project will be sold globally through current sales distribution agreements and the foreseen exploitation strategy. *Indirect benefits*: The successful achievement of the project will enable ENFOR to consolidate customer relationships and continuously strengthen its position as leading provider of solutions for the energy sector. It will also enable exploring multiple new methods for improved energy forecasting with DTU.
Danfoss	*Direct benefits*: As part of the exploitation partnership, Danfoss will deliver a solution – Circulation Booster Concept – for smart efficient operations based on external signals from electricity and district heating production. Danfoss estimates 1-5 new jobs in product management, production, and services within 5 years post-project, which can increase depending on the added value of the solution trend. *Indirect benefits*: The successful achievement of the project and of the inclusion of Danfoss solutions in the demonstrations will strengthen the #1 position in smart and efficient solution for district heating systems and be at the forefront of combining district heating substation technology with heat pump.
Mex Architects	*Direct benefits:* The project will allow Mex Architects to directly participate in the construction of contemporary building components and building typologies, benefiting from the increased ARV efficient processes that enables taking up more projects without ramping up internal resources. *Indirect benefits:* The inclusion of efficient, sustainable and attractive renovations within this project in their portfolio will strengthen Mex Architects position in the field, generating further market demand.
iWell	*Direct benefits:* iWell will benefit from demonstrating the iWell Cube batteries, which if successful can quickly be scaled up to use in multiple flats and neighbourhoods as a flexibility service to the grid operators and housing corporations in a Flexibility as a Service (FaaS) model. iWell estimates doubling its current employment through the hire of maintenance employees and installers and software engineers. *Indirect benefits:* The successful project outcomes will contribute to one of the core iWell R&D pathways, and therefore has the potential to accelerate developments in this track considerably. It will also increase visibility and new strategic partnerships, such as with grid operators, housing corporations, provinces and municipalities.
BOS GROEP	*Direct benefits:* The participation in this project will enable BOS to further improve smart renovation solutions for high-rise buildings such as facades and integrated roof modules with collective infrastructures for multiple heating services. By improving the products design, materials, and industrialisation features, BOS expects lowering production costs and making them financially more attractive, thereby increasing revenues. The increase in projects will enable BOS to start an off-site production facility for prefabricated installation modules and to create new jobs. *Indirect benefits:* The successful project outcomes will impact the overall company innovation strategy and propel novel R&D innovation pathways.
RC Panels	*Direct benefits:* RC Panels will benefit from participating in ARV by increasing yearly renovations from 1000 homes to 4000 homes within 4 years, supported by increased industrialisation and prefabrication. The ARV project will also enable joint developments with housing associations (representative of future clients) and other innovative companies for high-rise solutions. *Indirect benefits*: Participation in this project will contribute to the generation of new technical solutions and associated knowledge for integrating installations in building parts. It will also greatly increase the visibility and client portfolio of RC Panels, which will contribute to future projects and growth.
Metro-vacesa	*Direct benefits:* The developments foreseen in this project of Integrated service for monitoring and control of centralized systems in multifamily buildings will be implemented in future MV Residential Developments based on the degree of customer satisfaction, considering the results of this project, which will improve client satisfaction and MV business. The project will directly result in contracting 2 employees during the project and the additional business will lead to the creation of 3 new jobs. *Indirect benefits:* Will gain exclusive access to strategies and partnerships that will be relevant for future real-estate applications and be integrated in post-sale evaluations for future developments.
Aiguasol	*Direct benefits:* Participating in the ARV project will enable improvement of automatization of HVAC systems design, digital twin development, and improvement of BIM integration of simulation tools and results leading to doubling Aiguasol capacity to 800 k€ projects yearly. This will have a direct effect of contracting 2 new development engineers during the project and 6 new engineers after the project.

	Indirect benefits: This project will enable novel research & development of tools for PV output sharing.
Dolomiti Energia	*Direct benefits:* The participation in the ARV project is a crucial enabler to continuing their efforts of promoting energy efficient services as an ESCO that protect the environment. *Indirect benefits*: Dolomiti Energia will strongly benefit from the partnerships and increased visibility obtained through the participation in this project, which may be highly relevant for the customer's decision-making process.
Nano-Power	*Direct benefits:* NanoPower will benefit from participating in ARV by directly supplying second life battery energy storage systems to the demonstration sites and gain experience on how to optimally integrate and operate them in CPCCs as part of the planned exploitation strategy. *Indirect benefits*: Participation in this project will greatly increase the visibility and client portfolio of NanoPower, which will contribute to future projects and growth.
Buro de Haan IT	*Direct benefits:* The participation in this project will enable further developments on various algorithms for the pre-recognition of façade geometries, enabling the analysis of a building in a better and flawlessly manner as well as streamlining the construction process by automating the necessary engineering calculations. (including construction calculations, environmental calculations, legislative tests. This would lead to several breakthroughs with a direct impact in the business. *Indirect benefits*: Given that this is a new market, we expect that the participation in this project will greatly increase the visibility and market awareness of our work, as well as more collaborative projects.

The remaining partners will also directly benefit from the collaborative effort in this project. Table 2.8 summarizes the impacts for these partners. For simplicity, some were grouped based on their profile.

Table 2.8: Expected benefits from ARV for the **non-industrial** partners

Partner profile	Partner	Expected Impacts
University and Research Institutes	Norwegian University of Science and Technology, Czech Technical University, Technical University of Denmark, EURAC Research, SINTEF, Catalonia Institute for Energy Research, University of Applied Sciences Utrecht, Utrecht University, Politecnico di Torino, University of Trento	*Direct benefits:* Participation in ARV will strongly advance the state-of-the-art knowledge in innovative methods, solutions, and technologies to create sustainable patterns of behaviour and contribute to all integrative aspects of Circular Climate Positive Communities. *Indirect benefits:* The generated knowledge and established strategic partnerships will be relevant to other research areas within the Universities and further advance scientific breakthroughs. In the longer term, Universities expect to contribute to standardisation (national and EU level, such as the Level(s), skills and education training as well as policy making in the development of sustainable neighbourhoods.
Municipalities	Municipality of Utrecht Municipality of Karvina Palma City Council	*Direct benefits:* Participation in ARV represents a step forward into creating more Circular Climate Positive Communities that make neighbourhoods and cities more sustainable. The results will serve as examples and best practices for adjacent district renovation projects in the cities. *Indirect benefits:* The successful outcome of the project and the strategic partnerships will be relevant to implement more solutions in the future.
Housing associations / Corporations	SAB Housing Association, Stichting Bo-Ex '91, Mitros, IBAVI, Housing Europe	*Direct benefits:* The ARV innovations will used in the building stock managed by these associations, increasing their reach to potential new users. *Indirect benefits:* The participation in ARV will increase the network and future partnerships of these associations, laying foundations for future successful projects.
OsloBygg	*Direct benefits*: The participation in this project will generate new knowledge and experience in the full life cycle of new sustainable buildings, their management operations and their integration in urban neighbourhoods. *Indirect benefits:* The inclusion of successful demonstration cases in OsloBygg portfolio will attract further partnerships and business, making it a reference for widespread sustainable public buildings.	
Habitech	*Direct benefits*: The increased collaboration and integrative approach gained from this project will enable better implementation of smart-efficiency projects on individual buildings and on urban scale, from the planning stage to the implementation and the management and the performance analysis. *Indirect benefits:* The access to the unique ARV business network will provide a framework to give Habitech members a more comprehensive approach and access to novel solutions.	
EU Digital Innovation Hub	*Direct benefits:* Participation in this project will directly contribute to advancing the state-of-the-art and enlarge the digital platform/hub with more partners and more services. *Indirect benefits:* The generated partnerships will be relevant for the commercial partners using the digital platform running their services, with more available choices.	
Project Zero	*Direct benefits*: The participation in ARV will encourage the establishment of partnerships and sharing solutions to establish a leading position for Sønderborg and Denmark in CO_2-neutral growth and sustainable cities, the main goal of Project Zero. *Indirect benefits*: The generated collaborations will enable a transition to sustainability cities around the world.	
The Green Digital Finance Alliance	*Direct benefits:* The adoption of innovative sustainable business models and financial mechanisms developed during the project would directly impact their standard mode of operations. *Indirect benefits:* This project will enable the creation of a network of stakeholders with high potential to collaborate and further promote sustainable digital finance practices at national and international levels.	
Architects Council of Europe (ACE)	*Direct benefits:* Through the participation in the ARV project, the ACE will have a strong voice and participation in the decision-making process in the architectural services foreseen, thereby ensuring a balanced and valuable legacy for the future that complies with ACE´s mission. It will also enable future guidance to architects on how to provide high quality architectural services to clients whilst working to ensure that the regulatory environment for architectural practice facilitates the achievement of this aim. *Indirect benefits:* The partnerships established will contribute to fostering cross-border cooperation and facilitating the European practice in the context of relevant EU directives and policies.	

2.1.3 Barriers and obstacles to achieve the expected impacts

There are several potential external barriers that may influence the outcome and impact of the project. We describe the barriers below, and present ways of overcoming these barriers.

- **Lack of trust that renovations are economically attractive,** coupled with **high costs of interventions**. There is also the idea that even comprehensive renovations may not reduce running costs, or that shallow renovations may already help reduce running costs and still increase the cost of buying and renting. Our project will provide proof of the applicability and advantages of undergoing deep renovations, and the benefits it brings to building owners and users by demonstrating the value of the proposed solutions (multiple benefits framework).
- **High (perceived) effort** that demotivates owners and occupants to undertake renovations, coupled with difficulties in decision-making processes in multiple ownership residential buildings. In addition, energy efficiency is not always the main reason to invest in such a project, and owners often prioritize high comfort levels, personalization, and aesthetics, which can make the alignment with energy interventions a challenge. It is also unclear how energy performance would influence real estate prices, which may be demotivating for owners. ARV will address this barrier by providing validated, accurate, and information that is easy to access and understand for all stakeholders (validated real-world demo projects, e-marketplace, one-stop-shop, guidelines/blueprint for planning, design, construction, operation and use of CPCCs).
- **Difficulty in accessing financial support**, not only in obtaining loans for renovations in residential buildings but also long payback periods, unpredictability of costs throughout renovations, and high upfront payments before receiving financing. Barriers to issuances of green digital bonds are currently being lifted in the EU via increasing regulatory clarity of crypto assets. However, there is no guide or standard for green digital bonds (green STOs). The ARV project will contribute to correcting this failure (WP9). Through the demonstration of the success of the solution in the demo projects, this provides investors and loan agencies with the confidence that they will see a return on their investment. Also, creating the capability to trade energy in a fair and efficient way, will provide an economic incentive to building owners.
- **Insufficient technical expertise** amongst local and regional authorities, along with shortage of skilled workforce, especially for large-scale renovation projects. This often constraints the applicability of certain technologies in specific cases and poses resistance to the installation of new techniques or energy efficiency measures due to concerns on their maintenance. The ARV project will deliver an e-marketplace with integrated technical expertise and validated suppliers so that the owner can buy tested and guaranteed services and respective training.
- **Complex and conservative nature of the constructive sector**, who often do not easily accept major changes in their way of working, particularly in cases where new skills and technical expertise is needed. The slow and long project commencements are also perceived as a major obstacle to start construction and renovation projects. The reduction in time and costs of construction and renovation activities, as well as the integrated, streamlined, digitalized, and simplified production processes to be delivered by ARV, will address these challenges.
- **Limited uptake of smart technologies and digitalisation** is a potentially significant barrier, one that is vitiated within the project by a combination of highly experienced project partners with a long track record of deploying smart building/smart energy systems innovation, a wide range of large enterprises and SMEs across the entire value chain, and a clear digital-first strategy to lower costs, simplify the renovation/construction process, and use technology in a more systematic fashion.
- **Uncertainty about the future use of the building**, such as changes in services, demography, rural exodus, which increases reluctance to renovate. In addition, a common so-called split incentive barrier, where the owner pays for the renovations, but the occupants benefit from it, is a barrier. ARV strategies to engage with occupants and the integrated approach of energy efficiency/RES/storage in the value chain of CPCCs (from planning to use), will contribute to increasing the uptake of ARV solutions.
- **Wide applicability of the technologies in multiple solutions may be impaired,** e.g., where there are specific architectural constraints or concerns on the maintenance and reliability of new installations. The ARV project will address this challenge by demonstrating and validating solutions in a wide range of contexts (cultural, climates, typologies) enhancing the flexibility and scalability of the solutions.
- **Lack of attractive financing products** is listed in the Renovation Wave as the most common barriers to efficient building renovation. ARV will work with some of the world's leading financial institutions (WP9) in collaboration with real estate investors, public authorities, and construction/building industry partners to deploy and evaluate novel financing instruments that will bridge the risk/reward gap for both public and private housing owners, building industry, property developers, and public authorities.
- **Regulation and policy barriers** exist in some European jurisdictions to scale platform-based prosumer business models. This risk is lowering the incentives for citizens to transition from consumers

to prosumers of energy. The European Electricity Regulation and Directive provide the basis for an ambitious European Green Deal and Green Recovery[40]. Many articles in both the Electricity Regulation and Directive are crucial in removing existing regulatory barriers to demand-side flexibility, and for enabling active participation of energy consumers in order to increase efficiency and in the transition to clean energy. While some of the provisions of the Regulation were immediately applicable with its publication in the Official Journal of the European Union in June 2019, several provisions are expected to be transposed into national legislation by December 2020. However, a comprehensive demand response aggregation framework is still missing in most countries. ARV aim at releasing the barriers for demand side efficiency and flexibility by sustainable design, data-driven renovation, and a hierarchy of digitalization setups in order to enable customers and local communities to act as active customers without being subject to disproportionate technical requirements, administrative requirements, procedures and charges. Thus, ARV aim at demonstrating how to remove existing regulatory barriers to demand-side flexibility, to enable an active participation of all energy consumers in the clean energy transition.

2.2 Measures to maximize impact

Dissemination and exploitation activities are key factors to the success of the ARV project, as they will engage stakeholders and contribute to knowledge exchange between actors from different sectors, maximizing its benefit to the European economy and society. The dissemination strategy will focus on promoting the project scientific and technical actions & results, including training; workshops and events to engage stakeholders in mutual learning activities. Moreover, the exploitation strategy will ensure the effectively use of ARV results through scientific, economic, political, and societal routes and will guarantee that the impact of the outcomes is maximized after the completion of the project activities. In the following subsections, we detail our strategies for effective dissemination, exploitation, and communication of project results for the successful delivery of ARV expected impacts.

2.2.1 Dissemination activities

A dedicated Work Package (WP10) has been designed to ensure the maximum impact of the research for the whole industry and research community as well as building/energy value chain and citizens, through high transparency and full dissemination of the research results. The dissemination strategy aims to engage relevant stakeholders in all the activities conducted during the four-year project, contributing to setting the foundations of a long-lasting relationships for the promotion of scalability and market update of the developed solutions at a wider level including industry, policy makers, governance, and civil society. ARV will also foster synergies at EU level, contributing to EC activities and priorities as the Green Deal initiative. To reach those purposes the project will implement a dissemination plan for ARV results (WP10), which considers the following aspects: ***(i)*** Project target stakeholders; ***(ii)*** Dissemination tools and channels; ***(iii)*** Message; and ***(iv)*** Monitoring and evaluation. The dissemination plan will be monitored, reviewed and regularly updated throughout the course of ARV project to ensure the maximum impact is achieved.

The Dissemination Plan for the four-year activities outlines the dissemination goals, target audiences, key messages, strategies and responsibilities, consortium benefits, and communication channels. The details of this plan shown below and will be consolidated into a detailed report with planning and timing of the activities to fit with the start date of the project and upcoming events. Additionally, contextualized Dissemination and Communication Strategies will pe prepared for each CPCC Living Lab demo, addressing the specific communities at neighbourhood & district level for each of the 6 kkCPCC LLs in Norway, Spain, Denmark, Czechia, Italy and the Netherlands.

ARV target stakeholders

Six primary stakeholder groups have been identified and clustered: 1) construction/building; 2) citizens/end-users; 3) policy makers/regulators; 4) research community; 5) investment/business community; and 6) media/civil society. Table 2.9 details the stakeholder groups that will benefit from ARV activities/results and contribute to its long-term scientific and innovation capacity. The project partners have strong contacts with a number of national and international stakeholders in the areas of construction and energy, which will be leveraged during the project implementation and after expected results are achieved. Each of the identified stakeholder groups will benefit from the project in different ways and will have different dissemination and exploitation tools and activities to reach them.

Table 2.9 Stakeholder groups targeted by ARV dissemination activities.

[40] https://smarten.eu/wp-content/uploads/2020/11/FINAL_smartEn-EMD-implementation-monitoring-report.pdf

Stakeholder groups	Types of organizations/individuals	How stakeholders benefit from ARV & How their involvement contributes to maximizing ARV impact
Construction / building sector (Potential E-market members)	Material providers and portfolio managers, Constructors, Architects, Service providers, Real-estate representatives	First-hand contact with the technology & proposed strategies will enable direct implementations of solutions at early phase, while at the same time ensure the replication of the ARV strategies and therefore the growth of the envisaged outcomes.
Citizens (End-users)	Building owners, Tenants, Landlords Associations (cooperatives), Municipalities	The effective end-users of the sustainable buildings will benefit from the use of strategies that contribute to a sustainable environment, with economic savings in their electricity bill.
Policy makers and regulators/ authorities	EU Commission, Policy makers, World Green Building Council	Be informed about the benefits of ARV for the future of a sustainable European economy growth. New regulations and policies for more efficient buildings. Standardized processes, services, & business models between the different stakeholders.
Research community and educational institutions	Universities and research institutes (non-profit and commercial) Associations/networks of researchers/ scientists	Engage in mutual learning actions with ARV partners, contributing to enhancing research and innovation competences in the area. Knowledge spill-over.
Investment Companies and Business Associations	Business Europe Association, European Small Business Alliance (ESBA), European Capital, European Investment Bank, Alternative Investment Management Association (AIMA), Association of Investment Companies (AIC)	Be conscious about the developments in a cutting-edge sector with great impact in Europe's economic development. Support the further development of the sector and the upscaling and large-scale sustainable hubs.
Media groups, journalists, communicators	Synergies with relevant networks and projects	Contribute to inform the civil society about the economic and environmental benefits of ARV. Contribute to aware citizens for sustainable actions.
Broad public / citizens / non-profit organizations	General Public	

Dissemination (and Communication) tools and channels

The dissemination & communication actions aim to make European stakeholders aware of ARV benefits, relevant to their own core interests (energy & construction actors; building owners, tenants, renters, etc; academics/education; technology/industry promotion). To address the multitude of stakeholders, appropriate tools and channels will be implemented. The dissemination & communication channels (e.g. BUILD UP[41], ECTP[42] etc) will include:

- The creation of an ARV project visual design identity and templates for documents and presentations
- The production of a brochure & poster with an introduction to the ARV project
- The development of the project's website, associated with ARVs social networks (LinkedIn, Twitter)
- Digital newsletters will be developed regularly, disseminated to relevant project stakeholders, and uploaded on the project website, to transmit the progress of the project and the outcomes of the activities to all actors that may be interested in the research and that may be eventually involved in future research activities
- Support packages with decision support tools, description of processes for mentoring of the **Living Labs** (LLs) managers, and training material for citizens (prepared in WP3) will be further disseminated as part of the tailor-made Dissemination and & Communication Strategies developed in WP10
- A series of programmes, incl. Open Days, interactive guided tours, talks, workshops &festivals will take place at local level, to make the experience of each CPCC Living Lab more engaging & accessible to citizens
- Conferences will be organised together with targeted events to engage with industry & civil society
- A project result booklet containing description of all the results achieved in ARV will be produced with the contributions of all partners involved in the 6 CPCC demos sites
- Short video series & podcasts focused on ARV results & the citizens' experience of the CPCC LLs activities.
- Other tools will be used to target particular types of stakeholders such as social media, Web 2.0 technologies including features in specialist publications to be accessed by different types of stakeholders, or project/external events
- The dissemination of scientific and technical achievements will be done by open tools like Google Scholar & Research Gate, while relevant scientific communications will be available in the project website;

The **e- marketplace area** will be set up and embedded on the website, as a **"one stop shop".** There, all project results will be merged, providing guidelines for end-users, links to different resources, information on product suppliers,

[41] https://www.buildup.eu/en
[42] http://www.ectp.org/

software, spreadsheets, and datasets. Training material and technical guidance will also be included. Information will be easily filtered by type, topic, scale, country, license, etc. This area will also serve as a contact point for all demo projects targeting Climate Positive Circular Communities, enabling virtual connectivity and collaboration. Another channel that will be implemented concerns attending and delivering presentations about the project and the R&D collaborations, national and internationally, at relevant scientific/technical events. Direct communication with individuals (face-to-face meetings, workshop, webinars and/or direct emailing), targeted emailing to relevant organizations identified, and publication of news on the websites/newsletters/social networks of organizations of the partners' networks will also be fostered (see WP10).

Key Messages

Our messages will be direct and easy-to-remember. They will drive the project's C&D activities by conveying **how ARV responds to key societal challenges** such as climate change, housing affordability, energy poverty, citizens' health and well-being, economic recovery, and **how the project's outcomes are relevant to our everyday lives**, by creating jobs, introducing novel technologies, and in making a positive impact on the planet and the quality of life. ARV messages will be **tailor made to the type of activity they relate to** (communication or dissemination) and will be updated over the course of the project. Nonetheless, the consortium has defined a few preliminary messages for the dissemination and communication of the project:

- Climate Positive Circular Communities, where people can thrive and prosper for generations to come
- Beautiful, sustainable, together in CPCC
- Renovation for recovery, resilience, and social inclusion
- Environmental-friendly, safe, healthy, affordable living places & communities for all
- CPCC will make renovation a win-win for climate neutrality and recovery
- Greener and resilient communities
- CPCC to reconcile climate and social goals.

Monitoring and evaluation

As soon as the project kicks off plans need to be implemented, monitored, and elaborated, a monitoring strategy is foreseen (WP1, WP8). The evaluation will be carried out on a regular basis to ensure an effective impact assessment and update or redefinition of dissemination and exploitation activities and safeguard the high quality of the dissemination and exploitation carried out. Evaluation criteria and monitoring activities are depicted below:

- Evaluation criteria: impact measurements indicators. Table 2.10 shows the qualitative and quantitative indicators to measure the impact and thus, for conducting the most accurate assessment of the dissemination activities.
- Monitoring procedures: reporting and feedback. To facilitate an accurate monitoring and assessment of the dissemination activities, and to understand the impact of the actions carried out, all partners will register their ARV activities. Moreover, all partners will prepare their dissemination and exploitation activities according to the action plan &report, at least every 6 months to the AEB; all partners will register the activities in the dissemination and exploitation-reporting document; and all partners will keep evidence of the activities conducted. The dissemination strategy will be implemented taking into consideration that all relevant IPR are protected. Hence, results will be made public only after due consideration of IPR issues and respective protection, under the supervision of the Innovation Management Board and ARV Exploitation Board.

Table 2.10 Impact measures and target values.

Indicators to measure impact	Measurement technique/source	Target value
Scientific and Technical Results	Papers published in scientific journals with high Impact (e.g. Building Research & Information, Energy Build, Int. J. Life Cycle Assess, Renewable and Sustainable Energy Reviews, Architectural science review); International invited/plenary/keynote communications and poster presentations.	> 4/year > 5/year
Number of total visits to Project´s website	Project website is registered in Google analytics that offers a free service that generates detailed statistics about the visitors to a website.	1000 / year
Number of distributed brochures	Analysis of the partners' individual dissemination plans and reports.	200 / year
Number of scientific events attended in which the project is disseminated	Scientific events.	8
Number of technical events attended in which the project is disseminated	Technical events.	8
Number of person-to-person meetings/ communications	Person-to-person meetings/communications.	25
Number of targeted emails	Targeted emails.	200/ year

Nº of news published in other networks' websites	Other networks' websites.	12
Number of LinkedIn and Twitter follows/members	LinkedIn and Twitter registry.	300

2.2.2 Exploitation of results

The ARV exploitation board will be established as a vehicle for scaling the business models and financing instruments. The Exploitation Board will be composed in part by strong innovation clusters as well as financial sector players that will spread the green building and renovation concepts to provide momentum to the 'renovation wave' that will be politically underpinned. The ARV exploitation methodology will be structured in T9.6 as a three-step process as shown in Figure 2.9.

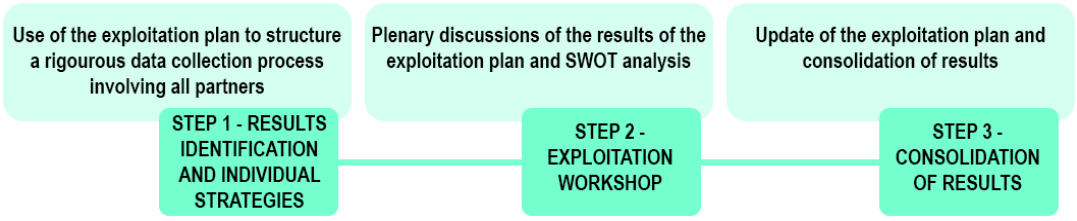


Figure 2.9 Exploitation methodology in ARV

2.2.2.1 Exploitation and Business Plan outline

The exploitation plan for the project innovations will be pursued with relation to **short-** and **long-term** objectives. The **short-term objectives**, within the four-year time frame and closely linked to WP1, WP8, WP9 and WP10, will be to:

1) Facilitate knowledge exchange with the ARV Exploitation Board to continuously identify commercially viable innovations and protect any further IP arising from the project,

2) Make recommendations for replication based on multiple benefit analyses (task 8.5, D8.8),

3) Develop business and financing models proven in other markets for adaptation in the EU to accelerate the renovation wave. (D9.2),

4) Design business model blueprints for energy positive retrofits for different asset classes as modules for replication across the EU (D9.3),

5) Design building-linked financing instruments for FI adoption in re-estate portfolios (D9.5),

6) Develop green digital bonds guide to scale prosumer flexible energy markets (D9.6)

7) Enable scaling across EU markets of energy positive renovation. (D9.7), and

8) Develop and expand the network of potential stakeholders in the value chain, including industrial partners, SMEs, and investors to further propel post-project activities (through ARV exploitation board and associated innovation clusters).

9) Establish an e-marketplace to merge project results with links to resources, product suppliers, etc. (D10.3)

The creation of an e-marketplace will enable the aggregation of all the project results, innovations, technology providers, and service providers. The e-market will include the necessary tools to streamline the process and deliver the necessary services and installations, and the financing mechanisms put in place will facilitate their uptake. In addition, **Innovation Clusters** (see Figure 2.10) that include ARV partners and other stakeholders from whom we received Letters of Support will be formed with the goal of serving as a local vehicle to facilitate the implementation of the envisioned solutions. They will include not only local stakeholders, but also larger international players, both academic and industrial, offering a broad yet still highly scalable solution.

The Innovation Clusters of ARV bring together key stakeholders from the whole value chain of CPCCs: knowledge institutes, tech and system providers, energy service providers, architects, real-estate and building owners, municipalities and regional authorities, financial institutes, and different organizations working to promote sustainable buildings and communities. In ARV, there are country specific clusters organized around the ARV demos and a common EU-wide cluster serving both the local clusters and acting as multipliers to the EU-wide market, see Figure 2.10.

The **long-term objectives** are closely linked to the potential uptake of ARV strategies and will be based on the growth of the solution as more end-users provide success stories. This growth is estimated in our market analysis, as depicted in the following section, and rely on the Innovation Clusters, the innovative Financial Mechanisms (WP9) and the success of the ***e-market area*** (i.e. increase the overall brand awareness of ARV solutions and innovations). Our goal is the establishment and systematization of streamlined processes and services towards the creation of more sustainable buildings in Europe. This will directly contribute to placing in the market **12 000 000 m² of renovated and new buildings** employing the ARV concept and strategies by 2029, as estimated by our Market Analysis below.

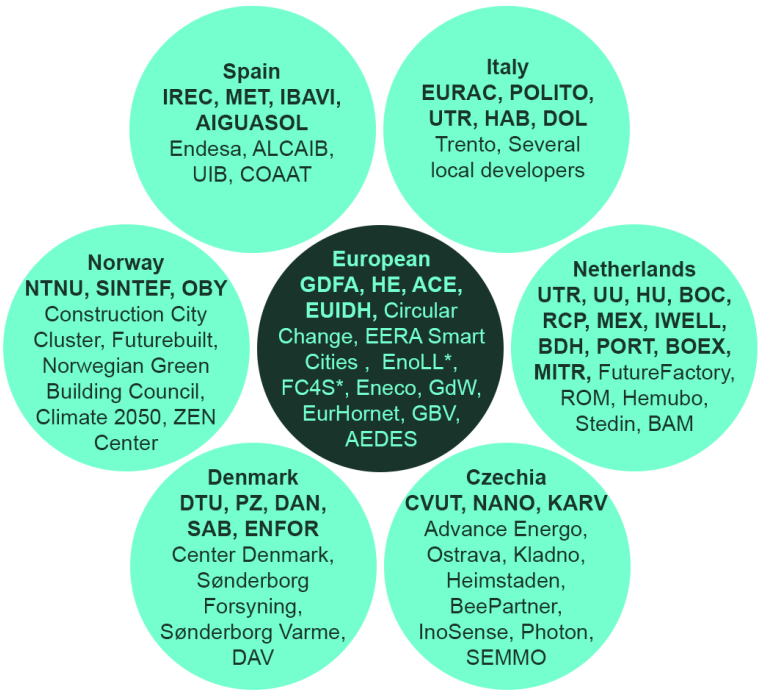


Figure 2.10 The innovation clusters of ARV: The country specific clusters and the common European cluster acting as incubators on the European scale market. Names in bold signify ARV partners, while the other names are associated partners confirmed through Letters of Support to ARV (attached) (*EnoLL: European Network of Living Labs, FC4S: Financial Centres for Sustainability (UN convened)).

Market analysis and Business case for ARV

ARV innovations have a huge market potential. The European building stock is aging and in need of replacement or renovation, which constitutes a considerable market potential, and therefore play a strong role in stabilizing the building sector, especially in a crisis period. The annual **turnover** in the construction sector (all activities) is in the region of €1,400 billion and that the **turnover** dedicated to **renovation** and maintenance activities is in the region of €370 billion[43]. The market for building energy efficiency products and services, including energy management technologies, water heating, and HVAC, was approximately €41 billion in 2015 and is expected to rise to €80.8 billion by 2023 (CAGR of 7.7%)[44]. The exploitable innovations envisaged in this project have a promising revenue potential.

Considering the known and predicted construction and renovation rates, we have estimated the overall market potential, which constitutes the total number of buildings in the EU expected to be constructed or renovated. From those, we have estimated the number of ARV projects that could be developed each year, and calculated the respective % market share, number of projects, and area. Following the principles of the proposed Renovation Wave, and considering the distribution of the ARV demonstration cases, we foresee more renovation projects than new constructions as the largest market. **Assumptions/input:** The market potential was calculated using data[45,46] on number and distribution of buildings as well as the forecasted construction and renovation rate, resulting in the following: EU building stock: 258 820 000; EU residential buildings: 219 685 150; EU non-residential buildings: 39 134 850; average area of residential building: 91,8 m²; average area of non-residential building: 6380,5m². The ARV's potential market penetration was based on estimations resulting from a feasibility study based on the input of ARV's partners with experience in launching new concepts and product in the construction market. The ARV potential is segmented by type of building (i.e., residential *vs* non-residential) and type of intervention (renovation *vs* new construction).

[43] https://www.renovate-europe.eu/category/news/, accessed January 2021.
[44] http://renovate-europe.eu/wp-content/uploads/2015/09/Final-pdf-version.pdf
[45] https://ec.europa.eu/energy/eu-buildings-factsheets_en
[46] Sandberg, Nina Holck; Sartori, Igor; Heidrich, et al. (2016): Dynamic building stock modelling: Application to 11 European countries to support the energy efficiency and retrofit ambitions of the EU. In Energy and Buildings 132, pp. 26–38. DOI: 10.1016/j.enbuild.2016.05.100

Table 2.11 – Overall market potential and ARV potential.

MARKET POTENTIAL		Year 1 (2025)	Year 2 (2026)	Year 3 (2027)	Year 4 (2028)	Year 5 (2029)	TOTAL in 5 years
	Construction Rate	**1.11 %**	**1.10 %**	**1.08 %**	**1.07 %**	**1.05 %**	
New	residential	2 443 165	2 409 880	2 376 594	2 343 308	2 310 023	**11 882 969**
	non-residential	435 227	429 297	423 368	417 438	411 509	**2 116 840**
	Renovation Rate	**1.26 %**	**1.26 %**	**1.27 %**	**1.27 %**	**1.28 %**	
Renovated	residential	2 762 707	2 773 359	2 784 010	2 794 661	2 805 313	**13 920 050**
	non-residential	492 150	494 048	495 945	497 843	499 740	**2 479 726**

ARV POTENTIAL		Year 1 (2025)	Year 2 (2026)	Year 3 (2027)	Year 4 (2028)	Year 5 (2029)	TOTAL in 5 years
New (#)	residential	122	241	594	820	1 155	2 932
	non-residential	44	64	127	188	247	670
Renovated (#)	residential	166	277	696	1 118	1 543	3 800
	non-residential	59	124	174	324	500	1 179
	TOTAL	391	706	1 591	2 449	3 445	**8 582**
% by Innovation Clusters		100 %	80 %	65 %	50 %	45 %	**4 764**
New (area, m2)	residential	11 219	22 132	54 565	75 322	106 074	269 312
	non-residential	277 697	410 870	810 390	1 198 560	1 575 379	4 272 895
Renovated (area, m2)	residential	15 223	25 470	63 919	102 662	141 699	348 974
	non-residential	376 820	788 068	1 107 533	2 064 716	3 188 592	7 525 728
	TOTAL	680 958	1 246 540	2 036 407	3 441 259	5 011 744	**12 416 909**

In summary, we estimate that, 5 years after the ARV project, a projected total number of about 8580 projects will be implemented with ARV innovations, for both residential & non-residential purposes, constituting a total area of about 12 417 000 m^2 of sustainable buildings which, ultimately, results in the total impacts described in EIC1-10.

ARV innovations will go beyond energy/cost reductions and direct CO2 savings. They will also enable energy flexibility to be commoditized and traded by the citizens as prosumers. Integration of flexible energy solutions in real-estate portfolios offers a new pathway to strengthen returns on energy retrofit financing. In ARV, we will leverage the benefits of energy positive neighbourhoods to create new incentives for citizens and financial service institutions to invest in energy efficiency via business model and financial instrument innovation, while considering regulatory and policy aspects.

The revenue stream and pricing model for the exploitable results will be based on the pricing of the individual solutions available in the e-market, combined with the necessary technical support, installation costs, and consultancy work. Therefore, predicting these values, at this stage, is difficult, as it is highly depending on: **i)** the extent of the renovations requested, which can range from minor to deep, **ii)** the level of technical expertise & time required to support the customer, **iii)** the specific challenges posed by e.g., geographical & / or architectural constraints, which could impact the final price per project, **iv)** geographical location and consequently cost per square meter. To perform a fair assessment of the pricing, we followed the EP report[47] on estimations of the renovation pricing, where the cost of minor renovations is €60/m^2, moderate renovations is €140/m^2, extensive renovations is €330/m^2 and nearly-zero renovations is €580/m^2. With the assumption that on average the users will perform moderate to extensive renovations (i.e., **€235/m^2** for residential buildings and **€124/m^2** for non-residential buildings), and that the price of new

Table 2.12 Business case for the ARV project.

		Average cost per project (€)	Total investment in ARV based projects in 5 years (M€)	Total revenues per total ARV partners & *e-market* companies in 5 years (M€)
New	residential	142 900	520	390
	non-residential	5 232 010	3 390	2 542
Renovated	residential	21 582	139	104
	non-residential	790 181	905	679
TOTAL			**4 953**	**3 714**

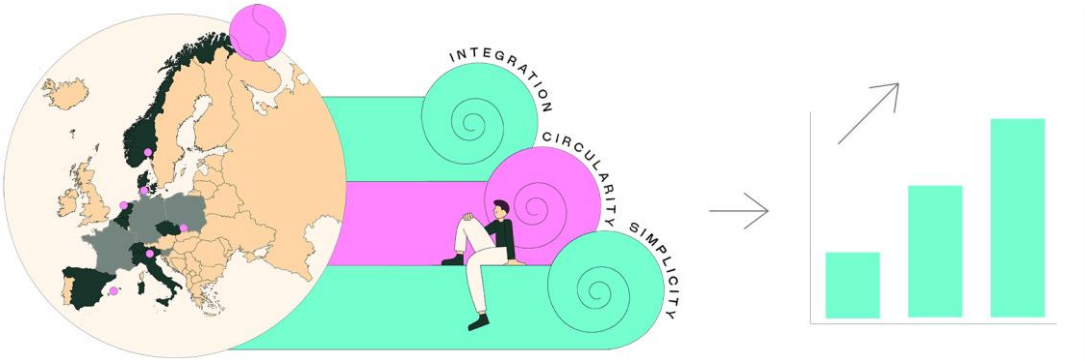
[47] https://www.europarl.europa.eu/RegData/etudes/STUD/2016/587326/IPOL_STU(2016)587326_EN.pdf

constructions would be on average **€1556/m²** (residential[48]) and **€820/m²** (non-residential[49]). Based on a conservative approach, for this forecast, the ARV consortium considers that, the ARV consortium will be able to capture 75% of the cost involved in renovation and new construction activities.

Based on these estimates, we can project a total aggregated revenue in 5 years of €3.7 billion for all the ARV partners and the companies within the ARV.

2.2.2.2 Commercialization Strategy & Routes to Market

Key exploitable results



ARV innovations (see table 1.7 in Section 1.4.2) **have the potential to be commercially exploited as products or services**, such as the 'Inside-Out energy façade modules', the 'Timber/bio-based plug-and-play modules', the 'LowEx system', the 'Digital Logbook for CPCC', the 'Circulation Booster', the 'Urban Energy Geostructure', the 'Green Security Token Offering (STO)', the 'Circular hub for optimized construction', the 'One-Stop-Shop for the large-scale renovation of urban areas', the 'iWell Cube', etc. The innovations will be commercialized together with technology and system providers in the ARV consortium. Service innovations routes to market will be paved in dialogue with energy service providers, real estate and building owner associations, and financing bodies. The municipalities and associations that are part of or associated with ARV will help to create an even larger pull in the market, further speeding up the transition towards CPCCs.

The six demonstration project clusters will, together with the ARV **Exploitation Board (AEB)**, be the key enabler and route-setters for market implementation and upscaling of ARV innovations. The AEB will ensure early identification and scalability of commercially viable innovations supported by the Innovation Manager (IM) and Innovation Management Board (T1.3). These groups will work together and liaise with possible partners and stakeholders outside the ARV consortium to identify the market for exploitable innovations. As ARV progresses, the AEB will work with partners and advise in developing Business Plans for exploitation. The associated partners of ARV will aid in further expansion of market for innovations. Through this pro-active approach, the consortium will identify and approach sources of private and public sector funding for follow-up developments after ARV ends.

WP1 and WP9 include tasks particularly addressed to achieve a successful and measurable exploitation, where the value for further use will be assessed, such as:

- The assessment of expected socio-economic impact of the knowledge and technology generated and the factors that would influence their exploitation (standardization, ethical or regulatory aspects, etc.)
- Detailed market study and uptake potentials and plan for internationalization and replication
- Financial opportunities and business models and technological implementation plan
- Methodology and strategy for an appropriated management of the knowledge generated in the project and IPR protection, according to the interest of the beneficiaries (T1.6)
- Analysis of the exploitation potential of the project results, reviewing all aspects from the point of view of potential investors, internal or external, and marketing people

[48] Manganelli et al, Sustainability 2019, 11, 249; doi:10.3390/su11010249

[49] https://zebra-monitoring.enerdata.net/overall-building-activities/average-cost-of-renovation-in-non-residential-per-m2.html#average-cost-of-construction-for-new-tertiary-buildings.html

- Analysis of transferability of the practices to the six jurisdictions as well as analysis of how to link revenue from flexible energy assets to the real-estate financing models to strengthen return potential
- Scale-up, level-up, mainstreaming of ARV through cooperative innovation, including replication profiles, feasibility studies, IP rights and market access.

An ***e-marketplace*** (D10.3) will aggregate, potentiate and exploit the ARV innovations. It will be launched on the ARV website as a ***one stop shop***, also serving as the main interface and contact point for all demonstration projects (current & future) targeting CPCCs, enabling virtual connectivity and collaboration, and acting as a communication and dissemination channel. It will serve as a database for all technology and service providers, as well as materials & local resources. The ARV e-marketplace will provide guidelines for end-users, links to different resources, information on product suppliers, software and datasets, as well as training material and technical guidance. The e-marketplace increases the potential for replicability, which will occur through the engagement from end-users and e-market members. This has advantages both for e-market members and to end-users of the proposed solutions.

Table 2.13 Benefits for *e-market* members and end-users.

Benefits for *e-market* members	Benefits for end-users of the proposed solutions
• Their products and services will be promoted under a seal of sustainability • Customers will find them without significant effort. • They will benefit from the synergistic approach the aggregated e-market enables. • The companies will benefit from increased visibility and market awareness. • The simple, integrative, and streamlined process is an incentive for end-users to adopt the solution. • The option for companies to sell their individual products enables targeting the DIY (Do It Yourself) market, which has a large market value and is represented by homeowners that undertake own stepwise renovations. These users are likely to be easily engaged to the ARV concept and integrative approach.	• End-users have access to a centralized shop, where they can find all the solutions for the full construction and/or renovation process. • The e-market platform connects the end-user to an educated project manager that will advise on the most efficient and appropriate solution, not for a specific component but for the whole project. • The process is highly streamlined and integrative, as opposed to fragmented stand-alone solutions. This will enable better services and faster installation times. • They will be directed to local stakeholders, that are able to target specific constraints of the relevant climate, geography, and architectural heritage. • End-users will benefit from the latest innovations in the respective fields, ensuring the best possible solution for a specific problem.

2.2.3 Research Data Management

ARV will generate many different types and forms of data. This will include reports, specifications, methodologies, processes, and energy data, to mention a few. Any data relating to the demo sites, *e.g.*, utility bills and metered data, will remain strictly the property of the demo sites and will only be shared with the permission of the demonstration site owner. Prior notice of any planned publication shall be provided to the Management Board at least 45 days before the publication. Any objection to the planned publication shall be made in accordance with the rules of the Consortium Agreement (CA). If no objection is made within the time limit stated above, the publication is permitted. For the avoidance of doubt, a Party shall not publish Foreground or Background of another Party, even if such Foreground or Background is amalgamated with the Party's Foreground, without the other Party's prior written approval. If any confidential information is provided for dissemination purposes or to the External Advisory Board (EAB) to gain valuable feedback for potential market exploitation, each member of the dissemination activity or EAB must sign a Non-Disclosure Agreement, assuring that they will not disclose the information to any third party. Relevant data protection acts will be complied with in full, and all personal data will be anonymized before it is used for academic research/commercial enterprise. In the following, we provide a brief analysis of the main elements of the ARV data management policy. The main elements comprise: ***(1)*** the type of data that will be collected, processed or generated, ***(2)*** the methodology and standards that will be used, ***(3)*** how this data will be exploited or shared and, finally ***(4)*** how it will be curated and preserved.

- Data set reference and name, identifier for the data set to be produced, and data set description
- Description of the data that will be generated or collected, its origin (in case it is collected), nature and scale and to whom it could be useful, and whether it underpins a scientific publication. Information on the existence (or not) of similar data and the possibilities for integration and reuse.
- Standards and metadata, and data sharing
- Reference to existing suitable standards of the discipline. If these do not exist, an outline on how and what metadata will be created.
- Description of how data will be shared, including access procedures, embargo periods (if any), outlines of technical mechanisms for dissemination and necessary software and other tools for enabling re-use, and definition of whether access will be widely open or restricted to specific groups. Identification of the repository

where data will be stored, if already existing and identified, indicating the type of repository (institutional, standard repository for the discipline, etc.).
- In case the dataset cannot be shared, the reasons for this should be mentioned (e.g. ethical, rules of personal data, intellectual property, commercial, privacy-related, and security-related).
- Archiving and preservation (including storage and backup)
- Description of procedures that will be put in place for long-term preservation of the data; indication of how long the data should be preserved, what is its approximated end volume, what the associated costs are and how these are planned to be covered.

ARV addresses the above-mentioned points, as part of the dissemination activities. In addition, the ARV Exploitation Board (AEB) and Innovation Manager IM will consider the additional guidance laid out and adapt where appropriate.

2.2.4 IPR / Knowledge Management and Protection

For the success of the project, it is essential that all project partners agree on explicit rules concerning IP ownership, access rights to any Background and Results for the execution of the project and the protection of intellectual property rights (IPRs) and confidential information before the project starts. Therefore, such issues will be addressed in detail within the CA between all project partners. The CA between all consortium partners will contain a description of each partner's role in the project and their expected contribution. Moreover, the CA will establish a legal framework for the project in order to provide clear regulations for issues within the consortium related to the work, IP-Ownership, Access Rights to Background and Results and any other matters of the consortium's interest. All partners have agreed to sign the obligatory CA in line with official Commission guidelines. The EM will be responsible for finalising the section on IPR in the CA. The CA will be finalized at the GA phase.

IPR management structure and process

The process for IPR management during the project has been designed to guarantee a structured process in place to identify, assess and protect the IPR generated throughout the project. At the centre of the IPR management process is the General Assembly (GA), which will oversee formulating the overall IPR strategy and ensuring compliance with Commission guidelines. Once the IPR strategy has been formulated and agreed upon by all partner representatives in the GA, the implementation of the IPR strategy will be handled by the EM.

Each partner is solely responsible for identifying the results that they generate in the project and report this to the AEB. Partners, in consultation with the AEB, are also responsible for carrying out a structured assessment process, including a thorough patent search, to determine whether foreground is best exploited via protection or through other means. Finally, if necessary, formalised license agreements with third parties may be implemented where this is deemed necessary to maximise exploitation of results, i.e., in geographical areas or market segments which the consortium is not able to service.

Principles for IPR ownership and access rights

As it will be described in detail in the CA, the partners preliminarily agree that the IP dealing with each of the main project results will be jointly owned by the partners involved in their development. If any Result is created jointly by at least two project partners and it is not possible to distinguish between the contribution of each of the project partners, such work will be jointly owned by the contributing project partners. Any joint Results, including inventions and all related patent applications and patents shall be jointly owned by the contributing parties. Details concerning jointly owned Results, joint inventions and joint patent applications would be addressed in the CA.

Patents application will be filed in any case where the requirements for inventive step and novelty seem to be fulfilled and there is industrial and commercial applications. Several partners in the consortium have previous experience in patent applications in their respective areas of expertise. The AEB and the Coordinator will draw upon this experience to ensure full compliance with EU and international rules and regulations on IPR. To ensure a smooth execution of the project, in the Consortium Agreement the project partners will grant each other and their affiliated companies, royalty-free Access Rights to their Background and Results for the execution of the project. This will allow the researchers the ability to execute the project to the best of their ability, without being hindered by administrative issues. The Consortium Agreement will define further details concerning the Access Rights for Exploitation to Background and Results.

Measures to provide open access to peer-reviewed scientific publications.

A central aim of this consortium is to provide benefit to the European community. Some of the project partners may be either using Open-Source code in their deliverables or contributing their deliverables to the Open-Source communities. Details concerning open-source code use will be addressed in the CA. The project budget includes Open Access Publication Fees to ensure research publications will have open access regardless of the journal, in

which they are published. Both open access publishing and self-archiving options will be considered (also called "gold" or "green" open access model, respectively).

2.2.5 Communication plan and activities

An effective communication strategy for the ARV project was designed based on a clear understanding of the complexity of the value chain as well as an assessment of non-technical barriers that are mainly related to the conservative nature of the construction sector and energy markets. The consortium will promote the project and its results, by providing targeted information to multiple audiences, in a strategic and effective manner and engaging in **one- and two-way exchange**. The communication activities will start at the outset of the project and continue throughout its entire lifetime. The overall goal is to create awareness among the public about the solutions designed by ARV and their relevance to our everyday lives. As well as raising the profile of ARV, and technical sciences in general, with the public, communication activities will also introduce students from schools and universities to science, research, and innovation.

The communication strategy will take into account **traditional communication activities** such as printed material, website, participation to exhibits and conferences in the field of construction, energy efficient buildings and new construction materials, as well as new methods such as **social networks, co-creation, virtual journeys and living labs (WP3)**. The most effective approach will be selected according to the specific target audience and to the message to be provided. To maximize the impact of ***communication activities***, a strategy was designed upfront, consisting of two main elements:

1) **a clear visual identity and solid marketing & communication plan** to ensure that the project becomes visible at multiple levels. The project will be established as an exemplary pioneer project in the EU.
2) **a targeted tailor-made local approach for each demo project CPCC, while supporting the co-creation process.** This is important to make local communities and local governments an active and integral part of the solution. Their active involvement will increase the chances of success and facilitate communication and dissemination efforts down the line. The ARV campaign will add a human face to this technical project by sharing the quantitative and qualitative evidence from the residents, by identifying Green Ambassadors and facilitating their training (WP3) so they can act as multipliers. Through the **demo sites**, ARV will analyse energy and environmental patterns and occupant behaviour. This creates a deeper understanding of local culture, climate, and markets, resulting in practical recommendations. The effective communication through multiple channels and media (online presence, newsletters, social media, audio-visual reports, conferences, etc.) and the creation of an active community of stakeholders, both online and offline, will ensure that all actions are well embedded in the spatial, economic, technical, regulatory, environmental, and social context of the project. The ***communication strategy*** has been delineated to ensure a high visibility of the project and maximize the impact of results. A distinct strategy will be designed for each specific ***audience***, using targeted ***messages*** and ***activities***, as described below:

Targeted Audience

The communication strategy has been defined to target different groups, namely:

- **Urban Authorities**: local councils and municipalities
- **Housing Community**: (associations of) homeowners, tenants (representatives), landlords, portfolio managers, housing co-operatives, social/public housing companies, etc.
- **Non-residential Community**: retail, care & health, education, hospitality, leisure, social services, and other commercial or public buildings.
- **Technology and Service Providers**: RES provider, storage technology, SME energy management, ESCO, Architecture, Engineering and Construction (AEC) Industry, green technology companies, etc.
- **Regulatory Authorities**: distribution network operator, transmission network operator, distribution systems operator, transport authority, planning bodies, etc.
- **Developers & Investors**: private & public sector banks, investment funds, institutional investors, ESCO etc.
- **Market Influencers**: policy makers at national and regional level, EU institutions (EP, DG ENER, CoR, EESC), World Green Building Council (WGBC), FIEC, CEER, ACER, EFIEES, Energy Cities, etc.
- Partners in relevant "Sister" projects under H2020 and other EU programmes.

These target groups will be the targeted by the communication activities to generate awareness about ARV project and concept exploiting the demo projects that will be used as a showcase through the organization of local workshops.

Communication activities

The communication and outreach plan/activities will comprise:

- **Communication Design (logo, forms, actions)**: A visual identity for ARV, including project logo, template, and forms for all relevant communication activities/documents, has already been produced by NTNU, and will be refined and included in the communication plan.
- **Visits to Living Labs:** ARV consortium will organize visits to the Living Labs (i.e. demo sites). We will organize visits targeting the general public, end-users, installers, public governance/government, societal partners, housing organization, etc. These visits will be held twice the first year of the project (to gain traction in communities) and once per year for the remainder of the project.
- **Seminars, Workshops, Open days and Visits:** The results will be presented for a broad audience at/by the universities and research institutes, namely through the organization of local seminars/workshops at each of the participating institutions targeting the general public. Young researchers and high school students will be particularly targeted. Hence, the consortium will organize visits to local high schools to inform the students about the project and encourage them to consider careers in science and technology, as well as invite high school communities for open days at universities. These arrangements will be sought held once a year in at least two schools in each country.
- **European Commission:** Publication of the results on the Commission's public websites. The consortium will provide periodic reports that include a publishable summary of such quality that the Commission can publish it right away in the public domain and will be understandable for a lay audience. The summary will include information on the expected results and their wider societal implications. The project research will be positioned within a broader socio-economic and policy context, so that it will be easier to explain the results and their relevance to policymakers and citizens.
- **Networking**: Active links will be established with European Institutions, International Organizations, Technical/administrative target groups, EU funded research projects, etc. These will be monitored, & ARV members will contribute to relevant events from other projects to share knowledge and results. This will be linked with the activities in WP10 on inter-project collaboration & clustering with "Sister Projects".
- **Media communication**: continuous public relation work, targeted communication and updates based on project partners´ news and project achievements, will be carried out. Brochures, short presentations, news articles, infographics, press kits, and policy briefs will be prepared and distributed. Brochures and other publications will be adapted in language and depth of detail depending on the different audiences: general public, possible replicators, authorities, local residents, and other close stakeholders. We will share stories from daily life that emerge through the project, helping the media better grasp the innovation and the importance of the ARV project for citizens.
- **Social networks**: Activate and manage, in collaboration with all project partners, dissemination actions through the most important social networks (LinkedIn, Twitter), and set up the ARV YouTube channel.
- **Informational Factsheet**: At the beginning of the project and at each reporting period a Factsheet will be produced to illustrate the project's progresses and deliverables. The Factsheet will be both printed and produced in electronic format (pdf). It is addressed to the target groups mentioned above and will have a schematic content.
- **Project result booklet:** A project result booklet, with a description of all the results achieved in ARV, will be developed (WP10).
- **Digital Newsletters**: Every 6 months the project will distribute a newsletter summarizing the main achievements during the period and will address the most relevant activities for the next periods.

ARV's website will collect information about these activities allowing common stream or collection of this information, newsletters, press releases etc., relevant to the project activities and partners. The ARV website will be updated throughout the project to inform visitors about upcoming events, news, and major project developments. All dissemination documents and public deliverables will be available in electronic format for download.

ARV's plan will also envisage ways of measuring communication efforts and impact at different stages of research. Indicators will be chosen to evaluate the impact (reaction or change) on the target audience.

Table 2.14 Summary of Initial Communication Plan

Goals	Target audiences	Key messages	Strategy
Increase of the share of positive energy buildings and communities	General public. Stakeholders from the target groups mentioned above, especially technology, energy and construction industry	Energy plus dwellings and neighbourhoods are becoming a reality	Show the evolution of ARV demo projects' performance indicators. Communicate the required conditions and solving barriers. Get involvement and green ambassadors. Regular updates on online dashboard linked to ARV Cloud Hub
Contribute to the reduction of GHG emissions	General public. All stakeholders from above mentioned target groups, especially public authorities at different levels	How PEB and PEDs and CPCC contribute to GHG reduction. Which measures and conditions are most cost-effective per $kgCO_2/m^2$ reduction.	Live update feed about GHG reduction in demo projects (compared to status quo & second best)
Improved indoor environment, leading to higher rate of users' satisfaction based on their demand and behaviour.	Residents (homeowners and tenants) Professional users of buildings	PEDs and CPCCs contribute both to GHG reduction and improved user satisfaction (in terms of IEQ, qualitative satisfaction, cost savings, and quality of living at community level)	Post occupancy surveys including measurements. Publications and presentations of projects reports, short video interviews
Similar or lower costs as compared to the 2020 nearly zero-energy buildings as an incentive to erect energy-plus-houses positive energy communities	Owners and managers of buildings (public, private and not-for-profit sectors). Public authorities (EU, national, regional, local). Financial stakeholders.	PEDs and CPCCs are no science fiction but a feasible option in terms of energy, CO_2 and cost savings while improving comfort of living.	Life cycle cost calculations featured in reports and other evidence for cost-effectiveness of PEDs and CPCCs approach through demo project results.
Accommodate learning, training and sustainable behaviour by engaging citizens in green living labs in local schools, community centres, and as informed users in public and private buildings	Citizens (end-users): Building owners, Tenants and citizens, Landlords, Associations (domestic cooperatives), Municipalities.	Climate Positive Circular Communities, where people can thrive and prosper for generations to come.	Establishing exhibition spaces for energy education, coaching to tenants in energy use through a Home Energy Management System (HEMS), appointment of "Green Ambassadors" among the tenants, support packages and training material for Living Labs
Achieving high architectural qualities by designing good spaces for people to live, work, and thrive	Construction / building sector (Potential E-market members), Citizens (End-users), Policy makers and regulators/ authorities	Environment-friendly, beautiful, safe, affordable living places & communities for all	Social media, short video series, podcasts and project booklet.

3. Implementation

3.1 Work plan — Work packages, deliverables

The ARV project will be divided in ten complimentary work packages as illustrated in the **PERT diagram** (right).

The timing of the different work packages and their components are given in the **Gantt chart** (next page).

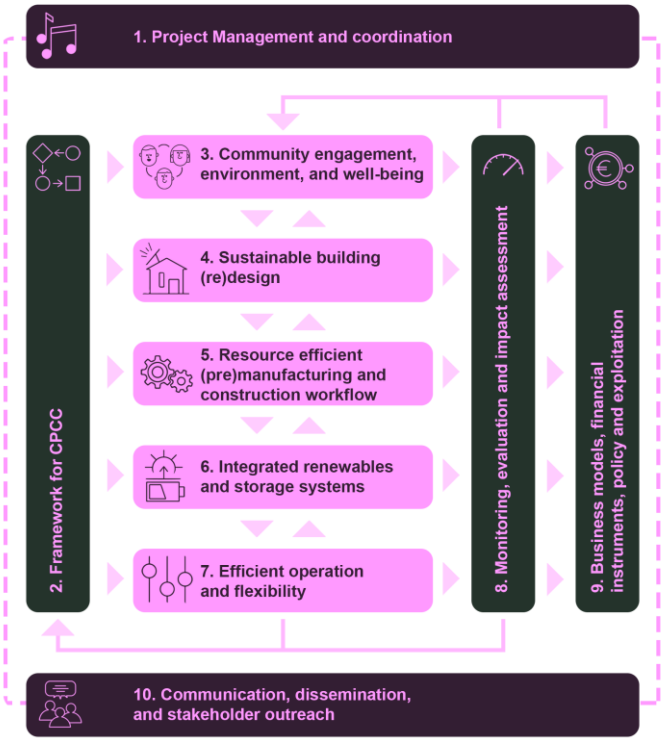
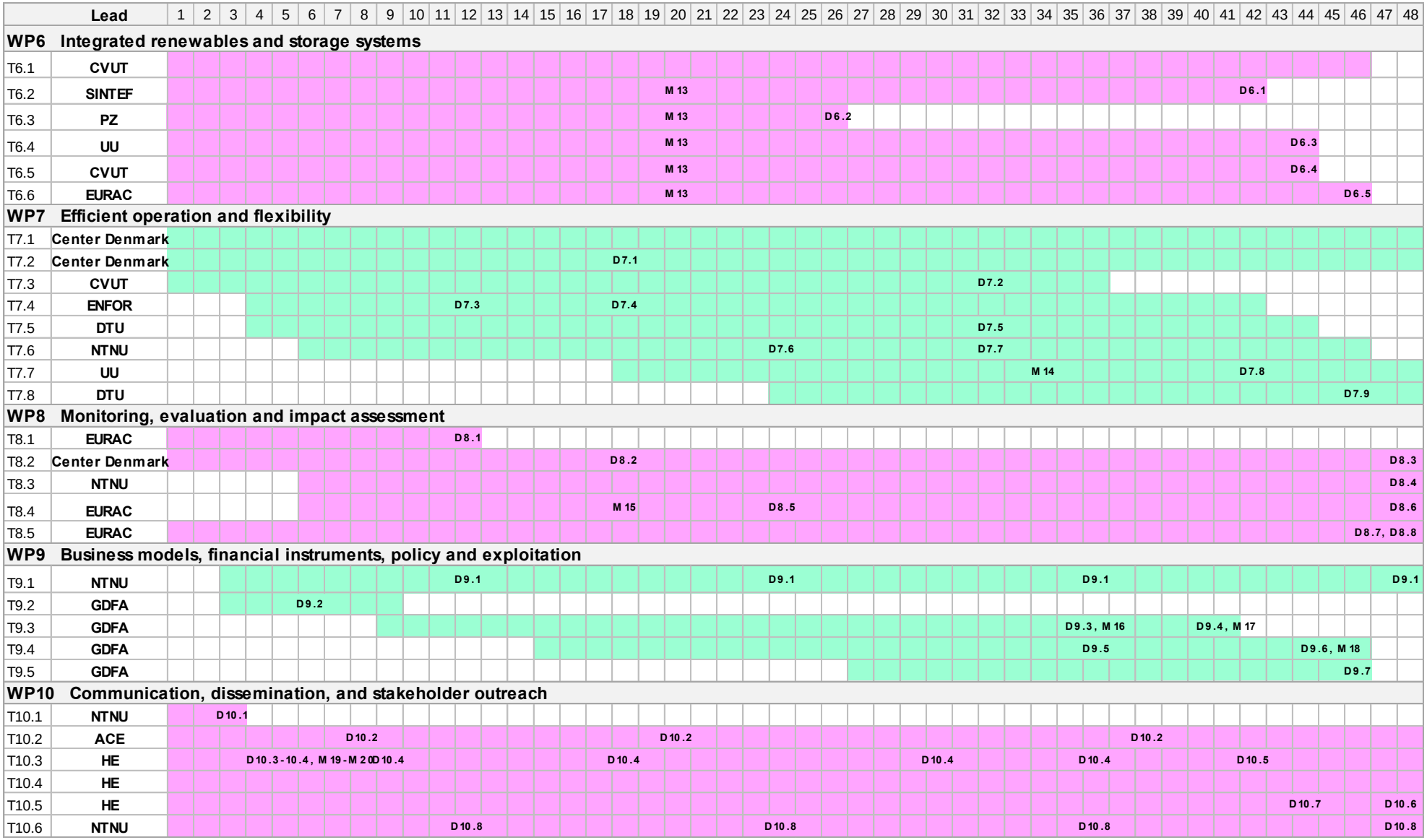


Figure 3.1. PERT Work package structure and interactions

GANTT

	Lead	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
WP1	**Project Management and coordination**																																																
T1.1	NTNU		D1.1, M1																																													
T1.2	NTNU											D1.2												D1.2												D1.2												D1.2
T1.3	NTNU					D1.3						D1.4						D1.3						D1.4						D1.3						D1.4					D1.3					D1.4
T1.4	NTNU		D1.5												D1.5												D1.5												D1.5							
T1.5	NTNU		D1.6												D1.6												D1.6												D1.6							
T1.6	NTNU		D1.7			D1.8									D1.7			D1.8									D1.7			D1.8									D1.7			D1.8				
WP 2	**Framework for CPCC**																																														
T2.1	IREC																																														
T2.2	IREC								D2.1, M2																																							D2.8
T2.3	IREC															M3			D2.2																											D2.4		
T2.4	IREC														D2.3																													D2.5				
T2.5	SINTEF																																			D2.6, M4												D2.7
WP3	**Community engagement, environment, and well-being**																																														
T3.1	SINTEF											D3.1												D3.1												D3.1												D3.1
T3.2	SINTEF									M5			D3.2																																			
T3.3	PALMA																							D3.3																								
T3.4	CVUT																								M6																								
T3.5	SINTEF																																															D3.5
WP4	**Sustainable Building (re) Design**																																														
T4.1	NTNU																																								D4.6							
T4.2	SINTEF											D4.1									M7			D4.1												D4.1											
T4.3	Housing Europe											D4.2									M7			D4.2												D4.2											
T4.4	IREC											D4.3									M7			D4.3												D4.3											
T4.5	CVUT											D4.4									M7			D4.4												D4.4											
T4.6	UNITN											D4.5									M7			D4.5												D4.5											
WP5	**Resource Efficient (pre)manufacturing and construction workflow**																																														
T5.1	Housing Europe																																														
T5.2	Housing Europe												M8											D5.1, M9																								
T5.3	UNITN																													M10						M11, M12											
T5.4	Housing Europe																																	D5.2, D5.8-D5.12, MS5.6											D5.3-D5.7	


Lead
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
WP6 Integrated renewables and storage systems
T6.1 CVUT
T6.2 SINTEF
M 13
D6.1
T6.3 PZ
M 13
D6.2
T6.4 UU
M 13
D6.3
T6.5 CVUT
M 13
D6.4
T6.6 EURAC
M 13
D6.5
WP7 Efficient operation and flexibility
T7.1 Center Denmark
T7.2 Center Denmark
D7.1
T7.3 CVUT
D7.2
T7.4 ENFOR
D7.3
D7.4
T7.5 DTU
D7.5
T7.6 NTNU
D7.6
D7.7
T7.7 UU
M 14
D7.8
T7.8 DTU
D7.9
WP8 Monitoring, evaluation and impact assessment
T8.1 EURAC
D8.1
T8.2 Center Denmark
D8.2
D8.3
T8.3 NTNU
D8.4
T8.4 EURAC
M 15
D8.5
D8.6
T8.5 EURAC
D8.7, D8.8
WP9 Business models, financial instruments, policy and exploitation
T9.1 NTNU
D9.1
D9.1
D9.1
D9.1
T9.2 GDFA
D9.2
T9.3 GDFA
D9.3, M 16
D9.4, M 17
T9.4 GDFA
D9.5
D9.6, M 18
T9.5 GDFA
D9.7
WP10 Communication, dissemination, and stakeholder outreach
T10.1 NTNU
D10.1
T10.2 ACE
D10.2
D10.2
D10.2
T10.3 HE
D10.3-10.4, M19-M20
D10.4
D10.4
D10.4
D10.4
D10.5
T10.4 HE
T10.5 HE
D10.7
D10.6
T10.6 NTNU
D10.8
D10.8
D10.8
D10.8

3.2 Management structure, milestones and procedures

The ARV management structure has been set up to effectively handle the complexity of the project and partner structures, and to clearly connect the responsible members of the various entities of the consortium. It is also designed to facilitate effective communication between the different partners and the managing bodies of the project and the European Commission. The management structure for the ARV project is illustrated in Figure 3.2 and the roles and tasks of the different management bodies are described below. The full procedure constituting the governance structure of the project, including representation in meetings, voting rights, etc., will be further outlined in the Consortium Agreement CA, based on the DESCA model for H2020 projects using the Module GOV LP.

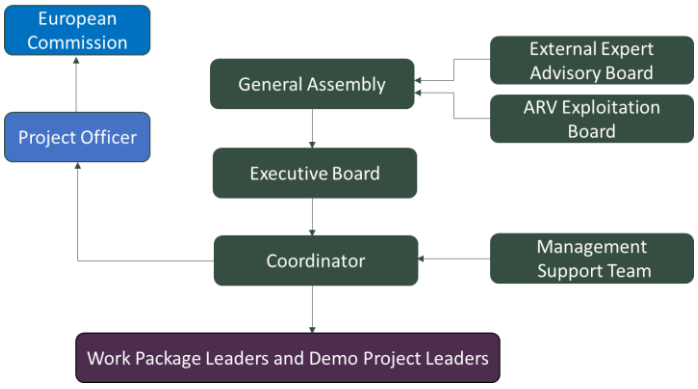


Figure 3.2. The main project management structure of ARV

The **Project Coordinator (PC)** and the **Project Management Team (PMT)**: As a beneficiary and coordinator in hundreds of European projects over the years, NTNU has accumulated extensive experience in the management and coordination of large, international research projects. As **PC**, NTNU will act as the intermediary between the beneficiaries and the European Commission. With the support of the **PMT** and the Financial Manager, it shall perform all tasks assigned to the coordinating institution as described in the Grant Agreement and CA. The tasks and duties of the PC and PMT are:

- Monitor the compliance of project partners with their obligations (assisted by the WP leaders);
- Act as a helpdesk for all beneficiaries for all project-related matters;
- Manage the continuous reporting, periodic reporting, quality assurance, and submission of deliverables to ensure that all documents/input are delivered on time and to the highest possible standard;
- Organize regular meetings of the Consortium and General Assembly, propose the agenda of those meetings, prepare the minutes and monitor the implementation of decisions taken; and
- Distribute the EU financial contribution to all beneficiaries.

The General Assembly (GA): is the ultimate decision-making body of the consortium. The PC will ensure that relevant decisions are discussed with the project officer and formalised in an Amendment to the Grant Agreement. The GA will decide on issues of strategic relevance, such as:

- Content, finances, and intellectual property rights (e.g. changes to the Description of Work DoW or Annex 2 of the Grant Agreement, changes to the CA)
- Evolution of the consortium (e.g. entry of a new- or withdrawal/termination of a -beneficiary)
- Appointments of members to the Executive Board

Composition: The GA consists of one senior voting member per beneficiary. Non-voting members from the beneficiaries may also be present during meetings. The voting members shall be deemed authorised to decide on the matters outlined above but will be advised to consult with their legal team on issues relating to IPR or changes to the consortium or budget. The PC will chair the meetings. The GA will receive important advice from the ARV Exploitation Board (AEB) and the External Expert Advisory Board (EAB). **Meetings:** Ordinary GA meetings, chaired by the PC, will take place at least once a year. The conditions for calling ordinary or extraordinary GA meetings will be described in the Consortium Agreement.

The Executive Board (EB): is responsible for the execution of the project. It will handle issues related to deliverables, completion of milestones, and critical risks. The EB shall propose solutions to such issues, to be voted on by the General Assembly. The EB may decide on minor issues that do not involve changes to the DoW or any of the voting items for the General Assembly outlined in the CA. To ensure transparency, the minutes of meetings shall be circulated among all beneficiaries. The EB will:

- Regularly collect information on the progress of the project to monitor the effective and efficient implementation of tasks, milestones, and deliverables

- Assist the coordinator in preparing meetings with the European Commission along with related data and deliverables.
- Propose decisions and prepare the agenda of the General Assembly meetings
- Be responsible for the proper execution of decisions of the General Assembly
- Agree on the content and timing of press releases and publications in accordance with Article 29 of the Grant Agreement

Composition: the EB consists of the Project Coordinator (PC), the Work Package leaders (WPL), and the Demo Project Leaders (DPL). **Meetings:** The EB will meet at least every 3 months, either physically in connection to consortium meetings, or online. Every 6 months a Project Performance Assessment (internal deliverable) will be conducted. The PC and the EB have the collective responsibility that the objectives of the project are achieved.

The Work Package Leaders (WPL) and the Demo Project Leaders (DPL): will work closely together to ensure the success of the project. In each of the thematic work packages, there will be a task entitled 'Innovation management of Work Package X', ensuring the coupling between the work in the WP and the demo projects. The WPL and DPL have a duty to report any major issues or delays to the Executive Board and General Assembly. The WPL and DPL will:

- Coordinate and plan the work in the work packages and the demo projects
- Monitor the progress of work in their work packages and demo projects and report to the EB
- Chair joint WP and Demo Project meetings and produce minutes from those meetings
- Alert the EB and GA of major issues, delays, or poor performance of a beneficiary or a demo
- Contribute to periodic reporting
- Identify IPR issues and opportunities and contribute to dissemination activities

Composition: The WP leaders are NTNU, IREC, SINTEF, NTNU, HU, CVUT, DTU, EURAC, GDFA, ACE. The demo leaders are HU, PALMA, OBF, PZ, KARV, and DTTN. **Meetings:** The WPLs and DPLs will organise common meetings in person or via web conference, as often as necessary.

The External Expert Advisory Board (EAB)

The EAB is a supporting body consisting of three internationally renowned external experts in main topics of the project. The selected experts are **Dr Ladeja Godina Košir**, **Founder & Executive Director of Circular Change**, Europe/Slovenia, **Dr Piotr Bartkiewicz**, **Professor at the University of Warsaw and partner of Go4Energy**, Poland, and **Dr Francis Allard, Emeritus Professor at La Rochelle University and chairman of Tipee**, France. The main task of the EAB is to provide guidance to quality of the project and to give feedback to the consortium on the overall progress of the project and its implementation. Through their respective networks, the EAB will also contribute to dissemination and wide scale uptake of ARV results. The EAB will be invited to consortium meetings on regular basis and may be invited to participate in the General Assembly (not having voting rights).

The ARV Exploitation Board (AEB)

An exploitation board will be established in T9.6 as a vehicle for scaling the business models and financing instruments. The Exploitation Board will be composed in part by strong innovation clusters as well as financial sector players that will spread the green building and renovation concepts to provide momentum to the 'renovation wave' that will be politically underpinned. The AEB is composed of industry experts selected from among the ARV partners and from influential external companies, to represent the whole value chain of CPCCs. The external members of the EAB are **Werner Jager, Director of Technology & Marketing in Hydro Building Systems**, Germany, and **Marianne Okland, CEO of Construction City Cluster**[50], Norway and **Dr Bruno Peuportier**, **Scientific Manager at the Centre for Energy Efficiency of systems CES**, France. The goal of the AEB is to contribute to enhancing the exploitation of ARV innovations, see Task 9.1 for a further description of their tasks. The AEB will meet regularly with the ARV Innovation Forum (Task 1.3) in order to ensure early identification and scaling of commercially viable innovations.

Innovation Management

Task 1.3 in WP1 will be dedicated to innovation management. The task will consist of all demo project leaders and work package leaders, led by an Innovation Manager (IM). The Innovation Manager will be hosted by NTNU using

[50]Construction City is an innovation cluster with a mission to drive collaboration and new solutions in the construction industry, www.constructioncity.no

the expertise of the NTNU Technology Transfer Office (TTO), which has extensive experience in working with innovation management and business models related to sustainable buildings and neighbourhoods through 15 years of experience and capturing more than 1800 ideas. Figure 3.3 shows an illustration of the structure of innovation management in the ARV project. In WP 1 (left) there is a task dedicated to innovation management (Task 1.3). The aim of this task is to ensure proper leadership of the demo projects aligned with the deliverables of the ARV project and the activities in the WPs (T1.3). The task participants encompass of the six demo project leaders (DPL), and is led by a representative of the PMT (NTNU). The DPLs will report on a monthly basis to NTNU on the progress of the demo projects, the status of the innovations, the compliance to and updates on the planning, potential problems and their potential solution. This will help keep track of the demo project status and relations. In addition, there will be a task in each WP (task 2.1, 3.1, 4.1, etc) dedicated to innovation management in each WP, linking the related work in the demo projects to the WPs.

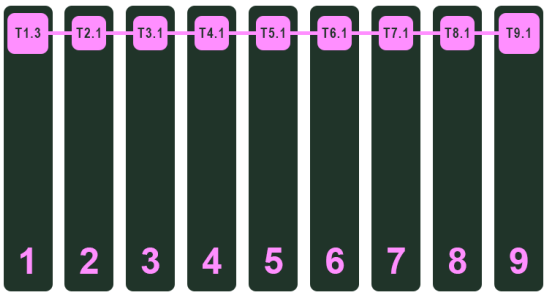
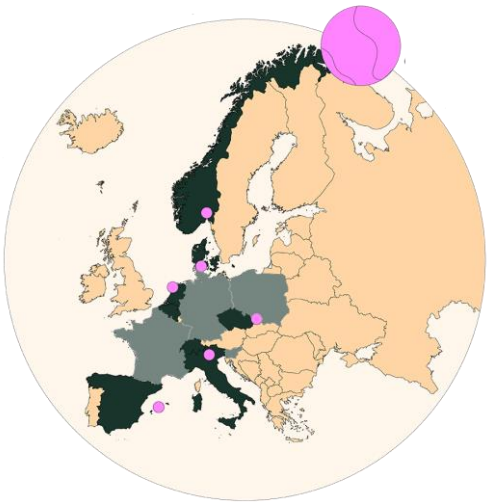


Figure 3.3. The link between activities related to demo projects and innovation management across the WPs.

3.3 Consortium as a whole

The **35 ARV partners** are carefully selected based on their experience, knowledge, and skills to contribute with outstanding innovations for Climate Positive Circular Communities (CPCCs). Together, they constitute the whole value chain of CPCCs, from planning, design, construction to operation and use of such communities. They also complement each other with respect to the knowledge, skills, products, and services they bring into the project, and they have wide reaching fields of impact and networks, which lay the ground for large scale market uptake of the ARV solutions. **11 of the partners are SMEs**. In addition to the 35 ARV partners in 8 countries, we have **38 associated companies and organisations** (confirmed by Letters of Support) **throughout Europe**, and the members of the Advisory & Exploitation boards are from France, Germany Poland and Slovenia, as indicated in the map. The partners, their role and contribution in ARV are described below.



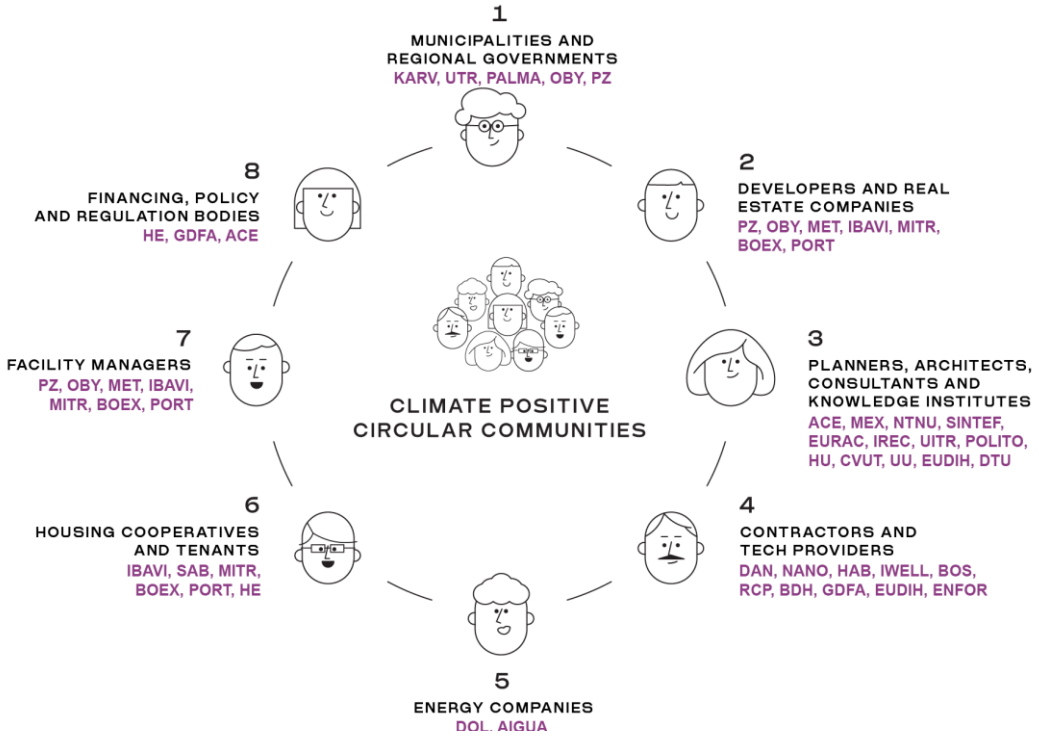


Figure 3.4 The ARV partners along the value chain of CPCC**.**

1) NTNU, the Norwegian University of Science and Technology (Knowledge institute) is the primary Norwegian university in engineering and technology, **will lead WP 1** on Project Management & Coordination **and WP 4** on Sustainable Building (re)Design. NTNU is contributing to all the WPs. NTNU has a professional administrative project support team to secure a high quality and a smooth project implementation. The NTNU team has extensive experience &knowledge in zero emission buildings and neighbourhoods (Leading ZEB Research Centre[51] and ZEN Research Centre[52] Sustainable Plus Energy Neighbourhoods, syn.ikia H2020[53]).	NTNU
2) The Architects' Council of Europe (ACE) represents the interests of over 600.000 architects from 31 countries in Europe. ACE consists of 44 Member Organisations. Having extensive experience from EU projects, ACE **will lead WP10** on Communication, Dissemination & Stakeholder Outreach & contribute to WP1–5, WP8 & WP9.	
3) Czech Technical university (CVUT) (Knowledge institute) in Prague is one of the oldest and largest technical universities in Europe. The ARV project will be carried out by the University Centre for Energy Efficient Buildings (CVUT UCEEB), which is a national centre of excellence in energy efficient and sustainable building. CVUT UCEEB will **lead WP 6** on Innovative Renewables and Storage Systems and the Czech demo case in Karviná.	ČVUT UCEEB
4) DTU, (Knowledge institute) the Technical University of Denmark **leads WP7** on Efficient Operation and Flexibility, with key members of DTU Compute, which have extensive experience in the digitalisation of energy systems. This DTU group was initiator of the concept of energy flexibility and had a central position within IEA Annex 67[54] in buildings and methodologies to use this flexibility to reduce CO_2 emissions and cost. The group has extensive experience in matching demand & consumption of energy in buildings & will contribute to WP2 & WP6.	DTU
5) Danfoss (DAN) has the headquarter in Sønderborg, DK, and is the largest Danish privately owned industrial company with 28.000 employees serving customers in more than 100 countries. In ARV, Danfoss will develop and demonstrate innovative solutions for heating control systems, both in hardware and software, with focus on reaching outstanding energy performance of the buildings. Danfoss will contribute mainly to WP7 with technical solutions reducing the return heating temperature from the buildings to the district heating network.	Danfoss ENGINEERING TOMORROW
6) ENFOR is a market-leading Danish SME of energy forecasting & optimization solutions for the energy sector. In ARV, ENFOR will provide solutions for forecasting of renewable energy production, electricity, and heat demand as well as optimization of district heating systems. ENFOR will primarily contribute to WP6 and WP7.	ENFOR
7) Project Zero (PZ) is a public-private-partnership to support the municipality of Sønderborg to become a ZERO carbon municipality by 2029 through offsetting 700.000 tons of energy-system related carbon-emissions. **PZ will be leader of the demo project in Sønderborg**, coordinating the activities & implementing energy-saving measures through retrofitting. PZ will participate in the implementation process and dissemination activities.	ProjectZero SØNDERBORG
8) EURAC Research is a private research centre with over 500 employees currently involved in 81 EU-funded projects. EURAC has a strong focus on renewable energies and the environment, but also on health, as well as political and social systems. In ARV, EURAC **will lead WP8** on Monitoring, Evaluation and Impact Assessment but will also contribute to WP3–5, among others.	eurac research
9) SINTEF, which is one of Europe's largest independent research organisations, **will lead WP3** on Community Engagement, Environment and Well-being. SINTEF's group has extensive experience and knowledge in working with stakeholder engagement and developing technologies for zero emission buildings and neighbourhoods working across themes like living labs, spatial planning, urban modelling, integrative energy efficient buildings and LCA. SINTEF is also contributing to WP1–8 and WP 10.	SINTEF
10) Palma City (PALMA) (Public authority) is the capital of the Balearic Islands (Spain) with a population of over 460,000. The main work in ARV is carried out by the City Model Department. It is supported by the Dept. for Housing, Dept. of Citizen Engagement, Environment Department and the Infrastructure Dept. PALMA is the **demo lead** in Spain. PALMA's contribution in ARV will focus mainly on WP2, WP4 and WP9.	Ajuntament de Palma
11) IBAVI, the Balearic Institute of Housing, has as a main goal to create and maintain accessible and affordable social housing. In ARV, IBAVI will contribute mainly to WP4, WP5 and WP8, which includes the integrated circular design and construction of the Spanish demo project.	IBAVI Institut Balear de l'Habitatge Govern de les Illes Balears
12) IREC, the Catalonia Institute for Energy Research, has extensive experience and expertise in sustainable development via new technological solutions and renewable energy technologies. IREC assists political decision-makers. In ARV, IREC **will lead WP2** on Framework and Tools for Effective Implementation and Assessment of CPCCs and mainly contribute with their expertise on integrated energy design on building and district level, business models for large-scale retrofits, citizen energy communities, and district & urban energy simulation. IREC will also lead the Spanish demo project.	IREC Shaping Energy for a Sustainable Future
13) Metrovacesa (MET) is one of the biggest real estate developers in Spain, working with residential and commercial developments, as well as land management. Especially regarding financing and business models, MET will contribute to ARV with their experience to promote the construction or renovation of energy efficient and sustainable buildings. MET will be mainly involved in WP3, WP7 and WP8.	metrovacesa
14) University of Applied Sciences Utrecht (UAS Utrecht) (Knowledge institute) brings in expertise on the transition to fossil free districts, healthy buildings, smart mobility and urban experience.UAS Utrechtmain focus is on integrating the different systems offered by ARV SME partners into energy & resource efficient retrofitting workflows.UAS Utrecht**will lead WP5** on Resource Efficient (Pre)Manufacturing and Construction Workflows	UNIVERSITY OF APPLIED SCIENCES UTRECHT

[51] https://www.zeb.no/index.php/en/
[52] https://fmezen.no/
[53] https://www.synikia.eu/
[54] http://www.annex67.org/about-annex-67/

15) Housing Europe (Housing Europe) is the European Federation of Public, Cooperative Social Housing, a network of 42 national and regional federations which together encompass about 41,400 public, social and cooperative housing providers in 22 countries, managing over 25 million homes which represent 12 % of the EU dwellings. In ARV,Housing Europewill be mainly involved in WP3 and WP10.	
16) Buro DeHaan (Buro de Haan) (SME) has experience in industrialisation and digitization for scalable renovation projects In the ARV, BURO DE HAAN will demonstrate pre-recognition of façade typologies and zero-engineering approaches (WP5) and contribute to in point cloud technology, engineering, image recognition and "file2factory" approach	
17) EU Digital Innovation Hub (CENTER DENMARK) is run by Center Denmark which is a non-profit & independent organization working to promote development of digitally integrated energy systems in order to enhance society's transition to 100 % RES and reduce environmental impact through digitalization and sector coupling. In ARV, CENTER DENMARK will demonstrate digital infrastructure for optimizing energy consumption & performance of buildings & neighbourhoods by using digital tools (AI) in WP7 and WP8.	
18) Sønderborg Andelsboligforening (SAB) is a non-profit independent and private social housing company owned by their residents (tenants). In ARV, SAB, as the host of the Demo project in Sønderborg, DK, will demonstrate new innovative energy saving measures in buildings, especially apartment buildings. SAB will involve the citizens/tenants in the project and disseminate the results to other social housing associations in Europe.	
19) Green Digital Finance Alliance (GDFA) is a non-profit organization that scales finance for the Paris agreement through fintech-enabled innovation. GDFA is a knowledge partner to the G-20 Working Group on Sustainable Finance and to the UN SG's Task Force for Digital Financing of the SDGs as part of its thought leadership work. In ARV, GDFA **will lead WP9** on Market Uptake to catalyze partner innovation by enabling them to deploy the new capabilities of fintech to address current barriers to scale green finance for carbon positive communities and to design standardized instruments for scaling across the EU.	
20) BOEX (Social housing corporation) has demonstrated in a previous project the first European Positive Energy Building retrofitting of a 10-story apartment building from the 60s and will offer their learning experience to the other Utrecht housing corporations. In the ARV project Bo-Ex will further apply the PEB retrofitting approach to 4-story mid-rise apartment buildings. Furthermore Bo-Ex will participate in the Smart Building and Smart Communities optimization activities using (BI)PV and battery storage	
21) RCP RC Panels (SME) is an innovative company offering prefab facades for zero-energy renovations. The main focus of RC panels is on integrating and demonstrating their façade panels into the energy and resource efficient retrofitting systems. RCP involved in the Dutch demo project will be most active in WP4 and WP5.	
22) Utrecht University (UU) (Knowledge institute) brings in expertise on the transition towards sustainable energy and resource systems, with special attention to integrating efficient use of energy and resources with renewable energy supply solutions, at various scales. Main focus in the ARV project is demonstrating the integration of renewables (BIPV primary) into the renovation systems and demonstrating a smart building and communities Virtual Power Plant for improved grid flexibility at various scales (building, district, city, country) WP6 & WP7	
23) Municipality of Utrecht (CITY OF UTRECHT) (Public authority) brings expertise on urban planning, citizen and community engagement and regulatory aspects. In the ARV project the Municipality of Utrecht will demonstrate social renovation, employment and energy coaching innovations and contribute to the energy and resource efficient retrofitting workflows where required.	
24) Bos Installatiewerken (BOS GROEP)(SME) has demonstrated in a previous project with Bo-Ex the Inside out retrofitting prototype and has vast experience in installation works. In the ARV project Bos will provide system engineering services for all building and installations components into modular components for quick mass customized production and retrofitting (WP4 and WP5)	
25) iWELL (SME) is a developer of smart energy storage systems. In the ARV project iWell will demonstrate the integration of stationary storage batteries as part of the smart building and communities' system to offer flexibility at grid flexibility at various scales (building, district, city, country) (WP6, WP7)	
26) MEX architects (SME) is an architect with experience in retrofitting of social housing apartment flats. In a previous project with Bo-Ex Mex has participated in the Inside out retrofitting prototype. In the ARV project Mex will provide innovative design services for integrating building components, active facades, BIPV into attractive and low resource designs (WP4 & WP5)	
27) Mitros (MITROS) (Social housing corporation) has demonstrated in a previous project Zero Emission Building Retrofitting and will offer their learning experiences to the other Utrecht housing corporations. In the ARV Mitros will prepare a retrofitting plan for PEB building retrofitting using low-temperature district heating, the specific focus of this activity is on setting up a modular ventilation, heating and cooling system. Furthermore, Mitros will participate in the Smart Building and Smart Communities optimization activities using (BI)PV & battery storage.	
28) City of Karviná (KARV) is located in the east of the Czech Republic on the border to Poland and has over 50,000 inhabitants. In ARV, the City of Karvina will mainly contribute with implementing CPCC living labs and involve citizens in WP3 and the implementation of storage solutions in WP6.	
29) DOL Dolomiti Energia is an Italian energy and gas supplier, with strong efforts in reducing environmental impacts thanks to the supply of 100% clean energy with traced and guaranteed origin, CO_2 free gas &innovative energy efficiency services designed specifically for families &for businesses. DOL's main role will be in WP3.	
30) Habitech (DTTN) – The Energy and Environment District promoted by the Autonomous province of Trento is the leading national center for green building, renewable energy, and innovation. DTTN promotes and coordinates	

integrated and innovative processes to improve buildings and real estate assets. In ARV, DTTN will lead the activities in the case study in Trento and will closely work with EURAC and UNITN, especially in WP4 and WP5.	
31) UNITN, the University of Trento, has outstanding experience with international projects as it has been involved in 117 FP7 and 119 H2020 research projects. In ARV, UNITN's Dept. of Civil Environmental & Mechanical Engineering will provide the scientific coordination for the prefabricated timber modular based approach, lab tests, technical surveys, and passive & active energy system design in WP4, WP6 and WP8.	
32) Politecnico di Torino (POLITO), is one of Europe's leading universities in technical-scientific research and has exceptional experience with international research projects from FP7 and H2020. In ARV, the Department of Structural, Geotechnical and Building Engineering Department (DISEG) and the Department of Architecture and Design (DAD) will be involved. In WP4 and WP5, they will contribute to the design, installation and management of the energy tunnel (Piedicastello tunnel), innovative architecture & BIPV.	
33) Oslobygg (OBF) is one of Norway's largest builders and real estate players with approx. 2.5 million m^2 of property and is owned by the municipality of Oslo. Their aim is to be at the forefront of sustainable and innovative solutions and technical. In ARV, OBY will be the **developer and leader of the Norwegian Demo** project and contribute mainly to WP3, WP4 and WP8.	
34) NANO Power is an integrator of transportation battery packs and energy storage systems which will contribute mainly to WP6 and WP7 to the potential usage of second life batteries, the optimization of battery performance vs. battery size targeting cost optimization and the possibility to reduce fixed energy costs.	
35) AIGUASOL is an energy consultancy, engineering and research company based in Barcelona, working mainly with comfortable indoor and outdoor spaces, as well as efficient energy systems. In ARV, they are primarily involved in WP2 and WP4, focusing on using and testing tools for the implementation of CPCCs and integrating circular design in the Spanish demo project.	

3.4 Resources to be committed

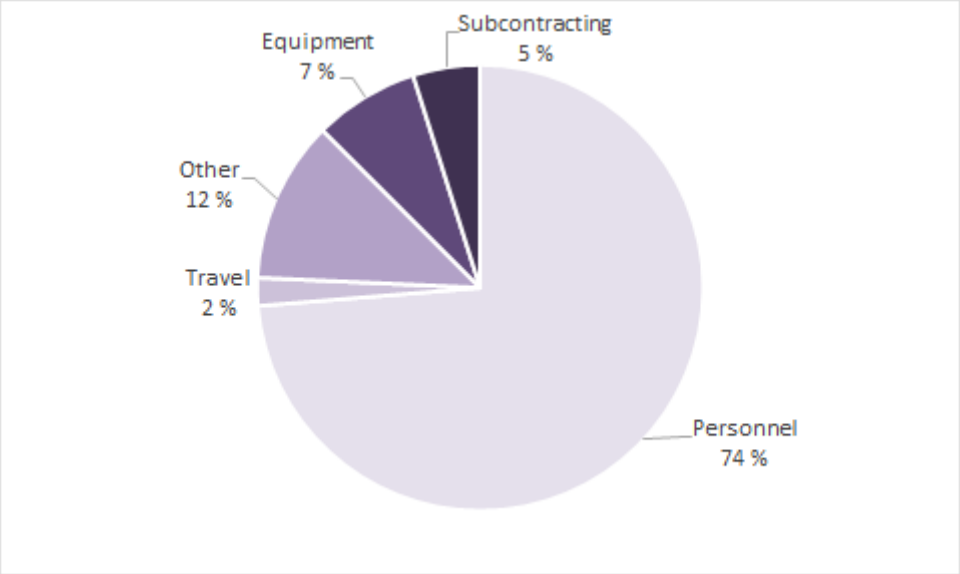


Figure 3.6. Share of direct eligible costs

The budget for total eligible costs for the ARV project is €21 316 652,68 with a **requested grant from the EU at €19 998 409,07**. Figure 3.6 shows the distribution of direct eligible costs.

The lion's share of the budget is for personnel carrying the work in the project, with 74% of the share. The second largest component is for other goods and services, with 12% of the share, which will cover materials and installations supporting the building activity in the project. Travel costs, which account for 2% of the share, are calculated according to an overall travel plan, using standard rates. Travel activity mainly includes beneficiaries' participation in project meetings and visits to demo sites for beneficiaries whose demos are located in different cities. There is a need to subcontract part of the work in task 2.5 for IREC, task 3.3 for BOEX, MITROS, PALMA, task 4.3 for RC Panels, task 4.4 for IBAVI, task 5.4 for BOEX, , task 7.5 PALMA, task 7.6 for BOEX, task 9.5 for CITY OF UTRECHT, as well as some work relating to training courses for PROJECTZERO and IT security for ENFOR. Subcontracting accounts for 5% of total direct eligible costs.

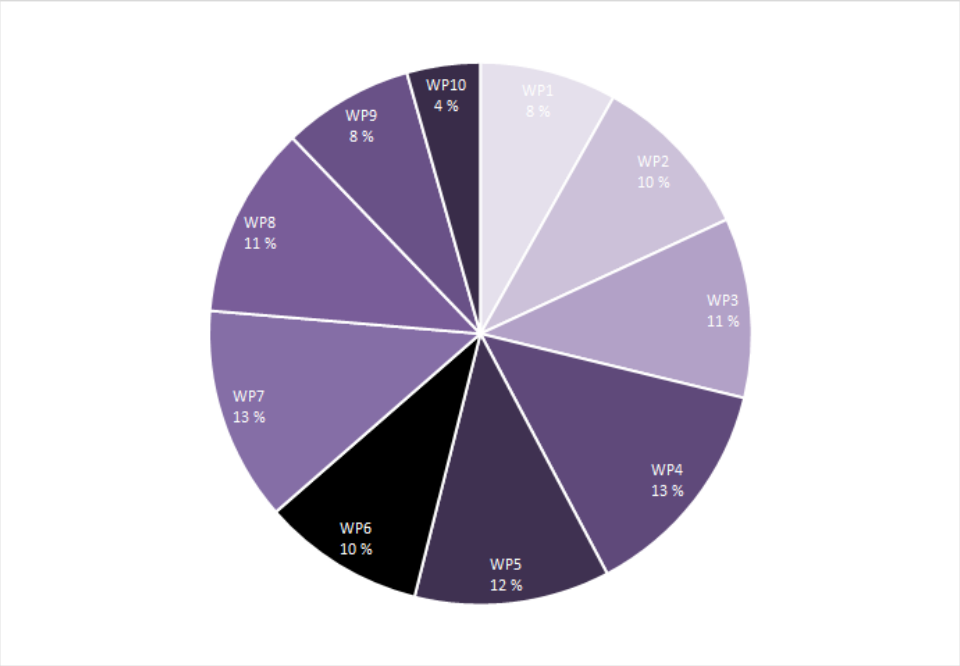


Figure 3.7. Share of PMs by WP

The allocated effort by WP is shown in Figure 3.7. The figure shows that the distribution of effort is even, with the exception of WP10, the work package for communication, with 4% of the effort. WP7 is the work package with the most effort, with 13%, while all the rest has between 8% and 12% of the effort each. NTNU has a larger budget than the other partners due to its integrative role, spanning almost all the WP topics: In table 3.4a the split of PM between WP and partners is shown, whereas in table 3.4b, the costs for the partners where costs for' travel', 'equipment', and 'goods and services' exceeds 15% of the personnel costs for that partner are shown. All depreciation costs for equipment, infrastructure or other assets in the project are in compliance with Article 6 and will be recorded in the appropriate beneficiary's accounts, purchased in accordance with Article 10 of the grant agreement and written off in accordance with international accounting standards and the beneficiary's usual accounting practices.

Table 3.4b: 'Other direct cost' items (travel, equipment, other goods and services, large research infrastructure)

02 – ACE	Cost (€)	Justification
Travel	10 000	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total), other travels, e.g. conferences/workshops, policy events, stakeholder events, travels to demo sites (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total)
Other goods and services	42 000	€15 000 for website, ICT infrastructure, cloud services, database and hosting costs, linked to subtask 10.3.1; €12 000 for 2 conferences for industry & civil society, linked to subtask 10.4.3; €5 000 for awareness raising events, linked to subtask 10.4.3; €10 000 for final conference, linked to T10.5
Total	52 000	

03 – CVUT	Cost (€)	Justification
Travel	15 000	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total); other travels, e.g. conferences/workshops, policy events, stakeholder events, travels to demo sites (2 persons per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year per person, €10 000 total)
Other goods and services	428 500	€8 500 for software for online facilitation and data processing, linked to tasks 3.3 and 3.4; €9 000 for workshops, linked to tasks 3.2, 3.3, 3.4 €37 000 for building integrated swappable façade system with integrated RES, linked to subtask 5.4.4 €16 000 for local Peltier HVAC unit system, linked to subtask 5.4.4 €29 000 for second life battery energy storage system, linked to task 6.3 €13 000 for weather forecasting system, linked to task 7.4 €15 000 for indoor air quality monitoring platform, linked to task 8.2 €7 000 for outdoor air quality monitoring platform, linked to task 8.2 €4 000 for monitoring stations, linked to task 8.2 €41 000 for RES and storage energy system solution for building electricity needs - BIPV part, linked to T 6.3 €15 000 for green roof and rainwater management, linked to subtask 5.4.4

		€31 000 for RES and storage energy system solution for building electricity needs - BAPV part, linked to T6.3 €6 000 for EV charging system, linked to T 6.3 €70 000 for RES and storages energy system solution for building electricity needs – heating, linked to task 6.2 €74 000 for building energy management system (BEMS), linked to tasks 7.5, 7.6, 7.7, 8.1, 8.2 €14 000 for building shading system, T6.3 €35 000 for building energy management system - operation, monitoring and control, T 8.2 €4 000 for CFS audit
Total	443 500	

05 – DANFOSS	**Cost (€)**	**Justification**
Travel	9 250	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total); other travels, e.g. conferences/workshops, policy events, stakeholder events, travels to demo sites (1 person per year for 4 years: flight (€750) + 1,25 nights on average * €250 per night gives €1 000 per year, €4 250 total)
Equipment	62 500	1 unit of prototype for circulation booster for domestic hot water at € 21 000, including installation costs. The technical equipment is a prototype and will have a depreciation period corresponding to the 2 years monitoring period in the project (linked to T6.3); 4x45 units of prototype for SOLO radiator thermostats/automatic at € 41 500 total, including installation costs: the technical equipment are prototypes and will have a depreciation period corresponding to the 2 years monitoring period in the project (linked to T6.3).
Other goods and services	35 000	To monitor the Danfoss SOLO thermostats multiple internet connection are needed and for this internet connection subscription is needed (linked to T6.3). This is budgeted to be €25 000. To interpret and conclude the data logs there could be need of specialized R&D consultants outside Danfoss A&S. This is budgeted to be €10 000 (linked to T6.3).
Total	106 750	

10 – PALMA	**Cost (€)**	**Justification**
Travel	15 000	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total); other travels, e.g. conferences/workshops, policy events, stakeholder events, travels to demo sites (2 persons per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year per person, €10 000 total)
Other goods and services	123 600	Costs associated to the One-stop shop service (total €9 600), linked to task 3.3; catalogue of renovation solutions (total €10 000), linked to task 4.4; expositions, show-rooms, and materials for off-site educational and training actions, etc in the Energy Transition Living Lab - TE21 (total €25 000), linked to task 3.3; engagement campaign for CEC - Citizen Energy Communities (total €15 000), linked to task 3.3; harmonization and generation of GIS Data for Demo District from different data sources in unique common urban 3D-based tool (total €40 000), linked to tasks 2.3 and 3.3; IEQ multi sensors & electricity portable metering system (20 units at €1 000 each, total €20 000), linked to task 8.1; €4 000 for CFS audit
Total	138 600	

11 – IBAVI	**Cost (€)**	**Justification**
Travel	6 250	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total); other travels, e.g. conferences/workshops, policy events, stakeholder events, travels to demo sites (1 person for 1 year: flight (€750) + 2 nights * €250 per night gives €1 250 total)
Equipment	9 900	Hybrid ventilation system control system and additional elements depreciated over the active use in the project, linked to task 4.4
Other goods and services	57 980	€45 000 for IEQ Sensors and comms for Monitoring and Evaluation, linked to task 8.3; €9 400 for external assistance for IEQ monitoring system, linked to task 8.3; €4 000 for CFS audit
Total	74 130	

13 – MET	**Cost (€)**	**Justification**
Travel	6 250	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total); other travels, e.g. conferences/workshops, policy events, stakeholder events, travels to demo sites (1 person for 1 year: flight (€750) + 2 nights * €250 per night gives €1 250 total)
Other goods and services	64 000	€54 000 for monitoring and advanced control system for centralized services (HVAC + PV) in two multifamily buildings, linked to task 8.2; €10 000 for IEQ multi sensors, linked to T8.2
Total	70 250	

14 – UAS Utrecht	**Cost (€)**	**Justification**
Travel	21 250	Consortium meetings (2,25 person on average per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €11 250 total); other travels, e.g. conferences/workshops, policy events, stakeholder

		events, travels to demo sites (2 persons per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year per person, €10 000 total)
Equipment	70 000	Equipment costs for innovative plug-play integration of energy installations, depreciated over the active use during the project duration: to optimze the performance of facade elements (consisting of low-carbon materials and integrated energy installations), building materials and sensoring equipment, linked to T 4.3.
Other goods and services	4 000	€4 000 for CFS audit
Total	95 250	

15 – HOUSING EUROPE	**Cost (€)**	**Justification**
Travel	13 750	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total); other travels, e.g. conferences/workshops, policy events, stakeholder events (1 person for 1 year: flight (€750) + 2 nights * €250 per night gives €1 250 total); travels to demo sites (1 person visiting 6 demos: flight (€750) + 2 nights * €250 per night gives €1 250 per demo visit, €7 500 total)
Other goods and services	49 800	€13 900 for dissemination and communication through printed materials, linked to subtask 10.3.3; €17 500 for online tools for web meetings, video interviews, video for the 6 CPCC demos, animation video, podcasts (COVID-proof measures), linked to subtask 10.3.3; €6 000 for 1 dedicated workshop per demo, linked to subtask 10.4.1; €6 000 for one targeted events to municipalities, linked to subtask 10.4.2; €5 000 for awareness raising events
Total	63 550	

16 – Buro de Haan	**Cost (€)**	**Justification**
Travel	6 250	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total); other travels, e.g. conferences/workshops, policy events, stakeholder events, travels to demo sites (1 person for 1 year: flight (€750) + 2 nights * €250 per night gives €1 250 total)
Equipment	35 000	€35 000 for digitalization tools and datasets for the pre-recognition of facade typologies, linked to T5.2
Total	41 250	

18 - SAB	**Cost (€)**	**Justification**
Travel	3 250	Consortium meetings (1 person per year for 3 years: flight (€750) + 1 nights * €250 for 1,33 nights on average gives €1 082,5 per year, €3 250 total)
Equipment	54 000	Installation of demonstration equipment in 45 apartments, depreciated in project period. The 45 units at €1 200 each of technical equipment are prototypes and will have a depreciation period corresponding to the 2 years monitoring period in the project. Necessary to have 2 separate housing blocks with each 22 + 23 apartments to have a certain amount of monitored apartments with different kind of inhabitants, linked to task 6.3.
Total	57 250	

20 - BOEX	**Cost (€)**	**Justification**
Travel	6 250	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total); other travels, e.g. conferences/workshops, policy events, stakeholder events, travels to demo sites (1 person for 1 year: flight (€750) + 2 nights * €250 per night gives €1 250 total)
Equipment	535 000	€250 000 of equipment costs for the design and demonstration of innovative elements of facade panels (bio-based / recycled material for facade panels and integrated systems for heating, ventilation, insulation, electricity), linked to tasks 4.3 and 5.4. Cost estimation breakdown: 1) Low-carbon biobased/recycled material for the production of prefabricated sandwich facade panels. Estimated costs: 50 dwellings x €2 500 EUR = €125 000 EUR total costs fully depreciated over project period. 2) Integrated energy installation equipment (tailor made energy installation equipment (pipes, cables, connectors). Estimated costs: 50 dwellings x €2 500 EUR = €125 000 EUR total costs fully depreciated over project period. €60 000 for the innovative BIPV panels to be installed at the demo-site buildings, linked to task 6.3; €100 000 for Home Energy Management System monitoring system, linked to task 7.4 and WP8; €50 000 for procurement of battery storage at apartment buildings, linked to task 7.6. 3) Equipment costs for innovative elements to integrate Hemubo and Inside Out renovation concepts, aimed at modular, plug-and-play energy and ventilation installation equipment. Estimated costs: 25 dwellings x € 3 000 EUR = € 75 000 EUR total costs fully depreciated over project period.
Other goods and services	4 000	€4 000 for CFS audit
Total	545 250	

27 – Mitros	**Cost (€)**	**Justification**
Travel	6 250	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total); other travels, e.g. conferences/workshops, policy events, stakeholder events, travels to demo sites (1 person for 1 year: flight (€750) + 2 nights * €250 per night gives €1 250 total)

Equipment	176 000	1) €28 000 for integration of LT DH and related HVAC systems, linked to task 6.2; €48 000 for Home Energy Management System monitoring system, linked to task 7.4 and WP8; €25 000 for procurement of battery storage at apartment buildings, linked to T7.6. 2) Equipment costs for innovative elements to integrate Hemubo and Inside Out renovation concepts, aimed at modular, plug-and-play energy and ventilation installation equipment. Estimated costs: 25 dwellings x € 3 000 EUR = € 75 000 EUR total costs fully depreciated over project period.
Other goods and services	4 000	€4 000 for CFS audit
Total	186 250	

29–DOL	**Cost (€)**	**Justification**
Travel	5 000	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total
Other goods and services	253 000	€210 000 for prototype of energy tunnel in the existing Piedicastello tunnel in Trento, linked to subtask 6.2.5: provision and installation of Radial BHE (€60 000), pipe circuit (€15 000), spritz and insulation (€20 000), safety and additional costs (€50 000), connection pipes to buildings (€40 000), support in design of the prototype (€25 000); €43 000 for NSGE floor slab thermal activation in new construction, linked to subtask 6.2.5: support in design of the prototype (€8 000), provision and Installation of pipes circuit (€12 000), workforce cost (€3 000), safety and additional costs (€10 000), provision and Installation of heat pumps (€10 000).
Total	258 000	

30– DTTN	**Cost (€)**	**Justification**
Travel	5 000	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total
Total	5 000	

Linked third party to DTTN – X-LAM Dolomiti)	**Cost (€)**	**Justification**
Other goods and services	454 000	Prototype of timber based prefabricated, multifunctional and modular facades, testing of cladding, lab testing, linked to subtask 5.4.5 (€42 500). Prototype of new Positive Energy Building Construction, linked to subtask 5.4.5, 6.3.5: foundations set-up under direct supervision (€90 000), provision and installation of wooden structure (€255 000). provision of other systems, energy distribution systems, ICT, BEM, integration and safety (€ 62 500). €4 000 for CFS Audit.
Total	454 000	

Linked third party to DTTN – Fanti Legnami)	**Cost (€)**	**Justification**
Other goods and services	285 000	Prototype of timber based prefabricated, multifunctional and modular facades, testing of cladding, lab testing, linked to subtask 5.4.5 (€42 500). Prototype of new Positive Energy Building Construction, linked to subtask 5.4.5, 6.3.5: provision and installation of innovative façade 500m2 BIPV, green solutions, windows (€180 000), provision of other systems, energy distribution systems, ICT, BEM, integration and safety (€62 500).
Total	285 000	

34 – NANO	**Cost (€)**	**Justification**
Travel	5 000	Consortium meetings (1 person per year for 4 years: flight (€750) + 2 nights * €250 per night gives €1 250 per year, €5 000 total)
Other goods and services	30 000	€30 000 for second life battery storage system - batteries and hardware, linked to T6.3.
Total	35 000	

Section 4: Members of the consortium

4.1. Participants (applicants)

NTNU Norwegian University of Science and Technology	**1. Norges teknisk-naturvitenskapelige universitet NTNU | NO Norwegian University of Science and Technology**	
	Web site: www.ntnu.no **PIC number: 999977851**	**Number of employees: 7400** **Number of students: 42 000**

Brief description of legal entity/partner organization

NTNU is the largest university in Norway, with 14 faculties and 70 departments and divisions. NTNU has 42 000 students and more than 4 600 person-years in academic or scientific positions (41% women). The university uses its main scientific profile in technology and the natural sciences and its cross-disciplinary competency to meet global challenges, summarized by its vision: *Knowledge for a better world*. Three out of four Strategic Research Areas at NTNU – Sustainability, Energy and Health – contribute directly to sustainable urbanization, delivering creative innovations with far-reaching social and economic impact in close collaboration with cities, industry, authorities, and civil society. NTNU has a strong focus on international mobility and research training. 11% of its students and 41% of PhD graduates are foreign nationals, as well as about 1/3 of the academic staff. NTNU currently participates in 126 signed H2020 projects, 30% are coordinated by NTNU. In FP7, NTNU participated in 139 projects.

NTNU hosts a number of **national centres of excellence and national centres for research-based innovation**. Most relevant for this proposal are:

- **ZEN, Zero Emission Neighbourhoods in Smart Cites**, develops solutions for future buildings and neighbourhoods/areas that will contribute to realize a zero-emission society.
- **CenSES, Centre for Sustainable Energy Studies**, develops fact-based knowledge for strategic decisions relevant to government and industry. The focus is knowledge for a national energy policy, for national and international climate policy, and for strategies of innovation and commercialization.
- **CINELDI, Centre for Intelligent Electricity Distribution**, will ensure that we are building the smart energy system of the future. CINELDI will contribute to designing the future's flexible and robust electrical distribution grid at an acceptable cost. CINELDI will facilitate renewable energy, electrification of transport and more efficient use of energy.
- **HighEFF, Centre for an Energy-Efficient and Competitive Industry for the Future**, develops energy-efficient processes and components aiming at reducing energy consumption by 20-30% and greenhouse gas emissions by 10%. HighEFF will help ensure that Norway has the world's greenest industries.
- **HydroCen, Norwegian Research Centre for Hydropower Technology**, aims to ensure and develop research and education in hydropower-related technology. The centre provides the hydropower sector world-class knowledge and innovative solutions.

Contribution to Work Packages and Tasks in the project

NTNU is leading the ARV project and the **WP1 Project Management and Coordination**. NTNU will also **lead** the **WP4**. In WP4 NTNU is leading T4.1 Innovation forum on Integrated and Circular Design and contributes to Task 4.2, about the design and evaluation of the Norwegian Demo project. Moreover, NTNU will coordinate and facilitate the cooperation between all the tasks within WP4. NTNU is also contributing to all the WPs.

WP2. Framework and tools for effective implementation and assessment of CPCC: NTNU is contributing to innovation forum, the assessment framework of Climate Positive Circular Communities and the evaluation tools.

WP3. Community engagement, environment, and well-being : NTNU is contributing to the plan, the overall methodology for establishing CPCC Living Labs and the implementation.

WP5: NTNU is contributing to innovation forum of Resource Efficient (Pre)Manufacturing and Construction Workflows T5.1

WP6: NTNU is contributing to innovative renewables & storage systems tasks T6.1, T6.2 and T6.5

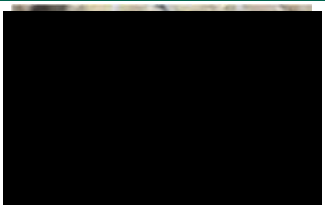
WP7: Efficient operation and flexibility. NTNU will contribute to the the flexibility functions and index, and the performance optimization. NTNU will lead Task7.5 on Deployment of methods for describing energy flexibility.

WP8: NTNU will contribute to all the tasks on Monitoring, evaluation and impact assessment

WP9: NTNU will perform an economic analysis of the long-term sustainability of some of the business models mentioned by GDFA and will lead sub-task in 9.3. NTNU will also lead the task on policy and regulations for the large-scale deployment of climate positive circular communities.

WP10: NTNU will have a substantial role in all the tasks. Dissemination, Communication and Stakeholder Engagement. Will lead T10.1 ARV visual identity and will contribute to all the tasks.

Profile of key personnel in the project



[redacted] (F) is a Professor in Integrated Energy Design at the Norwegian University of Science and Technology. She is also leading continuing education courses on Zero Emission Buildings. [redacted] was a leader of the research on pilot and demonstration buildings within the Research Centre on Zero Emission Buildings (www.zeb.no). She is currently involved in the research centre on Zero Emission Neighbourhoods in Smart Cities (www.fmezen.no), 2017-2024, where she has been the leader of the work on pilot projects and living labs. She is leader WP2 in syn.ikia H2020 on the development and demonstration of plus energy multi-storey apartment buildings. [redacted] [redacted] has more than 20 years of experience from research and development within the fields of energy efficient buildings and renewable energy. She also has experience from consulting and construction practices. [redacted] has been engaged as a researcher at SINTEF Building and Infrastructure, she has been an environmental manager at LINK architecture, and an energy advisor at Skanska Norway.
E-mail: [redacted], [redacted]

[redacted] (M) is a Professor in Building Physics and Director of the Research Centre on Zero Emission Neighbourhoods in Smart Cities (ZEN Research Centre) at the Norwegian University of Science and Technology (NTNU). The ZEN Research Centre has 32 partners from the building industry and energy sectors, as well as governmental organizations and municipalities. Our goal is to develop solutions for future buildings and neighbourhoods with no greenhouse gas emissions and thereby contribute to a low carbon society. [redacted] holds a MSc degree in environmental physics and a PhD degree in building physics. He has written and contributed to 100+ articles and has a h-index of 27. His research interests include zero emission buildings and neighbourhoods, energy use in new and existing buildings, heat, air and moisture transfer in building envelope systems, as well as development and application of new building materials. [redacted] is also project manager for the development of a large-scale research infrastructure on zero emission buildings (1800 m^2 office living laboratory), and Director of the Research Centre Zero Emission Buildings. Previously he worked as a senior research scientist at SINTEF Building and Infrastructure and visiting researcher at Lawrence Berkeley National Laboratory (LBNL).
E-mail: [redacted]

[redacted] (F) is Associate Professor in Integrated Energy Design at the Department of Architecture and Technology at the Norwegian University of Science and Technology, NTNU. She has more than fifteen years of experience in energy efficiency and sustainable design strategies from building to neighbourhood and city scale. Her expertise relates to the energy performance of buildings, the integrated energy design, the zero-emission neighbourhood concepts, the positive energy districts, the urban and building physics and climate-resilience of the built environment. [redacted] has authored 64 publications of which 22 articles in peer-reviewed scientific journals with high impact factors which have received 1094 citations (h-index is 12). She aspires to contribute towards the transfer of technological progress achieved in sustainable architecture and engineering to applications that pave the way to a low carbon, energy-efficient and resilient built environment. With an active role in more than twenty EU funded research projects (RIA, IA, CSA, and MSCA ITN), [redacted] is the Project Leader of [redacted] (IA) and Leader of Subtask D in the IEA EBC-Annex 83-Positive Energy Districts.
E-mail: [redacted]

[redacted] (M) is a Professor in Architecture and teaches within the international master programme of Sustainable Architecture at NTNU Faulty of Architecture and Design. His main teaching and research interest are within sustainable architecture and neighbourhoods (zero emission buildings and neighbourhoods). He has a special interest in passive energy design where the architecture itself responds to the climate and utilise passive strategies to achieve zero emission and plus energy buildings and neighbourhoods. [redacted] has a background from research within the field of low energy architecture (8 years at SINTEF) where he led and participated in several national and international research project, amongst them the EU projects RetroKit (FP7) and Cohereno (IEE). He has also worked as a consultant in the private industry (8 years) and led a large architectural office (3 years) were he was responsible for several low energy and plus energy buildings within the fields of education, health and housing.
E-mail: [redacted]

[redacted] (M) is a Senior Researcher at IØT-NTNU, working in four H2020 projects: SET-Nav (WP lead), INVADE (task contributor), +CityxChange (tasks contributor and lead), and Open ENTRANCE (WP lead). He also works as an advisor and research scientist in the Smart Distribution Grids group at SINTEF-Energy (Norway). Prior to this, he was working at ETH Zurich (Switzerland). There, he supported the research work and management of two multi-disciplinary flagship projects focused on electricity market design and combining energy-economic models. He holds a PhD in Operations Research from Lancaster University (UK) and a M.Sc. in Systems Engineering and Operations Research from The George Washington University (USA). His main research topics include smart grids and distributed generation, energy storage, applied stochastic programming, and energy-economic systems model integration to analyze the energy transition.
E-mail: [redacted]

[redacted] (F) is a Professor at the EPT at NTNU. She has strong background in district heating, energy planning, building energy monitoring, building simulation, optimization, and fault detection. She is a member of the Outstanding Academic Fellowship Programme at NTNU that focuses to qualify some of our foremost young research talents for internationally leading research careers. She has been a project leader for two research projects, one Horizon 2020 MSCA-IF, several collaboration and industry related projects, and a project on innovative teaching. Some of her projects were focusing on performance and control analysis of heat pump and energy supply systems for buildings. All these have given her lots of practical experiences and ideas about innovations related to heat pump implementation and energy supply systems for buildings. Further, in the NTNU/EPT laboratory, the entire CO_2 heat pump plant and the heated room has been initiated and developed by her together with the NTNU/EPT laboratory engineers. Until now, [redacted] has been the main supervisor for more than 45 MSc students, two completed PhD students, five on-going PhD students, and four Postdoctoral Fellow (two completed and two on-going). She is the main or co-author of 39 journal papers and has Scopus h-index 16. She is reviewer for more than 10 relevant journals and has been evaluator of the research proposals in Italy, Kazakhstan, Australia, Singapore, and Sweden.

[redacted] (M) is an Associate Professor and leader of the strategic area "Solutions for Smart cities" at The Department of Civil and Environmental Engineering (IBM) at the Norwegian University of Science and Technology (NTNU). He has 15 years of experience in research, consultation, and teaching, within the field of integrated building design within climate-neutral smart cities. He is expert in simulation and optimisation for early decision support. He has developed several methodologies and indicators for quantifying the building performance where building envelopes, HVAC systems, renewables, and flexibility assets are interacting. His toolbox includes building performance simulation (BPS), building automation systems (BAS), multi-objective optimisation (MOO), life cycle cost analysis (LCCA), and building information modelling (BIM). During his carrier, he has participated in developing two in-house simulation-based optimisations tools: MOBO and OptnZEB-I. As an academic author/co-author, [redacted] has published 28 peer-reviewed journal papers, 4 book chapters, 22 conference articles till now. He has 2030 citations, h-index: 18, and i10-index: 25. As a project leader/partner, [redacted] is a partner in ZEN Center and ENERSENSE group (a strategic research area with a focus on the nexus of energy efficiency, energy storage and sensor technologies, including automation), [redacted] is an active member of the International Energy Agency – Energy in Building and Communities program (IEA EBC) and a partner in the H2020 projects TRAN-URBAN-EU-CHINA and QUANTUM. Otherwise, he is a steering committee and advisory board

member for the research projects: "OCCuPANt" funded by the University of Liège, Council for Research and Development. [redacted] is also a collaborator in the project "The optimal transitions from interactively-isolated systems to the mutually-integrated unity between zero-energy building(s) and zero-energy vehicle(s)", funded by the Hong Kong Polytechnic University, University Grants Committee (UGC).
E-mail: [redacted]

[redacted] (F) is a Post-doctoral Fellow at the ZEN Research Centre at the Norwegian University of Science and Technology (NTNU) and researcher at the Department of interdisciplinary studies of culture, NTNU. [redacted] is a social anthropologist whose main field of research is the interaction between people and the physical and technical environment. Her research is interdisciplinary engaging with energy research, STS studies and architecture. Current research focuses on the sustainable transition and implications for the good life through the design and use of experiments in living labs located in nine ZEN pilot neighbourhoods in Norway. [redacted] has also worked with a long-term residential experiment in **ZEB living lab .** Where the impact of zero emission technology on domestic routines and home-making strategies was studied. [redacted] has published widely in international journals. She has also participated in international conferences within the fields of social science and energy research. [redacted] has extensive experience in projects funded by the Norwegian Research Council and EU (CommonEnergy, Retrofit, EcoCity).
E-mail: [redacted]

Relevant publications, and/or products, services, or other achievements

Publications (recent 10):

1. Resch, E.; Andresen, I. (2018). A Database Tool for Systematic Analysis of Embodied Emissions in Buildings and Neighbourhoods. Buildings, vol. 8 (106).
2. Wiik, M.R.K.; Fufa, S.M.; Kristjansdottir, T.F.; Andresen, I. (2018). Lessons learnt from embodied GHG emission calculations in zero emission buildings (ZEBs) from the Norwegian ZEB research centre. Energy and Buildings, Vol. 165.
3. Homaei S., Hamdy M. (2020). A robustness-based decision-making approach for multi-targets high-performance buildings. Applied Energy, Volume 267, 2020, 114868, ISSN 0306-2619
4. Mariño S., Eguia P., Grandaa E., Hamdy M. (2020). Performance Comparison of Multi-Objective Optimization-based approaches for Calibrating White-box Building Energy Models. Energy and Buildings, Volume 216, 2020, 109942, ISSN 0378-7788, see
5. Schönfeldt Karlsen S., Hamdy M., Attia S. (2020). Methodology to assess business models of dynamic pricing tariffs in all-electric houses. Energy and Buildings, Volume 207, 2020, 109586, ISSN 0378-7788, see.
6. M. Rabani, H. B. Madessa, O. Mohseni, N. Nord (2020). Minimizing delivered energy and life cycle cost using Graphical script: An office building retrofitting case, Applied Energy, Volume 268
7. Woods, Ruth; Berker, Thomas. (2019) Living labs in a zero emission neighbourhood context. IOP Conference Series: Earth and Environmental Science (EES). vol. 352 (1).
8. Zepter, J. M., Lüth, A., Crespo del Granado, P., Egging, R., (2019). Prosumer integration in wholesale electricity markets: Synergies of peer-to-peer trade and residential storage. Energy and Buildings, Vol 184.
9. J. Brozovsky, N. Gaitani, A. Gustavsen (2020). A systematic review of urban climate research in cold and polar climate regions, Renewable and Sustainable Energy Reviews, https://doi.org/10.1016/j.rser.2020.110551

10. How to define (net) zero greenhouse gas emissions buildings: The results of an international survey as part of IEA EBC annex 72. Building and Environment. Volume 192, April 2021, 107619D.Satola M.Balouktsi c T.Lützkendorf A. HoulihanWiberg A.Gustavsen .

Products and services:

Zero Emission Building Definition – A Life Cycle Approach to planning, design and construction of Zero Emission Buildings.

The NTNU Research Team has contributed to realization of **8 real-life zero emission demonstration buildings** in Norway (http://www.zeb.no/index.php/en/pilot-projects), through the Research Centre on Zero Emission Buildings. They include detached houses, office buildings, and educational buildings. The ambition level for several of the ZEB demos are higher than the plus energy level, since the balance also include embodied emissions from materials.

Contribution to **definitions of Plus Energy Buildings and Plus Energy Neighbourhoods** to FutureBuilt (www.futurebuilt.no) and Oslo Municipality (https://www.oslo.kommune.no/).

Project and activities

1. The **ZEN Research Centre** has 32 partners from the building industry and energy sectors, as well as governmental organizations and municipalities. Our goal is to develop solutions for future buildings and neighbourhoods with no greenhouse gas emissions and thereby contribute to a low carbon society.
2. The **ZEB Research Centre** with 21 partners from the building sector. Activities included development of new advanced building materials (e.g. insulation materials, electrochromic materials, low emissivity coatings, and phase change materials), smart building envelope systems, and new ventilation systems/membranes for better indoor air quality.
3. National projects (Research Council of Norway) in development, modelling and simulation, and testing of advanced building envelope systems – SkinTech (2016-2019), ReInVent Windows (2017-2021).
4. Large scale infrastructure project funded by the Research Council of Norway on ZEB Laboratory (a 1800 m2 office buildings to investigate plus energy and zero emission building technologies and user/worker-technology interaction).

Relevant ongoing and previous projects

ZEN Research Centre on Zero Emission Neighbourhoods in Smart Cities (Centre for Environment-friendly Energy Research funded by Research Council of Norway + industry), 2017-2024_The Research Centre ZEN, hosted by NTNU, aims to enable the transition to a low-carbon society by developing solutions for future buildings and neighbourhoods/areas that will contribute to realize a zero-emission society. The ZEN Research Centre has the laboratory facilities ZEB Test Cell Lab, ZEB Living Lab and 9 large-scale demonstration projects in Norway.

syn.ikia H2020 project/ Sustainable Plus Energy Neighbourhoods, funded by EU, coordinated by NTNU. The syn.ikia innovation project within the EU Horizon 2020 framework involves 13 partners from six countries and aims to enable the development of sustainable plus energy neighbourhoods in different climates, contexts and markets in Europe. Over the course of the project, four real-life plus-energy demo neighbourhood projects tailored to four different climatic zones will be developed, analysed, optimized and monitored, demonstrating the functionality of the plus-energy neighbourhood concept for the rest of Europe.

+CityxChange (H2020, Smart Cities and Communities), 2018-2023. NTNU coordinates the 32 partners in the project. Lighthouse Cities are Trondheim, Norway, and Limerick, Ireland.

ECHOES – Energy Choices (H2020) focuses on consumer/prosumer energy behaviour and supports the Energy Union and the SET Plan. Coordinated by NTNU.

INVADE (H2020) focuses on smart system of renewable energy storage based on integrated EVs and batteries to empower mobile, distributed and centralised energy storage in the distribution grid. NTNU is WP leader.

EERA JP Smart Cities, chaired by NTNU. In EERA JP Smart Cities, universities and research institutes from across Europe cooperate with industry, cities and citizens to support innovation and demonstration projects with knowledge-based experimentation, applied and fundamental research, to deliver quality and impact, and to ensure scalability and replicability of locally developed and tested solutions/processes. Building on the experiences from H2020 smart city lighthouse projects, and corresponding national/regional initiatives, EERA JP Smart Cities plays a defining role in the European research and innovation landscape on smart cities, as key drivers towards a climate-neutral Europe and world.

SET-Nav - Navigating the Roadmap for Clean, Secure and Efficient Energy Innovation, started in April 2016 and is co-funded by the EU Horizon 2020 programme. The project intends to support strategic decision making in Europe's energy sector, enhancing innovation towards a clean, secure and efficient energy system.

ZEB Research Centre on Zero Emission Buildings (Centre for Environment-friendly Energy Research funded by Research Council of Norway + industry), 2009-2017

QUANTUM (Quality Management for Building Performance), was a four year-long project from Jan. 2016 to Dec. 2019. The goal of the project was to develop and demonstrate pragmatic services and appropriate tools with high replication potential supporting quality management (QM) for building performance in the design, construction, commissioning and operation phase as a means to close the gap between predicted and actual energy performance in European buildings.

Significant infrastructure and/or technical equipment

NTNU has laboratory facilities that can be used in this project:

ZEB Living Laboratory

The ZEB Living Lab is a multipurpose experimental facility built by Zero Emission Buildings, Faculty of Architecture and Fine Arts, NTNU. The Living Laboratory is a test facility that is occupied by real persons using the building as their home. The focus is on the occupants and their use of innovative building technologies like intelligent control of installations and equipment, interactive user interfaces and interplay with the energy system as a whole. A highly flexible plus energy dwelling. This laboratory is a 100 m2 large regular residential building, but highly flexible, instrumented and controllable. Typical experiments include user-technology interaction (e.g. Graphical User Interfaces), testing of energy flexible operation (e.g. model predictive control and self-consumption

of renewable energy), and testing of various (interaction between) renewable energy sources (PV, solar thermal and heat pump are installed).

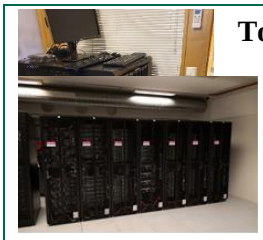
ZEB Test Cell Laboratory for research and development of plus energy and zero emission/energy building technologies. The Test Cell Laboratory is used for testing low-energy, integrated building systems under realistic operational conditions. The Test Cell can be divided into two smaller chambers that can be used to compare different technologies. The Test Cell Laboratory is a technical development facility where different elements of building materials, building envelopes, energy installations and control systems are developed and optimized together.

ZEB Office Living Laboratory

The **ZEB lab** is a laboratory for zero emission buildings, an arena where new and innovative materials and solutions are developed, investigated, tested and demonstrated in mutual interaction with people. The building includes systems like building integrated photovoltaics (BIPV), phase change materials (PCM), heat pumps, a highly flexible control system, possibilities for model predictive control, a combined mechanical and natural ventilation system. Systems can be changed/adjusted in the various experimental setups.

The **Advanced Materials and Component Laboratories** are used for both development and research on building materials, building envelope components (such as smart facades), technologies for energy supply (for example building integrated photovoltaics) and building services like for instance ventilation systems. The most important laboratories are: Large Scale Vertical Building Envelope Climate Simulator, Accelerated Climate Ageing Laboratory, Climate Exposure Laboratory, Building Component and Structure Thermal Performance Laboratory, Rotatable Hot-Box Apparatus, Advanced Spectrometer Laboratory, and Advanced Materials Technologies Laboratory.

e-Infrastructure (Hardware)



To facilitate computational tasks (i.e., simulation and data-analysis tasks)

NTNU has its own super-computers, located in air-conditioned rooms, in most of its departments. The figure shows one of the super-computers at the Department of Civil and Environmental Engineering at NTNU. In addition, huge computational power of approximately 85 million CPUs is available via national high-performance computing (HPC) systems. For instance, the HPC system ''SAGA'' which is operated under auspice of UNINETT Sigma2 AS. The SAGA provides several computational cloud-serves (i.e., parallel computing and data storage) and it is located in the datacentre called Valhall at NTNU.

e-Infrastructure (Software). To facilitate computational tasks (i.e., simulation and data-analysis tasks), NTNU has a set of licentiate software packages including:

- IDA ICE Expert 4.8: IDA Indoor Climate and Energy (IDA ICE) is a new type of simulation tool that takes building performance to another level. It accurately models the building, its systems, and controllers – ensuring the lowest possible energy consumption and the best possible occupant comfort.
- BesignBuilder Pro v6: DesignBuilder Packages for Engineers are an integrated set of high-productivity tools to assist with sustainable building design and gain credits with environmental schemes such as LEED and BREEA.M. Leading services engineers and energy modellers use DesignBuilder to make design choices that optimise energy efficiency, comfort and cost.
- HOMER Pro: The HOMER Pro® microgrid software by HOMER Energy is the global standard for optimizing microgrid design in all sectors, from village power and island utilities to grid-connected campuses and military bases. Originally developed at the National Renewable Energy Laboratory, and enhanced and distributed by HOMER Energy, HOMER (Hybrid Optimization Model for Multiple Energy Resources) nests three powerful tools in one software product, so that engineering and economics work side by side.
- MATLAB: MATLAB® combines a desktop environment tuned for iterative analysis and design processes with a programming language that expresses matrix and array mathematics directly.
- ModeFrointier: The comprehensive solution for process automation and optimization in the engineering design process. modeFRONTIER modular environment is key to reduce complexity, improve efficiency and cut development time.

Operational capacity of legal entity/partner organization

n/a

	2. Architects' Council of Europe **ACE | BE** **Conseil des Architectes d'Europe**
Web site: www.ace-cae.eu **PIC number: 924742517**	**Number of employees: 8**

Brief description of legal entity/partner organization

The Architects' Council of Europe (ACE) is the representative organisation for the architectural profession at European level. Its headquarters and Secretariat are located in Brussels. Its membership currently consists of 44 Member Organisations, which are the regulatory and professional representative bodies in all European Union (EU) Member States, and accession Countries, Switzerland and Norway. Through them, the ACE represents the interests of over 600.000 architects from 31 countries in Europe. The principal function of the ACE is to monitor developments at EU level, seeking to influence those areas of EU Policy and legislation that have an impact on architectural practice and on the overall quality and sustainability of the built environment. The ACE is dedicated to the better understanding of technical, environmental and cultural values and to the promotion of the highest standards of education and practice in architecture. Its mandate is to ensure that the views and expertise of the profession are delivered to the institutions of the European Union and to seek, as far as possible, consensus among its Members in all of its policy positions. Its policy is defined and approved by the General Assembly of all the Member Organisations, meeting twice yearly. The **main role of the ACE in ARV is to lead WP10**: Communication, Dissemination and Stakeholder Outreach

Contribution to Work Packages and Tasks in the project

WP 1 Management: Coordination & General Management Activities
WP 2 Framework for effective planning, design, construction and operation of CPCC: Assessment framework for CPCC
WP 3 Community, environment, and well-being: Contextualisation and implementation of CPCC Living Labs
WP 4 Sustainable building (re) design: Integrated design of CPCC
WP 5 Resource efficient (pre) manufacturing and construction workflows: Optimisation of the workflows
WP 8 Monitoring and evaluation: Assessment of KPIs for design and construction
WP 9 Market uptake: ARV e-marketplace and business models
WP 10 Communication, dissemination and training: WP leader. Dissemination & Communication Strategy, Dissemination and communication channels, Stakeholder outreach

Profile of key personnel in the project

[redacted] **Project Officer** (F)[redacted]
Diploma in Architecture, Master of Engineering in Real Estate Economics and Facilities Management, PhD in Construction Management on: 'Social network analyses of knowledge transfer in sustainable office building projects in the UK and Germany'. Work experience in different sectors of the built environment, from small independent companies to global blue-chip groups in Europe and the US. Expertise on a broad range of sustainability issues in the built environment and knowledge management. Working on various EU funded projects (FP7, H2020, Erasmus+) for seven years, leading work packages on communication, dissemination, exploitation, stakeholder involvement, international workshops and policy paper development.

[redacted] **Assistant Project Officer** (F)[redacted]
Graduate Architect and Urban Planner with a Master in Civil Engineering from USP (Brazil) and a Master of Science in Sustainable Environmental Design from AA School (UK). Self-motivated Architectural Designer with four years of experience in the UK. In addition, seven years of experience

in Brazil working in the retail industry on the design and construction of commercial units across the country. Working on H2020 projects since March 2019.

[redacted] **Assistant Project Officer** (F) [redacted]

Master of Architecture from the Polytechnic School of the University of Palermo (IT). Four years of work and research experience within the architecture industry and as a visiting researcher at the University of Coimbra. Strong expertise in innovative technologies (laser scanning, photogrammetry, scan-to-BIM) applied to both architecture and cultural heritage. Working on H2020 projects since August 2019.

[redacted] **Secretary General** (M) [redacted]

Modern languages graduate with 30 years' experience of working for professional bodies in the third sector (architecture) at national, European and international level. Responsible for researching and analyzing documentation to inform decision-making and policy development with a view to representing architects' interests and influencing EU legislative proposals; managing the ACE team.

[redacted], **Head of Administration** (F) [redacted]

Master in Sociology. Assisting the Secretary General in general Management Activities, accounting tasks, administrative management of personnel, preparation of the administrative papers for project proposals and administrative follow-up of approved projects, financial reporting of projects, organisation of events, preparation and implementation of questionnaires, statistical analysis of the results

Relevant publications, and/or products, services, or other achievements

ACE Publications:

- ACE Guide Introduction to BIM, 2019
- The Value of Design And The Role Of Architects, 2019
- 20 Architectural Projects Against Climate Change, 2018
- Work with European Architects!, 2018
- Sector Study: The Architectural Profession in Europe, 2018

Relevant previous projects

1. RenoZEB www.renozeb.eu (H2020) Accelerating nearly zero energy renovation for buildings and neighbourhood
2. TripleA-reno www.triplea-reno.eu (H2020) Attractive, Acceptable and Affordable deep renovation by a consumer orientated and performance evidence-based approach
3. Cultural-E www.cultural-e.eu (H2020) Climate and culture-based design and market valuable technology solutions for Plus Energy Buildings
4. Drive0 www.drive0.eu (H2020) Driving decarbonization of the EU building stock by enhancing a consumer centred and locally based circular renovation process
5. DigiPLACE www.digiplaceproject.eu (H2020) *Towards a European Digital Platform for Construction*

Significant infrastructure and/or technical equipment

n/a

Operational capacity of legal entity/partner organization

n/a

	3. CESKE VYSOKE UCENI TECHNICKE V PRAZE CVUT | CZ CZECH TECHNICAL UNIVERSITY IN PRAGUE	
	Web site: www.uceeb.cvut.cz PIC number: 999848744	**Number of employees: 4084 (2019) Number of students: 17 229 (2019)**

Brief description of legal entity/partner organization

CVUT (founded in 1707) is one of the oldest and largest technical universities in Europe. It offers a range more than hundred study programmes with over 400 fields of study. The project will be carried out by University Centre for Energy Efficient Buildings (CVUT UCEEB) which is a national centre of excellence in energy efficient building and sustainable innovations for the whole building life cycle. The main strength of the Centre is knowledge transfer to practice through close cooperation with industry and municipalities. CVUT UCEEB has five research departments that include energy and resource efficiency, advanced control systems, indoor environmental quality and sustainability in the built environment.

Since its establishment in 2012, CVUT UCEEB has focused on applied research and cooperation with industry. It has already finished/begun over 600 projects – funded both from public and private sources. Currently, there are 3 ongoing H2020 projects implemented by CVUT UCEEB: SPARCS - Sustainable energy Positive &
zero cARbon CommunitieS https://sparcs.info/, Powerskin+ https://www.powerskinplus.eu/ and PLURAL https://www.plural-renovation.eu/ and researchers are involved in Positive Energy Districts European Network – COST Action –
CA17126 https://www.cost.eu/actions/CA19126/#tabs|Name:overview, CVUT UCEEB is the leader of Working Group 1: PED Mapping, Characterisation and Learning. There are also two ongoing projects in IEA EBC Annex 83 – Positive Energy Districts https://annex83.iea-ebc.org/ and IEA EBC Annex 72 – Assessing Life Cycle Related Environmental Impacts Caused by Buildings https://annex72.iea-ebc.org.

CVUT UCEEB will be represented by experts from the following three research departments:

- Architecture and the Environment
- Energy Systems in Buildings
- Control and monitoring of intelligent buildings

Contribution to Work Packages and Tasks in the project

WP1: Participation on smooth running of the project.
WP2: Positive Energy District framework expertise, evaluation of local RES generation in urban environment, solar potential study performance.
WP3: citizen, communities and stakeholder engagement, awareness raising and learning, participatory methods, methodology development, co-creation workshops, user-centred design of building systems, pre- and post-surveys, qualitative and quantitative data collection, mapping of stakeholders involved, interests, and needs.
WP4: zero-emission/positive energy building concepts, integrated and efficient building design, digital design solutions, RES integration in building design, digital design and 3D simulations (digital twins), climate change resilient solutions.
WP5: expertise in climate change adaptive measures - summer cooling by heat pumps, green roof, elimination of heat islands, rainwater management (rain gardens, greenery), swappable façade-integrated RES (flexible solution enabling easy application of PV/PV-T/solar thermal/façade heat exchangers for possible coupling with heat pumps).
WP6: design, simulation and strategies for building and district energy systems (thermal and electricity), application of renewable energy sources, energy storages (batteries, water) and their operation, energy systems simulation, expertise in - heat pump, BAPV, BIPV, PVT, energy storage, waste heat.
WP7: Monitoring of the operational efficiency.

WP8: Data architecture design, communication protocols, datawarehouse, monitoring, data collection, analysis, IAQ sensors and evaluation, IoT platform.
WP10: dissemination and communication of project demo-site and project results, communication channels (website, social media, newsletters), marketing.

Profile of key personnel in the project

[redacted] (M) graduated from the Faculty of Civil Engineering of the Brno University of Technology, majoring in Building Constructions where he worked as a researcher as well. For several years he worked in Scandinavia and Southeast Asia in the field of sustainable construction. At CEZ Group, he focused on the topic of Smart City and Electromobility. Since 2019 he has been the head of the research department Monitoring and Control of Intelligent Buildings at CVUT UCEEB.

[redacted] (M), Head of department Architecture and the Environment, is expert in sustainability assessment systems and performance of the built environment. He graduated and got PhD at CVUT Faculty of Civil Engineering and worked at various R&D and consulting positions in the construction and RES industry. Since 2006 research scientist at the Faculty of Civil Engineering and since 2012 at CVUT UCEEB. Participated in projects – LEnSE (FP6), PERFECTION (FP7), SuPerBuildings (FP7), MORE-CONNECT (H2020) and contributed to development of the national building sustainability certification scheme SBToolCZ. Antonín is active member of the International Initiative for Sustainable Built Environment (iiSBE), founding member of the Czech Green Building Council and organizer of www.cesb.cz conference series. https://orcid.org/0000-0002-3142-2631

[redacted] (M) gained his Ph.D. at the CVUT Faculty of electrical engineering and his focus is on electronic and sensor design for special applications. Between 2007-2012 as postdoc researcher and team leader in Tyndall NI, Ireland. Since 2012 at CVUT UCEEB, where he established and lead department Monitoring and Intelligent Control in period 2015-2019, in 2019 as visiting researcher at InnoRenew CoE, Slovenia, focusing on renewable construction materials. Co-founder of two companies and inventor of several EU and US patents. He is a principal investigator of several research projects in the field of IoT sensor design, renewable energy sources and other topics. https://orcid.org/0000-0002-0647-2987

[redacted] (M) holds PhD from the Electronic Engineering Department at the Polytechnical University of Catalonia (UPC). His background is in supervision and automatic fault detection in grid-connected photovoltaic (PV) systems, as well as modelling and degradation analysis of different PV module technologies. At CVUT UCEEB deals with PV applications, microgrids, smart energy management of multiple renewable energy sources (RES) and battery energy storage systems (BESS). https://orcid.org/0000-0003-4122-5823

[redacted] (M) graduated from faculty of Mathematics and Physics at Charles University in Prague, then worked as freelance consultant and software developer. Since 2018 member of the department of Monitoring and Control of Intelligent Buildings where he focuses on developing the prediction of PV irradiation and PV forecast service. https://orcid.org/0000-0003-2955-1634

[redacted] (F) gained an undergraduate degree in Media Studies and Sociology, at Masaryk's University in Brno, and consequently a Master's degree in Sociology at University of West Bohemia. Then worked as research analyst specialized in quantitative research in terms of informal care taking. Since 2019 researcher at CVUT UCEEB involved in rainwater management in urbanized landscape and implementing the Smart City principles into Czech towns and cities. Currently working on a methodology to help Czech municipalities with deployment of blue-green infrastructure and projects in effective city management and planning processes and applying the participative design process for public spaces and buildings.

[redacted] (M) graduated from the Department of Heat Energy at the Omsk Transport University (Russia). Since 2014 works as researcher at CVUT UCEEB where he is engaged in R&D in renewable energy sources integrated into the building envelope. He deals with modelling and experimental testing of solar elements and advanced glazing. He is currently completing his doctoral studies at the Institute of Environmental Engineering, Faculty of Science, Czech Technical University in Prague. https://orcid.org/0000-0002-9535-6143

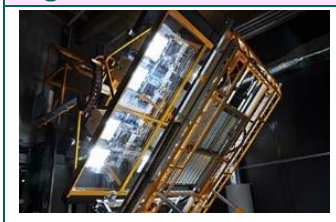
Relevant publications, and/or products, services, or other achievements

- Envilop – Environmentally Friendly Building Envelope – connected to several utility models, the main one with reg. No CZ 266197, https://isdv.upv.cz/webapp/!resdb.pta.frm
- PV Forecast – tool for PV irradiation forecast – for CZ, local using skyscanners, or locally installed exposure sensors, http://wp2.pvforecast.cz/en/home/#services
- SBToolCZ National Sustainability Assessment Tool - Czech method for complex quality assessment of building performance in which the characteristics of the building and its surroundings are evaluated with respect to the sustainable development,https://www.sbtool.cz/en/homepage-english/
- Volf, M., et al. Application of Building Design Strategies to Create an Environmentally Friendly Building Envelope for Nearly Zero-Energy Buildings in the Central European Climate. Energy and Buildings. 2018, 165 35-46. ISSN 0378-7788. DOI 10.1016/j.enbuild.2018.01.019.
- Kichou, S.; Skandalos, N.; Wolf, P. Energy Performance Enhancement of a Research Centre Based on Solar Potential Analysis and Energy Management. Energy. 2019, 183 1195-1210. ISSN 0360-5442.

Relevant previous projects

- **MORE CONNECT** - Development and advanced prefabrication of innovative, multifunctional building envelope elements for MOdular REtrofitting and CONNECTions, H2020 GA 633477, 2014-2019, https://www.more-connect.eu/
- **POWERSKIN+** Smart modular building facade systems for retrofit will affordably enhance energy efficiency, H2020 GA 869898, 2019-2023, https://www.powerskinplus.eu/
- **SPARCS** - Sustainable energy Positive & zero cARbon CommunitieS, H2020 GA 864242, 2019-2024, www.sparcs.info
- **Autonomous curtain wall panel,** Technology Agency of the Czech Republic, GA TH03020341, 2018-2020, https://starfos.tacr.cz/en/project/TH03020341?query_code=4feqaacjmlpa
- **IEA EBC Annex 72** – Assessing Life Cycle Related Environmental Impacts Caused by Buildings https://annex72.iea-ebc.org

Significant infrastructure and/or technical equipment



Solar laboratory

- Solar simulator with artificial sunlight with indoor test stand
- Outdoor test stand for long-term monitoring of solar components
- Test stand for determining the optical characteristics of transparent materials
- Portable ultrasonic flow & heat meter for pipes DN 10 to DN 2000 for in-situ measurements
- Mertel EurotestPV device for complete testing and diagnostics of photovoltaic panels and installations
- Mass flow meters for measuring different kinds of fluids
- Outdoor test cell (3 x 3 m) for solar components integrated into building envelope
- Accredited testing of liquid solar thermal collectors (thermal performance, time constant, stagnation temperature)
- Preaccreditation testing of solar collectors (exposure test, resistance to high temperature, thermal shock)
- Development and testing of air solar thermal collectors and hybrid concepts (air-liquid, photovoltaic-thermal)
- Optical evaluation of homogeneous and inhomogeneous glazing and prismatic structures
- Research and development in building envelope integration of solar components
- PV characteristics testing for PVT collectors

Electronic Systems and Diagnostics

- Electronic devices – power sources, oscilloscopes, spectral analyzer, measuring systems, soldering workplace
- Diagnostic systems – thermal camera, endoscopic camera, precise accelerometers, laser measurers, magnetometers and metal detectors
- 3D printing center FORTUS 400mc – modeling space of 406 × 355 × 406 mm, resolution up to 0.127 mm, materials ABS-M30, PC-ABS, PC, PC-ISO, ULTEM
- Spectral analyzers – measured spectrum from 200 to 1750 nm, precision of measuring ±20 pm, dynamic range up to 60 dB
- Interrogator – measured spectrum from 1270 to 1650 nm, precision of measuring ±1 pm, maximum number of wave channels 1000, detection threshold -40 dBm
- Laser source – C+L band, width of the spectral line <100 kHz, tuning step: 1 pm, output 15 dBm
- Welding kit – Fitel S178A including the optical fi breaker, quick weld in seven seconds, allows for directly welded on connectors

Photovoltaic systems

- Simulator of PV field with maximum output of 20 kW (1000 V / 20 A) capable of static as well as dynamic simulation of the electric output of PV modules according to set operational conditions (intensity of radiation, temperature, shielding)
- Exact analyzer of output ZIMMER LMG 670 for measuring and recording of electrical quantities
- Assembly of three programmable loads ZSAC for AC as well as DC load with the output up to 5,2 kW
- Experimental PV field with the output of 2,5 kWp and an assembly for the verification of behavior of hybrid systems in real conditions

Control systems and optimization

- The lab has a testing device with a heating circuit with all the necessary sensory equipment and a wide range of control options for actuators. All the data is continuously recorded; in addition, the experiment can be controlled via completely remote access.
- For this purpose, the team created a platform which is specifically focused on rapid prototyping and commissioning of various experimental sets.

Operational capacity of legal entity/partner organization

n/a

Tekniske Universitet	**4. Danmarks Tekniske Universitet DTU | DK Technical University of Denmark**	
	Web site: www.dtu.dk **PIC number: 999990655**	**Number of employees: 5881** **Number of students: 12048**

Brief description of legal entity/partner organization

Founded in 1829 with the mission of creating value for the benefit of society, DTU is an international elite technical university where education, scientific advice, and innovation rest on a solid foundation of world-class research. The University is at the academic and multidisciplinary forefront of the technical and the natural sciences—with new initiatives in a number of demanding engineering disciplines. DTU has a strong track record of industry partnership and is ranked number 1 in the Nordic region and number 9 in Europe among the most innovative universities according to Reuters. To date, DTU has coordinated or participated in 399 H2020 projects and has an extensive central support network for European projects including: project, financial, legal, IPR/innovation, and risk management.

DTU Compute is the largest environment for math & comp science in DK, covering topics from research to ICT. DTU Compute hosts CITIES, which is the largest national research on smart energy systems. DTU Compute related EU projects: SmartNet, FLEXCoop, eBalance+, syn.ikea, OpenE, SmartCityAccelerator, HEAT 4.0, uGRIP, COOL Data, CESI, etc. DTU Compute has defined AI, IoT and the green transition as key research areas.

DTU Civil Engineering (DTU Byg) carries out teaching and research in smart cities area and contributes to establishing digitalized building sector in Denmark. DTU Byg develops methods based on big data to provide energy efficiency and energy flexibility solutions for buildings and districts. Byg is active in smart cities projects, e.g. CITIES, HEAT 4.0, SCA, EnergyLab Nordhavn.

Contribution to Work Packages and Tasks in the project

DTU will primarily contribute to WP2, 6, 7 and 8, additionally also WP1 and 10.

WP 2 Framework for effective planning, design, construction and operation of CPCC:

DTU will use and test innovative methods and tools for Large-Scale Retrofitting actions in the demo of Sønderborg.

WP 6 Renewable energy and storage:

DTU will contribute to the demonstration of low temperature district heating and forecasting PV energy production.

WP 7 Efficient operation and flexibility:

DTU is the WP leader and will develop and test digital solutions and infrastructures for efficient operations in the ARV project. Specifically, the focus is on unlocking the available flexibility in all the six demo sites for optimizing the self-consumption and minimizing the carbon footprint by data-driven and intelligent

operations. DTU will collaborate with the ARV Cloud HUB (CENTER DENMARK) on efficient operations of all demo sites and harvest innovation digital synergies.

WP 8 Monitoring and evaluation:

DTU will contribute to the development of monitoring, evaluation and impact assessment.

Profile of key personnel in the project

[redacted] (M) is a Professor and the Head of section Dynamical Systems – DYNSYS. Furthermore, he is the head of Center for IT-intelligent Energy Systems (CITIES). He received the Ph.D. in Statistics from the Technical University of Denmark in 1986. He was appointed Asst. Prof. in Statistics in 1986, Assoc. Professor in 1989, and Professor in Mathematical Statistics with a special focus on Stochastic Dynamical Systems in 1999, and the Head of the National Center for IT-Intelligent Energy Systems (CITIES) 2014. The total budget for the research projects he has received is more than 30 million Euro. He has published 550 publications including 230 journal papers, 12 research monographs (Citations: >24000, h-index: >70, i10-index: >400 (Google Scholar)). See [redacted] for more details. His main research interest is related to analysis and modelling of stochastic dynamics systems. This includes signal processing, time series analysis, identification, estimation, grey-box modelling, prediction, optimisation and control. The applications are mostly related to Energy Systems, Smart Cities, Informatics, Environmental Systems, Bioinformatics, Biostatistics, Process Modelling, and Finance.

[redacted] (F) is an Associate Professor with the Department of Civil Engineering, DTU. She received the Ph.D. degree in Architecture Engineering from the University of Tokyo, in 2014. She was a Postdoctoral Researcher with the Department of Built Environment, Eindhoven University of Technology from 2014 to 2016, then with the Department of Civil Engineering, DTU from 2017 to Nov. 2018. She was appointed to an Assistant Professorship in 2018. She has been a major contributor and WP/task leader of several large research and demonstration projects in the area of smart energy systems and smart cities, including CITIES (IFD), EnergyLab Nordhavn (EUDP), COMBIOTES (H2020), etc. She works on energy demand management in real buildings using building integrated ICT, and quantification of energy flexibility potential in buildings using data-driven approaches based on data mining and machine learning. Under her supervision, three PhD candidates have successfully defended their theses and four are on-going. She was a major contributor of International Energy Agency EBC Annex 67- Energy Flexible Buildings, 2014 - 2019. She is the Co-Operating Agent of IEA EBC Annex 82- Energy flexible buildings towards resilient low carbon energy systems, 2021-2024. Her research interest includes smart cities, energy demand flexibility, energy system modelling, big data analysis, building physics and services. She is also the author of more than 60 papers including 40 peer-reviewed journal papers.

Relevant publications, and/or products, services, or other achievements

1. Real, J. P., Rasmussen, C., Li, R., Leerbeck, K., Jensen, O. M., Wittchen, K. B. & Madsen, H (2021): Characterisation of thermal energy dynamics of residential buildings with scarce data, Energy and Buildings, vol. 230.
2. R.G. Junker, C.S. Kallesøe, J.P. Real, B. Howard, R.A. Lopes, H. Madsen (2020): Stochastic nonlinear modelling and application of price-based flexibility, Applied Energy, vol. 275.
3. C. Finck, R. Li, W. Zeiler (2020). Optimal control of demand flexibility under real-time pricing for heating systems in buildings: A real-life demonstration. Applied Energy, vol. 263.

4. C.M. Herget, R. Li, P. Pinson (2020): Demand side management of heat in smart homes: Living-lab experiments, Energy, vol. 195.

5. R.G. Junker, A.G. Azar, R. Lopes, K. Lindberg, G. Reynders, R. Relan, H. Madsen (2018). Characterizing the energy flexibility of buildings and districts. Applied Energy, vol. 225.

Relevant previous projects

- CITIES (Danish Innovation Fund, 2014-2020)

Develop integrated city energy systems, building short-term operational models that feed longer term planning models, considering the spatiotemporal variations, interactions, dynamics, and stochastics in the energy system. Relevant activities within the project include the development of controller of low level system components that can inform higher-level aggregate models employed in market and control framework design; the development of energy flexibility index which can be used as a measure of the smartness of buildings. http://smart-cities-centre.org/

- Flexible Energy Denmark (Danish Innovation Fund, 2019-2023)

The aim of the project is to develop tools and solutions based on big data and artificial intelligence to activate flexibility at all levels of the energy system. The methods are being tested in living labs. As a part of the project, a cloud data platform will be used to collect and store the data, while products from different industry partners are tested and improved in terms of better controls and algorithms by the work of DTU.

https://www.energiforskning.dk/da/project/flexible-energy-denmark-fed

- SmartNet (Horizon 2020, 2016-2019)

Till now, distribution networks have been managed with a fit-and-forget philosophy. In the future, strict real-time coordination will be needed between the different actors that are involved in the provision of ancillary services. Optimising the interface between TSOs and DSOs will prove a crucial factor to ensure the achievement of an overall efficiency target. Different TSO-DSO interaction modalities are compared on the basis of national key cases (Italy, Denmark, and Spain); where physical pilots will be developed to monitor transmission's distribution parameters and investigate modalities for the acquisition of ancillary services from specific resources located in distribution systems.

http://smartnet-project.eu/

- Syn.ikia (Horizon 2020, 2020-2024)

The goal of syn.ikia aims to develop and test methodologies to develop sustainable and energy plus neighbourhoods, i.e. highly energy efficient neighbourhoods with a surplus renewable energy in four different climate zones in Europe. The syn.ikia concept relies on the interplay between novel technologies at the neighbourhood scale, energy efficiency and flexibility, energy sharing among users, good architectural and spatial qualities, sustainable behaviour and citizen engagement.

https://synikia.eu/

- ebalanceplus (Horizon 2020, 2020-2024)

The aim of the project is to increase the flexibility of energy networks, to test new business models and support import stakeholders with tailor-made end-user interfaces. The project will help reforming the operation of electricity grids and markets for the future low carbon society. Using digital technologies,

smart grids offer greater energy efficiency and make it possible to integrate more renewable energy sources into the grid. Ebalanceplus deals with technical, economic, and social aspects of intelligent electricity grids and increases their flexibility and resilience.

Significant infrastructure and/or technical equipment

- CTSM-R - Grey-box modelling

At DTU Compute we are leading the development of CTSM-R, which is the tool used on IEA Annex 58 and 71 for detailed description of the thermal characteristics of buildings. Prototype tools for separating the total energy consumption into components which are related to the building fabric and another component which are due to occupancy behaviour have been developed also been developed and applied in IEA Annex 66. Both software systems will be used, and potentially further upgraded.

- Center Denmark (CENTER DENMARK)

An European Digital Innovation Hub for Smart Energy Systems, and ERA-NET Smart Energy System Platform Provider. It is an independent and non-profit national and European research center with the aim of unify and embed research results within the field of digitalization of energy systems, and innovate data-intelligent methods jointly with the industries and low-carbon cities and municipalities. CENTER DENMARK aims at a widespread use of data without compromising privacy and GDPR, and the focus is on providing the knowledge for a transition to the future weather driven energy system while ensuring democraticy governance.

- Climify

Climify is developed by DTU COMPUTE. Climify is a digital platform for plug and play connection of IoT sensors and actuators, for easy monitoring and controlling of buildings and buildings' HVAC systems. The platform climify.org offers 3 main applications. The first application is an IoT device installation app, to be used on portable devices (e.g. mobile phones or tablets of system administrators): this app allows easily installing and locating of a sensor or an actuator, within a building. The second application is an online service for data visualisation and HVAC control: while the monitoring data can be plotted, the service offers several data evaluation methods; moreover, the settings of the connected actuators (e.g. the set temperature of a smart thermostatic valve) can be modified and controlled. The third application can be installed on portable devices (mobile phones and tablets of buildings' occupants) and allows occupants to provide feedback on their perception of the indoor climate through several questionnaires' formats.
Through the three applications developed within climify.org, we aim at providing the best indoor climate and the lowest energy use through a low cost, digital solution. DTU is in the process of creating a spin-off for the commercialization of Climify.

- uni-lab.dk

Climate change calls for a strong, joint action from research, industries and from the citizens. With uni-lab.dk we aim at bringing together all living labs and test labs in Denmark in order to enhance their cooperation among each other and with Danish industry.
Uni-lab.dk can help universities in Denmark find a suitable lab where they can develop their next sustainable solutions related to their particular research field. But it can also help the Danish companies find the right partners for the development, test and demonstration of their next-generation products. Uni-lab.dk is built

upon Center Denmark, a national hub for the digitization of the Danish energy systems. Currently, 9 Living Labs and 4 testing Labs are associated to uni-lab.dk
Operational capacity of legal entity/partner organization
n/a

ENGINEERING TOMORROW	**5. Danfoss A/S** **DAN | DK**	
	Web site: www.danfoss.com **PIC number:** 999914316	**Number of employees:28.000**

Brief description of legal entity/partner organization

Danfoss engineers' technologies enable the world of tomorrow do more with less. We meet the growing need for infrastructure, food supply, energy efficiency and climate-friendly solutions.

We are active in the field of renewable energy as well as district heating infrastructure for cities and urban communities. Besides this our products and services are used in areas
such as refrigeration, air conditioning, heating, motor control and mobile machinery.

District energy systems are extremely flexible. Efficient heating and cooling of buildings reduce 2 emissions and energy costs and make it possible for urban leaders to embrace a new vision for supplying energy to their cities, one that combines local renewables, cogeneration plants and district energy in a smart and innovative way.

Our innovative engineering dates back to 1933 and today Danfoss is a world-leader, employing 28,000 employees (2019) and serving customers in more than 100 countries. Turnover for the year 2019 was 6,3 Billion EUR. Danfoss is headquartered in Nordborg. Today we are structured around four dedicated business segments: Drives, Heating, Cooling and Power Solutions. We are privately held by the founding family.

The work is made mainly by the Heating Application Centre, a dedicated team of specialists acting as internal and external consultants in the field of product development, conceptual development of energy systems and techno economic studies. Furthermore, the relevant business units are involved, e.g. Residential Heating business unit, as well as business units related to prototype realization.

Contribution to Work Packages and Tasks in the project

WP 7 Efficient operation and flexibility:
Product/concept/system development of HVAC systems
In deep knowledge of building physics
In deep knowledge of comfort control equipment
In deep knowledge of control principles, also AI based
Highly skilled in Techno Economic Analysis

WP 8 Monitoring and evaluation:
Monitoring, analysis and AI based control is the key strategic area going ahead. Investments made, thus high level of skills are in place.

WP 9 Market uptake:
Large Enterprise with strong market position and ability to launch new concepts.

WP 10 Communication, dissemination and training:
Large Enterprise with strong market communication channels.

Profile of key personnel in the project

[redacted] (M) - Director Danfoss Heating Segment application centre - is leading activities within the field of conceptual development of energy technologies, covering development of components and systems and their interaction in smart energy systems. The Application Centre has the role as internal and external consultants in the field of market and project support, district energy technology and product development.

[redacted] (M), Application Specialist in Danfoss Heating Segment Application Center – is working on development and testing of new products and concepts in field of heating systems usually in cooperation with external business partners and universities. Recently the focus is on remote data acquisition and commissioning of heating installations.

[redacted] (M), R&D Director for RH-DT Controls. Specialist in indoor climate solutions, incl. development of electronic termostats and related advanced control principles. Business model analysis and feasibility studies.

Relevant publications, and/or products, services, or other achievements

Publications:

Thorsen, J.E., Brand, M., Gudmundsson, O. "Smart Operation of ULTHD Booster Substation for Multifamily Building", 5th International Conference on Smart Energy Systems, Copenhagen, 2019.

Thorsen, J.E., Ommen, T., "Field experience with ULTDH substation for multifamily building, Energy Procedia 149 (2018) 197-205.

Lund, H., Werner, S, Wiltshire, R., Svendsen, S., Thorsen, J.E, Hvelplund, F., Mathiesen, B.V. "4th Generation District Heating (4GDH). Integrating Smart Thermal Grids into Future Sustainable Energy Systems." Energy Journal, EGY5906, 2014.

Thorsen, J.E., Gudmundsen, O., Brand M. "Performance Specifications for Heat Exchangers for DH Substations of the Future", the 14th International Symposium on District Heating and Cooling, 2014, Stockholm, Sweden.

Thorsen, J.E., Iversen, J. Impact of lowering dT for Heat exchangers used in DH systems, the 13th International Symposium on District Heating and Cooling, 2012, Copenhagen, DENMARK.

Relevant previous projects

EUDP (DK) – EnergylabNordhavn, New Urban Energy Infrastructures and Smart Components, www.energylabnordhavn.dk
Our role is: Development and demonstration of ultra-low temperature district heating substation, load shift of flats and heat recovery from supermarket.

Innovation Fund DK – HEAT 4.0, Digitally Supported Smart District Heating
Our role is: Demonstrating smart heating control in multi flat buildings

EU H2020 – REWARDHeat, Smart networks, integrating renewable and waste energy sources, www.rewardheat.eu
Our role is: Development and demonstration of ambient loop district heating substation for multi flat building.

Innovation Fund DK – 4DH, 4 generation District heating, www.4dh.dk
Our role: Member of SC, providing energy system data and contributions to conferences.

Innovation Fund DK – RE-INVEST, An innovative research-based endeavor towards a 100% renewable energy system in Europe, www.reinvestproject.eu
Our role is: Member of SC and contribution on data for thermal energy infrastructure.

Significant infrastructure and/or technical equipment

Relevant prototypes for demo will be developed during project.

Operational capacity of legal entity/partner organization

Product/concept/system development of HVAC systems
In deep knowledge of building physics
In deep knowledge of comfort control equipment
In deep knowledge of control principles, also AI based
Highly skilled in Techno Economic Analysis
Monitoring, analysis and AI based control is the key strategic area.
Large Enterprise with strong market position and ability to launch new concepts.

	6. ENFOR A/S **ENFOR | DK**	
	Web site: https://enfor.dk **PIC number:** 968694478	**Number of employees:** 11 **Number of students:** 4

Brief description of legal entity/partner organization

ENFOR provides market-leading energy forecasting and optimization solutions for the energy sector. Utilities, energy traders, transmission and distribution system operators use ENFOR solutions for forecasting of renewable energy production, electricity and heat demand as well as optimization of district heating systems. ENFOR was established in 2006 as a spin-off from the Technical University of Denmark. The company has a solid operational track record and has successfully served customers all over the world for many years.

Contribution to Work Packages and Tasks in the project

WP 6 Renewable energy and storage: Forecasting and optimization systems for renewable energy and storage

WP 7 Efficient operation and flexibility: Forecasting and optimization systems for renewable energy and storage

Profile of key personnel in the project

[redacted] (M) is head of model development and co-founder of ENFOR. He holds a Ph.D. in Statistics from Informatics and Mathematical Modelling, Technical University of Denmark in modelling of parametric and non-parametric systems. Before founding ENFOR he was employed as Assoc. Prof. at the Technical University of Denmark and has been working with modelling and optimization in relation to energy systems for 15 years. He has published a large number of research papers regarding prediction of wind energy, heat load, power load and related subjects.

Professional experiences:

- Development of methods for wind power forecasting, heat load forecasting, electricity load forecasting, electricity price forecasting.
- Development of methods for advanced forecast products (probabilistic forecasts, scenario generation).
- Development of methods for optimal decision support / control strategy based on forecasts.
- Development of methods for estimating thermal characteristics of buildings

Relevant publications, and/or products, services, or other achievements

- Wind and solar power forecasting systems
- District heating forecasting and temperature-optimization software

Relevant previous projects

Participation in H2020 project **Syn.ikia**

Significant infrastructure and/or technical equipment

n/a

Operational capacity of legal entity/partner organization

n/a

ProjectZero SONDERBORG	**7. Project Zero A/S PZ | DK**	
	Web site: www.projectzero.dk PIC number: 950688077	**Number of employees: 5**

Brief description of legal entity/partner organization

ProjectZero is a public-private-partnership established in 2007 to support the municipality of Sonderborg´s transition to become a ZEROcarbon municipality in 2029 by transitioning 700,000 tons of energy-system related carbon-emissions to zero.

ProjectZero´s legal structure has the Project Zero-Foundation as its highest authority, where the board of directors represents the founders and key funders: the city council of Sonderborg, the Danfoss-foundation, the university of Southern Denmark, the municipal utility company and Sydbank. The Project Zero-foundation controls 100% the Project Zero A/S company, acting as a PPP-body for energy planning, coordination, actions, monitoring, communication etc across the Sonderborg community. The Board of directors in Project Zero A/S represent key local stakeholders like: house associations, banks, schools/education, utilities, city administration and the city council.

The current Roadmap2025 (created by 100 local experts/stakeholders and approved by the city council in 2018) determine the framework for how to achieve a 75% carbon reduction across sectors in Sonderborg. The execution of the Roadmap2025 is structed in 8 segmented working-groups, where the 100 experts now focus on execution.

Contribution to Work Packages and Tasks in the project

WP 1 Management: *Project management and coordination*

WP 3 Community, environment, and well-being: *Creating innovative climate action participatory platforms, creating rolemodels*

WP 4 Sustainable building design: *Design of zero energy buildings and sustainable city areas*

WP 6 Renewable energy and storage: *Design and implementation of renewable energy and storage systems in buildings*

WP 7 Efficient operation and flexibility: *Management of sustainable buildings and energy retrofitting activities. Management of district heating systems in buildings.*

WP 8 Monitoring and evaluation: *Planning and management of monitoring systems, evaluation of energy retrofitting demonstration projects.*

WP 9 Market uptake: *Exploitation, replication, public affairs*

WP 10 Communication, dissemination and training: *Citizens, companies and stakeholder engagement, dissemination, training, publications, society engagement and communication.*

Profile of key personnel in the project

[redacted] (M), Managing Director
Education and background in social science (business). Working with ProjectZero since 2007. Both nationally and internationally experienced from projects, policy and communication. Has been a project/WP/task-manager in several EU-projects during last 10 years. Vice-chairman of the CITIES

research and demonstration project since 2014. Member of the EU POD Panel (since 2019) and a NORLYS (utility) representative (since 2018).

[redacted] (M), Building/Renewable Energy Expert
M.Sc in energy efficient buildings from DTU and whole life since in building/energy-consulting. Several years managing own consultancy company, but also a partner in the DEM Danish Energy Management. Recently a parttime employee of ProjectZero. Has comprehensive knowledge of the house associations across Sonderborg and worked in the past as an external research-application-reviewer for the EU-Commission. Torben is currently the project manager for the Sonderborg H2020 HAPPI-project, focused on scaling energy retrofit across the six house associations.

[redacted] (F), Network Project Manager
Master in energy planning from Aalborg University. Worked with ProjectZero since 2016 and now specialized on energy monitoring, digitalisation projects, replication of EU H2020 SmartEnCity-project by the SmartEnCity Network, communication etc.

[redacted] (M), ProjectZero Business Development
Master of science from Southern Denmark University. More than 20 years' experience from industry, focused on market and new business development for energy efficiency solutions. Now focused on (green) business engagement, innovation and demonstration-projects.

Relevant publications, and/or products, services, or other achievements

Participatory platforms for segment participation:
ZERObolig; ZEROboligforening; ZEROcompany; ZERObutik; ZEROskole; House of Science

Publications:
- Roadmap2025
- Grøn Vækst Sønderborg

Relevant previous projects

EU H2020 **SmartEnCity**
EU Interreg **BSR ActNow**
EU H2020 **Happi**
EU H2020 **Refurb**
Energibyerne.dk

Significant infrastructure and/or technical equipment

n/a

Operational capacity of legal entity/partner organization

n/a

eurac research	**8. EURAC Research** **EURAC | IT**	
	Web site: www.eurac.edu **PIC number:** 999887253	**Number of employees:** 517

Brief description of legal entity/partner organization

EURAC is an applied research centre located in Bolzano, South Tyrol. Founded in 1992 as a private association, EURAC currently has eleven institutes organised into four main areas of research: Autonomies, Mountains, Health and Technologies. Through an interdisciplinary approach, they work on the protection of minorities and multilingualism, investigate climate change, draw up sustainable development plans through the use of renewable energy, and contribute to the health of the community by conducting biomedical studies.
It has a turnover of about 21 million Euros. In the past 9 years EURAC participated in about 70 projects and at present is involved both as coordinator or partner in 45 projects funded within various EU programmes, including H2020, FP7, IEE, Interreg. Further than European funding and commissioned projects, EURAC receives contributions from the centre's members, and has a financial agreement with the Province of Bolzano.
The Institute for Renewable Energy conducts applied research on advanced energy systems, based on or including sustainable energy sources. Its activities include national and international research projects, as well as direct cooperation with industry partners. The institute also supports the promotion of renewable energy technologies and assists political decision-makers the scientific consultancy. Scientific results are based on laboratory tests of single components and integrated energy systems, as well as the monitoring of applied demonstration sites, experimental outdoor installations and residential buildings. The institute offers support also in the elaboration of complex energy models as decision support system for single energy systems or buildings as well as for urban and regional areas.

Adequacy to the project/ role in the project:
Within the Institute for Renewable Energy, the Research Group on "Urban and regional energy systems" – URS offers high level competences and experiences concerning: development of urban and regional energy plans and Sustainable Energy Action Plans in alpine municipalities (SEAP); development of tools and models for energy strategic planning; indoor and outdoor environmental and micro-climate monitoring; spatial decision support; big data analysis and database management; financial evaluations of sustainable energy solutions at urban and regional level, smart city projects and demo case management. The group members are involved in international and national scientific networks and initiatives: International Energy Agency (IEA), International Society Of City And Regional Planners (ISOCARP), Alpine Convention, EUSALP AG9.

URS has been actively involved in various EU (STARDUST, SINFONIA, SMARTBEEJS RECHARGE.GREEN, LOCSEE, GRETA) and national (SEAP of the city of BOLZANO and BRESSANONE) projects related to the management of energy transition at the urban or regional scale. Currently URS is the demo site coordinator of STARDUST H2020 smart city project in Trento and SINFONIA FP7 smart city project in Bolzano, developing an innovative and integrated ICT-energy-mobility solutions aiming at deep energy retrofit of buildings, and digitalization of systems as well as the urban environment to increase the quality of life in cities. In parallel, USR is involved in SMARTBEEJS Marie Curie H2020 project, targeting the definition of skills and multidisciplinary knowledge necessary to PhD candidate to develop Positive Energy Districts, with the ability to understand and engage with the needs of citizens and communities.

Additionally, for administrative matters, the Research Development Office (RDO), Scientific Communication Service and Accountancy and Legal Office offer support to researchers in preparation and management of the research projects.

Contribution to Work Packages and Tasks in the project

EURAC Research is among the scientific partners of the Project.
It coordinates WP8 (Monitoring and evaluation).
It is also supporting the demo City of Trento in the design and implementation of the CPCC «Piedicastello Destra Adige» and is involved in all WPs:

- WP1 Project management
- WP2 Framework for CPPC
- WP3 Community, environment and well being
- WP4 Sustainable building (re)design
- WP5 Resource efficient (re)construction
- WP6 Innovative renewables and storage systems
- WP7 Efficient operation and flexibility
- WP8 Monitoring and evaluation
- WP9 Market uptake
- WP10 Communication

Profile of key personnel in the project

[redacted] (M) (Degree in Urban and Regional Planning, PhD in Environmental/Energy Engineering), the team coordinator, is responsible for the research team on Urban and Regional Energy Systems. He is technical responsible for the smart city FP7 project SINFONIA and for the H2020 STARDUST SCC project coordinating the implementation of the 2 LH districts in the cities of Bolzano end Trento. He coordinated the Interreg South East Europe LocSEE "Low-Carbon South East Europe" working with 8 South East Europe Countries. He is expert at the International Energy Agency SHC TASK 51: Solar Energy and Urban Planning and IEA EBC Annex 83 on Positive Energy Districts and in the COST action Positive Energy districts,COST Action CA19126. He is elected Vice-President of ISOCARP, the International Society of City and Regional Planners with responsibilities on the Academic Development. Since 2015, he promoted the international conferences on "Smart and Sustainable Planning for Cities and Regions" —SSPCR— held by EURAC (http://www.sspcr.eurac.edu/). In 2018 he attended as speaker to the World Urban Forum 9 and the REAL CORP 2018. He is already active in the SCC Stakeholder platform and in the SCIS working group.

[redacted] (M) is an urban and environmental planner by training and holds a Ph.D. in real estate economics. Building on more than 10 years of practical experience in planning design, his research currently focuses on smart city projects and multiple-benefits of energy transition. Since 2015, he is responsible for coordinating the international conference on 'Smart and Sustainable Planning for Cities and Regions' (SSPCR), and has acted as session moderator/chair or keynote speaker in national and international events. He is coordinating the local working team of smart city project H2020 STARDUST in Trento and Eurac activities in the VARCITIES project (H2020). [redacted] is member of the COST action Positive Energy districts,COST Action CA19126, sub task co-leader in the IEA EBC Annex 83 on Positive Energy Districts, concerning economic, environmental and social assessement. He has also participated in numerous EU research projects (FP7 Sinfonia, SEE Locsee, AS Recharge.green), the design of Sustainable Energy Action Plans (SEAPs), and he is the author of more than 20 papers in scientific journals and conferences. Since 2015, he coordinates the international conferences on "Smart and Sustainable Planning for Cities and Regions" —SSPCR— held by EURAC (http://www.sspcr.eurac.edu/) and is editor of the proceeidngs volume published by SPRINGER.

[redacted] [redacted] (F) (Degree in Architecture, PhD in Sustainable Energy Systems - MITPortugal Program) is a post-doctoral researcher of the Urban and Regional Energy Systems group. She combines professional experience, as an architect, in Portugal, Denmark and the Netherlands, with a data-driven researcher mindset. Since 2011, she has participated in a diversity of projects, mostly focusing on the development of environmental impact assessment approaches to support decision-making. In particular, she has experience on the application of life-cycle assessment to urban systems (e.g., buildings, transportation), urban metabolism, circular economy and waste prevention and management. At Eurac, she has worked on circular economy projects (SEC – Strategy for circular economy in the Province of Bolzano), positive energy districts (IEA Task 83), smart cities (STARDUST), advanced mobility (LifeALPS), among others.

[redacted] (F) (Degree in Urban and Regional Planning, PhD in Environmental/Energy Engineering) is post-doc researcher in the team on Urban and Regional Energy Systems at EURAC. Her fields of work are mainly related to spatially explicit analysis and data-processing using GIS (Geographical Information Systems) to estimate or calculate the energy demand of buildings and the energy potential production from renewable energy sources (RES). During her PhD she also gained experience in the fields of Strategic Environmental Assessment (SEA) of plans and development of scenarios for the sustainable energy transition of cities and regions.

[redacted] [redacted] (M) has a BSc in Mathematics (Università degli Studi di Torino), MSc in Mathematics (Università degli Studi di Torino) and PhD in Pure and Applied Mathematics (Università degli Studi di Milano & Universitat Politècnica de Catalunya), thesis in the topic of mathematical analysis and Partial Differential Equations. His m**ain field of activity concerns d**ata analysis, impact assessment modelling and modelling of dynamical systems. Pietro is actually involved in following projects: Sinfonia FP7 (monitoring actions); Renewable Cooling Tender for EU commission, BuiltHub H2020.

Relevant publications, and/or products, services, or other achievements

- Bisello, A. Assessing Multiple Benefits of Housing Regeneration and Smart City Development: The European Project SINFONIA. *Sustainability* 2020, *12*, 8038
- S. Croce, D. Vettorato "The definition of urban surface uses: a systemic approach for climate resilient and sustainable cities" IOP Conference Series: Earth and Environmental Science 588, December 2020
- D'Alonzo V, Novelli A, Vaccaro R, Vettorato D, Albatici R, Diamantini C, Zambelli P "A Bottom-up Spatially Explicit Methodology to Estimate the Space Heating Demand of the Building Stock at Regional Scale" Energy and Buildings, January 2020
- Bisello, A. and Vettorato, D. (2018) 'Multiple Benefits of Smart Urban Energy Transition', in Droege, P. (ed.) Urban Energy Transition. Second Edition. Elsevier, pp. 467–490.
- Mosannenzadeh, F., Bisello, A., Vaccaro, R., D'Alonzo, V., Hunter, G. W., & Vettorato, D. (2017). Smart energy city development: A story told by urban planners. Cities, 64, 54-65.

Relevant previous projects

STARDUST - Holistic and Integrated Urban Model for Smart Cities https://cordis.europa.eu/project/rcn/212410_en.html , H2020, 2017 – 2022.

COST Action PED – Positive Energy districts , COST Action CA19126, https://www.cost.eu/actions/CA19126/ 2020-2024

VARCITIES - the EU-funded VARCITIES project aims to create a vision for future cities with the citizen and the so-called human community at the centre. It will therefore implement innovative ideas and add value by creating sustainable models for improving the health and well-being of citizens facing diverse climatic conditions and challenges around Europe. https://www.varcities.eu/ H2020 – 2020-2025

SINFONIA - Smart initiative of cities fully committed to invest in advanced large-scaled energy solutions https://cordis.europa.eu/project/rcn/197825_it.html , FP7, 2014 -2020.

SMARTBEEJS Marie Curie H2020 - Human-Centric Energy Districts: Smart Value Generation by Building Efficiency and Energy Justice for Sustainable Living, https://cordis.europa.eu/project/rcn/223178/factsheet/en, 2019 – 2023.

Significant infrastructure and/or technical equipment

With dedicated laboratories, the Institute for Renewable Energy offers test services studying heat pumps, both thermally and electrically driven, and solar photovoltaic modules, and measuring the thermal properties of passive and active solar building components. Extensive dynamic simulations are performed to enhance the product development process and virtually integrate the component in an overall system.

INDOOR FACILITIES:

- SOLARE PV LAB - Sun simulator for photovoltaic modules
- ACCELERATED LIFE TESTING LAB - Climatic chamber for accelerated life tests
- MULTIFUNCTIONAL FACADE LAB - Laboratory for performance characterization of multifunctional facades
- HEAT PUMPS LAB - Laboratory for heat pump systems test

OUTDOOR FACILITIES

- PV INTEGRATION LAB - Facility for the integration of photovoltaic systems in buildings and grids
- ENERGY EXCHANGE LAB - Facility for tests on advanced district heating and cooling networks
- FACADE SYSTEM INTERACTIONS LAB - Facility for evaluating facade system and indoor environment interactions

Operational capacity of legal entity/partner organization

n/a

SINTEF	**9. SINTEF AS** **SINTEF | NO**	
	Website: https://www.sintef.no/ **PIC number: 919303808**	**Number of employees: 2000**

Brief description of legal entity/partner organization

SINTEF is one of Europe's largest independent research organisations. Every year, we carry out several thousand projects for customers large and small. For more than 60 years, SINTEF has developed solutions and innovation for society and customers all over the world. This is how we have become a world-leading research institute. Our vision is *Technology for a better society*.
We deliver innovation by developing knowledge and technologies that are brought into practical use. SINTEF is multidisciplinary with international top-level expertise in the fields of technology, the natural sciences, medicine and the social sciences. We conduct contract R&D as a partner for the private and public sectors, and we are one of the largest contract research institutions in Europe.
The work of SINTEF in ARV will be undertaken by the institute of **SINTEF Community**, Department of Architecture, Building Materials and Constructions which works across themes of integrative energy efficient buildings, life-cycle analysis, urban modelling, living labs and spatial planning, and Department of Mobility and Economics.

Contribution to Work Packages and Tasks in the project

Norwegian demo contact: Steinar Grynning
WP 1 Management: -/-
WP 2 Framework for effective planning, design, construction and operation of CPCC:
Task leader of 2.5, Visualization technologies/laboratory (Jo Skjermo, Judith Thomsen)
WP 3 Community, environment, and well-being: Work package leader (Judith Thomsen), task leader 3.2 overall Living lab methodology (Caroline Cheng), contributor (Daniela Baer)
WP 4 Sustainable building design: task leader of 4.5 BIPV solutions (Steinar Grynning) and contributor Nicola Lolli, and nature based- solutions (Berit Time)
WP 5 Resource efficient manufacturing and construction workflows: contributor LCA (Nicola Lolli)
WP 6 Renewable energy and storage: contributor (Steinar Grynning)
WP 7 Efficient operation and flexibility: contributor (Steinar Grynning)
WP 8 Monitoring and evaluation: contributor, link to WP3 data collection, follow up the monitoring in the Oslo Demo (Judith Thomsen, Caroline Cheng)
WP 9 Market uptake: contributor (Caroline Cheng)
WP 10 Communication, dissemination, and training: link to the Living Lab activities of WP3. Task lead of 10.2.2 (Daniela Baer)

Profile of key personnel in the project

[redacted] (F), PhD in Architecture, MSc in Architecture, is a research manager at the Dept of Architecture, Building Materials and Constructions in SINTEF Community. [redacted] is currently a Work Package leader at the Research Centre on Zero Emission Neighbourhoods in Smart Cities (www.fmezen.no) where she is leading the WP on pilots and living labs. [redacted] PhD is within the area of housing research, exploring satisfaction with the built environment through qualitative and quantitative methods. Previously, [redacted] has worked in the Centre on Zero Emission Buildings (www.zeb.no) and in the national research project EBLE – Evaluation of housing with low energy needs.

[redacted] (M), PhD in Architecture Design, History and Technology, is a research manager at the Dept of Architecture, Building Materials and Constructions in SINTEF Community. [redacted] has an extensive background from both theoretical studies as well as
from design, implementation and the carrying out of laboratory and field measurements. He has close collaborations with the building industry through numerous national industrial and research projects like Research Centre on Zero Emission Neighbourhoods in Smart Cities (www.fmezen.no), Centre on

Zero Emission Buildings (www.zeb.no), National Centre for Research Based Innovation (SFI) *Klima 2050 – Risk reduction through climate adaptation of buildings and infrastructure and* the national research project EBLE – Evaluation of housing with low energy needs. [redacted] is also involved in international research through various IEA-Annexes, COST actions. He has had two research stays at Lawrence Berkeley National Laboratories in Berkeley, California.

[redacted] (F): Chief scientist in SINTEF Community, a civil engineer and holds a doctoral degree in building physics from NTNU, Norway. Her expertise is in the areas of climate adaptation of buildings, moisture, heat and air transport in building envelopes in general and wooden buildings in particular. She has worked as a municipality planner and has a long career in research in different research positions such as the former Norwegian Building Research Institute. Time has participated in several international projects and networks in Europe, she has also been a member of many national and international committees. She is the managing director of the National Centre for Research Based Innovation (SFI) *Klima 2050 – Risk reduction through climate adaptation of buildings and infrastructure.*

[redacted] (M): (PhD in Architecture, MSc in Sustainable Architecture, March) is a senior research scientist at the Dept of Architecture, Building Materials and Constructions at SINTEF Community. [redacted] carried out research in the field of Lifecycle Assessment applied to buildings, building energy simulations, energy and resource efficiency in buildings, user comfort in buildings, and cost analysis of Zero Emission Buildings. [redacted] has been a Task Leader in the EU FP7 PROFICIENT, currently Work Package Leader in the H2020 NERO project, and has published a number of articles in international journals and in conferences focusing on the aspect of environmental impact of materials and energy use in residential buildings. [redacted] has worked in academia for 10 years and as a professional for 3 years.

[redacted] (F), PhD in Industrial Economics and Technology Management, MSc Industrial Ecology (Environmental Management), is a research scientist at the Dept of Architecture, Building Materials and Constructions at SINTEF Community. [redacted] conducts research in the use of different types of tools in supporting innovation efforts and inter-organizational collaborative work. She is currently a task leader for innovation management, exploitation and market uptake in the H2020 syn.ikia project (2020-2023). She also holds an adjunct Associate Professor position at NTNU Business School at the Norwegian University of Science and Technology. Before her research and teaching career, [redacted] had held managerial positions in strategic marketing and business development in the financial sector in Singapore and Hong Kong.

[redacted] (F), PhD in Geography, is a research scientist at the Dept of Architecture, Building Materials and Constructions at SINTEF Community. [redacted] is involved in the Research Center on Zero Emission Neighbourhoods in Smart Cities (www.fmezen.no) and Sharing Neighbourhoods (https://www.sintef.no/en/projects/sharing-neighbourhoods/). [redacted] is an active member of Norwegian Management Committee COST Action PED-EU-NET European Network for Positive Energy Districts. Prior to becoming a researcher, she has worked for 8 years in various urban planning projects (Associate in the project "Future Urban Industries", Stiftung Neue Verantwortung, Berlin, Germany (2011-2012); Consultant and Neighbourhood Manager for a Business Improvement District (BID) at CIMA GmbH, Hamburg and Luebeck, Germany (2009-2010); Project manager at Büro für Stadterneuerung [Office for Urban Renewal] Berlin, Germany (2006-2009).

[redacted] (M), PhD in Visualisation and Computer Graphics, is a research scientist at the Dept of Mobility and Economics at SINTF Community with over 20 years of experience in research using advanced visualization methods. He has been project manager, work package leader and key member of a long range of projects, including several on Virtual Reality. In addition, he is presently leader for the GEMINI centre for eXtended Reality, a cooperation between SINTEF and Norwegian University of Science and Technology (NTNU). He has a strong background and competence in the development, modelling, programming and implementation of simulated scenarios to be used in VR and AR and has developed both small and full-scale driving simulations for the Norwegian Public Roads Administration and SINTEF. He currently leads the SINTEF research group state-of-the-art VR-laboratory.

Relevant publications, and/or products, services, or other achievements

1. Thomsen, Judith; Berker, Thomas; Hauge, Åshild Lappegard; Denizou, Karine; Wågø, Solvår Irene; Jerkø, Sidsel. The Interaction between Building and Users in Passive and Zero-Energy Housing and Offices: The Role of Interfaces, Knowledge and User Commitment. *Smart and Sustainable Built Environment* 2013; Vol 2.(1) s. 43-59
2. Hauge, Åshild Lappegard; Thomsen, Judith; Löfström, Erica. How to get residents/owners in housing cooperatives to agree on sustainable renovation. *Energy Efficiency* 2013; Vol 6 (2); pp 315-328
3. Taveres-Cachat, Ellika; Grynning, Steinar; Thomsen, Judith; Selkowitz, Stephen. Responsive building envelope concepts in zero emission neighborhoods and smart cities – A roadmap to implementation. *Building and Environment* 2019; Vol 149. Pp 446-457
4. Lolli, Nicola; Lien, Anne Gunnarshaug; Rønneseth, Øystein. Cost optimization of a zero-emission office building. *Buildings* 2020, Volum.10.
5. Gullbrekken, Lars; Time, Berit. Towards Upgrading Strategies for nZEB-Dwellings in Norway. *Journal of sustainable architecture and civil engineering.* 2019; Vol 25.(2) pp. 35-42

Relevant previous projects

H2020 NMBP- EEB-2019 syn.ikia
Duration: 2020-2023
Website: https://www.synikia.eu/
Role of SINTEF: WP leader

FME ZEN The Research Centre on Zero Emission Neighbourhoods in Smart Cities (Centre for Environment-friendly Energy Research funded by Research Council of Norway + industry)
Duration: 2017-2024
Website: www.fmezen.no
Role of SINTEF: Research partner, WP leader

FME ZEB The Research Centre on Zero Emission Buildings (Centre for Environment-friendly Energy Research funded by Research Council of Norway + industry)
Duration: 2009-2017
Website: www.zeb.no
Role of SINTEF: Research partner, WP leader

H2020-EE-2016-CSA: NERO – Nearly Zero Energy Wooden Buildings in Nordic Countries
Duration : 2017-2020
Website : https://cordis.europa.eu/project/rcn/210342/factsheet/en
Role of SINTEF: WP leader

SFI Klima 2050 – Centre for Research-based Innovation: Risk reduction through climate adaptation of buildings and infrastructure (funded by Research Council of Norway and national partners)
Duration : 2015-2022
Website : http ://www.klima2050.no/
Role of SINTEF: Centre leader

Significant infrastructure and/or technical equipment

NTNU/SINTEF laboratory infrastructure relevant to ARV:

- Laboratories for testing of building materials and components
- VR -Virtual reality lab for visualization of 3D scenarios

Zero Emission Laboratories:

- ZEB Test Cells Lab (twin cells) for research and development of ZEB technologies
- ZEB Living Lab – A dwelling for user-technology interaction studies.
- ZEB Lab – a flexible ZEB office for research on heating, ventilation, BIPV, PCM storage, and workplace design

Operational capacity of legal entity/partner organization

SINTEF is a research institute with several departments/institutes whose research activities are in line with the projects` activities. If needed the involvements of researchers from other departments/institutes will be considered, based on the need of the tasks in which SINTEF is involved. This to avoid disruptions and delays of the project development.

Ajuntament de Palma	**10. Palma City Council** **PALMA | ES**	
	Web site: www.palma.cat **PIC number:** 967168474	**Number of employees:** 881

Brief description of legal entity/partner organization

The participant in ARV is the town council of the city of Palma de Mallorca, the capital of the Balearic Islands (> 460.000 inhabitants).

The work will be undertaken by the City Model Department (Model de Ciutat). Other departments and public organizations, also part of the Ajuntament de Palma, will collaborate in this project. These would include: PMH (Patronat municipal de l'Habitatge), Engagement Department (Participació Ciutadana) which deals with integrating citizen participation in some decision-making processes, Environment Department (Mediambient) in charge of reviewing the current regulation like PACES and developing new ones and the Infrastructure Department (Infraestructures) in charge of the efficiency energy on Town hall owned buildings.

Contribution to Work Packages and Tasks in the project

WP 2 Framework for effective planning, design, construction and operation of CPCC:
Use of planning methods and tools for Large Scale retrofitting actions at District level, for CEC at District level, and for Urban Planning at District Level: Energy &Circularity impact

WP 3 Community, environment, and well-being:
Social engagement for Large Scale Renovation. Centre for the Energy Transition –TE21 & Living labs. CEC- Citizen energy Communities
Demo developer in Districte Innovador Llevant in Palma de Mallorca

WP 4 Sustainable building design:
Integrated design process & catalogue of solutions for refurbishment of buildings with 50% of energy reduction

WP 5 Resource efficient manufacturing and construction workflows:
Integrated workflow for Large Scale Renovation of urban dense areas through Public private Partnerships (PPP).

WP 7 Efficient operation and flexibility:
Optimal management in CEC

WP 8 Monitoring and evaluation:
Energy monitoring & data collection in current buildings, retrofitted and new buildings and in CEC.

WP 9 Market uptake:
Business and financial models for Large Scale Renovation and CEC

Profile of key personnel in the project

[redacted] (M)
General Director, Technical director, Deputy director of Urban Modeling, Fair Housing and Sustainability of Palma City Council since 2015. He is an architect and Doctor in Urbanism from the "Universitat Politècnica de Catalunya", combining research in urbanism with the corresponding transfer of knowledge in planning, programs and projects at the municipal and supramunicipal level. The following works are remarkable:

- In the town councils of Calvià (Mallorca), Gavà (Barcelona) and in the Barcelona Metropolitan Area.
- At the Universitat Politècnica de Catalunya as Deputy Coordinator of the Urbanism Research Group, Professor of the Department of Urbanism and Spatial Planning and at the European Postgraduate Master in Urbanism.
- Co-director of the *Revista Iberoamericana de Urbanismo*.

General Director, Technical director, Deputy director of Urban Modeling, Fair Housing and City Council

[redacted] M)
[redacted] is an industrial engineer specialized in buildings. He was Energy Director for the Balearic Islands Government in 2010 and currently acting as the Housing Director for Palma and Director of the Coordination Department of the Sustainable and Integrated Urban Development Strategy, Josep Maria brings experience in sustainability and urban regeneration.

Director of Housing and Manager of the Municipal Board of Housing and Integral Rehabilitation of Neighborhoods

Relevant publications, and/or products, services, or other achievements

Relevant previous projects

- FP7 – CIVITAS-DYNAMO project. Website: https://civitas.eu/content/dynmo
- FP7 – CONURBANT project. Website: https://www.conurbant.eu/en/
- Interreg MED – INCIRCLE project. Website: https://incircle.interreg-med.eu/
- European Parlament – Biodivercities project.
  Website: https://oppla.eu/groups/biodivercities/timing-and-end-date-biodivercities-project

Significant infrastructure and/or technical equipment

n/a

Operational capacity of legal entity/partner organization

n/a

IBAVI Institut Balear de l'Habitatge Govern de les Illes Balears	**11. Institut Balear de l'Habitatge** **IBAVI | ES**	
	Web site:	**Number of employees:**

Brief description of legal entity/partner organization

The Balearic Housing Institute (IBAVI) is a public body attached to the Ministry of Mobility and Housing of the Government of the Balearic Islands, whose objective is the promotion of protected housing. The IBAVI's primary purpose is the creation and maintenance of a real estate park of public social housing that is accessible and affordable for the citizens of this community. The Balearic Housing Institute also processes and manages grants and subsidies designed to facilitate and improve access to housing for residents of this community. The IBAVI was created on December 30, 1986, and its Constitution Decree was published in the BOCAIB No. 9 of January 20, 1987

Contribution to Work Packages and Tasks in the project

WP4: Sustainable building (re)design
WP5: Integrated Manufacturing processes and worflows – **Task 5.3**
WP8: Monitoring and Evaluation
WP9: Market Uptake
WP10: Communication

Profile of key personnel in the project

[redacted] (F)

[redacted] is currently the Balearic Social Housing Institute (IBAVI) Manager and Director. She is graduated in Economics by the Pompeu Fabra University, Barcelona and Ludwig Maximilians Universität, München. She has a Master's degree in Corporate Social Responsibility (CSR) and Sustainability from UNED & Jaume I University (UJI). She was the Mallorca Island Council Director of Finance, Budgets and Projects from August 2015 to March 2019 being in charge of SCR development from July 2017 onwards. She was also the Founder and CEO of Tucktuck Community, S.L. from 2012 to 2020, and international cooperant aid for the Fair Trade Project at Vicente Ferrer Foundation from March 2011 to June 2012, in Anantapur, India.

Email: [redacted]

Telephone: [redacted]

[redacted] (M)

[redacted] Oliver is an architect from the Barcelona School of Architecture (ETSAB). During his studies, he has received scholarships to study to UC Los Angeles, TU Delft and ETSAM. Currently he is the Head of the Technical Department of the Balearic Social Housing Institute, and he has been the director of the Life Reusing Posidonia project, funded by the European programme LIFE+ for Nature Conservation & Climate Change Adaptation Projects. As member of the IBAVI team he has received some awards that facilitate his credibility when he explains that things can be done differently, like FAD Award 2018, Spanish Biennale Award 2018, Spanish Architecture 2019, and shortlisted for the Mies European Award 2019. He has given lectures around Europe and his work has been extensively published and exhibited.

Email: [redacted]

Telephone[redacted]

Relevant publications, and/or products, services, or other achievements

Publications:

- Life Reusing Posidonia book. 2017. http://eng.reusingposidonia.com/the-book/
- Life Reusing Posidonia documentary. 2017. http://eng.reusingposidonia.com/the-documentary/
- Balearic eco-friendly building materials catalog. 2018. http://eng.reusingposidonia.com/catalog-of-materials/
- Posidonia oceanica as thermal insulation. Journal of Construction. Vol 17, No 2 (August 2018).
- http://revistadelaconstruccion.uc.cl/index.php/RDLC/article/view/2067/2135

Other publications resume: file:///C:/Users/aparato/Downloads/AFTERLIFE-LRP-ENG.pdf

Relevant previous projects

- LIFE +: LIFE12/ENV/ES000079 (Life Reusing Posidonia). 2013-2018.
- Euroregió Pirineus Mediterrània: 'Buildings that tend to industrialization and the nZEB' project. 2014-2015.

Significant infrastructure and/or technical equipment

1- Neptune grass thermal insulation, a nature-based solution that will be performance at the demo building, which can be applied only on those places where the Posidonia Oceanica is a local resource.
2- Embodied energy calculation method.
3- Low emissions architectural solutions in order to build <500Kg CO2/m2.

Operational capacity of legal entity/partner organization

n/a

Shaping Energy for a Sustainable Future	**12. Institut de Recerca en 110nergía de Catalunya IREC | ES**	
	Web site: www.irec.cat **PIC number: 996435993**	**Number of employees: 120**

Brief description of legal entity/partner organization

The Catalonia Institute for Energy Research (IREC) is a publicly funded institution of approximately 120 people created in 2008 based in Barcelona and Tarragona that conducts research and promotes innovation over a wide range of energy related science and technology fields. IREC contributes to sustainability via development of new technological solutions, promotion of scientific and technological know-how related to clean energy and its efficient use as well transfer of solutions and expertise to market actors. Activities include national and international projects as well as direct cooperation with leading industrial partners. The institute also supports the promotion of renewable energy technologies and assists political decision-makers.

IREC has a large expertise and skills in research and industrial projects, with an annual turnover of about 10M€. IREC belongs to the CERCA and TECNIO networks of research and technologic centres of the Generalitat of Catalunya as well as to several Joint Programs of the European Energy Research Alliance (EERA, www.eera-set.eu). IREC is a full member and founder of the KIC Innoenergy and the Catalonia Energy Efficiency Cluster (CEEC) to promote energy innovation in Europe. Finally, IREC leads RIS3CAT community in energy belonging to the Smart Specialization Platform- S3 (http://s3platform.jrc.ec.europa.eu/), published more than 600 peer-reviewed papers, holds more than 35 patents and has supported the creation of 3 spin-off companies. IREC counts with state-of-the-art experimental laboratory facilities for evaluating and improving the performance of emerging energy technologies and building thermal/electrical components under realistic dynamic conditions.

IREC is organized in 2 Departments: i) Energy Efficiency for Systems, Buildings and Communities area (ECOS); ii) Advanced Materials for Energy. Topics of interests include Renewable energy sources (e.g., PV, wind, heat recovery, fuel cells, hydrogen), Circular economy (e.g., carbon conversion, catalyst), Smart energy Management and Systems (for systems, buildings, and communities), Energy Systems Analytics (e.g., Internet of Energy) and Energy Storage (e.g., electrochemical batteries, redox flow batteries).

Within the ECOS area, lays the Thermal Energy and Building Performance Group. The group has wide expertise in dynamic energy simulation and the implementation of energy efficiency strategies, heat reuse and the integration of renewables in buildings, Post-Occupancy evaluation and building flexibility.

Contribution to Work Packages and Tasks in the project

IREC will **lead WP2** on ‘’Framework and tools for effective implementation and assessment of CPCC’’ as well as act as supporting technological center for the democase in Palma de Mallorca.

In addition, IREC will contribute to the following WPs:

- **WP 2** Framework for effective planning, design, construction and operation of CPCC
    - Definition of CPCC assessment framework
    - Test and use of methods and tools for techno-socio-economic planning of Large-scale Renovation buildings & Citizen Energy Communities
    - Virtual Reality 3D Models for planning and citizen awareness
- **WP 3** Community, environment, and well-being:
    - Technical support in Living Labs Implementations
- **WP 4** Sustainable building design:
    - Energy modelling and integrated design for retrofitting of buildings in demo in Palma de Mallorca

- BIPV analysis and modelling. Testing BIPV solutions
- **WP 7** Efficient operation and flexibility:
  - Model predictive controls for the enhancement of centralized systems in multifamily buildings
- **WP 8** Monitoring and evaluation:
  - Data analysis and impact assessment of implemented innovations in Palma de Mallorca
- **WP 9** Market uptake:
  - Business models analysis for Large Scale retrofitting and CEC
- **WP 10** Communication, dissemination and training:
  - Publication of results & international conferences and seminars

Profile of key personnel in the project

[redacted] (M) [redacted] is currently Group Leader of the Thermal Energy and Building Performance research group at IREC. Previously to joining IREC, he co-founded and led the cooperative firm AIGUASOL, which has become an international reference in the field of thermal energy efficiency, renewable energies, building physics and software development. He holds a doctorate degree in Thermal Engineering from the Polytechnic University of Catalonia (Spain) and he has research and professional experience in the fields of heat and mass transfer, fluid mechanics, building energy efficiency, thermal comfort and dynamic simulation. In his current position, he leads collaborations in several national, international and industrial research projects directed towards improving energy performance in buildings and energy systems.

[redacted] (F) [redacted] is part of the Energy Efficiency Systems, Buildings and Communities group (ECOS) at IREC since 2011. She works as a researcher in energy efficiency in buildings. She has participated in national and international projects related to refurbishment of buildings, NZEB / nZEB concepts, energy flexibility of buildings, stochastic models of occupancy and environmental comfort of the users (MEDNICE, MARIE, RePuBlicZEB, ECOE, SABINA, Rehab-SALUT). She has obtained recently a PhD in Sustainability at the Polytechnic University of Catalonia, which mainly focused on evaluate the refurbishment of residential buildings in Mediterranean climate. She combines her work as a researcher at IREC, with the position of Associate Professor in the Department of Fluid Mechanics at the Polytechnic University of Catalonia since 2016.

[redacted] (M) [redacted] is a researcher at the Catalonian Institute for Energy Research (IREC). He obtained his PhD in 2020 from the Polytechnic University of Catalonia (UPC) and under the funding of the Marie Skłodowska-Curie Actions granting scheme of the European Union (project INCITE), working at IREC. His research focuses on designing efficient control strategies for heat pump systems, notably to enhance the energy flexibility of buildings. This work includes simulation studies but also a large experimental part, where the strategies are tested on real heat pump systems in semi-virtual laboratory environment. He also participates actively in the activities of the IEA EBC Annex 67 about energy flexible buildings. [redacted] graduated in 2014 carrying out a double degree between the École Centrale of Nantes (France) and the Technical University of Denmark (DTU). After graduation, he held a position of Research Assistant from 2015 to 2016 at the International Centre for Indoor Environment and Energy (ICIEE) at DTU, studying the performance of plus-energy houses and the use of solar panels for nocturnal radiative cooling, both topics also including experimental tasks.

Relevant publications, and/or products, services, or other achievements

1. **Salom, J.,** Pascual, J., (2018). Residential Retrofits at district scale. Business Models under Public Private Partnerships. ©InnoEnergy, 2018. ISBN 978-84-09-07914-8. http://www.innoenergy.com/residentialretrofitsreport
2. **T. Péan, J. Salom, J. Ortiz**, Environmental and Economic Impact of Demand Response Strategies for Energy Flexible Buildings. Proceedings of BSO 2018: 4th Building Simulation and Optimization Conference, Cambridge, UK: 11-12 September 2018.
3. A. Tejero**, J. Ortiz**, **J. Salom**, Evaluation of Occupancy Impact In A Residential Multifamily nZEB Through A High Resolution Stochastic Model. Proceedings of BSO 2018: 4th Building Simulation and Optimization Conference, Cambridge, UK: 11-12 September 2018.
4. **T. Péan, J. Ortiz and J. Salom**. Impact of Demand-Side Management on Thermal Comfort and Energy Costs in a Residential nZEB. Buildings, vol. 7, no. 2, p. 37. (2017)
5. **Péan T., Salom J**., Costa-Castelló R., 2018, "Review of control strategies for improving the energy flexibility provided by heat pump systems in buildings", Journal of Process Control, doi: 10.1016/j.jprocont.2018.03.006.

Relevant previous projects

- **H2020 syn.ikia** (https://synikia.eu/; 2020-2024). The syn.ikia project will design a blueprint for sustainable plus energy buildings and neighbourhoods. This will include a balanced application of integrated energy design, energy- and cost-efficiency measures, local renewables, local storage, energy flexibility, and energy sharing and trading. The project will encourage community engagement and allow for flexible management of energy demand. It will also provide big data-based infrastructure management and smart networks.
- **H2020 EmpowerMED** (https://www.empowermed.eu/; 2019-2023). The project, taking into account the dynamic role women play in an economy, will connect them with health practitioners in a series of awareness pilot programmes to reduce energy poverty, assess its impact on health, and share knowledge for policy building at local- and EU-wide level.
- **H2020 GrowSmarter** (http://www.grow-smarter.eu/home/; 2015-2019) will demonstrate at 3 lighthouse cities (Stockholm, Cologne and Barcelona) 12 smart, integrated solutions as a way of preparing for a wider market rollout. Through this project, building retrofitting and infrastructures of energy supply connection will be implemented in Barcelona. Energy consumption and thermal comfort in citizen's houses is monitored to evaluate the impact of the energy intervention in buildings. The project will have a large impact across EU, by means dissemination activities and also involvement of follower cities.
- **H2020 SABINA** (http://sabina-project.eu/; 2016-2020) aims to develop new technology and financial models to connect, control and actively manage generation and storage assets to exploit synergies between electrical flexibility and the thermal inertia of buildings. SABINA targeted flexible energy storage by using the existing thermal inertia in buildings and the coupling between heat and electricity networks to reduce the electricity bill and, at the same time, giving the opportunity on buildings to participate in energy markets to obtain additional revenues for demand side energy markets.
- **FP7 RENEWIT** (http://www.renewit-project.eu/: 2013-2016) developed advanced simulation tools for the integration of renewable sources in IT data centers, as well as applications of heat reuse. The role of IREC in this project consisted on laboratory experiments for testing energy management and heat reuse techniques on a data center, defining energy concept and control strategies for supplying renewable energy and heat reuse strategies in data centres and performing energy simulations.

Significant infrastructure and/or technical equipment

IREC counts with state-of-the-art experimental laboratory facilities for evaluating and improving the performance of emerging energy technologies and building thermal/electrical components under realistic dynamic conditions. The laboratory infrastructure that is most relevant to this project is the Semi-Virtual Laboratory for Energy Integration (SEILAB) provided with cutting-edge technology comprising a data centre and systems for energy consumption, storage and district heating/cooling integration. SEILAB is provided with systems for generation and storage of heat and power and state-of-the art facilities for testing thermal and electrical equipment. A novel and advantageous feature of the laboratory is its semivirtual approach, which allows for the real equipment to be operated as a function of the Energy demand/production of a dynamic virtual building model. IREC laboratory applies a building semi-virtual testing environment for evaluating the performance of a comprehensive range of equipment technologies such as energy generation systems, thermal storage and space heating and cooling equipment, with the aim of defining strategies for assessing and integrating major energy systems in buildings. A liquid cooled micro-data centre is also available in SEILAB to test heat reuse strategies and control algorithm. This micro-data centre is connected either with a climate chamber or to a district heating/cooling. Moreover, SEILAB has the following facilities: 3 thermal test benches for emulating thermal energy loads/sources; 2 electrical test benches for electrical energy production/consumption; walk-in climate chamber; meteo station: temperature, wind speed, RH, global and diffuse radiation. PV station; HVAC equipment: air to water heat pump Buderus and water to water heat pump Dynaciat water storage tanks 1500, 1000 and 300L.

Operational capacity of legal entity/partner organization

n/a

metrovacesa	**13. Metrovacesa, S.A.** **MET | ES**	
	Web site: www.metrovacesa.com **PIC number: 915199269**	**Number of employees: 190**

Brief description of legal entity/partner organization

With more than 100 years of history, Metrovacesa is one of the biggest Real Estate developers in Spain, with 125 active developments (7.429 units) at the end of 3q20. Our mission is create homes to improve our clients´ lives. Our vision to become the national champion in residential development, being the developer of choice for customers, employees, communities and shareholders. To that end we must continuously achieve superior financial and operating results while adhering to the highest standards of business conduct. We have three business lines, Residential Development, Commercial Development and Land Management.

Contribution to Work Packages and Tasks in the project

WP 3 Community, environment, and well-being: POE surveys as part of post-sale satisfaction process in Real State High Energy Efficient Buildings in the framework of Energy transition Living Labs.
WP 7 Efficient operation and flexibility: Efficient operation and control of centralized systems in multifamiliy buildings to improve energy matching with renewables energy sources.

Profile of key personnel in the project

[redacted] (M) [redacted] has 20 years' experience in the Real Estate sector and has worked at Metrovacesa for the last 12. He has accumulated extensive experience in land management. Prior to his appointment as Land Manager at Metrovacesa in October 2015, he was Regional Manager for a year for 700.000 m2 for residential and commercial use. [redacted] has been Land Manager in the regions of Levante and Catalonia from June 2005 to January 2015, specifically overseeing the urban development area. He was in charge of development at García de los Reyes, a private Spanish architecture firm, from July 2001 to May 2005. During this period, he was member of the Municipal General Town Planning Office at Almuñécar Town Hall (Granada)[redacted] is a graduate in Architecture from the Granada Higher Technical School of Architecture and holds an Executive MBA from the Madrid Business Institute

[redacted] (M) [redacted] has 19 years´ experience in the Real Estate sector and has worked at Metrovacesa for the last 2,5 as residential development`s manager for the regions of Cataluña and Baleares. He is responsible for the residential projects that Metrovacesa is actually developing in Sector Levante District in Palma. Jordi has previous experience in other relevant companies in the sector in Spain as Solvia, Building Center, Applus+, Gerens Hill International or Colonial. [redacted] s a graduate in Technical Architecture from the Universitat Politécnica de Catalunya and holds an Executive Real Estate Development grade at IESES Business School.

[redacted] (M) [redacted] has 15 years´ experience in the Construction sector and has worked at Metrovacesa for the last 3 as Building Facilities Technical Manager[redacted] has previous experience in FCC, one of the biggest construction groups of the country. [redacted] is a graduate in Mechanical Engineering from the León University.

Relevant publications, and/or products, services, or other achievements

Relevant previous projects

Significant infrastructure and/or technical equipment

JARDINS DE LEVANT (https://metrovacesa.com/promociones/illes-balears/palma-de-mallorca/jardins-de-llevant) 114 units residential development at Sector Levante District in Palma. Currently under construction. Expected to be completed at the end of 2021.

JARDINS DE LEVANT (https://metrovacesa.com/promociones/illes-balears/palma-de-mallorca/jardins-de-llevant) 114 units residential development at Sector Levante District in Palma. Currently under construction. Expected to be completed at the end of 2021.

SOL DE LLEVANT & TERRASES DE LLEVANT. 115&88 units residential development at Sector Levante District in Palma.
Currently obteining construction permision. Forward purchase agreement for a Build to Rent turnkey project signed wit AEW. Expected to be completed during 2023.

Operational capacity of legal entity/partner organization

n/a

	14. University of Applied Sciences Utrecht **HU | NL**
Web site: www.hu.nl or **PIC number:** 986208507	**Number of employees: 3.329** **Number of students:** 36,000

Brief description of legal entity/partner organization

University of Applied Sciences Utrecht - Through its practice-based research, University of Applied Sciences Utrecht contributes to solutions for a wide range of societal issues. Issues submitted by our partners working in the field – at the regional, national and international level.UAS Utrechthas around 36,000 degree seeking students enrolled and offers over 70 different degree courses (bachelor and master level, full-time and part-time, summer school and professional courses). Education and research are closely related at HU.

Centre of Expertise Smart Sustainable Cities was founded in 2014, led by UAS Utrecht, a joint initiative of companies, educational institutes and local government, with the mission to move forward towards a sustainable city. Governance of the centre lies with the program council, which consists of representatives of the VET providers (HU-UAS and ROC-MN), sector and industry representatives (BAM, Engie, Stroomversnelling, Happpy Balance, USI) and local government (City of Utrecht). This Centre is active in four programs: fossil free areas, healthy buildings, smart mobility and urban experience. An important theme for the centre is the transition to fossil free areas, offering research and education. The centre has over 100 partners that participate in one or more of the activities of the centre. Multidisciplinary (construction, engineering, IT, retrofitting, co-design, operations & maintenance, building physics, monitoring & real estate finance etc.) researchers and student teams participate in the programs of the centre.

The research group Applied Urban Energy Transition has the following expertise: construction, engineering, renovation, operations & maintenance, building physics, monitoring & real estate finance, customer journey, supply chain innovation, product development. The research unit is part of CoE Smart Sustainable Cities.

Contribution to Work Packages and Tasks in the project

WP 1 Management: *Demo coordination*
WP 2 Framework for effective planning, design, construction and operation of CPCC: *Pre-manufacturing framework*
WP 3 Community, environment, and well-being: *Social impact in districts.*
WP 4 Sustainable building design: *Circular and Energy Efficient Retrofit design of building components with the crossover between installation and building technology. Design for retrofitting in occupied state through multidisciplinary design teams.*
WP 5 Resource efficient manufacturing and construction workflows: *Retrofit construction process in occupied state. Circular HUBs for distribution and manufacturing*
WP 6 Renewable energy and storage: *Designing and monitoring renewable energy systems*
WP 7 Efficient operation and flexibility: *Social innovation for innovation adoption*
WP 8 Monitoring and evaluation: *KPI's assesments for construction and design to deliver performance guarantees.*
WP 9 Market uptake: *Business models for As a Service.*
WP 10 Communication, dissemination and training: *Embedded design research education methods.*

Profile of key personnel in the project

[redacted] (F) is Professor of Applied Urban Energy Transition at the University of Applied Sciences Utrecht. She is leading the theme energy neutral and circular regions in the Centre of Expertise Smart Sustainable Cities. The professorship is affiliated with the courses of the Institute for Design and Engineering (IDE). From January 2012 until 2019 she was Professor Spatial Transformations at the Hanze University in Groningen. Until 2016 she combined the position in Groningen with a professorship Innovative Technology in Construction at Saxion University. [redacted] studied Architecture at the Delft University of Technology, where she also obtained a doctorate with her thesis *Components Design: the role of architects in product innovation*. She furthermore worked for a period of four years at Slavenburg's Bouwbedrijven, where she was in charge of incorporating client-focused innovations into the operating processes. She then joined TNO (the Netherlands Organisation for Applied Scientific Research) as a senior building process innovation researcher in the Energy and Comfort Systems department, where she focused on the development, together with companies in the building sector, of sustainable building components and processes that meet the needs of clients and end users. She has more than 50 publications on her name and worked at several EU projects e.g. ManuBuild, eHub, Retrokit and Cost Effective. As the chair of Urban Energy (all Dutch professorships of the Universities of Applied Sciences focused on the energy transition in the built environment) she is member of the writing committee of the BTIC (Dutch Center for Building Technology Innovation) program on energy transition in the built environment. She is a board member of Earth, Wind & Fire (EWF) promoting passive climatisation principles, Eurosolar NL, promoting renewable energy, and Booosting, an innovation network in construction and a member of the Groninger EnergieKoepel (GrEK). She is furthermore a member of academic networks Het Groene Brein, W104 Open Building Implementation and W119 Customized Industrial Construction (the former TG57, Industrialised Building) of the International Council for Research and Innovation in Building and Construction (CIB).

[redacted] (M)
Senior lecturer [redacted] graduated as a physicist at the University of Utrecht in 1994 and subsequently conducted doctorate research in the field of atomic and molecular physics at Stichting FOM. From 1999 until 2006, he worked as a researcher and project manager in the field of hydrogen technology at the ECN (Netherlands Energy Research Centre, now known as TNO) in Petten for applications in the built environment, industry and mobility. Those applications were developed together with several European consortiums. The further development and optimisation of fuel cells and stacks were the main challenges. From 2007 to 2009, he worked at TNO in Apeldoorn, where his focus shifted to thermal storage systems and heat pump technology for residential and non-residential building. Issues in the field of sustainable energy were addressed on behalf of market gardeners, data centres, housing corporations and the installation sector, in addition to fundamental research in the field of energy storage, among other fields, such as energy piles and thermochemical materials. In 2010, [redacted] carried out research as part of an international heat pump monitoring programme (Sepemo Build) at government agency RVO, and participated in the development of the Renewable Energy Monitoring Protocol and the order in council regarding heat and cold storage in the urban environment. Since late 2010, he has worked at the University of Applied Sciences Utrecht in the field of energy systems research and education. Since 2013, he has worked as a senior lecturer in the Applied Urban Energy Transition professorship, in charge of acquisition, project management and research in the field of local energy systems and sustainability techniques for areas and buildings.

[redacted] (M)
[redacted] works as a researcher and project manager in the Applied Urban Energy Transition professorship, at the Centre of Expertise Smart Sustainable Cities and at the Built Environment Institute. He is an initiator of several workshops aimed at linking trade and industry, research and education, with a view to achieving the greatest possible positive impact on society. He is project manager of Inside Out at the University of Applied Sciences Utrecht and researcher of the monitoring of comfort performances and the building process, where a ten-storey block of flats is being converted into high energy generating flats for housing corporation Bo-Ex. The students are participating in that project as designers and testers. New projects that [redacted] is working on relate to Dutch and international knowledge of the existing housing stock, knowledge of the (potential) demand in relation to Business to Consumer and Business to Business; application of Industry 4.0 by having several Product Market Combinations run along the same product line; Open Building as a modular strategy for building components designed on the basis of user wishes and technology of the existing housing stock, implemented in an Industry 4.0 product environment. [redacted] coordinates several courses at the Built Environment Institute, such as the Sustainable Transformation and Renovation (120EC) specialist course. He lectures on Zero Energy home renovations, his specialist area.

[redacted] (M)
[redacted] studied Architecture and Construction Engineering at the University of Applied Sciences Utrecht, followed by Architecture and Construction Engineering at the Delft University of Technology. In 2017, he obtained a doctorate at the Delft University of Technology with his thesis *Future-proof Renovation*. He has worked at the University of Applied Sciences Utrecht since 2002, as senior lecturer in Future-proof Building and Living, Innovation Lab and minor Asset Management researcher, and Master of Urban Engineering project manager.

[redacted] graduated as physical geographer at the Institute for Biodiversity and Ecosystem Dynamics of the University of Amsterdam. He is specialized in developing and coordinating sustainable innovation projects that start off from the Utrecht region, contributing to the transition towards sustainable urban regions, nationally and internationally. The Utrecht region is characterized by many knowledge institutions and companies providing sustainable solutions. By linking their knowledge to regional sustainability ambitions, complex issues can be solved in an integrated manner. [redacted] works in close cooperation with knowledge centres, governments, businesses and societal organizations, bringing these parties together in research and innovation projects leading to smart and sustainable approaches related to the strategic reserves of energy, water and materials in urban areas. [redacted] is project manager and Lighthouse City Site Manager in the IRIS Smart Cities (https://irissmartcities.eu/) demonstrating solutions at district scale integrating smart homes and buildings, smart renewables and closed-loop energy positive districts. Also, demonstrating smart energy management and storage solutions targeting grid flexibility and demonstrating integrated urban mobility solutions increasing the use of environmentally-friendly alternative fuels. [redacted] is also site manager of the project Inside Out (https://tki-inside-out.nl/), in which a consortium is developing and testing a modular renovation system to create positive energy high-rise apartment buildings. The Inside Out consortium integrates installations into multifunctional building components on the outside of the building.

Relevant publications, and/or products, services, or other achievements

- Oostra, Mieke, *De circulaire energietransitie van de gebouwde omgeving, verkenning voor woongebieden* (The circular energy transition of the built environment, exploration for living areas), to be published in 2021, study for Enpuls
- Oostra, Mieke, *Nieuwe Energie, Energietransitie van de gebouwde omgeving als onderdeel van complexe maatschappelijke transformatie; Applied Urban Energy Transition, Energy transition of the built environment as part of complex societal*

transformation, inaugural lecture, Utrecht University of Applied Sciences, Utrecht, 2019. https://centreofexpertise.mett.nl/publicaties/downloads_getfilem.aspx?id=1120470&forcedownload=true

- Oostra, M. 'Smart Open Retrofitting', proceedings *CIB World Building Conference 2019 Constructing Smart Cities*, June 17-21, 2019.
- Oostra, Mieke & Civic architects, *Circulaire Stations*, Spoorbeeld inspiratie, Spoorbouwmeester, Utrecht, 2019
- Oostra, Mieke, 'Democratising Large-Scale Retrofitting of Housing', proceedings *UIA Conference*, Seoul, 2017

Relevant previous projects

1. **Energy Poverty in the rented sector (H2020).** This Horizon 2020 project aims supporting the policies for alleviating energy poverty in specifically the rented sector in various European Member states.
2. **Smart Solar Charging (EFRO).** A sustainable energy system at district level: with Smart Solar Charging, locally generated solar energy is stored in (shared) cars via a smart and dynamic system (Vehicle2Grid). The University of Applied Science is investigating the desirability of this service for users. What are the needs, wishes and fears of the citizens? How could citizens be engaged to support the charging system?
3. **De stroomversnelling (Energiesprong).** The research group Applied Energy Transition was part of several projects part of Energiesprong (Energy Leap), a programme commissioned by the Dutch Ministry of the Interior. In these projects owner-occupants and three consortia of companies were supported in their quest to make privately owned homes energy-neutral. The Living Lab One-Stop-Shop was developed to support the consortia with research necessary for the development of industrial renovation concepts, modular building components, service concepts and reconfiguration of their supply-chains for row housing.
4. **Future Factory (MMIP3 & 4)**. Based on a programmatic approach, in this project the consortium is developing the Future Factory, which manufactures modules to make housing sustainable on a large scale. Through developments in three generations the necessary system change is made in order to realize large-scale mass production: generation 1 (current production facilities) to prototype, generation 2 production facilities and ultimately the 3rd generation the realization of a production facility that can supply 25,000 homes per year. https://future-factory.nl
5. **IRIS Smart Cities (H2020)**. The European Innovation Partnership on Smart Cities and Communities (EIP-SCC) brings together cities, industry and citizens to improve urban life through more sustainable integrated solutions, including applied innovation, better planning, a more participatory approach, higher energy efficiency, better transport solutions, intelligent use of Information and Communication Technologies (ICT). The IRIS project is strongly committed to actively participate in the 6 'Action Clusters' set by the EIP-SCC.

Significant infrastructure and/or technical equipment

TESTING FACILITIES OF THE PROFESSORSHIP

The professorship has direct access to the following TechLabs:

- Energy Lab
- Climate Chamber
- Sustainable Energy Lab – a roof for testing of renewable energy generating modules
- Innovation Lab – for assembling and testing building components
- Wonen 3.0 – e.g. biobased & energy neural homes that can be used for testing

Test labs of the University of Applied Sciences Utrecht

Via our contacts at the University of Applied Sciences, we also have access to:

- Co-design Labs

- ProtoSpace Lab, where technological innovation concepts can be converted to proofs of concept by means of rapid prototyping and 3D printing, among other things
- Block Chain Lab
- iLabs – Life Sciences lab facilities

Operational capacity of legal entity/partner organization

n/a

	15. Housing Europe **HE | BE**
Website: https://www.housingeurope.eu/ **PIC number:** 991142024	**Number of employees:** 10

Brief description of legal entity/partner organization

HOUSING EUROPE is the European Federation of Public, Cooperative & Social Housing. Housing Europe is based in the Belgian capital of Brussels and is registered as an NGO (AISBL under Belgian law). Since 1988, Housing Europe has developed a network of 45 national & regional federations bringing together 43,000 housing providers in 24 countries. Together, we manage roughly 27 million homes, about 11% of the dwellings in Europe.
Social, public, and co-operative housing providers have a vision of a Europe that provides access to decent and affordable housing for all residents in socially, economically and environmentally sustainable communities and where everyone is enabled to reach their full potential. For Housing Europe, the priority of the European Union and its member states in the field of sustainability, energy, and climate in the next decade should be to develop a positive business environment for the reduction of energy consumption in the housing sector, with specific attention paid to the affordable-housing sector.
Housing Europe has participated successfully in more than a dozen Horizon 2020 projects as Project Coordinator (Power House), Work Package leader (Syn.ikia) and as Partner in several Work Packages, often including Communication, Dissemination, Replication, Policy Recommendations and Research activities.

Contribution to Work Packages and Tasks in the project

WP 1 Management: Sorcha Edwards with the assistance of Clara Mafé will ensure effective project management and implementation.

WP 2 Framework for effective planning, design, construction and operation of CPCC: Dara Turnbull and Clara Mafé will draw from their experience in contributing to already existing assessment frameworks for Sustainable Plus Energy Neighbourhoods (www.synikia.eu), especially referring to social key performance indicators.

WP 3 Community, environment, and well-being: Sebastien Garnier and Clara Mafé will draw from their experience in producing user acceptance and satisfaction renovation survey for HEART (https://heartproject.eu/) and the creation and development of Living Labs in under H2020 smart city projects.

WP 7 Efficient operation and flexibility: Dara Turnbull and Clara Mafé will support and follow the progress in this WP to increase the replicability potential of innovations across the Hosing Europe community.

WP 9 Market uptake: Dara Turnbull, Sébastien Garnier and Clara Mafé will contribute to the design innovative financial instruments for energy positive real estate and communities.

WP 10 Communication, dissemination and training: Diana Yordanova, Clara Mafé and Sorcha Edwards will guarantee effective stakeholder outreach and engagement thanks to the well-established networks and communities of Housing Europe and will ensure content alignment withing and beyond the consortium through the development of appropriate online platforms and dissemination material.

Profile of key personnel in the project

[redacted] (F) is the Secretary General & Energy Coordinator of Housing Europe and is in charge of the so-called CECODHAS Energy Expert Network, a group within Housing Europe gathering experts from 20 national housing federations from all across Europe. She led the POWER HOUSE EUROPE Project, an initiative aimed at creating National and European Platforms of key stakeholders to promote energy efficiency and sustainable energy in housing. [redacted] is currently coordinating the POWER HOUSE Nearly Zero Energy Challenge project, aimed at engaging local housing organisations to share experiences and identify avoidable mistakes to meet the nearly-Zero obligations outlined in the Energy Performance of Building Directive. After her Communication & Language degree during which she studied a year in Germany, she completed a Master in European Policies at the University of Leuven, Belgium. She has also worked for the Irish Institute for European affairs developing training seminars on EU policies and to the TACIS EU Technical Assistance Office to monitor the implementation of the TACIS programme. [redacted] speaks English (mother tongue), French, German and Spanish.

[redacted] (F) is Communications Director at Housing Europe. She is responsible for the external and internal communications work of the federation, including its online presence, press relations, event curation, and European projects-related communication activities. She is in charge of curating the organisation's publications and preparing the bi-weekly newsletter. Before joining Housing Europe, [redacted] was leading the communication team of a Brussels-based trade association where she gained experience in communicating complex and technical EU issues in a simple and engaging way, media campaigns, and brand awareness. Having been part of a communication consultancy, she also specialised in social media campaigns for DG Environment. [redacted] holds a bachelor degree in Journalism from UNWE, Sofia and a Master Degree in New Media and Society in Europe from Vrije Universiteit Brussel. A native Bulgarian, [redacted] also speaks English and French fluently.

[redacted] (F) is a Junior Project Manager at Housing Europe. She has been mostly working H2020 projects related to the energy transition through innovation actions related to sustainable plus energy neighbourhoods and circular deep renovation in the housing sector. Besides, she also manages Housing Europe's "Our Homes, Our Deal" initiative to benchmark the work done by the public, cooperative, and social housing sector on building and renovation in an energy- and resource-efficient way. Before joining Housing Europe in 2020, she gained experience on user-centred innovation, co-creation and Living Labs at the European Network of Living Labs (ENoLL). [redacted] holds a BSc in Economics from the University of Valencia (Spain) and a MSc in Urban and Regional Planning at the University of Birmingham (UK). She speaks Spanish (mother tongue), English (C2) and is currently learning French (B1).

[redacted] (M) is responsible for the expansion and management of the Housing Europe network of members, while he deals with the events organised by the Federation. At the same time, he is feeding into the work related to migration and integration policy and involved in the Triple A reno project on adequate, affordable and attractive deep renovations through gamified end-user cantered business models.

[redacted] (M) is the Research Coordinator at Housing Europe, bringing together various strands of our work. This includes the preparation of research for the Observatory, coordinating knowledge sharing with and between our members, as well as working with our Innovation & Projects manager in ensuring the successful participation of Housing Europe in a number of EU level projects. An economist by training, [redacted] also brings five years of expertise in the area of finance to bear on analysis of issues concerning the financing of social housing and of national and EU funding schemes related to the provision of non-market housing solutions.

[redacted] (M) is Housing Europe's Innovation and Project Manager. He has been working for almost ten years in the social and affordable housing sector. First as advisor in the Financial and Public Affairs departments of Aedes - the Dutch federation of social housing providers and its 300 members. He was later responsible for managing the European affairs for the Brussels office of Aedes during six years. During three years, he was chair of the Social Affairs working committee of Housing Europe. He has also been actively involved in the Housing Partnership of the EU Urban Agenda, the International Social Housing Festival and co-created the Housing Evolutions Hub that maps the sector's innovations in Europe.

[redacted] (M) is Housing Europe's Deputy Secretary General & Policy Coordinator, coordinating the policy work of Housing Europe, monitoring all relevant political developments, and drafting the position papers of the organisations. Julien coordinates the work of all Committees and makes the link between them and the day-to-day work in Brussels. He also represents Housing Europe in various events, delivering a wide range of presentations.

Relevant publications, and/or products, services, or other achievements

1. The future of Smart Energy Homes in 32 Words - A Housing Europe HEART Glossary, April 2019: https://www.housingeurope.eu/resource-1264/the-future-of-smart-energy-homes-in-32-words
2. Impact of the revised Energy Performance of Buildings Directive on affordable housing providers - Housing Europe Policy Brief, June 2018: https://www.housingeurope.eu/resource-1123/impact-of-the-revised-energy-performance-of-buildings-directive-on-affordable-housing-providers
3. The financing of renovation in the social housing sector - A comparative study in 6 European countries, June 2018: https://www.housingeurope.eu/resource-1124/the-financing-of-renovation-in-the-social-housing-sector
4. Decarbonisation of the building stock: a two-front battle, A Housing Europe position paper, April 2018: https://www.housingeurope.eu/resource-1096/decarbonisation-of-the-building-stock-a-two-front-battle
5. From blind gambling to visible impact - Making housing finance work for society, October 2017: https://www.housingeurope.eu/blog-1020/from-blind-gambling-to-visible-impact

Relevant previous projects

1. **HEART (H2020 - No 768921)**

   Period: 2017-2022
   Overall budget: € 6 638 687,50

   The HEART toolkit incorporates different components and technologies, which cooperate to transform an existing building into a smart building. In developing this toolkit, the project advances and improves energy efficiency and the use of renewable energies in buildings across Europe, particularly in Central and Southern Europe, where climate change is leading to increased electricity consumption both during summer and winter seasons.

   Our role in the project is to supervise demonstration activities in case studies with the specific support on the assessment of monitored data and users' acceptance, while strongly supporting exploitation/dissemination activities.

2. **syn.ikia: Sustainable Plus Energy Neighbourhoods (H2020 – No 841850)**
   Period: 2020 – 2024

   Overall budget: € 7 435 278,75

   The syn.ikia innovation project within the EU Horizon 2020 framework involves 13 partners from six countries and aims to enable the development of sustainable plus energy neighbourhoods in different climates, contexts and markets in Europe. Over the course of the project, four real-life plus-energy demo neighbourhood projects tailored to four different climatic zones will be developed, analysed, optimized, and monitored, demonstrating the functionality of the plus-energy neighbourhood concept for the rest of Europe. Our role in the project involves leading the work package of communication, dissemination and stakeholder engagement. We ensure content alignment within and outside the project by tailoring syn.ikia's message to diverse audiences of urban professionals, policymakers and residents who are in a position to spread the word and push the plus energy neighbourhood concept a step further. We are also responsible for establishing and developing an online community of stakeholders that want to learn more about with syn.ikia and similar research and projects in Europe. Our contribution to the project also entails the design and development of neighbourhood scale user engament systems and social key performance indicators for the demo neighbourhoods.

3. **HIROSS4ALL/OpenGela (H2020 - No 846707, 2019-2022)**

   Period: 2019-2022

   Overall budget: € 1 786 766.25

   "Creating One-Stop-Shops for integral urban regeneration in vulnerable districts" is a Horizon 2020 project that develops and implements new integrated home renovation services (IHRS) for private residential buildings in two districts in the Basque Country (Spain). Together with the public housing actors, it will be replicated the economically viable business model within the region and bring together active citizen engagement and an innovative financial instrument, making the service suitable for vulnerable populations. We put our network of organizations involved at the service of HIROSS4ALL for the

development of two main tasks: To contact with other One-Stop-Shop initiatives running in Europe and learn from their best practices (WP2), and to disseminate the project results among the Public and Social Housing stakeholders for replication purposes Europe wide.

4. **TRANSITION ZERO (H2020 - No 696186)**

   Period: 2016-2018

   Overall budget: € 3 570 438,75

   TRANSITION ZERO will make Net Zero Energy (E=0) refurbishments a market reality in the UK, France and The Netherlands. Energiesprong brokered a deal between housing associations and builders to refurbish 111,000 houses to E=0 levels in the Netherlands of which the roll-out will be further supported. Building on the same methodology and the inspiring example, a similar innovation trajectory will be facilitated through deals for 5,000 houses in the UK and France and building a pipeline of more demand.

   In this project we disseminated the lessons learnt and market conditions realized through our network of members as well as to national and EU policy makers.

5. **Triple-A-Reno (H2020 - No 784972, 2018-2021)**

   Period: 2018-2021

   Overall budget: € 1 999 933,88

   To make nZE (nearly Zero Energy) renovations attractive for consumers TripleA-reno wants to come up with clear information and communication on the real energy usage, indoor quality and personal health by developing an open and end-user-centered gamified (application of game-design elements and game principles) platform for decision support, quality validation / proven quality and community building. As a Brussels-based umbrella organisation representing the interests of our affiliated organisations, our tasks involved, amongst others, informing members and promoting the exchange of best practices form all across the EU and raise the profile of the sector to the broader public. All Housing Europe members will benefit from the project results once available.

Significant infrastructure and/or technical equipment

n/a

Operational capacity of legal entity/partner organization

We bring together 46 national and regional federations which together gather about 43,000 public, social and cooperative housing providers in 25 countries. Altogether they manage around 25 million homes.

Social, public and co-operative housing providers have a vision of a Europe which provides access to decent and affordable housing for all in communities which are socially, economically and environmentally sustainable and where everyone is enabled to reach their full potential.

Therefore, they do not just provide affordable homes but a number of other services such as:

- Domiciliary care and support services for residents with specific needs

- Additional services for tenants (kindergardens, community centres, employment and training services, financial advice)
- Neighbourhood services
- Management of other types of ‘sheltered’ accommodation
- Urban development and urban regeneration.

Our impact:

- 43,000 local housing organisations
- 24,936,000 dwellings
- roughly 200,000 new dwellings completed each year
- over 200,000 dwellings refurbished each year
- roughly €40bn in new investment per year
- 7,500+ staff employed directly by the federations
- 300,000+ staff employed by local housing providers.

BURO DE HAAN	**16. Buro de Haan (BURO DE HAAN) | NL**	
	Web site: www.bdh.nl **PIC number: 898384222**	**Number of employees: 64**

Brief description of legal entity/partner organization

Buro de Haan is a dynamic company specialized in housing issues and building systems. We offer architectural knowledge, from initiative to implementation, to realize building plans.
Our knowledge and skills combined with advanced design and engineering tools enable clients to build better by giving them a realistic picture of their plans. Our distinctive capacity is thinking along throughout the construction process and the amount of insight we give a client to make the right decisions. We operate from six business units with our central mission: "Build Beter". Our units are: area development, architecture, engineering, construction, measurement and information technology.

Contribution to Work Packages and Tasks in the project

WP 5 Resource efficient manufacturing and construction workflows:
Our experience in industrialisation and digitization will be applied for fast, comfortable and scalable renovations. Our digitalization expertise in point cloud technology, engineering, image recognition and "file2factory" approach, enlarged with a geo/district approach helps reducing costs in several stages of the process, in design and engineering as well as off site production.

Renovation design/ engineering is currently a relatively non-collaborative process. In large construction projects, owners typically contract with a firm to create a concept or front-end design that is then handed to contractors to further detail. The latter have little say on the initial design, and this can result in on-site complexities and constructability issues being solved late in the process rather than at the outset.

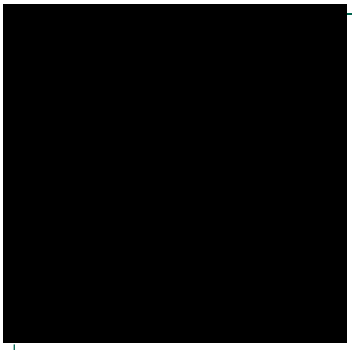
The process of design needs to be streamlined and made more collaborative,
and the repeatability of designs encouraged in order to drive scale in the production of
elements used in construction projects. Zero engineering has great potential to
influence the eventual cost of a project. Reducing overdesign, improving coordination,
removing ambiguity, and creating a cost-efficient constructible design that maximizes the
amount of components that can be produced off-site will have a significant impact on the
rest of the construction process.

Zero Engineering
Digital data harvesting using point-cloud scanning and image recognition that enables us to classify the buildings. Our development off AI-algorithms can recognise shape and generate the new surface on top of the existing building. By giving building owners access to this technique by means of configurators, one is able to customize the appearance format of the new components.

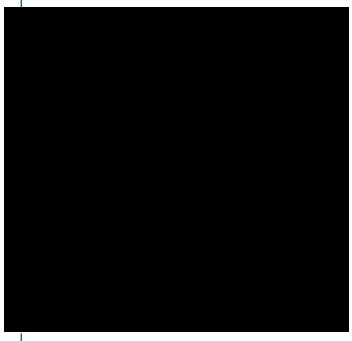
WP 6 Renewable energy and storage:
Expertise for integrating storage in building components and total concepts / propositions.

WP 9 Market uptake:
Experience in actual market dynamics, uptake and business models.

Profile of key personnel in the project



[redacted] (M)
[redacted] graduated from TUDelft, from the Faculty of Architecture. He is specialized in more analytical form of design. His personal passion is in the digital design world in the field of programming and modeling.
In the activities of his team Zero Hours Engineering at buro de haan, automation based on parametric models and processing of datasets are central. In other words: informed design based on data analysis. Within the company we have built up knowledge to make the BIM process more efficient and streamlined by additional tools such as Grasshopper and programming languages such as Python and Java. Where the traditional BIM process is characterized by manual data entry, we believe in an automated process, where the design and its model are designed as a whole by using parametric models. Within the team we work according to the D2RPO (design to robotic production & operation), which means that all elements of the design are designed with the possibilities of modern technologies such as mass customization in mind. All parametric models have been set up in such a way that even during the implementation phase, it is possible to respond flexibly to possible hiccups in the production process, and, if necessary, to act quickly and adequately.



[redacted] (M)
[redacted] graduated from Windesheim University of Applied Sciences in Zwolle, from the Faculty of Architecture. He is the founder of Buro de Haan, and has the core task of managing the various teams as well as bringing the entire company further with the mission “Build Better”. In addition to this role, he also fulfills the task of technical developments within the company RcPanels. Due to the insight into the work required for renovation projects, as well as the knowledge of the teams of Buro de Haan / RcPanels and the high degree of interest in new techniques, he often acts as a driver to explore a next level in engineering and production. He takes part in this project to make good connections between the required end result and technical possibilities.

Relevant publications, and/or products, services, or other achievements

Beyond 2020
Upscaling the housing renovation market through far-reaching Industrialization
Y Decorte, M Steeman, U B Krämer, C Struck, K Lange, B Zander and A de Haan
https://iopscience.iop.org/article/10.1088/1755-1315/588/3/032041

BIM and Factory
Buro de Haan is the supplier of the engineering and production system of RcPanels. At the start of the factory, drawings were produced by employees of Buro de Haan and the machines manually provided with data. Due to developments in the field of BIM, Pull Planning and Warehouse Management, we have been able to reduce the manual actions to less than 30%. Currently the customer, machines, planning and coordination on the building site are operated from a BIM model.

BIM acts as a single-information resource for the entire project and supports all personnel who can access the BIM applications. This integration of information is made possible through involving 3D models of the building plans, the 'as-built facility,' as well as data related to subsequent building upgrades or for conceptualizing ways of solving problems that may be encountered once the building is put to use. Therefore, BIM becomes a way to virtualize construction, design, and management of a building throughout the life cycle of the building.

Pull planning / LPS are developed by those who later also founded the Lean Construction Institute, the method is a planning monitoring and control system that follows the principles of lean construction. Its ultimate goal is to enable more reliable and predictable production of projects as well as support a seamless workflow throughout the project, promote collaboration and trust within the project team and deliver safe & quality results with a faster turnaround time. Due to the completely seamless integration

between the LPS planning and the data from the BIM models, RcPanels is able to balance the factory on production and all employees can at any time access the latest data regarding product or production status.
https://www.youtube.com/watch?v=E97LRybwIy4

Relevant previous projects

Indu Zero
The North-Sea Region alone consists of 22 million outdated dwellings built between 1950 and 1985 that are in high need of renovation. Nowadays, the renovation industry applies mainly manual on-site renovation techniques, resulting in a low renovation pace, relatively high labour costs and a long duration. To tackle the urgent need for rapid renovations, six countries of the North-Sea Region collaborate to upscale the current renovation process in the Interreg project INDU-ZERO "Industrialization of house renovations toward energy-neutral". The project focuses on modular prefabricated renovation packages with fully integrated HVAC technologies to arrive at energy-neutral dwellings. The project researches the possibilities of far-reaching automated and industrialized production processes. A smart factory blueprint will be designed to speed up the renovation pace to a target of 15,000 renovation packages per year per factory while cutting the current price with 50%.

Future factory
Based on a programmatic approach, the consortium is developing the Future Factory, a production, supply and sales company with which homes and residential buildings can be made more sustainable on a large scale. Three generations are working on the system change that is necessary for this unprecedented scale. The upscaling from generation 1 (current production facilities) to prototype generation 2 production facilities and ultimately the 3rd generation production facility that can supply 25,000 homes per year. The customer interaction takes place within the program. However, not every product is suitable for mass production. The necessary research and development of the building components is done along the lines, roof module, facade module and installation module.

Significant infrastructure and/or technical equipment

Projectportals
A project collaboration portal has been developed within Buro de Haan with the insight Connect everyone. Manage better. Communicate and report in real time on the same digital tool with all those involved in the construction project. Construction projects have a major risk factor to control this, we divide projects into phases and we have tools in the sector to monitor the phases in the following areas:
- Money
- Risk
- Organization
- Time
- Information
- Quality

This platform now relieves us in projects and delivers its value on a daily basis. We are developing this further to offer more and more management tools to our own employees / affiliated parties and customers. In the context of this project, where the ambition is to speed up the process, it is important that this platform is in-house. Here we can use it to structure the data input between users and AI algorithms with are designing the buildings.

Measurement equipment

One of our departments is measurement. Further automated engineering process demands a higher accuracy of the input, because the human check will disappear. This course will also change craftsmanship off this department and probably has an impact on equipment. Because we own this company, we can more easily implement changes in equipment or work processes than with dependence on other suppliers with not sharing the same interests.

Bimpact
We also partly own Bimpact. This company sells software to automatically check within BIM software whether the building complies with laws and regulations. This knowledge and expertise has been developed within Buro de Haan and we will be sorely needed in the automatic generation of renovation packages.

Operational capacity of legal entity/partner organization

n/a

centerdenmark intelligent energy	**17. Center Danmark/EU Digital Innovation Hub** **CENTER DENMARK | DK**
	Web site: **www.centerdenmark.com** **PIC number:** 894818114 | **Number of employees: 6**

Brief description of legal entity/partner organization

Center Denmark provides a Trusted Data Sharing Platform with focus on data intelligence and integrated energy systems for Identification and utilization of flexibilities on demand side across energy systems.

Center Denmark is an independent, self-owned and non-profit organization working to promote development of digitally integrated energy systems in order to enhance society's transition to renewable energy sources and reduce environmental impact. Center Denmark contributes to establishing a national framework to promote research, education, innovation & development, testing and demonstration in connection with the transition to a fossil-free green society, building the foundation for a Danish "Silicon Valley" of energy systems.

The members of Center Denmark's Board of Directors are Associate Dean at Aalborg University Jakob Stoustrup, Associate Dean at Aarhus University Brian Vinter, Chief Consultant SDU Niels Langvad, Director of digitalization at Energinet Nicolaj Peulicke, CEO of Thorsen Invest Henrik Thorsen, CTO of HOFOR Bjarne Korshøj, CEO of Aalborg Forsyning Søren Gais Kjeldsen, Professor at DTU Henrik Madsen (deputy chairman) and CEO of EWII Lars Bonderup Bjørn (chairman).

Contribution to Work Packages and Tasks in the project

WP 1 Management: Experienced in large scale European projects

WP 3 Community, environment, and well-being: We can deliver digital user-interface for user feedback and smart control

WP 6 Renewable energy and storage: Digital infrastructure for real-time data and real-time control of when to store or consume energy so it serves the overall performance of the building in terms of lowering CO2 emission

WP 8 Monitoring and evaluation: We can fetch IoT-data and deliver monitoring systems and data dashboards that can give intelligent insights in the building performance and user behaviour

WP 9 Market uptake: Center Denmark can put the digital solutions for disposal to the industry through our digital Trusted Data Sharing Platform.

Profile of key personnel in the project

Primary responsible:

[redacted] (M), Director of Center Denmark.

Staff:

[redacted] (M), Senior Project Manager and computer scientist.

[redacted] (M), Software Engineer.

[redacted] (F), Data Scientist.

[redacted] (M), Data Scientist.

+ 2 new software engineers that are being on-boarded just now.

Relevant publications, and/or products, services, or other achievements

- Center Denmark is providing digital infrastructure and has part of the Danish Innovation Fund Project Flexible Energy Denmark, developed the very first Data Lake that can handle real time streaming of consumption data from electricity, heat and water sector.
- Bi-directional setup which can send back control signals with real-time capabilities.
- Approved Digital Innovation Hub by the EU-commission.
- Approved as Digtial Platform Provider and Living Labs and Test Beds by ERA-net Smart Energy Systems.

Relevant previous projects

Key partner in the Danish Innovation Fund project: **Flexible Energy Denmark**, www.flexibleenergydenmark.dk

Key partner in the Danish Innovation Fund project: **HEAT4.0**. Focus on continue developing digital infrastructure for district heating.

Key partner in the Danish Innovation Fund project: **Cool-Data Flexible Cooling of Data Centers**

Significant infrastructure and/or technical equipment

Center Denmark own and maintain our own servers situated at DTU in Denmark.

Operational capacity of legal entity/partner organization

n/a

	18. Sonderborg Andelsboligforening **SAB | DK**
	Web site: www.sab-bolig.net **PIC number: 929565842**
	Number of employees: 30

Brief description of legal entity/partner organization

SAB is a non-profit independent and private social housing company established as a cooperative member organisation of the residents (tenants), who own the organisation. The tenants are organised in housing departments, which have an individual economy and make their own decisions concerning their own housing department. For each department there is a board, and SAB has a main board for the whole organisation. SAB can only work with activities related to housing of their tenants.
SAB has 46 departments with totally 3,400 apartments in the Municipality of Sonderborg, DK.

Contribution to Work Packages and Tasks in the project

WP 3 Community, environment, and well-being: *Building owner, maintenance of buildings*
WP 4 Sustainable building design: *Planning of energy retrofitting activities and new construction projects*
WP 6 Renewable energy and storage: *Owner of several PV plants on different buildings*
WP 7 Efficient operation and flexibility: *Planning of energy retrofitting activities, maintenance of buildings, building owners*
WP 8 Monitoring and evaluation: *Experienced in pilot and demonstration projects within housing associations*
WP 10 Communication, dissemination and training: *Experts in communication and training of tennants in housing associations, citizens awareness*

Profile of key personnel in the project

[redacted] (M)
Technical Director for SAB
Email: [redacted]
Phone: [redacted]

[redacted] (M)
Technical inspector for SAB Department 22
Email: [redacted]
Phone: [redacted]

Relevant publications, and/or products, services, or other achievements

Relevant previous projects

- Partner in H2020/SCC-01-2015 No 691883: SmartEnCity. Proposal successful.
- Partner in H2020/EE-2017-CSA No 785147: HAPPI. Leader of Work Package WP2: Energy Screening and Feasibility Studies

Significant infrastructure and/or technical equipment

n/a

Operational capacity of legal entity/partner organization

n/a

	19. Green Digital Finance Alliance **GDFA | CH**	
	Web site: https://greendigitalfinancealliance.org **PIC number: 893237208**	**Number of employees: 3**

Brief description of legal entity/partner organization

The GDFA is a not-for-profit organization with a mandate to scale finance for the Paris agreement through fintech enabled innovation. We catalyse partner innovation by enabling them to deploy the new capabilities of fintech to address current barriers to scale green finance (barriers include size of green assets, high cost of structuring green assets and issue debt, insufficient green metrics from the real economy and more). The work is guided by three strategic pillars of 1) thought leadership 2) enabling green digital investor ready metrics 3) experimentation to scale. GDFA has been knowledge partner to the G-20 Working Group on Sustainable Finance and to the UN SG's Task Force for Digital Financing of the SDGs as part of its thought leadership work. In this work the GDFA has worked closely with several European jurisdictions to identify innovative financing models to deliver on national green objectives these include BMU in Germany, The Central Bank of Spain, and the Central Bank of the Netherlands. The GDFA has a network of relations to FI's and FI associations (e.g., European Banking Federation) in the Union to be leveraged in the project. The GDFA has a global catalogue of innovative financing models for scaling energy efficiency and renewable energy supply, which is an asset of emerging practices to be leverages in the project. The work of the GDFA is guided by its high-level advisory board, which will also be an asset in the ARV project. GDFA links its knowledge and results of the thought leadership and experimentation to scale work into the network of UNEP FI, which has 350 FI member institutions. GDFA experimentation to scale work demonstrate scalable green digital financing instruments through experimentation at market level and use validated innovative financing vehicles in dialogue with FI partners to enable adaptation across jurisdictions through standardised frameworks.

Contribution to Work Packages and Tasks in the project

WP 9 Market uptake:

Green Digital Finance Alliance (GDFA) has been knowledge partner to the G-20 Working Group on sustainable finance and to the UN SG's Task Force for Digital Financing of the Sustainable Development Goals. Here the GDFA has worked across jurisdictions with policy makers, regulators, and financial service institutions via innovation processes to develop new concepts on innovating green finance with fintech. The GDFA works on "Experimentation to Scale" projects that brings together partners to design and test innovative green digital financial instruments. Hence, GDFA brings with it a toolbox and processes to design innovative financial instruments that are digitally enabled. The GDFA was co-founded by UNEP and works closely with the UNEP Finance Initiative, as the digital finance arm that informs the work of its 350 member organizations. The GDFA has a large network to financial service institutions in the European Union and has collaborated with banks to design green digital bond concepts. The GDFA brings the capabilities of its high-level Advisory Board into the work which include but are not limited to MIT Media Lab, the European Climate Foundation, as well as relations outside of the Advisory Board to for instance the Central Bank of the Netherlands, the Central Bank of Spain, the European Banking Federation and more.

Profile of key personnel in the project

[redacted] (F): Director of the Green Digital Finance Alliance. [redacted] has been leading projects with banks (incl. HSBC) on innovation of financial instruments via automation, she has spearheaded the design of a data measurement framework for policy makers and regulators to guide avenues to scale green finance with fintech, she has designed approaches to innovation in finance under the GDFA. She has managed a knowledge partnership with the UN SG's Task Force for Digital Financing of the SDGs. [redacted] holds an M.Sc. in Environmental science and additional certificates in digitization of finance.

Green Finance Specialist (to be engaged): This specialist will be identified by drawing from the was network of our Co-chair UNEP FI to identify the best match of a green finance specialist. Key capabilities and skills will include in-depth knowledge of structuring financial instruments to scale flexible energy finance linked to different real-estate asset classes.

[redacted] (M): Business Model and Finance Officer. Has dedicated his career to business model and financial instrument design. Has been mention at several accelerator programs incl. Growth Train. Has built a fintech business to structure fund investments using tokenization of assets. Has engaged as expert and consultant to renewable companies incl. Ørsted supporting innovation of finance of flexible energy and to financial service institutions. Including experience with tokenization as part of design of prosumer markets. Holds a B.Sc. in Business and Finance and an M.Sc. from London School of Economics.

Relevant publications, and/or products, services, or other achievements

1. *Blockchain – Gateway to Sustainability linked Bonds.* Collaboration between GDFA and HSBC.
2. *Fintech for Sustainability – German Country Report.* Collaboration between GDFA and Fair Finance, Institute for Social Banking, and Conscious Fintech.
3. *Fintech for Sustainability* – Spain Country Report.
4. *Fintech for Sustainability* – The Netherlands Country Report.

Relevant previous projects

- Pathfinder Initiative under the UN Secretary General's Task Force on Digital Financing of the SDGs. Developing a country measurement framework for sustainable digital finance.
- Innovating climate finance with technology – collaborative project between the CAFI trust fund, CUFE University in China and the GDFA.

Significant infrastructure and/or technical equipment

n/a

Operational capacity of legal entity/partner organization

n/a

	20. Stichting Bo-Ex '91 **BOEX | NL**	
	Web site: **www.boex.nl** **PIC number: 934165485**	**Number of employees:** **90**

Brief description of legal entity/partner organization

Stichting Bo-Ex '91 is a housing corporation under Dutch Law, the Housing Act, established in 1907. Their main task is to provide low income households with sound quality and affordable housing. Bo-Ex cannot be selective in admitting households to its dwellings, except for income (there is a maximum). Bo-Ex is the owner of more than 9,000 dwellings in the city of Utrecht. Bo-Ex has a very ambitious refurbishment programme. In the period 2020–2025 more than 1,000 dwellings will be refurbished. And also Bo-Ex works on the realization of several new-build projects: in the period 2020-2025 more than 500 new-build houses will be realized.

Contribution to Work Packages and Tasks in the project

WP 3 Community, environment, and well-being:
Bo-Ex contributes to this Work Package on the following aspects:

- Social renovation: the involvement and engagement of tenants in the existing apartment buildings to develop a plan which will be supported by the tenants and to develop a plan for a sustainable community after the refurbishment has taken place.
- Bouw = Wouw (Human capital program): the involvement of (local) students into the realization of the refurbishment works.
- Energy Transition: the involvement and coaching of tenants to understand the energy concept and possibilities of their dwellings. With a better understanding, tenants can guide their energy usage.

WP 4 Sustainable building design:
Bo-Ex contributes to this Work Package by participating in an innovation forum which aims a better scalable solution for renovation works with a high degree of energy efficiency.

WP 5 Resource efficient manufacturing and construction workflows:
Bo-Ex contributes to this Work Package by elaborating on a resource efficient design for the refurbishment of apartment buildings.

WP 6 Renewable energy and storage:
Bo-Ex contributes to this Work Package by elaborating on a BIPV design for maximizing solar energy harvesting combined with local and district electricity storage providing support to the grid and EV-V2G.

WP 7 Efficient operation and flexibility:
Bo-Ex contributes to this Work Package by elaborating on the following demonstrations:

- Building Energy Management Systems
- Smart grids at district and city scale

WP 8 Monitoring and evaluation:
Bo-Ex contributes to this Work Package by gathering information and monitoring data coming from the tenants behaviours and energy performance of the refurbished apartment buildings.

WP 9 Market uptake:
Bo-Ex contributes to this Work Package by contributing to bankable business models for new replicable initiatives.

Profile of key personnel in the project

[redacted] (M) – project manager and real estate developer of several refurbishment and new construction housing projects. [redacted] has a broad experience within utility and housing projects for more than 10 years. Furthermore, [redacted] is involved in the Horizon 2020 project IRIS as project coordination and Work package leader for two WP's. [redacted] will be responsible for one of the selected refurbishment projects.

[redacted] (M) – project manager and real estate developer of several refurbishment and new construction housing projects. [redacted] has a broad experience within housing corporations in several functions for more than 10 years [redacted] will be responsible for one of the selected refurbishment projects.

Relevant publications, and/or products, services, or other achievements

Bo-Ex has experiences with the following products/services:

- Maintenance of dwellings / apartment buildings
- Refurbishment works of dwellings / apartment buildings
- Energy performance data of dwellings / apartment buildings
- Re-use of materials within new initiatives for dwellings / apartment buildings

Relevant previous projects

Bo-Ex participates currently in the following innovation projects:

1. European innovation project: IRIS – Horizon2020 project (2018-2022)
   District of Kanaleneiland-Zuid, Utrecht
2. National innovation project: TKI (2018-2021) – Henriettedreef
   District of Overvecht in Utrecht

Significant infrastructure and/or technical equipment

n/a

Operational capacity of legal entity/partner organization

n/a

RCPANELS	**21. RC Panels** **RCP | NL**	
	Web site: www.rcpanels.com **PIC number: 892078931**	**Number of employees: 23**

Brief description of legal entity/partner organization

Rc Panels is an innovative market leader in prefab facades for zero-energy renovations in The Netherlands and moving fast recently adding roofs and new built to the portfolio as well. It is a front runner in industrialization and digitization, running a "file2factory" process. The mission of Rc Panels is to make energy-neutral living profitable. The focus is on attractive "right first time" renovations with far-reaching energy savings, making them flexible for practically all types of fossil-free energy systems. By investing heavily in knowledge development, combined with a different view of the construction process, Rc Panels has developed a technological lead supported by patents. Rc Panels has knowledge and track record in developing and executing smart manufacturing.

Contribution to Work Packages and Tasks in the project

WP 1 Management: experience in core team roles managing both national innovation program and international innovation project, and managing own part of it as well.

WP 4 Sustainable building design: As a front runner in sustainable building and renovations, our expertise in design of integrated products (including hvac and pv installation integration in building components), in total concepts as well as in manufacturing (including DFM) ensures solutions that are both feasible and scalable for larger impact.

WP 5 Resource efficient manufacturing and construction workflows: Our experience in industrialisation and digitization will be applied for fast, comfortable and scalable renovations. Our "file2factory" approach helps reducing costs in several stages of the process. Front runner in off site production. Innovative far-reaching prefabrication and integration saves time, costs and inconvenience on site. Experience and expertise for manufacturability of the developed solutions as well as feasibility, circularity and scalability.

WP 6 Renewable energy and storage: Expertise for integrating storage in building components and total concepts / propositions.

WP 8 Monitoring and evaluation: Expertise in realisation of renovations, in innovation programs and pilots, in high performance methods, LCA and gap analyses.

WP 9 Market uptake: Experience in actual market dynamics, uptake and business models as well as innovation within those and new roles / system innovation.

WP 10 Communication, dissemination and training: experience in communicating both technical and non-technical topics expanding to policy makers, (future) clients, other bunisses, 139pprox.139t institutes as well as training of students.

Profile of key personnel in the project

[redacted] (F). Manager Business Development. 25+ years of experience in innovation, management, renewable energy and sustainable construction. Trained as a technical physicist and coach. Skilled in creating coalitions and merging interests, including those of the customer. Bridges the social, economic, environmental and technical innovations and the realization of feasible and scalable renovations. Lead in core team of national innovation program Future Factory.

[redacted] (M). Innovation manager. 25+ years of experience with various contractors and one of the pioneers of Nul Op de Meter (zero energy) renovations from the very beginning. Trained in both engineering and economics, he has an eye for what can be done in construction. His many years of experience as both an innovator and realisator gives him even more eye for what is not yet possible but can be done, with which he, together with his innovation team at Rc Panels, works both structured and fast on new generations of products.

Relevant publications, and/or products, services, or other achievements

Relevant products: highly insulating and prefabricated facades (including doors, windows, finishing etc.) for net-zero renovations, fast and convenient and thus suitable for renovations in occupied condition.
Publications:

1. https://www.cobouw.nl/innovatie/nieuws/2020/04/de-renovatiefabriek-van-lemelerveld-we-kunnen-al-hele-huizen-maken-101283670
2. The “recovery façade”, prefab integrated heat recovery ventilation in façade, is nominated for the national Rabobank innovation award. Published a.o. in: https://www.bouwmagazine.nl/nominaties-rabobank-innovation-challenge-2020-bekend/
3. RC Panels is covered in several video’s and films on renovation and innovation. An example can be found here: https://www.youtube.com/watch?v=yy6-rZFE4JY Also featuring in the documentary made for the national renovation 139pprox.139tion program: https://youtu.be/KwLEk2k85lI

Relevant previous projects

Previous:

***Inside Out*:** Rc Panels delivered the end façade of the Inside Out apartment building, renovating it prefab with our high insulation value. The façade is fitted with PV panels.

Previous and ongoing:

Several energy renovation projects (140pprox.. 1000 dwellings/year), all with our industrialized prefab highly insulating facades.

Ongoing:

***Future Factory*:** Dutch national mission oriented innovation program investing 30 mio Euro's, 180 interconnected innovation projects, 29 coalition members. Rc Panels is one of the three leading parties and manages the program in the core team. Results of this R&D program can be demonstrated and tested in the Utrecht demo (following up TRL levels). Rc Panels andUAS Utrechtserve as linking pins.

***MustBe0*:** EU Interreg project aiming at kick starting a market for net zero energy retrofits for apartment buildings. Rc Panels is one of the partners. Experience from this project can be used and further developed in the Utrecht demo.

***INDU ZERO*:** EU Interreg project aiming at making a blue print for a mega-factory for net zero energy retrofits. Rc Panels was advisory board member at the start. The need for their expertise was so high that this was changed to being a participant. Delivering expertise for renovation package and the factory, the showcases and realising the Dutch showcases (low rise building) including integrating HVAC system in building components. Experience from this project can be used and further developed in the Utrecht demo.

Significant infrastructure and/or technical equipment

Rc Panels has a factory that is capable of producing a.o. prefab facades for realizing the renovation of the demonstration apartment buildings. Rc Panels has an innovation lab for off site development and research on new or integration of materials, components and products.

Operational capacity of legal entity/partner organization

n/a

Utrecht University	**22. Utrecht University** **UU | NL**
Web site: https://www.uu.nl/en PIC number: 999985805	Number of employees: 6500 Number of students: 30000

Brief description of legal entity/partner organization

Utrecht University (UU), founded in 1636, is an internationally renowned research university. The quality of research at the University is demonstrated by positive research evaluations and a high position in international league tables. The 2020 Shanghai Rankings of world-class universities put Utrecht University in first place in the Netherlands and 52nd worldwide. The Faculty of Geosciences has leading international positions in academic research into sustainability, solar energy and urbanisation. The extensive and internationally oriented research of the faculty makes a major contribution to the Shanghai ranking. The department Copernicus Institute of Sustainable Development in the faculty aims to contribute to improved knowledge related to all Sustainable Development Goals (SDGs) as set by the United Nations in 2015. The research group Energy & Resources (E&R) of the Copernicus Institute will be involved in the ARV project **(**https://www.uu.nl/en/research/141anagement-institute-of-sustainable-development)

The research group Energy & Resources (E&R) is the major group in the Copernicus Institute of Sustainable Development, with about 60 staff and researchers. Its research focus is the transition towards sustainable energy and resource systems, with special attention to integrating efficient use of energy and resources with renewable energy supply solutions, at various scales. It is the ambition of E&R to boost the transition towards a sustainable energy and circular resource system. The scientific quality of the E&R group has been evaluated in the latest national quality assessment by an external committee and has been awarded 19 out of 20 points, reflecting its international scientific top-level position. E&R addresses a number of grand challenges for the transition to a sustainable society. The ever-growing energy and materials demand of our society puts enormous pressure on our natural resources, renewable and non-renewable, reducing the environmental quality and increasing the constraints on resource availability. The response to these challenges requires a different approach to fulfil the energy services demand by society, including efficient use of energy and materials, shifting to renewable energy sources, mitigating risks of and adapting to climate change, reducing unsustainable land use change, and redirecting industrial metabolisms. This transformation is a multi-disciplinary process with a large number of stakeholders, requiring understanding and inputs from a variety of disciplines to come to collaborative solutions. The E&R group offers a unique multi-disciplinary environment to develop knowledge and collaborative science projects in this complex field. One of its research focus areas is smart grid development, large-scale penetration of photovoltaics and the need of flexibility in our energy grids. The research activities address integration of photovoltaics and other intermittent renewable sources in the energy system, predominantly applied in urban environments. Research includes data management platforms for smart energy and mobility solutions in cities, as well as monitoring, evaluating and optimizing these solutions in practice. Four senior and twelve junior researchers are specialists in this area.

Contribution to Work Packages and Tasks in the project

WP 4 Sustainable building (re)design:
UU contributes to this Work Package by participating in an innovation forum which aims for a better scalable solution for renovation works with a high degree of energy efficiency. UU also contributes to this Work Package by demonstrating BIPV design principles in flexible renovation building components
WP 5 Resource efficient (pre)manufacturing and construction workflows:
UU contributes to this Work Package by integrating PV in plug and play building components that are prefabricated in a factory.
WP 6 Innovative renewables and storage systems:
UU contributes to this Work Package by elaborating on a BIPV design for maximizing solar energy harvesting combined with local and district electricity storage providing support to the grid and EV-V2G.

WP 7 Efficient operation and flexibility:
UU contributes to this Work Package by elaborating on the following demonstrations with focus on forecasting and flexibility services through aggregation entities for both market and grid optimisation purposes:

- Building Energy Management Systems
- Smart grids at district and city scale

WP 8 Monitoring, evaluation and impact assessment:
UU contributes to this Work Package by gathering information and monitoring data coming from the BEMS focusing on optimal energy performance of the refurbished apartment buildings.
WP 10 Communication, dissemination and stakeholder outreach:
UU contributes to this Work Package by publishing important results and dissemination knowledge at conferences.

Profile of key personnel in the project

[redacted] (M), -Faculty Geosciences, Copernicus Institute of Sustainable Development. [redacted] graduated from Utrecht University, the Netherlands, with a M.Sc. in Experimental Physics in 1985, with a M.Sc. thesis on measurement and analysis of I-V characteristics of c-Si cells. He received his Ph.D. from Nijmegen University, the Netherlands; the topic of his Ph.D. thesis was III-V solar cell development, modelling and processing. He then spent 7 years as a post-doc/senior researcher at Utrecht University and specialized in a-Si:H cell deposition and analysis. He is an expert in Plasma Chemical Vapour Deposition, both rf and Very-High Frequency. After an assistant professor position at Nijmegen University, where he worked on III-V solar cells, he returned to Utrecht University, with a focus on (single molecule) confocal fluorescence microscopy of nano-crystals. In 2002 he moved to a position as assistant professor at the research group Science, Technology and Society of the Copernicus Institute at Utrecht University, the Netherlands. Since 2012 this group moved to the Geoscience faculty and was renamed Energy & Resources, where he was appointed associate professor in 2014. He was appointed full professor Integration of Photovoltaic Solar Energy in 2018. He now performs and coordinates research on next generation photovoltaic devices incorporating nanocrystals, e.g., luminescent solar concentrators, as well as photovoltaic performance and real-time forecasting, smart grid development including Evs, V2G, congestion management, life cycle analysis, socioeconomics, and policy development. He is member of WG digitalisation of the ETIP-PV, and Dutch representative in IEA PVPS Task 13 (performance and reliability of PV systems), Task 15 (BIPV), and Task 16 (solar resource). He is associate editor of Elsevier's Solar Energy journal, as well as of Frontiers in Energy Research. He is of various organizing committees of EU, IEEE, and SPIE PV conferences. He is (co-)author of over 300 peer-reviewed journal and conference paper publications and book chapters. He has (co-) edited five books.

[redacted] (F) – Faculty of Geosciences, Copernicus Institute of Sustainable Development. She is a full professor in the area of Integration of Intermittent Renewable Energy in the Energy & Resources group. [redacted] received her PhD in Electrical Engineering from University of Washington, U.S. in 2003. Her research interests are in the modelling and simulation of power systems and electricity markets with a large penetration of renewable energy sources. Since 2004, [redacted] has worked in the Netherlands in various academic capacities at TU Delft, TU Eindhoven, and Utrecht University, leading research in smart grids and system integration of wind energy and solar photovoltaics. Selected topics include long-term network planning under severe uncertainty, cross-border balancing, machine learning methods for predicting and deploying flexibility in energy communities, demand response from commercial/industrial consumers, market-based control of storage systems, new concepts for local electricity markets and TSO-DSO coordination. She was a member of the IEA Wind Task 25 expert group "Design and Operation of Power Systems with Large Amounts of Wind Power" (2009-2014). In 2015, she was a member of the Local Organizing Committee in charge of Public Relations for the IEEE PowerTech conference held in Eindhoven, with a record attendance of more than 600 participants. [redacted] has been interim director and co-PI of the 6-year programme funded by the I-TTW

Perspective fund, Smart Energy Systems in the Built Environment (2014-2020). [redacted] is the co-author ed journal and conference articles and book chapters.

[redacted] (F) – Faculty of Geosciences, Copernicus Institute of Sustainable Development. Elena holds a M.Sc. in Nuclear Engineering from Politecnico di Milano, Italy and a Ph.D. in Energy Engineering from the University of Padua, Italy. The focus of her thesis was on the development of an incentive regulatory framework for electricity networks. As a post-doctoral researcher, she worked at Politecnico di Milano where she continued her career to become an associate professor of Energy Economics with the Dep. Of Management, Economics and Industrial Engineering and has held coordinating positions at MIP, Politecnico di Milano's Business School. In September 2018 she joined the group Energy & Resources at the Copernicus Institute of Sustainable Development and, after a long period of collaboration, became Part-time Professor at the European University Institute, Florence School of Regulation, Section Energy and Climate. Besides regulatory economics, her research interests include competition in electricity markets, electricity market design, and technology policy and diffusion. In those areas she has carried out data-driven, statistical analyses, worked with optimization models, and performed comparative studies of alternative policy approaches. She has been involved, as principal or co-principal investigator, in several research and consultancy projects for the Italian Regulatory Authority for Energy, Networks and Environment (ARERA), the Avvocatura dello Stato (Italian State Lawyers), the Italian Power Exchange, and a number of energy companies. She is active as a peer reviewer for international journals (Energy Economics, Energy Journal, Energy Policy) and as a member of scientific committees in international conferences. She is (co-)author of over 70 peer-reviewed journal and conference paper publications, and one book.

[redacted] (M) is assistant professor at Energy & Resources (E&R) group of the Copernicus Institute, Utrecht University. [redacted] holds a Dipl. Ing. Degree from the department of Electrical & Computer Engineering, National Technical University of Athens, a M.Sc. degree (cum laude) in Sustainable Energy Technology from Delft University of Technology, and a Ph.D. degree in Electrical Energy Systems from Eindhoven University of Technology. He has worked as a project engineer at Siemens Greece in the area of integrated command and control solutions, and at the Department of Innovation of Enexis, a Distribution System Operator in the Netherlands, where he conducted one of the first-of-their-kind studies on the effect of charging the batteries of electric vehicles on low voltage distribution grids. His research interests are in the areas of planning and operation of power systems, demand side management, demand response, aggregated flexibility services and integration of renewable energy sources in the power system. He has performed research for several projects including H2020, EU FP7, ERA-NET and Dutch Top Sector Energy projects. He is an IEEE Senior Member and a member of the Working Group for developing the IEEE Smart City Planning and Technology P2784 standard.

Relevant publications, and/or products, services, or other achievements

- Ioannis Lampropoulos, Machteld van den Broek, Erik van der Hoofd, Klaas Hommes, Wilfried van Sark, A system perspective to the deployment of flexibility through aggregator companies in the Netherlands, Energy Policy, Volume 118, July 2018, Pages 534-551.
- W. L. Schram, T. AlSkaif, I. Lampropoulos, S. Henein and W. G. J. H. M. van Sark, "On the Trade-Off Between Environmental and Economic Objectives in Community Energy Storage Operational Optimization," in IEEE Transactions on Sustainable Energy, vol. 11, no. 4, pp. 2653-2661, Oct. 2020.
- Lampropoulos, I., Alskaif, T., Schram, W., Bontekoe, E., Coccato, S., van Sark, W. (2020) *Review of energy in the built environment*, Smart Cities, 3, pp. 248–287.
- Brinkel, N. B.G., Gerritsma, M. K., AlSkaif, T. A., Lampropoulos, I., van Voorden, A. M., Fidder, H. A., van Sark, W. G.J.H.M. (2020). Impact of rapid PV fluctuations on power quality in the low-voltage grid and mitigation strategies using electric vehicles. *International Journal of Electrical Power and Energy Systems*, 118, 105741.

- Brinkel, N. B.G., Schram, W. L., AlSkaif, T. A., Lampropoulos, I. & van Sark, W. G.J.H.M. (2020). Should we reinforce the grid? Cost and emission optimization of electric vehicle charging under different transformer limits. *Applied Energy*, 276, 115285.

Relevant previous projects

Selected projects:

IRIS Smart Cities (EIP-SCC): IRIS is a H2020-funded project (2017-2022).The project has been developed around three lighthouse cities – Utrecht (The Netherlands, coordinator), Nice (France), and Gothenburg (Sweden) – who will work as collaborators and test-beds for follower cities Vaasa (Finland), Alexandroupolis (Greece), Santa Cruz de Tenerife (Spain) and Focsani (Romania). Each city will draw upon a mix of universities and research organisations, local authorities, innovation agencies and private expertise to accelerate entire communities to adopt ambitious energy, mobility and ICT initiatives. In the light of such a transiting environment, the need for strategies that help cities to smartly integrate technological solutions becomes more and more apparent. Given this condition and the fact that cities can act as large-scale demonstrators of integrated solutions and want to contribute to the socially inclusive energy and mobility transition, IRIS offers an excellent opportunity to demonstrate and replicate the cities' great potential. By demonstrating smart solutions that integrate energy, mobility and ICT, rooted in a City Innovation Platform, IRIS quantifies their value, and connects interests of many different stakeholders in innovative business models, allowing for upscale and replication of integrated solutions for sustainable cities across Europe and world-wide. UU's role is to define and manage KPIs of the whole project.

PV Prosumers4Grid is a H2020-funded project (2018-2020), Development of innovative self-consumption and aggregation concepts for PV Prosumers to improve grid load and increase market value of PV. Project duration: 11/2017-4/2020, H2020-LCE-2017-RES-CSA, 12 partners. Objectives: to develop and implement innovative self- consumption and aggregation concepts and business models for PV prosumers that will help integrating sustainable and competitive electricity from PV in the electricity system. Benefits will be a.o. to further support the deployment PV systems for electricity generation with focus on physical and financial grid interactions, and to provide PV Prosumers (households and industries) wit competitive and sustainable electricity innovative self-consumption and aggregation concepts and business models. UU's role is to assess the Dutch situation and analyse self-consumption effects on GHG emissions.

PARENT: *PARticipatory platform for sustainable Energy 144anagement* (2016-2019, funded by ERA- NET Co-fund Smart Cities and Communities programme). This project focused on energy savings in households through the application of innovative information technologies. A software-based solution becomes an extensible, reusable, socially acceptable and marketable platform, incorporating real-time energy information, novel gaming and other reward mechanisms to achieve energy efficiency by stimulating behavioural change. Tasks of UU were to develop behavioural change strategies for prosumers, with PV installations, in a 100-household pilot.

CESEPS: *Co-Evolution of Smart Energy Products and Services* (2015-2019, funded by ERA-NET Smart Grids Plus programme). This project aimed to develop a viable market for residential smart energy systems, and focuses on interdisciplinary research on stakeholder's practices, users' energy behaviour, local trading of energy, customer driven products, demand side management, local production of sustainable electricity, e-mobility and forecasting techniques in the Netherlands and Austria. UU's tasks are to analyse dataflows in smart grid pilots including PV and EV.

PEARL-PV (reliability of PV performance), COST Action (2018-2022).

Significant infrastructure and/or technical equipment

UU operates an outdoor PV test facility with capacity of testing 50 standard sized PV modules simultaneously. It is fully equipped with meteorological sensors, an all-sky imager and a spectroradiometer. I-V curves of all modules can be measured at sub-minute time resolution. This will be used for BIPV component testing. A 1.2

MW university PV system is monitored as well, and ~200 regional small PV systems are monitored in order to develop forecasting. Data access to pilots using PV and EV is secured via various projects. Data and (PV) models use the extensive cloud-based ICT solutions present at the Faculty and University level.
Operational capacity of legal entity/partner organization
n/a

	23. Municipality of Utrecht **UTR | NL**	
	Web site: www.utrecht.nl **PIC number: 998300818**	**Number of employees: 4 350**

Brief description of legal entity/partner organization

Gemeente Utrecht (Municipality Utrecht) is the fourth largest municipality in the Netherlands. The city's population is growing from 339,000 today to 400,000 in 2028. Utrecht is home to the largest university in the Netherlands (Utrecht University), as well as many other renowned (applied) research institutes, such as the University of Applied Sciences HU. The municipality highly values multi-stakeholder collaboration, combining technical and social innovation. This is illustrated by the title of its coalition agreement "Utrecht we make together", and the participation of Gemeente Utrecht in many European networks, most notably EUROCITIES (all for a, co-chair of the Working group Air quality, climate change, and energy efficiency), the EIP Smart Cities and Communities (notably the chair of the SCC-01 Task Group on Replication), the Open and Agile Smart Cities network (OASC), Climate-KIC (Europe's largest public-private innovation partnership for climate change), Energy Cities, ERRIN, POLIS, and the European Institute of Innovation & Technology. Due to the city's natural role as transportation hub, the municipality of Utrecht for decades already prioritizes sustainable mobility, renewable energy, and energy efficiency. The first Sustainable Energy Action Plan (SEAP) was submitted in 2008. Gemeente Utrecht is committed to be a climate neutral city in 2030. By 2020, we will have reduced CO2 emissions by 30% compared with 2010 and increased the share of renewable energy to 20%.

Contribution to Work Packages and Tasks in the project

WP 1 Management:
Municipality of Utrecht brings extensive experience as partner in many European projects, including FP7 and H2020 projects, a.o. in the fields of energy and mobility, and as coordinator, we coordinate the H2020 IRIS Smart Cities (2017-2022, total project budget 20.4 million Euro).

WP 2 Framework for effective planning, design, construction and operation of CPCC:
As public authority with a legal mandate for spatial planning the Municipality of Utrecht has deep expertise on integrated urban planning, urban planning policy frameworks, legislation.

WP 3 Community, environment, and well-being:
As public authority we have deep expertise and experience on community and citizen engagement and safekeeping public values such as liveable environment, public health and well-being. In the demonstration district of Overvecht an integrated public engagement program called 'Samen voor Overvecht' (Together for Overvecht) allows for innovative approaches in involving local residents in the renewal of the district.

WP 4 Sustainable building design:
Specific expertise regarding implementation of building codes, regulations, energy performance of buildings and welfare.

WP 5 Resource efficient manufacturing and construction workflows:
City of Utrecht is the fastest growing city in Netherlands with many inner city densification projects. Utrecht has experimented with new approaches to construction logistics and construction hubs that offer more efficient construction workflows.

WP 6 Renewable energy and storage:

Expertise and legal role in the approval of energy production and storage infrastructures in public environment. Furthermore coordinating the energy transition by bringing together all societal stakeholders towards joint objectives.

WP 7 Efficient operation and flexibility:
Municipality of Utrecht participates in different smart grid demonstration projects with innovative SMEs, energy companies and grid operator.

WP 8 Monitoring and evaluation:
As public authority the municipality has their own research department offering policy evaluations, dashboard for Sustainable Development Goals and other censor research tools.

WP 9 Market uptake:
As public authority we collaborate with the regional Economic Board Utrecht in scaling the solutions in our region as well as attracting companies to the Utrecht region.

WP 10 Communication, dissemination and training:
As public authority we have a direct communication mandate towards our residents and companies with deep expertise and experience in messaging and campaigning.

Profile of key personnel in the project

[redacted] (M) is senior policy advisor energy transition in the built environment with specific attention to social housing corporations. Martin is responsible for the coordination of social housing and energy transition affairs in city of Utrecht. [redacted] will mainly be involved in the WP4 and WP5 offering the project team support in connecting to the different organizational units in the municipality.

[redacted] (F) is a social geographer and urban planner; she is the Manager Energy Transition at the municipality of Utrecht. Previously she was program manager Housing and Neighborhoods at Platform31, where she managed knowledge programs about the housing market, the neighborhood approach, shrinking regions and the energy transition. [redacted] will be senior strategic advisor to the project team mainly for the tasks in WP4 and WP5.

[redacted] (M) Innovation advisor to the urban development department of the municipality of Utrecht. Currently Roel is leading the H2020 IRIS Smart Cities-project as project coordinator. IRIS is an EU-wide project of 43 partners funded by the European Commission and led by the City of Utrecht in the field of sustainable urban development, energy positive districts, electric mobility and innovative IT services. [redacted] will be senior strategic advisor to the project team and be involved in WP1, WP9 and WP10.

Relevant publications, and/or products, services, or other achievements

Relevant publications:

- Energy plan (2015): drafted by 165 individuals appointed by drawing lot for this task.
- Energy agendas 2016-2020.
- Vision on the heating solutions for the city (2017)
- Sustainable Energy Action Plan (SEAP) approved by the Convenant of Mayors.

Relevant achievements:

13% of roofs are fitted with solar panels (2019); 1607 public electric vehicle charging points (2019); New Sustainable Energy Action Plan (2016-2020) drafted by 165 randomly selected citizens – a ground-breaking innovative experiment with aleatoric participatory democracy.

Relevant previous projects

- **H2020 IRIS Smart Cities**: Integrated and Replicable Solutions for Co-creation of Sustainable Cities (H2020-SCC-01-2017 – Smart Cities and Communities, IA, 2017-2022). The Municipality of Utrecht is project coordinator of the IRIS lighthouse project 'Integrated and Replicable solutions for co-creation In Sustainable cities'. The project accelerates integration of initiatives in the areas of energy, mobility and ICT into 'communities'. IRIS develops and stimulates energy and mobility services based upon user needs. Municipality of Utrecht participates in the Board of Coordinators and chairs the Task Group Replication to support scale-up of smart city solutions throughout Europe.
- **H2020 FosterREG**: Fostering public capacity to plan, finance and manage integrated urban REGeneration for sustainable energy uptake (H2020-EE-07-2014 – Enhancing the capacity of public authorities to plan and implement sustainable energy policies and measures – CSA, 2015-2017). Municiapilty of Utrecht was one of the three public authorities participating in the FosterREG project aimed at enhancing public capacity at local, regional and national levels to plan, finance and manage integrated urban regeneration for sustainable energy uptake, through capacity building, promotion and articulation of effective multilevel coordination, and national as well as European network strengthening.
- **URBACT URGE**: circular building cities (URBAN Action Planning Network, 2019-2022). Municipality of Utrecht is lead partner. URGE, standing for 'circUlaR 148uilding citiEs' is an Action Planning network on circular economy in the construction sector – a major consumer of raw materials. As there is a gap in circular economy principles' implementation in this sector, URGE brings together nine cities and their stakeholders to inspire and learn from each other in developing their integrated urban policy. This supports integration of circularity in the construction tasks, thus contributing to sustainable cities

Significant infrastructure and/or technical equipment

- *Urban Data Platform:* Utrecht deploys a well-functioning City Information Platform with over 200 data sets publicly available via www.utrecht.dataplatform.nl. Utrecht uses CKAN as an open data platform for several years now. It cooperates with a large number of Dutch cities on Dataplatform. It´s a proven solution for collecting, storing and providing open data. Utrecht has integrated Dataplatform with internal processes to streamline data publishing. One example is the integration of public issue management based on Open311.
- *Digital Twin*: Utrecht's current 3D version of the city – it's 'Digital Twin' – is **based on the widely known and used open gaming platform Unity**, and visualizes urban data from (currently) 125 datasets through SPOTINFO, with ArcGIS (a commercial tool by ESRI) being used for geographical analysis of the data. The Digital Twin has object-related information in it, so that it can calculate, create simulations and interact with users.

Operational capacity of legal entity/partner organization

n/a

	24. Bos Installatiewerken B.V. **BOS GROEP | NL**	
	Web site: **www.bosgroep.com** **PIC number: 892047406**	**Number of employees:** **55**

Brief description of legal entity/partner organization

Bos Installatiewerken B.V. is a Building Services contractor / Technical contractor established in 1939.
Our main task is to provide clean water, sufficient ventilation and sustainable building services.
The past couple years Bos has had a major role in the renovation concept Inside Out.
The renovation concept focusses on creating energy sufficient / zero-energy apartments buildings. We think that it is necessary for a sustainable built environment that the focus shifts from projects to concepts that focus on prefabrication, less labor cost at site and industrialization.

Contribution to Work Packages and Tasks in the project

WP 4 Sustainable building design:
Bos contributes to this Work Package by elaborating on solutions for energy efficient building designs. Smarter buildings that can be linked to local en district energy infrastructures. This will help with efficient energy management. Bos will help to design and enhance modular installation infrastructures and components used in the Inside Out concept.

WP 5 Resource efficient manufacturing and construction workflows:
The focus within Bos and Inside Out is integrated installation infrastructures in prefabricated modules to enhance industrialization processes and reduce on-site construction. Bos will contribute to the automated integration in BIM and has experience in occupant-friendly construction processes. This also has a link to minimizing on-site construction for all contractors and subcontractors.

WP 6 Renewable energy and storage:
Bos has experience in creating a low-temperature heating infrastructure in high-rise buildings. Bos will help in expanding the knowledge and creating solutions for integration of low-temperature district heating in high rise buildings. Besides integration of heating infrastructure Bos will elaborate on integration of BIPV and the BIPV infrastructure in high-rise buildings.

WP 7 Efficient operation and flexibility:
Bos contributes to this Work Package by elaborating on the following demonstrations:

- Building Energy Management Systems
- Smart grids at district and city scale

WP 8 Monitoring and evaluation:
Bo-Ex contributes to this Work Package by gathering information and monitoring data coming from the Inside Out and other demonstration projects.

WP 9 Market uptake:
Bos contributes to this Work Package by contributing to bankable business models for new replicable initiatives

Profile of key personnel in the project

[redacted] Msc. Bsc. (M) – director Bos Installatiewerken B.V. – Rogier has a broad experience in HVAC-systems, solar/BIPV and NZEB buildings. Moreover, [redacted] s one of the leading figures in the realization of the first energy surplus high-rise building Inside Out. Bos Installatiewerken is a pioneer in net zero energy high-rise buildings.

[redacted] Bsc. (M) – Project manager and project development of several innovative projects such as the Inside Out project where a high-rise building is renovated to a NZEB with a surplus. In this project [redacted] was responsible for a part of the design, research and [redacted]

[redacted] Msc. Bsc (M) – Project manager and concept developer – [redacted] has worked as project manager for the realization of the Inside Out concept. Joris has played a major role in the design and research page, and has written his master thesis on Linking transition theory to a multiple case-study to investigate the upscaling potential of net zero energy retrofit concepts for high-rise buildings. [redacted]

Relevant publications, and/or products, services, or other achievements

Bos has experiences with the following products/services:

- HVAC systems for dwellings / apartment buildings
- Smart grid energy production and storage
- Energy performance data of dwellings / apartment buildings
- Integration of installation infrastructures for modular and prefabricated components such as facades or heating systems.
- Experience in the realization of a NZEB with the project Inside Out.

Relevant previous projects

National innovation project: TKI (2018-2021) – **Henriettedreef District of Overvecht in Utrecht**

Significant infrastructure and/or technical equipment

n/a

Operational capacity of legal entity/partner organization

n/a

	25. iWELL B.V. **iWELL | NL**	
	Web site: www.iwell.nl **PIC number: 892079707**	**Number of employees: 11** **Number of students: 1**

Brief description of legal entity/partner organization

iwell is a private company.
Clean and affordable energy for everyone; one of the greatest challenges of our time. The energy transition is begging for change. That is why many parties have endless conversations about how things can and should be done differently. But all this takes so much time.

We are accelerating the energy transition and building tomorrow's energy supply today. Together we make the world a better place. More sustainable, cleaner and greener. Today we are already taking steps towards a better world with our smart batteries.

Contribution to Work Packages and Tasks in the project

WP 6 Renewable energy and storage:
Smart battery

WP 7 Efficient operation and flexibility:
Smart Energy Management Cloud

Profile of key personnel in the project

[redacted] (M)
I prefer to change the energy world as an entrepreneur, because I believe that this is how I can make the most impact. And preferably with a practical and concrete approach. Do not keep talking about 2050 but work together on solutions that make the world a better place today!

[redacted] (M)
How can we do things smarter, better, faster and above all more sustainably? After years of working as a consultant in the built environment and government, the making of concrete products that contribute to the energy transition is a welcome change. My knowledge of building installations and decisions within the government comes in handy here!

[redacted] (M)
Look at the history of humanity and you will see that technology affects us more than the other way around. Soon after the penny fell where people come from, as a young lad, I realized that evolution theory doesn't just apply to biology. The future is determined by the few who dare to change technology and I think I have come to the right place at iwell as a technical physicist!

[redacted] (M)
love to come up with innovative solutions as a team, optimize processes and continuously improve them. I can apply my experience in developing software and cloud solutions well. Pioneering together for a faster and smoother energy ransition!

[redacted] (F)
t is good to see that more and more attention is being paid to the impact that we as humans have on the environment and climate. The consequences are becoming more and more obvious. But then the question is: "how do we solve he problems?". While we can all do our bit, I believe that the real change will be driven by innovative companies that offer practical and cost-effective solutions. iwell is such a company that dares to think further. I like to use my echnical knowledge for that!

[redacted] (M)
Believe me, the transition to clean energy will be faster than you think! Less waste, smart use of renewable energy and ensuring reliable sources of electricity are my spearheads. We are going to bring about that change together with great enthusiasm!

[redacted] (M)
With an entrepreneurial eye I create as much optimization as possible within well. It is essential for the energy transition that the current and future cubes perate as efficiently as possible. As a business developer I strive for ontinuous innovation in order to create the most innovative system.

Relevant publications, and/or products, services, or other achievements

Products and services:

https://iwell.nl/producten/
Cube – Delivering high peak power for peakshaving the elevator – over 100+ clients al ready
Power Cube – connected with charging poles, electrical cooking or machines to deliver high peak power
Mega Cube – stabilising the grid with large battery systems
VPP- Virtual Power Plant delivering energy grid services to TSO & DSO with our batteries
Ultra fast peak shaving algoritme – software to peakshave the grid connection ultra fast so that fuses don't break

Publications:
https://www.duurzaambedrijfsleven.nl/energietransitie-business/35063/iwell-batterij-thuis

https://www.bouwinvest.com/news/latest-news/2020/smart-battery-stores-renewable-energy-when-and-where-it-s-needed/

https://iwell.nl/stedin-mitros-en-iwell-maken-werk-van-decentrale-batterij/

https://www.alteravastgoed.nl/en/nieuws/altera-launches-iwell-collaboration-with-two-cube-battery-systems/

Relevant previous projects

Second place in the EU proptech competition 2020 for scale ups -
https://www.proptechhouse.eu/the-winner-of-proptech-startup-and-scaleup-europe-awards-2020/

Winner of the STEDIN challenge on delivering a solution to electrical peakdemands in apartment buildings:
https://iwell.nl/stedin-mitros-en-iwell-maken-werk-van-decentrale-batterij/

Winner of the challenge by the province of Drenthe by delivering a solution for a Football club with ambition to generate renewables to the grid with congestionproblems:
https://energeia.nl/energeia-artikel/40089629/batterijsysteem-helpt-icoonproject-vv-nieuw-buinen-uit-de-brand

Winner of BNG + VNG challenge on SDG of UN in 2019 -
https://www.bngbank.nl/Pages/Over%20BNG%20Bank/Duurzame-groei-voor-BNG-Duurzaamheidsfonds-en-iwell.aspx
https://www.bngduurzaamheidsfonds.nl/initiatieven/batterijsysteem-iwell/

Significant infrastructure and/or technical equipment

See attached leaflets Cube and PowerCube + Cloud software
We have a testing facility (in old coal factory in Utrecht) where we can do testing.

Operational capacity of legal entity/partner organization

n/a

26. MEX architects b.v
MEX | NL

Web site: www.mexarchitects.nl

PIC number: 892092802

Number of employees: 4

Brief description of legal entity/partner organization

Mex architects is an architecture firm with emphasis on architecture and its technical elaboration. In addition to healthcare projects mex architects is specialized in renovating residential buildings from the 1970s.

Mex architects is a technical architectural firm with an expert and enthusiastic team that is responsible for the realisation of a wide variety of projects. We work closely with a network of experienced external advisors and partners.
Clients include care institutions, housing corporations, project developers and private individuals.

Mex Architects is a flexible party. A team player who is able to coordinate large processes without losing sight of the details. With a great sense of responsibility for the entire process. From design to delivery and aftercare.

Mex Architects translates client requirements into a suitable design that occupies the right position in its surroundings. At Mex Architects, budget, planning and feasibility are at least as important as design.

By using the BIM (Building Information Model) method, Mex Architects is able to manage complex processes.

Contribution to Work Packages and Tasks in the project

WP 4 Sustainable building design:
Design of modular architecture, architectural conscience, connection between partners.
Architectural design of basic building components.

WP 5 Resource efficient manufacturing and construction workflows:
Design of modular architecture, architectural conscience, connection between partners.
Architectural design of building typologies.

WP 6 Renewable energy and storage:
Gathering knowledge for WP4 & WP5

WP 9 Market uptake:
Architectural conscience

Profile of key personnel in the project

[redacted] MSc (M) – Director Mex Architects. Architect, BIM modeller, 3d visualization, architectural research into building typologies.

Relevant publications, and/or products, services, or other achievements
Inside Out project
Relevant previous projects
Inside Out project
Significant infrastructure and/or technical equipment
n/a
Operational capacity of legal entity/partner organization
n/a

	27. Stichting Mitros **MITROS | NL**	
	Web site: www.mitros.nl **PIC number: 892081356**	**Number of employees: 250**

Brief description of legal entity/partner organization

Mitros is a Dutch housing corporation. We provide housing for low-income households in the Utrecht region. Mitros owns 30.000 dwellings, have done so for the last 100 years and will continue to do so. We aim to grow in order to keep up with the growth of te city. We build new projects and renovate older ones. We also sell some of our real-estate and even demolish some in order to build more and better new houses.

Contribution to Work Packages and Tasks in the project

WP 3 Community, environment, and well-being:
Mitros contributes to this Work Package on the following aspects:

- Social renovation: the organisation of support for the tenants on many aspects of their lives. To set up and maintain co-operation with many partners in the social domain.
- Community center: to support the social renovation we aim to create a place where people can meet for various activities, in co-operation with local government and many partners in the social domain as well as partners in energy-coaching. The involvement and engagement of tenants can also take place here.
- Bouw = Wouw (Human capital program): the aim is to raise the interest of students and unemployed people in working in the construction and refurbishment sector. We create starter-jobs and internships and work closely together with schools.
- Energy Transition: the involvement and coaching of tenants to understand the energy concept and possibilities of their dwellings. With a better understanding, tenants can guide their energy usage.

WP 6 Renewable energy and storage:
Mitros contributes to this workpackage by:

- participating in the research into integrating PV-panels in the refurbishment of the 10-story flats;
- participating in the research into lower temperature district heating: what measures are necessary to lower the input-temperature?
- participating is the research into decentralised ventilation solutions, possibly combined with heat-recovery solutions.

WP 7 Efficient operation and flexibility:
Mitros participates in the research and pilot with batteries to level out peaks in electricity-demand. This package aims to build an energy management system and contribute to a smart grid at district and city scale.

WP 9 Market uptake:
Mitros' main contribution here is the size and scale of our refurbishments of 10-story flats.

WP 10 Communication, dissemination and training:
Mitros will contribute to this work package by involving tenants in the programme. This may involve small-scale workshops in a model-apartment, individual visits, flyers and newsletters and wider publicity in local media and online.

Profile of key personnel in the project
[redacted] (M), senior real-estate developer, has a broad experience with planning and organizing large-scale renovation projects and creating support from tenants as well as decisionmakers. [redacted] will engage in work package 3 and 10. [redacted] (M), senior project-manager, has a wide experience in new construction and renovation works. [redacted] has a technical background and will engage in work package 6 and 7. [redacted] work together as a team on the 10-story apartment building renovations in Overvecht. This programme involves the renovation of 1800 apartments that started in 2018 and will be finished in 2025.
Relevant publications, and/or products, services, or other achievements
Relevant previous projects
Significant infrastructure and/or technical equipment
n/a
Operational capacity of legal entity/partner organization
n/a

	28. Statutory city of Karviná **KARV | CZ**	
	Web site: https://www.karvina.cz/ **PIC number:** 918490867	**Number of employees:** 303 (12/2020)

Brief description of legal entity/partner organization

Location: northeast of the Czech Republic; Moravian-Silesian Region. At the same time, half of the city's border forms the border with Poland. From a historical point of view, Karviná is located in the territory of Těšín Silesia.
Area: 57.48 km 2
Population: 52,998 (as of 1/1/2019)
Settlement structure of the city: the city includes nine city districts named Karviná-Fryštát, Karviná-Doly, Karviná-Lázně Darkov, Karviná-Ráj, Karviná-Staré Město, Karviná-Nové Město, Karviná-Mizerov, Karviná-Hranice, Karviná-Louky.

Department of Education and Development
Ensures and coordinates the elaboration of a draft strategic plan for the economic development of the city. Its scope includes mining and the environment and transport. The list of activities also includes marketing of the city, including the development of tourism, ensuring the organization and promotion of city-wide cultural and sports events, subsidy policy and project management of selected projects of the statutory city of Karviná and education.

Contribution to Work Packages and Tasks in the project

WP 1 Management: project management, coordination of demo-site activities.

WP 2 Framework for effective planning, design, construction and operation of CPCC: knowledge of demo-site location, local stakeholder involvement and coordination, provide input data and feedback on the CPCC KPIs in local conditions.

WP 3 Community, environment, and well-being: energy transition, community engagement, citizen and student education and citizen and stakeholder involvement, promotion solutions.

WP 4 Sustainable building design: experiences in building design and legislation processes, coordination demo-site activities

WP 5 Resource efficient manufacturing and construction workflows: experiences in construction phase in deep retrofit projects, workflow validation on demo-site, provide municipal real estates for testing automated energy performance analyses

WP 6 Renewable energy and storage: cooperation and coordination with RES and storage system implementation within demo building.

WP 7 Efficient operation and flexibility: supervision of the building operation, responsible for communication of demo-site operation to tenants as well for their education.

WP 8 Monitoring and evaluation: involvement of city energy manager to monitoring and evaluation of the demo-site, coordination of monitoring activities within demo building.

WP 10 Communication, dissemination and training: PR department involvement to communication and dissemination of the project and demo-site results.

Profile of key personnel in the project

[redacted] (M) is the Deputy Mayor for City Development, Subsidy Policy, Spas and Tourism and more.
As a project leader, he participated in the implementation of a number of investment and non-investment projects financed from ESIF and national resources, he was also involved in Czech-Polish cross-border cooperation projects.
With his competencies, he guarantees the presentation of the project plan at the level of the city management and represents in the project team persons with decision-making authority of the statutory city of Karviná.
Tel.: [redacted]
Email: [redacted]

[redacted] (M) is an officer in the Strategy and Planning Department of the Department of Education and Development of the Statutory City of Karviná and acts as a project manager for grant programs and projects co-financed from ESIF or national resources.
Within the project, he will perform the function of project manager and project administrator for the statutory city of Karviná..
Tel: [redacted]
Email: [redacted]

Relevant publications, and/or products, services, or other achievements

Relevant previous projects

- **Strategic documents of statutory City of Karviná**
  Funded by Operational programme Employment - CZ.03.4.74/0.0/0.0/17_080/0009841
  The following documents will be created within the project implementation:
    - Strategic city development plan
    - Sustainable Urban Mobility Plan
    - concept of greenery in the city

- **Adaptation strategy of city of Karvina for Climate Change**
  Funded by Norway Grants, project no: 3194100020

- **Facade insulation of house no. 871, U Lesa, Karviná-Ráj**
  Funded by combination of sources:
    - Integrated regional operational programme - CZ.06.2.11/0.0/0.0/17_097/0011752
    - National Envrionmental Fund, project no. – 04381961
    - Karviná´s city budget

- **Energy savings in buildings owned by City of Karviná**
  Funded by Operational programme Environment - CZ.1.02/3.2.00/09.04823

- **Revitalisation of the City police Building in Karviná**
  Funded by Operational programme Environment CZ.1.02/3.2.00/09.04821

Significant infrastructure and/or technical equipment

The statutory city of Karviná provides the project with the building of the polyclinic at 2379 Žižkova St in Karviná (postal code 733 01) as an input. The city will acquire the ownership of this building (January 2021) from the Moravian-Silesian Region based on Resolution No. 16/1924 of 4 June 2020. The building has long been used to provide health service. The polyclinic building was built and put into use in 1993. The building has four floors and three wings with a basement, the area of the standard floor is about 1850 m^2. The building comprises the hospital pharmacy, rehabilitation premises, incl. swimming pool, doctors' surgeries, ophthalmic optics, cosmetics, massages, travel agency, etc. In the centre of the building there is a central staircase with a pair of elevators. On the building roof there are engine rooms for elevators and

air conditioning. It is in the interest of the Statutory city of Karviná to continue to use the above-mentioned property to provide health care not only to the citizens of Karviná, but also to the citizens of the wider area. Within the ARV project, this building will be used for the joint creation of innovative technologies and processes to reduce and optimize the energy performance, which will lead to zero or plus energy performance of the demonstration building.
Operational capacity of legal entity/partner organization
n/a

	29. Dolomiti Energia Solutions Srl **DOL | IT**	
	Website: www.de-solutions.it **PIC number: 911841032**	**Number of employees: 17**

Brief description of legal entity/partner organization

Dolomiti Energia Solutions Srl was born from the merger of Dolomiti Energia Rinnovabili with Nesco, already established companies in the field of renewable energies and energy efficiency. The company is a leader in Trentino for the management of energy efficiency services in the public and private sectors, in the production of energy from renewable sources and in cogeneration. The development activities are proposed in ways of sharing the risk with the customer, in order to directly guarantee the optimization of the results.

Contribution to Work Packages and Tasks in the project

Dolomiti Energia Solutions' main role will be in WP3.

Profile of key personnel in the project

[redacted] (M) holds a degree in electrical engineering from the university of Padua (Italy); he has been working since 2007 in the ESCO sector and in the design of energy saving solutions and production from renewable sources. Since 2007, he has worked for NESCO as CEO, an ESCO company acquired by the Dolomiti Energia group in 2017, and subsequently transformed into Dolomiti Energia Solutions in 2019, where he holds the position of Deputy Director. Since July 2019 he has been president of NEOGY, a company dedicated to electric and sustainable mobility, born from a jont venture between the Dolomti Energia Group (TN) and the Alperia group (BZ). Since 2020 he has been Energy manager of Dolomtit Energia Holding.

[redacted] (M) graduated in Electrical Engineering at the University of Padua in 2009. He is the manager for DES of the Energy management sector, with the role of development and management of consumption data of the Dolomiti Energia group and of private customers. He coordinates and develops the entire incentive area.

[redacted] (M), qualified building expert. He is the head of the Energy Efficiency sector of Dolomiti Energia Solutions, with a specific focus on the management of technological systems serving buildings. He develops energy saving projects in the ESCO formula, with guaranteed results and coordinates their implementation and the measurement and verification of results

Relevant previous projects

STARDUST (2017-2022): The project is funded under the European Union's Horizon 2020 Smart Cities and Communities Lighthouse Programme. This is a highly interdisciplinary project made possible by 29 partners from 8 countries, all of whom will be working together to transform carbon supplied cities into smart, highly efficient, intelligent and citizen-oriented cities using technical green solutions and innovative business models coupled with a strong replication strategy. Activities will be first demonstrated in Pamplona (Spain), Tampere (Finland), and Trento (Italy) and will be re-applied in the following cities. The Stardust project aims to transform present day cities to smarter cities through a holistic replication model. It will be combining expertise of the different consortium partners on smart buildings, energy efficiency, ICT, and e-mobility, coupled with innovation and social engagement coming from the locals. By doing so, it will raise awareness between the citizens of Pamplona, Tampere and Trento on the possibility of using their cities as "innovation islands" or urban incubators of technological, social, regulatory and market solutions, for other interested cities around the world.
Significant infrastructure and/or technical equipment
District heating network
Operational capacity of legal entity/partner organization
n/a

habitech IL DISTRETTO ENERGIA AMBIENTE	**30. Habitech** **DTTN | IT**	
	Web site: www.habitech.it **PIC number: 955168313**	**Number of employees: 18**

Brief description of legal entity/partner organization

Habitech – the Energy and Environment District promoted by the Autonomous Province of Trento and recognized by the Italian Ministry of University and Research, is the leading national center for green building, renewable energy and innovation: since 2006 Habitech operates in these areas and strives for a market transformation towards sustainable solutions.
Habitech is a non-for profit organization and a network of more 120 members which represents both private and public sectors: it is not only the point of reference for all of its members when it comes to R&D, innovation and sustainable practices, but it has also become a beacon for many other industries in Italy and abroad.
Habitech's mission is to change the way to consider sustainability towards a strategic tool for business innovation and development, and to drive public and private clients in providing consultancy for high standard performances.
Habitech promotes and coordinates integrated and innovative processes to improve buildings and real estate assets through specialized activities: energy audits, sustainability assessment, retro commissioning and dynamic modeling; it works together with the construction and manufacturing industries in order to insert sustainability in an effective and profitable way over the entire design, construction and operation processes.

Contribution to Work Packages and Tasks in the project

In ARV, Habitech will lead the activities in the Demo Project in Trento and will closely work with EURAC and UNITN, especially in WP4 and WP5.

Profile of key personnel in the project

[redacted] (F) has been working in Habitech since 2009 and is currently EU funded projects responsible in which Habitech is involved. She is the PM of the activities and involves the technical competences from the colleagues where necessary, planning the activities with the adequate skills requested. She also manages the institutional relations of the CEO, involving Habitech members in all the initiatives, activities and projects that are planned during the year. She will manage the whole project within Habitech. She has already been involved in the coordination and management of many EU projects, ensuring the correct execution of their activities and their compliance with the consortium EC contractual obligations (STARDUST, OptEEmAL, INSTRUCT, etc.).

[redacted] (M) is an engineer and from January 2020 is the CEO of Habitech. He was previously the Technical Director of the LEED, BREEAM, WELL and ARCA services within Habitech. He is also the first LEED AP of the first school certified LEED (Gold level) in Europe and has managed the technical area and several projects under the different certification systems. In 2017 he gained the title of LEED Fellow from GBCI. He has gained work experience in Europe and the United States, where he still collaborates actively with a Michigan company.

[redacted] (M) is an engineer and he has been working at Habitech since January 2012 in the area of timber buildings. In particular, he follows the management of ARCA certifications both for New Construction and for Elevations and Expansions. He supports, in the technical contents, the area dedicated to the training of ARCA Academy wood professionals.

[redacted] (F) is an architect and has been working in Habitech since 2008. She is LEED Accredited Professional BD+C and since 2016 she is G4 Training certificate holder of Global Reporting Initiative (GRI), international standard for sustainability reporting. She has promoted the implementation of the Charrette and she was Coordinator of the Standards Committee GBC District of GBC Italia. She is responsible for the "Greenmap" project, which fosters sustainability as a strategic tool to innovation and development, and involves the economic chain that contributes to the realization of products always aware of the use of resources, places, people and business cultures.

Relevant publications, and/or products, services, or other achievements

- Action plans for sustainable energy (**PAES**): the Province of Trento has started a virtuous process to achieve the objectives set by the European Union within the 2020 Climate and Energy Package. Habitech has been identified by the provincial agency APIAE (Provincial Agency for the stimulation of economic activities) as a consultant for the verification of the SEAPs of the municipalities of Trentino. There are about seventy PAES analyzed by Habitech, including those of the City of Trento, Rovereto, Pergine, Arco.
- **Odatech** is Habitech's qualification and certification body. There are three areas in which it focuses its activities: the qualification of energy certifiers in the Province of Trento, the skill's certification in the sustainable construction sector and the management of the ARCA certification - Quality certification for timber constructions.
- **Greenmap** is Habitech program for industries - manufacturing and services. It fosters sustainability as a strategic tool to innovation and development. It supports the clients' orientation towards their corporate mission by structuring new projects; involving the economic chain to realize sustainable products, being aware of the use of resources, places, people and business cultures. The activities that Habitech proposes to the market are customer specific objectives, based on a product rating and analysis method in terms of processing and in terms of comparison with the competitors.
- **Training services supporting sustainability policies for businesses**. The choices of sustainability are often accompanied by the need to raise awareness among employees - technicians, agents and sales people, managers, administrators, etc. - on "green" issues, often associated with the standards of the major certification systems (eg LEED and BREEAM, ARCA Academy). Habitech training service derives from the analysis of the needs of the clients, finding together instruments and methods appropriate to objectives, recipients, space-time constraints. Habitech offers active and experiential methods, aiming for maximum involvement of the participants. The staff is composed of LEED-AP experts, BREEAM Assessor, BREEAM Auditor and ARCA with teaching skills.
- Energy Performance Contract – **EPC**: Habitech has experience of optimization of energy performance of both individual buildings and entire real estate assets outside the voluntary seaway protocols. These are independent Energy Audit activities, as well as efficiency measures through the application of Energy Performance Contract (EPC) with the support of Energy Service Company (E.S.Co.).

Relevant previous projects

OptEEmal – H2020, 2015-2019. Partner. OptEEmAL has developed an Optimized Energy Efficient Design Platform able to design energy efficient retrofitting projects that are based on different energy conservation measures to improve the behaviour of a district. The tool reduced time delivery and uncertainties and result in improved solutions when compared to business-as-usual practices. Partners have worked on delivering an optimized, integrated and systemic design tool based on an Integrated Project Delivery approach for building and district retrofitting projects.

STARDUST – H2020, 2017-2022. Partner. STARDUST's objective is to introduce low carbon, highly efficient, intelligent, and citizen-oriented cities. This will be done by providing green technical

solutions and innovative business models to address the urban challenges identified by the cities involved. These challenges have got to do with the environment, society, mobility, energy, economy and the cities' visibility. Stardust is set to light up cities across Europe by creating a blueprint for replication using its innovative solutions in ICT, energy, mobility and citizen engagement.

BUILD IN WOOD – H2020, 2019-2023. Partner. It aims to develop a sustainable and innovative wood value chain for construction of multistory wood buildings, in order to meet the immediate global and European challenges of reducing the GHG emissions from the construction sector. It will develop the materials and components as well as structural systems and façade elements for multistory wood buildings for both new construction and retrofitting applications. The project will deliver a Design Guide – a dynamic co-created online toolbox of documented materials and components. At the end of the project in 2023, it will have demonstrated full-scale digital case projects and a test system for prototypes.

Made in Italy – Architettura della Performance – H2020, 2011-2017. Coordinator. The "Made in Italy - Architecture of performance" is a project launched by the Ministry of Economic Development - Industry 2015 - concerning the objective area "strategic supervision of the markets". Habitech was the first proponent of the project and collaborated with 13 partners (7 of which are District Members - 8 private companies and 5 research centers).

Significant infrastructure and/or technical equipment

n/a

Operational capacity of legal entity/partner organization

n/a

UNIVERSITÀ DI TRENTO	**31. University of Trento** **UNITN | IT**
Web site: www.unitn.it **PIC number: 999841954**	**Number of employees: 1.470** **Number of students: 16.868**

Brief description of legal entity/partner organization

UniTrento is a dynamic, middle-size University (about 16,000 students) located in the North East of Italy. Founded in 1962, it has constantly pursued the improvement of the quality of research and teaching and the strengthening of its international dimension, networking with qualified universities and research centres from all over the world, making its campuses international and encouraging the presence in Trento of foreign visiting professors, researchers and students. The strong commitment in international research and mobility projects have boosted its attractiveness and position in both national and international rankings.
The university is structured in 14 Departments and Centres (Economics&Management, Law, Sociology&Social Research, Humanities, Psychology&Cognitive Science, Civil Environmental & Mechanical Engineering, Industrial Engineering Information Engineering & Computer Science, Physics, Mathematics, International Studies, Integrative Biology, Mind/Brain Sciences, Agriculture Food Environment) that promote, coordinate and manage the university teaching and research activities.
The broad academic offer is complemented by a proven experience in the organization of double, multiple and joint degrees, international Master and PhD programmes, student and staff mobility, summer schools, workshops, joint projects shared with partners over the years also under different EU schemes (e.g. Erasmus+, Bilateral Programmes etc.). UniTrento participates also to 3 EIT KICs: EIT Digital, EIT Raw Materials and EIT Climate. International Research activity records outstanding levels with 117 FP7 and 119 Horizon 2020 research projects, out of which 32 ERC projects , about 10% of international students, widespread international exchange mobility thanks to EU and international programmes and a significant number of bilateral agreements with prominent institutions and organizations all over the world.

The primary objective of DICAM (Department of Civil Environmental and Mechanical Engineering) is the development of research and teaching in important fields of engineering and architecture. The research and teaching activities are developed in six main subject areas, aimed at enhancing the individual and society well-being where they are developed and applied. Within this framework they focus on the quality of the urban and natural environments, the enhancement of the quality of life, security and the harmonious development of society, through the innovation of products.
The work of DICAM in all these sectors pursues high level scientific and teaching objectives, regarding research and training, in line with the most important research-intensive universities. The Department also promotes significant interrelations with public authorities and private companies, at local, national and international level.
The mission of the Department is laid down in the following specific targets:
a) The promotion of research in key areas of Engineering, Planning and Applied Sciences, such as Environmental Protection, Landscape, Architecture, Natural Renewable Resources, Energy, Biomedical Sciences, Smart Structures and Materials, Risk Prevention, Infrastructures and Efficient and Sustainable Structures, Building and Estates, Service Networks and Territory.
b) The training of professionals (engineers and architects) and researchers of the future generations, able to contribute to the economic and cultural growth of society, in an innovative and creative way, in all the above-mentioned fields.

Contribution to Work Packages and Tasks in the project

WP 4 Sustainable building design: **timber construction design, passive design for heating and cooling, monitoring and management of IEQ, LCA and C2C analysis**

WP 6 Renewable energy and storage: **passive and active Energy systems design, envelope-system integration**

WP 8 Monitoring and evaluation**: IEQ and energy consumption monitoring campaigns, technical survey, POE**

Profile of key personnel in the project

[redacted] (M), civil engineer and PhD in "Engineering for building recovery and technological innovation", is Full Professor of Building Construction at the University of Trento and head of the Laboratory of Building Design at the Department of Civil Environmental and Mechanical Engineering. His research is mainly focused on issues related to comfort in indoor spaces, bioclimatic design for the use of passive solar systems for heating and cooling of indoor environments also with the help of building automation systems, timber constructions, evaluation of the environmental footprint of buildings in terms of life cycle analysis and sustainability of the project for the reuse and recycling of components, development of rating systems for the assessment of sustainable building. It actively participates in national and international research projects (including H2020, Leonardo da Vinci Programme, Cost Action, Interreg Alpine Space). He is a teacher at several training courses organized by professional associations and public and private bodies on the issues of environmental energy sustainability in the construction sector. He is author of over 135 publications including monographs, articles in scientific journals, conference proceedings. Last International projects: "Energy efficiency and renewable energies in the building sector" - European Territorial Cooperation – Alpine Space (2009-2012), "Pearls - PLANNING AND ENGAGEMENT ARENAS FOR RENEWABLE ENERGY LANDSCAPES" (H2020-MSCA-RISE-2017), "SHELDON – Indoor living space improvement: Smart Habitat for the Elderly" (Cost Action CA16226)

Relevant publications, and/or products, services, or other achievements

- D'Alonzo V, Novelli A, Vaccaro R, Vettorato D, Albatici R, Diamantini C, Zambelli P, 2020, A bottom-up spatially explicit methodology to estimate the space heating demand of the building stock at regional scale. DOI: 10.1016/j.enbuild.2019.109581. In ENERGY AND BUILDINGS vol. 206
- Lovati M, Salvalai G, Fratus G, Maturi L, Albatici R, Moser D, 2019, New method for the early design of BIPV with electric storage: A case study in northern Italy. DOI:10.1016/j.scs.2018.12.028. In SUSTAINABLE CITIES AND SOCIETY vol. 48
- Polastri A, Giongo I, Angeli A, Brandner R, 2018, “Mechanical characterization of a pre-fabricated connection system for cross laminated timber structures in seismic regions”, Engineering Structures, vol. 167, 705-715
- Prada A, Gasparella A, Baggio P, 2018, On the performance of meta-models in building design optimization. doi:10.1016/j.apenergy.2018.04.129. In Applied Energy, 225: 814–826
- Loss C, Piazza M, Zandonini R, 2016, Connections for steel–timber hybrid prefabricated buildings. Part II: Innovative modular structures. DOI: 10.1016/j.conbuildmat.2015.12.001. In Construction and Building Materials vol. 122 (796–808)

Relevant previous projects
• "Renew-wall – prefab timber solutions for building retrofit", National project, years 2019-2022 • "Planning and Engagement Arenas for Renewable Energy Landscapes – PEARLS" – H2020-MSCA-RISE-2017, years 2018-2022 • DPC-ReLUIS (the Network of University Laboratories for Seismic Engineering) - "Seismic Risk and Vulnerability Center – WP5, Integrated retrofit interventions (seismic strengthening and energy efficiency) of fast execution and little impact", years 2019-2021 • "FLEXHEAT - The energy FLEXibility of enhanced HEAT pumps for the next generation of sustainable buildings", National project PRIN, years 2019-202 • "Energy efficiency and renewable energies in the building sector" - European Territorial Cooperation – Alpine Space, years 2009-2012
Significant infrastructure and/or technical equipment
Climate chamber, steel portal for timber structure seismic characterization
Operational capacity of legal entity/partner organization
n/a

POLITECNICO DI TORINO	**32. Politecnico of Turindi Torino POLITO | IT**	
	Web site: www.polito.it	**Number of employees: 1850**
	PIC number: 999977754	**Number of students: 35000**

Brief description of legal entity/partner organization

The Regio Politecnico di Torino (Royal Turin Polytechnic) was founded as institution in 1906, but its origins go back further. It was preceded in 1859 by the foundation of the Scuola di Applicazione per gli Ingegneri (Technical School for Engineers) and in 1862 by the Museo Industriale Italiano (Italian Industry Museum). In 1859 Valentino Castle (Castello del Valentino) was given to the Technical School for Engineers, nowadays Politecnico di Torino, which owns the Castle. Over the decades, Politecnico di Torino became one of the most important research and academic institutions in Italy with its continuously growing community. Politecnico expanded in November 1958 in the big complex in Corso Duca degli Abruzzi and further with the Cittadella Politecnica, where classrooms, laboratories, education, research, and services to the town coexist in a modern, lively and creative campus. The Politecnico over its more than 150 history has become an international school, where traditions and future, past and modernity are all interlinked.

The Department of Structural, Geotechnical and Building Engineering (DISEG) is the head of the schools for Civil Engineering and Building Engineering. The Department of Architecture and Design (DAD) is the leading branch of learning of the Turin Polytechnic focusing on the art and science of design, architectural and urban buildings, and product and cultural heritage design. The DISEG promotes, coordinates and manages basic and applied research, training, technology transfer and services to the local community in the fields of structural mechanics, structural engineering, geotechnical engineering, building technology, building production, drawing and representation. On the contrary, the DAD verges these objectives with regards to architectural and urban design including its sustainability, economics and financial aspects, as well as restoration, enhancement and management of architectural, urban and landscape heritage, and industrial, graphic and virtual design.

Contribution to Work Packages and Tasks in the project

Politecnico di Torino (POLITO) will contribute to **WP 4** regarding the design of sustainable buildings by studying the best options for the integration of geothermal heat supply in the neighbourhood that will be constructed. Options that embed the energy systems in the building will be supported by the POLITO expertise in real applications design and feasibility studies both in terms of BIPV (Building Integrated Photovoltaics) and of energy geostructures (foundation slabs and walls as well as energy tunnels).
This activity is strictly related to **WP 6** where the expertise will be employed to provide demonstration of seasonal storage capability by accurate management of different heat exchangers in the energy tunnels (lining exchangers and borehole heat exchangers), realising an Underground Thermal Energy Storage (UTES) system, completely fed by renewable sources.
All the demonstration is based also on the acquisition of a set of monitoring data that will allow to study, understand and control the most influential parameters on the performances of the system, on the buildings and on the environment. These activities can be regarded as part of **WP 8**.
The POLITO team will be available for some of the One stop Shop activities, with digital engagement processes aiming at studying the perceptions and acceptance of end users on design of new technologic solutions. Design solutions will be matched against cost-time effective choices and building processes in comparison to traditional reference cases. It will also be put in place activities of knowledge transfer and networking (experts stakeholders), in order to support future scale up developments of positive energy strategies. Dissemination activities will include publications on scientific peer-reviewed international journals, presentation at selected international conferences and training/summer schools addressed to undergraduates and/or graduates.

Due to the large experience in teaching, dissemination and public debate, POLITO also ensures the results of the aforementioned activities to gain visibility.

Profile of key personnel in the project

[redacted] (M) is a Ph.D. in Geotechnical Engineering, Associate Professor at the Politecnico di Torino teaching Numerical modelling in geotechnical engineering for Ms students. He is a distinguished academic with international and local recognition based on scientific achievements and active involvement in several management activities. He is the Rector's Advisor for Sports, President of ELGIP (the European Large Geotechnical Laboratories Platform), member of the Board of IACMAG (the International Association for Computer Methods and Advances in Geomechanics) and Chair of the 16th IACMAG international conference.

He has more than 20 years' experience in coordination or participation to national/international research projects and activities at the Politecnico with reference to the swelling behaviour of rocks and soils, laboratory testing, numerical modelling in geotechnical engineering, discontinuum and combined numerical methods, tunnelling, microtunnelling, structural and geotechnical monitoring, ground based radar interferometry, deep and shallow geothermal energy, slope stability problems. He also bestowed extensive practical experience as a consultant on projects related to slope stability, tunnelling, sewage systems, foundations, monitoring of geotechnical structures and ground investigation and as expert for the Turin Public Prosecutor's Office. In 2013 he founded Resolving Srl, a Politecnico di Torino spin-off company, which turned into a full engineering company, Geosolving srl., in 2016.

He patented a new tunnel energy segment, is author of a textbook, of almost two hundreds of scientific papers on international and national journals, on conference proceedings, as well as editor of conference proceedings. He currently is the Editor in Chief of the ASCE International Journal of Geomechanics, member of the Editorial Board of Tunneling and Underground Space Technology and served as Assistant Editor for the Rock Mechanics and Rock Engineering journal.

[redacted] (F) Architect graduate of the Faculty of Architecture - Politecnico di Torino, Ph.D. in Building and Environmental Renewal, she is Full Professor in Technology of Architecture and is Vice-Head of DAD (Department of Architecture and Design, Politecnico di Torino). Full Professor of Technology of Architecture, vice-Head of Department of Architecture and Design (DAD), Politecnico di Torino, Italy.

Her main fields of research are the landscape safeguard and valorization, low environmental impact components and materials for eco-buildings, architectural and technological refurbishment of traditional and contemporary architecture. She is author of numerous publications concerning these topics.

In the last years she has developed the research in the field of the maintenance, rehabilitation and energy refurbishment of traditional buildings on the point of view of environmental sustainability. Recently, she has conducted research in the definition of operating guides for the maintenance and recovery of the traditional building in Piedmont area and she was the project leader of the research called "Current Architecture and Landscape – between Tradition and Innovation" funded by the European Commission as part of the Community Culture 2000 Project and involved three countries -Italy, France and Poland – with five work units split up between co-organizers and partners. She is president of Landscape Observatory of Mongioie, associated to Landscaper Observatory network.

[redacted] (M) holds a Ph.D. in Architecture and Building design and is Associate Professor of 'Technology of Architecture' at the Politecnico di Torino; Coordinator of the 2nd level Masters course in 'Wood Construction Architecture' and vice-chairman of the Ph.D. course in 'Architecture. History and Project' at the Doctoral School of the Politecnico di Torino (ScuDo). He is the co-founder of the IAM Research Center at the Institute of Mountain Architecture, based at the Politecnico di Torino. He teaches in the MSc degree program in 'Architecture Construction and City', the MSc degree program in 'Architecture for Sustainability Design' and in the degree course 'Design and Visual Communication'.

His research activity centers on technological innovation in architecture, with a particular interest in technological transfer and the development of experimental architecture projects, including the

construction of a number of residences including the Rifugio Carlo Mollino; a Zero Emission Building, energy efficient and built according to the standards of the protocol CasaClima Oro (Gold) exhibited during the XXIII UIA World Congress, Torino 2008 as one of the main Off Congress projects; the Biosphera 2.0. residential module that was the focus of a European Roadshow with the aim of scientifically defining the level of psycho-physical well-being of the users within a residential unit in very different environments.
He has also acquired extensive practical experience as a consultant on industrial development projects, including Naturwall© and his research is the basis for the development of a project finalized in the design and subsequent development of a façade component for retrofit used in a first experimental Eco-Home building with project PEFC™ certification.
In 2014 he founded Be-eco for sustainable construction S.r.l., at the Politecnico di Torino, a spin-off company, which turned at the end of the incubation period in 2019. During the spin-off activity he built 12 single-family homes and designed a biophilic building.
[redacted] (M), is a nationally scientific qualified Professor in Urban Design and Planning, holds a PhD in architecture and design practices, is a licensed architect and master environmental engineer and from 2003 research fellow and scientific advisor at the School of Architecture and Urban Planning of Politecnico di Torino. He has got international training and professional experiences in urban design and spatial planning (C.T.H and K.T.H of Sweden). He has received awards from European educational bodies and has published articles on design decision support systems and scenario making processes. He is an expert in urban analyses ranging from socio-economic- environmental GISbased analyses to sustainable community-based design development. He is a consultant for architectural offices, private companies and public authorities. Since 2008 he has been responsible for local landscape and environmental committees in the area of Turin, has published numerous scientific articles and was editor of a book.
[redacted] (F) is a research assistant at the Politecnico di Torino (Italy) since 2019. She got her Ph.D. in Civil and Environmental Engineering at Politecnico di Torino and Université Paris-Est in 2020, with a thesis on energy geostructures. She is an expert in numerical modelling of Thermo-Hydro-Mechanical coupled problems and her current research activities are mainly devoted to GSHP and thermoactive geostructures. Recently, she also developed an interest in research related to adaptation to climate change of geoinfrastructures, tunnelling in difficult conditions and fiber optics monitoring of debris flows. Since two years she is also working as a consultant for Geosolving srl., where she is active in energy geostructures design, numerical modelling of geotechnical problems and monitoring data interpretation. She has experience in teaching as supervisor of master students and assistant for the course of Numerical Methods in Geotechnical Engineering. She is author of several scientific publications on international journals and on conference proceedings.
[redacted] (M) is a research assistant at the Politecnico di Torino where he got his Ph.D. in Civil and Environmental Engineering with a thesis on the management and planning of shallow geothermal resources in urban areas. His main expertise are on numerical modelling with specific focus on coupled Hydro-Thermal analyses, hydro-geological conceptual modelling, GIS data processing and environmental and structural monitoring. Current research activities are mainly devoted to GSHP and energy geostructures. He also gained practical experience as a consultant for Geosolving srl on projects related to energy geostructures design, slope stability and design of structures and infrastructures. He supervised several master students, deposited an Italian patent for a new energy wall modular system and authored several scientific publications on international journals and on conference proceedings.

Relevant publications, and/or products, services, or other achievements

- Insana A., Barla M. (2020). Experimental and numerical investigations on the energy performance of a thermo-active tunnel, Renewable Energy, vol. 152, pp. 781–792.
- Development of the patent ‘An improved tunnel precast segmental lining equipped to exchange heat with the ground in order to heat and cool adjacent buildings (ENERTUN)’, deposited at Ufficio Italiano Brevetti e Marchi on 29/2/2016 and granted on 20/8/2018 at Italian and European level (Number: 102016000020821). Inventors: Barla, M. (60%) and Di Donna A. (40%).

- Bottero, M., Ambrosini G., Callegari G., (2017). Valuing the Impact of Social Housing Renovation Programs: An Application of the Social Return on Investment (SROI), Green Energy and technology, pp. 291-302, ISBN: 9783319496757.
- Fregonara E., Lo Verso V., Lisa M., Callegari G. (2017). Retrofit scenarios and economic sustainability. A case-study in the Italian context. Energy Procedia, pp. 245-255, ISSN: 1876-6102.
- Development of the patent 'Multifunctional energy efficient façade system', deposited at Ufficio Italiano Brevetti e Marchi on 24/11/2014 and granted on 15/2/2017 at Italian and European level (Number: 102014902311769). Inventors: Callegari, G. (50%), Spinelli A. (45%) and Miroglio M. (5%).

Relevant previous projects

- **ENERTUN**: Le gallerie metropolitane come fonte di energia geotermica/Metro tunnels as geothermal energy sources. Feasibility study funded by the Regione Piemonte (Polo di Innovazione Regionale Enermhy) with the collaboration of Desa Srl, Torino. 2014-2015 (12 months). Funding : 57.000€
- **GEOTHERMSKIN**: Sistema energetico contro terra e metodo per scambiare calore tramite tale sistema. Proof of Concept study funded by the Links Foundation 2020-2021 (6 months). Funding: 43.000€.
- Consulting contract "**Study on the integration of low temperature heat from energy tunnels in district heating systems**", funded by Iren SpA, 38.000 €.
- **OPTISOUNDWOOD.** Development, experimentation and realization on industrial scale of new panels and composites based on plywood made from regional timber. Feasibility study funded by the Regione Piemonte (PSR is co-financed by the European Agricultural Fund for Rural Development) with the collaboration of Be-eco for sustainable construction S.r.l. 2010-2013 (18 month). Funding: 60.000 €.
- **ECO WOOD SKIN** - Environment Carbon Offset Wall for Retrofit. Development of a model that will make the chain of building recovery a tool for the progressive decarbonisation of the residential sector, making use of environmentally friendly products in the form of high-performance building components for energy retrofit. Feasibility study funded by the Regione Piemonte (PSR is co-financed by the European Agricultural Fund for Rural Development) with the collaboration of Be-eco for sustainable construction S.r.l. 2017-2018 (12 month). Funding: 35.000 €.

Significant infrastructure and/or technical equipment

POLITO has gained large experience on the design and management of energy geostructures thanks to the development of two distinct experimental sites in significant environment.
The first realisation refers to the installation of two complete rings of the ENERTUN energy tunnel segmental lining in the South extension of Torino Metro Line 1. The prototype was at first intended to test the technology only during the construction phase of the infrastructure. Due to the excellent results obtained, the usage of the system has become permanent.
The latter realisation refers to the installation of three modules of the GeothermSkin energy wall system in the Energy Center Research Building in Torino. The experimental site has been intended to test the technology and is now being enlarged with the integration of different renewable energy sources such as the solar energy to provide a total solution for buildings energy needs.

Operational capacity of legal entity/partner organization

POLITO administrative offices have large experience in managing large project teams at international (European and not European) and national levels.
The organization has more than 20 years of experience in European projects, working with Public Authorities on sustainable development processes, urban design, infrastructure design and environmental projects. The team was also involved in Life funded projects ("TiRec4life" which was supporting PA dealing with the topic of reuse of rubber for the development of new eco-road

pavement), Interreg projects (Alcotra-"Co&Go" which was supporting PA in planning incentives for boosting sustainable mobility), H2020 projects ("STEVE" which is supporting European cities in defining their policies for e-maas) as well as in cooperation COST Action projects (GABI TU1405 – Geothermal applications in buildings and infrastructures).

Oslo	**33. Oslobygg KF** **OBF | NO**	
	Web site: *(no website yet)* **PIC number:** 994216051	**Number of employees:** 174nviron. 600

Brief description of legal entity/partner organization

Oslobygg KF is a municipal enterprise, which is sorted under the City Council Department for Industry and Ownership. We are one of the country's largest property managers with almost 3 mill. Square meters in portfolio, which consists of schools, kindergartens, sport halls, public library, cultural buildings, hospitals, fire stations, social housing, residential care homes and other municipal disabilities.

Our organization have 174nviron. 600 employees, consisting mainly of construction engineers and developers, property managers, operators and advisors.

Contribution to Work Packages and Tasks in the project

Bodil Motzke is the the link between the Norwegian demonstration project and the EU-project coordination, and participate in the EU-network together with Romeo Apetrei Thomassen, who has previous experience with similar EU-projects.

WP 1 Management: Project management, facility management

WP 2 Framework for effective planning, design, construction and operation of CPCC: climate emission calculations and other 174nvironmental subjects, energy measurements, economy, LCC-analyses, law, early project design phase, social sustainability.

WP 3 Community, environment, and well-being: project design phase, social sustainability.

WP 4 Sustainable building design: measurements, economy, LCC-analyses,

WP 5 Resource efficient manufacturing and construction workflows: economy, project management

WP 6 Renewable energy and storage: energy measurements, renewable energy production

WP 7 Efficient operation and flexibility: energy measurements, renewable energy production

WP 8 Monitoring and evaluation: climate emission calculations and other 174nvironmental subjects, indoor climate and emissions from the building site

WP 9 Market uptake: economy and law

WP 10 Communication, dissemination and training: facility management

Profile of key personnel in the project

[redacted] (M)
E-mail: [redacted]
Mob.: [redacted]

[redacted] has an MBA in Leadership and Sustainable Economy and double Bc degree within Business Economics and Sustainability Engineering. With a 15 year experience in environment, energy efficiency and innovation within the field, his role is to strengthen the collaboration with the market on the innovation segment. He is the key person in several Horizon 2020 project with different topics, all of them covering the strategic environmental goals for Oslo City government.

[redacted] (F)
E-Mail: [redacted]
Mob.: [redacted]

[redacted] is a civil engineer in energy and environmental science. She has long experience with within the field of environmental issues in the building sector as well as responsible for the strategic work and environmental management systems. She has in depth knowledge with LCA, energy efficiency and renewable solutions, and circular construction materials.

Relevant publications, and/or products, services, or other achievements

Experience in initiating and taking part in several science and innovative projects, with several players in the market. Through the collaborations, several publications have been published. We provide strong expertise, pilot projects and an impressive project portfolio.

Relevant previous projects

Zero Emission Building Sites EU Big Buyers collaboration
The project is a common effort from many European cities to join forces, exchange knowledge and strengthen the work with green procurement. The main goal is to achieve de-carbonization though engaging the marked in distance themselves from use of fossil driven machinery and change the profile to an emission free one.

Pilot -E project (2018 – 2020)
The Pilot-E project emission-free excavator will develop, design, produce, test and put into operation a prototype beltless excavator in the class 25 tons.

FME SUSOLTECH (2017 -2024)
FME SUSOLTECH give access to expertise from world class, laboratory infrastructure and production capacity along the entire value chain too crystalline silicon-based solar power systems, as well as in solar energy systems.

User-driven innovation arena (BIA) program – Re-use of concrete (2019-2023)
Societal challenges related to sustainability, including circular economics with a focus on zero / low emissions and recycling are a professional prioritization for the Research Council. Key Information Reuse of concrete with a focus on hexavalent chromium. The main goal of the project is to increase the recycling of different types of waste by looking at new methods to improve the physical and chemical properties of the materials so that they can be utilized

Building Integrated Photovoltaics for Norway (BIPV Norway) (2018 – 2021)
The BIPV project is a R&D project. BIPV is just a small niche market in Norway today, and knowledge and expertise on this field is missing. The purpose of the BIPV project is to gather the necessary knowledge in all parts of the value chain, from manufacturers of BIPV products, contractors, consultants, architects, building owners and all the way to the research community.

Significant infrastructure and/or technical equipment
n/a
Operational capacity of legal entity/partner organization
OsloBygg KF has several departments whose activities are in line with the project activities. The involvements of employees and advisors from other departments will be considered if needed, based on the workload of the tasks in which OsloBygg is involved. This to avoid disruptions and delays of the project development.

NANO POWER	**34. Nano Power** **NANO | CZ**	
	Web site: www.nanopower.eu **PIC number: 892082714**	**Number of employees: 10** **Number of students: 1**

Brief description of legal entity/partner organization

Integrator of transportation battery packs and energy storage systems and dedicated distributor of Altairnano and Yinlong LTO batteries in Europe.

Contribution to Work Packages and Tasks in the project

WP 6 Renewable energy and storage

- Potential usage of second life batteries
- Optimalization of battery performance vs. battery size with target of cost optimization
- Potential of reduction fixed energy costs

Profile of key personnel in the project

[redacted] (M)

- CEO, founder
- Experienced in the market of energy storage (battery systems of various sizes and technologies) and renewable sources, experience with the development of custom solutions

[redacted] (M)

- Project Manager
- Experienced Innovator & Designer with a demonstrated history of working in the automotive & railway industry. Skilled in Engineering, Customer Service, Sales, Continuous Improvement and Project Management. Strong entrepreneurship professional with a Doctor of Philosophy (Ph.D.) focused on innovative powertrain solutions from Czech Technical University in Prague.

[redacted] (M)

- Electrician
- experience with testing, installation and service of (not only) battery systems

[redacted] (F)

- Sales Manager
- experience in sales of (stationary) electricity storage and the renewable energy market

[redacted] (M)

- Mechanical Design Engineer, student
- Experience with student projects from the Technical University of Glasgow, participation in the development of the product flash charge battery titanium rapid

[redacted] (M)

- Back Office Manager
- administrative support

Relevant publications, and/or products, services, or other achievements
1. https://nanopower.eu/en/emergency-charging-not-only-for-electric-cars/ 2. https://nanopower.eu/en/the-whitelee-wind-farm-and-its-battery/ 3. https://nanopower.eu/en/the-potential-of-a-domestic-photovoltaic-power-plant-for-charging-an-electric-car/ 4. https://nanopower.eu/en/battery-life/ 5. https://nanopower.eu/en/conference-smart-city-in-practice-battery-technologies-for-urban-mobility-and-energy/
Relevant previous projects
1. Supply of 102 kWh LiFePO4 battery energy storage system for connection to a photovoltaic power plant, Poland 2. Supply of 82 kWh LTO battery energy storage system, project “second life of batteries” designed from batteries which are no longer able to
Significant infrastructure and/or technical equipment
Battery components (cables, bms, structures, modules, controls), installation: power supply, load, battery tester, multimeter, common tools, ensuring the transport of the battery to the site
Operational capacity of legal entity/partner organization
n/a

AIGUASOL	**35. AIGUASOL** **AIGUA | ES**	
	Web site: **www.aiguasol.coop** **PIC number: 995438057**	**Number of employees:19**

Brief description of legal entity/partner organization

AIGUASOL is a Spanish SME that provides engineering, consultancy and research services, promoting innovative solutions to reduce the impact associated to the use of energy. Operating as a working cooperative, with a horizontal work structure participatory management, AIGUASOL pursues organizational transformation and focuses on social responsibility, innovation, training and quality. AIGUASOL combines scientific knowledge, practical experience and management skills, which are essential to successfully reach the objectives of the project. Furthermore, AIGUASOL most important addition to the project is a versatile approach that integrates engineering, consultancy and research.

Founded in 1999, the AIGUASOL provides engineering, consultancy and research services, promoting innovative solutions to reduce the impact associated to the use of energy. Operating as a working cooperative, with a horizontal work structure participatory management, AIGUASOL pursues organizational transformation and focuses on social responsibility, innovation, training and quality. The AIGUASOL team is made up of nineteen high-level scientific and technical professionals, including PhDs, engineers and physicists, who have a wealth of experience in the energy sector, both in private companies and research centres.

AIGUASOL has extensive experience in several areas: engineering and integration of energy concepts (renewable, heat pump, waste management, etc) into advanced applied systems; modelling, design, monitoring and control of bespoke energy solutions; and commercialization of energy systems from a demonstration stage to a real operational environment. The capacity of AIGUASOL to effectively work in the project is based on the long-term experience of its members coordinating European projects (POSHIP), and leading work packages in FP7 and Horizon2020 projects.

AIGUASOL has extensive experience in both bioenergy engineering projects and digitalisation tools, specially those related with the provision of energy services, including the creation of an Energy Services Company (ESCO) as start-up.

More recently, AIGUASOL has elaborated the Spanish guide for the promotion of Citizen Energy Communities, promoted by the Spanish Institute for Energy Diversification and Savings (IDAE).

Contribution to Work Packages and Tasks in the project

In ARV, AIGUASOL is primarily involved in WP2 and WP4, focusing on using and testing tools for the implementation of CPCCs and integrating circular design in the Spanish demo project.

Profile of key personnel in the project

[redacted] (M), Mechanical Engineer and Economist, senior expert – Since 2006 he manages projects at AIGUASOL in areas related to energy system modelling, solar thermal energy, solar cooling, district networks, energy efficiency and cogeneration. He has participated in TASK 25 and TASK 38 of the IEA Solar Heating&Cooling Program. He has managed the EU Projects PV-SALSA, H-SAPS and PV-DOMSYS. He has coordinated the EU projects Indus3Es, CRESMED, POSHIP, ST-ESCOS, SAHC, and has contributed technically to the HIGH-COMBI project.

[redacted] (M), Sustainability PhD, senior expert – Since 2019, as projects director, he manages several engineering and R&D projects related with RE-based energy generation and distribution, both off-grid and grid-connected. He has participated in numerous local, national and international projects focused on the design of integrated energy solutions based on sustainability schemes from the technical, social, regulatory, organizational and economic aspects, for public, private and multilateral clients. At the technological level, he specializes in photovoltaic (autonomous, grid-connected, self-consumption), biomass (thermal, electrical and polygeneration) and electric micro-grid solutions.

[redacted] (F): expert in air quality criteria and bioclimatism. [redacted] has devoted her entire career to improve spaces, doing air quality audits and developing projects under WELL standards. She is, at the moment, leading the dissemination WP of the Nanosens project, related to the development of low price air quality sensors. She has developed a COID-free methodology for the offices of Ferrer group in Barcelona.

Relevant publications, and/or products, services, or other achievements

- González, A., Riba, J. and Rius, A. (2016). Combined heat and power design based on environmental and cost criteria. Energy, 116, pp.922-932.
- González, A., Riba, J. and Rius, A. (2015). Optimal Sizing of a Hybrid Grid-Connected Photovoltaic–Wind– Biomass Power System. Sustainability, 7(9), pp.12787-12806.
- Carrera, A., Cámara, O., Casanova, M., Farré, M. and Serra, I. (2011). New calculation methodology for solar thermal systems. ISES Solar World Congress 2011, Kassel (Germany)
- Arranz, P., Bellot, O., Gavaldà, O., Kemausuor, F. and Velo, E. (2016). Trigeneration based on biomass. Specific field case: agricultural residues from smallholder farms in Ghana. Energy Procedia, 93, pp.146-153.

Relevant previous projects

INTEGRIDY - inteGRIDy aims to integrate cutting-edge technologies, solutions and mechanisms in a scalable Cross-Functional Platform connecting energy networks with diverse stakeholders, facilitating optimal and dynamic operation of the Distribution Grid (DG), fostering the stability and coordination of distributed energy resources and enabling collaborative storage schemes within an increasing share of renewables. AIGUASOL develops thermal-electrical models to evaluate the different measures to be undertaken and will design the monitoring scheme and its integration with the existing SCADA system and engineering, commissioning and follow-up (IPMVP).

INDUS3ES - Indus3Es project aims to recover and revalue non-recovered low-exergy surplus heat in energy intensive industrial processes by the use of Absorption Heat Transformer (AHT) Technology. Indus3Es System will upgrade low temperature waste heat streams to process heat streams at higher temperature levels and then use them in internal industrial process, reducing primary energy consumption of the industry. AIGUASOL is in charge of the engineering design of the integration infrastructure of the AHT at the pilot site, monitoring and control of the system, data transfer and development of a web-based tool to analyse the feasibility of AHT solutions

HOUSEFUL - HOUSEFUL proposes an innovative paradigm shift towards a circular economy for the housing sector. The main goal is to develop and demonstrate an integrated systemic service (HOUSEFUL Service) composed of 11 circular solutions co-created by stakeholders in current housing value chain. The HOUSEFUL Service will aim at the circular management and efficient use of water, waste, energy and material resources for all stages of European building's life-cycle. AIGUASOL holds WP leadership. Most relevant tasks include: development of a tailored-fit Building Circularity Methodology and Optimization of Passive and Active Energy systems of Demo cases implementation, monitoring solutions design and business modelling and exploitation strategies development, as well as detailed engineering of the final solution.

PLUG-N-HARVEST - Passive and active multi-modal energy Harvesting systems, circular economy by design, with high replicability for Self-sufficient Districts & Near-Zero Buildings. AIGUASOL will contribute by defining the boundary conditions related to the end-user's patterns, and the overall energetic behaviour of the buildings, considering too the implementation of new advanced and smart facades and control and management systems solutions, under circular economy business models. AIGUASOL holds two WP leadership. Most relevant tasks include: definition of project's end-users and business requirements, development of LCA/LCC of developed products and

creation of innovative CE-based business models (e.g. Pay per Service (PPS), Pay per Performance (PPP), for ESCO). **Montjuic project**: detailed design for all installations for the Montjuic Castle in Barcelona, including HVAC, electricity, sanitation and fire protection.
Significant infrastructure and/or technical equipment
n/a
Operational capacity of legal entity/partner organization
n/a

4.2. Third parties involved in the project (including use of third party resources)

NTNU, ACE, CVUT, DTU, DANFOSS, EURAC, SINTEF, MET, UAS Utrecht, HOUSING EUROPE, Buro de Haan, Center Denmark, SAB, GDFA, UU, BOSGROEP, iWELL, MEX, KARV, DOL, UNITN, POLITO, OBF, NANO, AIGUASOL: No third parties involved. For the other participants, please see the following tables:

The beneficiaries must base their contracts/subcontracts according to the principles for best value for money and absence of any conflict of interest (according to Articles 10, and 13 of AMGA). Beneficiaries that are 'contracting authorities' or 'contracting entities' (within the meaning of the EU public procurement Directives 2004/18/EC and 2004/17/EC or any EU legislation that replaces these Directives) must moreover comply with the applicable national law on public procurement.

ENFOR

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y
Total amount to be subcontracted: €30 000 *We will require support from an IT consultant in terms of IT-security measures, and data integration in a secure form (authentication, encryption), and apply the relevant mechanism to secure data and data transfer. This also includes SCADA and PCL integration work. Since the cost is allocated for IT integration services – especially IT security measures – the main part will be spent on T7.4, but adjustments and modifications in the services will have to be made to support other tasks, supporting the work in T6.2, T6.3, T6.4 , T6.6, T7.2, T7.6.* *Subcontractor t.b.d. The subcontract will be awarded according to the principles for best value for money and absence of any conflict of interest (according to Articles 10, and 13 of AMGA).*	
Does the participant envisage that part of its work is performed by linked third parties[55]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners[56] (Article 14a of the General Model Grant Agreement)?	N

PROJECTZERO

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y

[55] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

[56] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

Total amount to be subcontracted: €20 000 *Planning of training workshops and training seminars will be subcontracted, because partner PROJECTZERO does not have sufficient qualifications for these activities. The subcontractor will contribute to the planned technical workshops and training seminars. The subcontractor needs to have big experience planning and managing training sessions for technical building companies. The subcontractor will be working in WP10: Communication, Task 10.2 and Task 10.4.* *Subcontractor t.b.d. The subcontract will be awarded according to the principles for best value for money and absence of any conflict of interest (according to Articles 10, and 13 of AMGA).*

Does the participant envisage that part of its work is performed by linked third parties	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	N

PALMA

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y

Total amount to be subcontracted: €130 000

(1) Private Company in charge of the management and coordination of the large-scale renovation process of the aggregated building demand in the Public Private Partnership (PPP) business model to be demonstrated in Palma de Mallorca (Task 3.3), which accounts for the renovation of 250 dwellings (400€/dwelling). The services/subcontracts will be awarded following the legal regulations and according to the principles for best value for money and absence of any conflict of interest, since PALMA has no internal resources with all the needed competences. This is a key role of the Business Model to accelerate the retrofitting of Urban District which cannot be performed by the Public Partner (PALMA) in the consortium, as one of the main innovations to be tested is the PPP model. The partner of the consortium is the Palma de Mallorca city council (the Public part in the PPP model) and the Private party will be selected according legal regulations that apply Public bodies. The estimated budget for this task is 100.000 €.

(2) Online platform for a P2P management, monitoring and visualization system for the energy flows between the PV installation(s) and the members of the Citizen Energy Community (CEC), including communications. The services/subcontracts will be awarded following the legal regulations and according to the principles for best value for money and absence of any conflict of interest and will enable correct implementation of the P2P CEC (Task 7.5 & 8.3). The estimated budget for this task is 30.000 €.

Subcontractor t.b.d. The subcontract will be awarded according to the principles for best value for money and absence of any conflict of interest (according to Articles 10, and 13 of AMGA).

Does the participant envisage that part of its work is performed by linked third parties	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	N

IBAVI

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y

Total amount to be subcontracted: €229 172.97

Project manager team (architects, engineers and surveyors), author of the project of the demo building (35 Public Protection Homes for rent (PPH) located on Tous and Fornaris streets, La Soledad, Palma de Mallorca).

The project was chosen the best proposal based on suitability, architectural quality and technical, economic and constructive feasibility by a jury, following a transparent and non-discriminatory competitive selection procedure. The competitive selection was published in the supplement to the Official Journal of the European Union: https://ted.europa.eu/udl?uri=TED:NOTICE:171861-2020:TEXT:EN:HTML&tabId=1.

The subcontracting cost considered by the IBAVI partner includes the fees of the technicians for the control and supervision of the construction works of the experimental and innovative building, as well as the adaptation of the project so that it meets additional objectives described in The ARV project proposal (Task 4.4, Task 5.3, Task 5.4 -Subtask 5.4.2, Task 8.2 – Subtask 8.2.1 and 8.2.2).
Currently, the functions of the IBAVI technical department staff are managing and coordinating more than 40 public housing developments with more than 900 dwellings in The Balearic Islands, so the inner procedure to achieve the strategic goal requires subcontracting full external teams to draft most of the architectural projects and managing the construction works of the public housing buildings. These teams are always selected according to legal regulations that apply to Public bodies.

The construction works management will take 15 months, coinciding with the construction works. The cost includes all travel costs and related subsistence allowances, and they have been calculated as follows:

WORKS MANAGEMENT	COST (15 MONTHS)	COST PER MONTH
PROJECT MANAGER - ARCHITECT	110.703,66 €	7.380,24 €
CONSTRUCTION MANAGER - SURVEYOR	83.027,75 €	5.535,18 €
HEALTH AND SAFETY COORDINATION - SURVEYOR	19.171,20 €	1.278,08 €
TELECOMUNNICATION MANAGER - ENGINEER	2.100,00 €	140,00 €
PARKING ACTIVITIES MANAGER	3.100,00 €	206,67 €
ENGINEERING MANAGER	11.070,37 €	738,02 €
TOTAL COST OF WORKS MANAGEMENT	**229.172,97 €**	15.278,20 €

Subcontractor t.b.d. The subcontract will be awarded according to the principles for best value for money and absence of any conflict of interest (according to Articles 10, and 13 of AMGA).

Does the participant envisage that part of its work is performed by linked third parties[57]	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N

[57] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

Does the participant envisage that part of the work is performed by International Partners[58] (Article 14a of the General Model Grant Agreement)?	N

IREC

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y
Total amount to be subcontracted: €40 000 *Programming tasks for the 3D district Virtual Reality (VR) model with the Unreal Engine for the demo in Palma de Mallorca (Task 2.5). A specialized company programming with Unreal Engine is necessary to perform this work, generating interactive visualization experiences and integrating results from the energy tools This specific knowledge is not available in the consortium.* *The services/subcontracts will be awarded following the legal regulations and according to the principles for best value for money and absence of any conflict of interest.* *Subcontractor t.b.d. The subcontract will be awarded according to the principles for best value for money and absence of any conflict of interest (according to Articles 10, and 13 of AMGA).*	
Does the participant envisage that part of its work is performed by linked third parties	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	N

[58] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

BOEX

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y

Total subcontracting: 170 000 EUR

1. *37 500 EUR (expected costs): Campaigns for Utrecht Living Lab community building by involving local change agents in reference to Task 3.3. The Utrecht district of Overvecht-Noord and Kanaleneiland has active local community groups that have extensive expertise in working and involving citizen and other local stakeholders in the energy transition. These community members serve as independent 'change agents' in the local community, because they are not connected to one of the institutional partners such as the social housing corporation Bo-Ex or the municipality of Utrecht. The ARV project will engage, co-create and empower local residents and tenants by hiring/contracting members of the local community groups to manage, expand and enrich the ARV activities around energy transition and build community that will continue to exist after the ARV project as a legacy. The following activities will be planned:*
   - *organising co-creation sessions with local residents, tenants and community members together with ARV partners (hiring trainer/facilitator)*
   - *coordinate the organisation of campaigns around the local energy transition (organisation/engagement support to the social housing corporation Bo-Ex)*
   - *implementation of this subcontract in coordination between the two involved social housing corporations Bo-Ex, Mitros. The budget is split over the two partners since each housing corporation has their own sub-community within the district.*
   - *Cost structure: it is expected that a total of 6 campaigns will be organised with a budget of 6 250 EUR each to be implemented by one change agent in the district.*
2. *37 500 EUR (expected costs): Energy Coaching for tenants of Bo-Ex retrofitted buildings to reduce energy poverty in reference to Task 3.3. The ARV project will coach the tenants of the retrofitted buildings to sustainably reduce their energy consumption and their energy bill by providing energy coaching advice. The ARV project will recruit energy coaches from the local community and local (student) companies. The energy coaches have specific expertise on measures to reduce energy consumption and knowledge of incorporating the smart metering output to workable advices. The specific expertise on tenant interaction in combination with didactic experience of working with people from the districts is not available at the project partner and should therefore be recruited. The following activities will be planned:*
   - *organisation of energy coaching sessions with tenants at the physical district hub (hiring trainer/facilitator)*
   - *one-on-one coaching advice at household level based on personalized data (organisation/coaching of tenants of social housing corporation Bo-Ex)*
   - *implementation of this subcontract in coordination between the three involved social housing corporations Bo-Ex, Mitros. The budget is split over the three partners since each housing corporation has their own tenants to provide coaching advice.*
   - *Cost structure: (1) it is expected that for the general energy coaching session a budget of 3 750 EUR is required. (2) It is expected that for each household coaching advice a budget of 150 EUR is required. In total it is expected to cover 225 households totalling to 33 750 EUR"*
3. *30 000 EUR (expected costs) To shorten retrofitting time of Bo-Ex building retrofits. The work cannot be performed in the consortium partners because the following expertise is not available and is very specific. Cost structure*
   - *15 000 EUR for external logistics consultant for construction logistics improvement*
   - *15 000 EUR for external social consultancy organisation to perform independent tenant satisfaction studies and propose improvements*
4. *50 000 EUR (expected costs) To demonstrate the building and grid flexibility service innovative battery storage systems are purchased. The following expertise is not available within the consortium partners and need to be procured:*
   - *50 000 EUR for subcontracting of an aggregator service to connect the battery systems to the bidirectional charging ecosystem / Smart Solar Charging.*
5. *15 000 EUR to implement small studies, design sprints with the aim to involve external to ARV contractors that design and implement the HeMuBo + Inside Out integrated retrofitting approach in reference to Task 4.3*

Subcontractor t.b.d. The subcontract will be awarded according to the principles for best value for money and absence of

Does the participant envisage that part of its work is performed by linked third parties	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	N

RC Panels

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y
Total subcontracting: 35 000 EUR (expected costs) *To shorten the retrofitting time & prepare building components with the least amount of material to decrease the embodied energy. The work cannot be performed in the consortium partners because the following expertise is not available and is very specific. Cost structure:35 000 EUR for specialist on the integration of specific building facade components, specifically the integration of the balcony elements in the facade panels. The subcontracting is linked to WP3, Task 3.4.* *Subcontractor t.b.d. The subcontract will be awarded according to the principles for best value for money and absence of any conflict of interest (according to Articles 10, and 13 of AMGA).*	
Does the participant envisage that part of its work is performed by linked third parties	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	N

City of Utrecht

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y
Total subcontracting: 35 000 EUR 1. *35 000 EUR (expected costs): External support for setting up the regional the regional Utrecht Exploitation Board as part of Task 9.5. The Utrecht regional innovation cluster of ARV around energy and resource efficient retrofitting consists of many stakeholders (public authorities, housing corporations, construction branche organisations, installation branche organisations, architects) that have an interest in the scaling of the ARV solutions. To involve these stakeholders regional exploitation board meetings are organised for which specific expertise and knowledge on their constituencies are required. This expertise is not available within the consortium and is very specific.* *Cost structure: 7x 5 000 EUR for the organisation of regional exploitation board meetings in collaboration with ARV partners involving site visits, transferability assessment and scale-up activities (contracting of external advisor specialised in regional scale-up activities) "* *Subcontractor t.b.d. The subcontract will be awarded according to the principles for best value for money and absence of any conflict of interest (according to Articles 10, and 13 of AMGA).*	
Does the participant envisage that part of its work is performed by linked third parties	N

Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	N

Mitros

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	Y

Total subcontracting: 90 000 EUR

1. *37 500 EUR (expected costs): Campaigns for Utrecht Living Lab community building by involving local change agents in reference to Task 3.3. The Utrecht district of Overvecht-Noord and Kanaleneiland has active local community groups that have extensive expertise in working and involving citizen and other local stakeholders in the energy transition. These community members serve as independent 'change agents' in the local community, because they are not connected to one of the institutional partners such as the social housing corporation Mitros or the municipality of Utrecht. The ARV project will engage, co-create and empower local residents and tenants by hiring/contracting members of the local community groups to manage, expand and enrich the ARV activities around energy transition and build community that will continue to exist after the ARV project as a legacy. The following activities will be planned:*
   - *organising co-creation sessions with local residents, tenants and community members together with ARV partners (hiring trainer/facilitator)*
   - *coordinate the organisation of campaigns around the local energy transition (organisation/engagement support to the social housing corporation Mitros)*
   - *implementation of this subcontract in coordination between the two involved social housing corporations Bo-Ex, Mitros. The budget is split over the two partners since each housing corporation has their own sub-community within the district.*
   - *Cost structure: it is expected that a total of 6 campaigns will be organised with a budget of 6 250 EUR each to be implemented by one change agent in the district and the buildings to be renovated.*

2. *37 500 EUR (expected costs): Energy Coaching for tenants of Mitros retrofitted buildings to reduce energy poverty in reference to Task 3.3. The ARV project will coach the tenants of the retrofitted buildings to sustainably reduce their energy consumption and their energy bill by providing energy coaching advice. The ARV project will recruit energy coaches from the local community and local (student) companies. The energy coaches have specific expertise on measures to reduce energy consumption and knowledge of incorporating the smart metering output to workable advices. The specific expertise on tenant interaction in combination with didactic experience of working with people from the districts is not available at the project partner and should therefore be recruited. The following activities will be planned:*
   - *organisation of energy coaching sessions with tenants at the physical district hub (hiring trainer/facilitator)*
   - *one-on-one coaching advice at household level based on personalized data (organisation/coaching of tenants of social housing corporation Mitros)*
   - *implementation of this subcontract in coordination between the three involved social housing corporations Bo-Ex, Mitros. The budget is split over the three partners since each housing corporation has their own tenants to provide coaching advice.*
   - *Cost structure: (1) it is expected that for the general energy coaching session a budget of 3 750 EUR is required. (2) It is expected that for each household coaching advice a budget of 150 EUR is required. In total it is expected to cover 225 households totalling to 33 750 EUR.*

Subcontractor t.b.d. The subcontract will be awarded according to the principles for best value for money and absence of any conflict of interest (according to Articles 10, and 13 of AMGA).

Does the participant envisage that part of its work is performed by linked third parties	N
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	N

DTTN

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	N
Does the participant envisage that part of its work is performed by linked third parties[59]	Y

[59] A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the Model Grant Agreement).

ARMALAM S.r.l*. is a founding member of HABITECH and one of his owners is currently part of the HABITECH Board. One of the major strengths of Armalam S.r.l. is the knowledge and the capacity to manage all stages of the realization of wooden works, from intellectual conception up to the most delicate phases of realization. The company follows every phase of the work:*

- *i) preliminary processing of the idea in order to gather, together with the Client, the architectural and functional needs;*
- *ii) the executive design in order to identify the best technical solutions;*
- *iii) the organization of the industrial production of wooden structures in order to guarantee the quality of products;*
- *iv) the management of the execution work on site in order to ensure the perfect correspondence with the project.*

The applied methodology can be summarized in the term "INTEGRATED DESIGN" by the use of the BIM approach (Building Information Modelling). Armalam S.r.l. is then able to provide and to manage all the aspects of design: architectural, structural, and energy design in accordance, from the early stages, with the customer demands, and ensuring the certification of buildings with the most common protocols of the Green Economy. For this reason, ARMALAM S.r.l. will take over specific activities related to New Construction and refurbishment of the existing buildings.

Concerning the ARV project, ARMALAM S.r.l. will take part as a supporter entity throughout the different WPs where DTTN is also present, but will be mostly involved on an operational stage in the Italian Demo Case of Trento - Piedicastello Destra Adige (WP4-WP5). In particular, it will perform design and prototyping tasks linked to the new Positive Energy Building and to the retrofit of the existing buildings located in the area, as foreseen by the project.

Key Person of ARMALAM S.r.l. participating in the project actions: Fabio Ferrario, partner of ARMALAM S.r.l. and technical director of the R&I sector.

Fanti Legnami S.r.l. *was founded in 1956, as a small family-run craft company; over the years, it developed by adopting increasingly advanced processing techniques. It is a member of HABITECH since 2017. In recent years Fanti Legnami S.r.l. has become one of the main companies dealing with woodworking in the Italian region of Trentino. With more than 50 years of experience, Fanti Legnami S.r.l. has been able to choose and enhance the Trentino wood as the best material on the market, in order to produce structural elements and wooden roofs of great value and strength, which have been improved over the years and increasingly established in the demands of the craft market.*
According to the programs of use and care of fir, larch and pine forests at high altitudes, the Trentino wood is the only one that ensures cylindrical trunks with minimum conicity and excellent thin fiber, resistant, flexible, and characterized by well-proportioned growth rings: essential conditions for producing large wooden structures, wooden roofs, chalets and houses of the highest quality. Fanti Legnami S.r.l. also deals with the design and construction of energy-saving wooden roofs and houses. Today the company may count on 37 employees, including lumberjacks, workers, clerks, and a technical office. Moreover, it is in possession of the following certifications:

UNI EN ISO 9001:2015;
- CE marking of solid wood;
- CE marking of bi-lamellar and lamellar wood;
- PEFC forest management certification

Concerning the ARV project, Fanti Legnami S.r.l. will be involved on an operational stage within WP4-WP5, performing construction and installation activities in the framework of the Italian Demo Case of Trento – Piedicastello Destra Adige. In particular, the company will be involved in the construction stage of the new Positive Energy Building, being in charge of its envelope, and in the installation of the new prototype of timber based prefabricated, multi-functional and modular facades linked to the retrofit tasks foreseen by the project.

Key Person of Fanti Legnami S.r.l. participating in the project actions: Marino Fanti, administrator and legal representative of the company.

X-Lam Dolomiti S.r.l. – *member of HABITECH since 2018 - is the leading Italian manufacturer of XLAM-CLT structural panels as well as one of the most important interlocutors for the design and construction of buildings both in wood and mixed steel-wood technologies. Operating since 2010, with a share capital of 1,000,000 euros and a turnover of 15 million euros, XLAM DOLOMITI is composed of 50 employees and stands out in the market for the constant search for quality attested by the numerous certifications achieved: UNI EN ISO 9001: 2008, SALE, Organization Management and Control Model D.Lgs. 231/01, Cat 0G1 Class. VI, Cat 0S6 Class. III-BIS, Cat 0S32 Class. V, ARCA in addition to CE, ETA-12/0347, PEFC product certifications. Furthermore, its belonging to the Paterno Group, operational since 1986 and composed of over 500 employees, represents an important guarantee of financial soundness and reliability.*

The strong point of the company is the engineering and production of XLAM (or CLT, Cross Laminated Timber) structural panels that are large prefabricated panels (up to 13.5 mx and 3.5 m) made of glued cross-laminated boards which are delivered to the construction site, shaped and numbered, ready for assembly which is extremely fast and precise.

The technical-engineering department uses the collaborative design method BIM (Building Information Modeling) that allows to integrate in a single model the useful information in every phase of the design: architectural, structural, plant engineering, energy and management.

For particularly complex projects, which require great speed of realization and intense project management activities, XLAM DOLOMITI proposes itself as GENERAL CONTRACTOR. This means that XLAM DOLOMITI can operate by providing a service "turnkey" becoming the reference point for the realization of hotels, residence halls, multi-storey, holiday villages and residential complexes complete with the provision of furniture.

Within the ARV project, the company will be involved on an operational stage inside WP4-WP5, performing construction and installation activities in the framework of the Italian Demo Case of Trento – Piedicastello Destra Adige. In particular, the company will be involved in the construction stage of the new Positive Energy Building, being in charge of its supporting structure, and in the installation of the new prototype of timber based prefabricated, multi-functional and modular facades linked to the retrofit tasks foreseen by the project.

Key Person of X-Lam Dolomiti S.r.l. participating in the project actions: Albino Angeli, Legal Representative and Technical Director of the company.

Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N

Does the participant envisage that part of the work is performed by International Partners[60] (Article 14a of the General Model Grant Agreement)?	N
If yes, please describe the International Partner(s) and their contributions	

[60] 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

Section 5: Ethics and Security

5.1 Ethics

Compliance with national and European regulations is embedded in the activities and concept of ARV. Consideration to national and international regulations along with ethical and societal dimensions will be performed at all stages of the ARV project. All proposed ARV tasks are permissible under applicable laws and regulations and given proper observance of requirements. Necessary actions will be taken by the project management and all beneficiaries to ensure compliance with applicable European and national regulations and professional codes of conduct relating to personal data protection. This includes in particular Directive 95/46/EC regarding data collection and processing, the General Data Protection Regulation (GDPR, 2016/679) that entered into effect in May 2018, and respective national requirements, ensuring legal and regulatory compliance.

In order to fully comply with research ethics requirements, a Data Management Plan (DMP) will be provided at an early stage of the project (in WP1, T1.6/D1.8). Together with the Consortium Agreement, the Data Management Plan will cover the ethical aspects relevant for the planned research activities connected to the ethical requirements on Personal Data Protection.

The project does not involve any activities or is raising concern regarding:

- Human embryos & fetus
- Human cells & tissues
- Animals
- Environment, health & safety
- Dual use
- Exclusive focus on civil applications
- Potential misuse of research results

The ethics self-assessment, to be entered into the ethical issues table in the administrative forms of the proposal, identified two issues: 1) human participation, and 2) personal data collection and/or processing. These are described in below in Section 5.1.1 and 5.1.2.

- Involvement of human participants
- Collection and/or processing of personal data

5.1.1 Humans

ARV will involve **voluntary adults'** participation (citizen involvement). (see also 5.1.2 Personal Data). Voluntary participation of school children/minors from the age of 16 to 19 years is planned in at least three of the demonstration projects. The information asked from the school children will centre around topics of energy use and energy consumption. The minors and their legal representatives will be informed on the research, methods and procedures planned. The procedure of informed consent is followed. An information letter is provided, and the participants or/and their parents have to sign a consent form. The participants will be anonymized. The country specific law for involving minors (16 years and older), which may vary between participating countries, will be followed.

In the context of ARV demonstration activities, data will be collected through:

- Questionnaires/Online forms;
- Digital Systems (e.g. smart meters, IOT monitoring, City Information Platform etc.);
- Citizen Engagement Activities, such as workshops, co-creation activities, etc.

The consortium will ensure that all necessary procedures are followed, in particular with regards to the signing, collection, and storing of all necessary Informed Consent Forms prior to the collection of any data. These Informed Consent Forms will apply also for anonymous/online data collection, e.g. questionnaires. All involved stakeholders and users will be informed in detail about purpose of data collection, measures and the consortium will obtain free and fully informed consent. Details of recruitment, inclusion and exclusion criteria, and informed consent procedures will be prepared ahead of the start of any proposed measures. Adults unable to give an informed consent will not be involved in the project. Vulnerable groups/individuals will not be involved in the project activities.

5.1.2 Protection of personal data

Personal data of ARV beneficiaries

The consortium agrees that any Background, Results, Confidential Information and/or any and all data and/or information that is provided, disclosed or otherwise made available between the beneficiaries during the implementation of the Action and/or for any Exploitation activities ("Shared Information"), shall not include Personal Data as defined by the General Data Protection Regulation 2016/679 hereinafter referred to as the Data Protection Legislation. By exception to the principle described above, the beneficiaries may share Personal Data of individuals involved in the project for the purpose of executing the Consortium Agreement or the Grant Agreement including but not limited to; names, job titles, e-mail addresses, and other related tele-contact information ("Business Contact Information"). The beneficiaries agree that the Business Contact Information will be only processed to the limited extent required to manage the business relation between the members. Each beneficiary, its affiliated entities, and its contractors may, wherever they do business, store and otherwise process such Business Contact Information. Where notice to or consent by the individuals is required for such processing, each beneficiary, as applicable, will provide notice or obtain such consent as applicable.

Personal data of the third parties

The project implements several activities related to the personal data collection. All six demonstration projects in ARV will require data processing and evaluation involving human research subjects and the collection of personal data. As this project will include the participation of six real-life demo projects requiring multiple data measurements per project, the actual project beneficiaries, external stakeholders and users involved will vary between tasks. The ARV DMP (D.1.8) will refine all the necessary legal and regulatory requirements applicable for the type of data that will be collected and processed. In accordance with the DMP, an Informed Consent process and forms will be developed, and in respective tasks within the Work Packages, we will specify and implement approaches related to data collection, management, and processing measures that are most appropriate based on data avoidance, especially concerning personally identifiable aspects of datasets. Individual data collection will be handled by the involved partners in the work packages, keeping data processing close to the source and within the originating partner organizations.

The project will respect the privacy of all stakeholders and users and will seek free and fully informed consent where personally identifiable data is collected and processed, implementing suitable data handling procedures and protocols to avoid potential identification of individuals. This will include participants' data in activities that use techniques such as questionnaires, interviews, workshops, or mailing lists, as well as automatic building and energy data collection. Where necessary, the data will be anonymised and the mapping of the ID and the person will be safeguarded and will not be available to persons other than the ones working with the data. Results may be used in anonymised or aggregate forms of analysis and may subsequently be published in project reports and scientific papers. All beneficiaries will handle all material with strict care for confidentiality and privacy in accordance with the legal and regulatory requirements, without any harm to participants, stakeholders, or any unknown third parties.

The ARV consortium is aware of potential issues arising from data aggregation from different sources, scales, flows, and devices. Data collected in the project will be anonymised and aggregated as close to the source as possible. In certain cases, personal data avoidance and minimisation can eliminate and/or reduce identifiability. For example, energy consumption with a high temporal resolution can be used to identify personal daily patterns and routines when gathered at an individual household level. Aggregate data either with lower temporal resolution (e.g. once a day) or with a lower geographical resolution (e.g. energy consumption on a district level as is directly available for energy providers), mitigates this risk. Direct data transfers between beneficiaries will be planned on a limited basis, leading to a limited import and export of personal data to/from non-EU countries to the EU. The reason is that Norway is considered an Associated Country within the Horizon 2020 Framework Programme.

The consortium confirms that the ethical standards and guidelines of Horizon 2020 will be rigorously applied, regardless of the country in which the work is carried out, and that all data transfers will be permissible under all necessary legal and regulatory requirements. The project aims to make anonymised datasets public but will aim to strike a balance between publication of data and privacy and confidentiality issues. When in doubt, the consortium will refrain from publishing raw datasets and only report aggregate measures. Decisions will be made on a case-by-case basis by senior staff to ensure that privacy, anonymity, and confidentiality are not breached by publication of datasets or any other type of publication. In addition, on-going consultation with the relevant National Data Protection Offices will be ensured during the lifetime of the project.

The ARV project implies collecting different personal data from individuals during the project's implementation. During the project collection of personal data included collecting contact information (f.e. name, professional email that is already available online) this will be done only for the purpose of organizing the network community we are aiming to establish with this project. This data is only used to contact the participants and it is not used in the research and no further personal data is collected. The consortium will comply with the European and national directives on data protection and with any updates it might receive during the lifetime of the project. The scientific work will be fully based on publicly available data. All data will be handled and shared under an open-source philosophy and in a cooperative manner amongst the partners (cf. data management plan).

Primary data:

All partners in charge of network building and identification of experts for workshops, events or to be invited for other activities confirm that they will not gather any personal data, except publicly available contact information. In case that any personal data will be needed for the successful completion of the research, the respective ethical rules and committees of the involved countries and the EU will be respected.

Secondary use of some datasets:

We state that we will comply with the national and EU directives on data protection and with any updates it might receive during the lifetime of the project. In addition, we confirm that the ethical standards and guidelines will be rigorously applied, regardless of the country in which the research is carried out. In terms of data management, we refer to the data management plan.

Data Management:

All the data used within the project will be available using non-proprietary formats and documented accordingly via the use of extensive metadata descriptions and standard naming conventions. The metadata descriptions will contain the required elements to guarantee that data are easily discovered. Metadata will be containing key information such as ID, Title, Summary, Variable, Unit, Activity, Tags, Frequency, Period/Reference, Institution, Contact, etc. The ARV project aims for data transparency and harmonization. This can only be achieved by allowing anyone to

understand the work and to find the source of every data that will be used. Due to quick data emergence, it is important to keep track of the versions. Finally, every assumption/hypothesis that is made is influencing the final result of the analysis. Accordingly, they will be tracked and well explained. For further details please see Section 2.2 on Research Data Management (2.2.3.) and on IPR / Knowledge Management and Protection (2.2.4.)

Data anonymisation: The ARV consortium is aware of potential issues arising from data aggregation from different sources, scales, flows, and devices.

The project will respect the privacy of all stakeholders and users and will seek free and fully informed consent where personally identifiable data is collected and processed, implementing suitable data handling procedures and protocols to avoid potential identification of individuals. This will include participants' data in activities that use techniques such as questionnaires, interviews, workshops, or mailing lists. Where necessary, the data will be anonymised and aggregated as close to the source as possible, and the mapping of the ID and the person will be safeguarded and will not be available to persons other than the ones working with the data. Results may be used in anonymised or aggregate forms of analysis and may subsequently be published in project reports and scientific papers. All beneficiaries will handle all material with strict care for confidentiality and privacy in accordance with the legal and regulatory requirements, without any harm to participants, stakeholders, or any unknown third parties.

Data minimisation: The collected data are relevant to the ARV project and will be exclusively limited to the purposes of the successful implementation of the action. The type of data to be collected, and data collection processes are in accordance with **'data minimisation 'principle.** The data collection and processing will be done to serve these closely engaged stakeholders' interests and the society overall.

NTNU confirms that the Data Protection Officer (DPO) has been appointed and the contact details of the DPO will be made available to all data subjects involved in the research. For beneficiaries not required to appoint a DPO under the GDPR a detailed data protection policy for the project will be kept on file and submitted to the EC services upon request. Each beneficiary will submit a confirmation within this respect to the coordinator.

A description of the technical and organisational measures that will be implemented to safeguard the rights and freedoms of the data subjects/research participants and a description of the security measures that will be implemented to prevent unauthorised access to personal data or the equipment used for processing will be provided by NTNU. The following measures will notably be implemented:

- clear definition of roles and responsibilities regarding data processing operations (including collection, storage, access, sharing, protection, destruction), as part of the data management process;
- clear definition of the purposes of the processing and no further processing without specific new consent of data subjects or their legal representatives;
- notification of the data processing to relevant national protection authorities, if applicable;
- security of data and their processing (hardware, networks and physical businesses security, confidentiality agreements through which authorised persons will notably commit to use the data for the strict purpose of the project, access control and log records);
- clear separation, each time it will be possible, between the different categories of data according to their degree of accuracy or reliability, particularly between data based on facts and data based on personal or technological assessments;
- enhanced protection of sensitive data;
- mechanisms ensuring data deletion when they are not anymore necessary to the purposes for which they were processed;
- no transfer of personal data to another party without a specific consent given by data subjects and their legal representatives; no transfer to third parties that do not ensure the same level of personal data protection;
- set up of procedures to ensure the efficiency of data subjects' rights, including their right of access, communication, rectification, erasure and to object.

5.1.3 Self-assessment of ethical issues

Within ARV, the following potential ethical issues have been identified by the self-assessment:

- Involvement of human participants
- Collection and/or processing of personal data

The details related to each of the six demonstration projects are summarized in the following table:

Identified demonstration projects	**Human participants**	**Collection of personal data**
Residential, tertiary, and educational buildings, with both new construction and renovation activities, Palma, Spain [Demo 1]	X	X
Energy data, building level, [Demo 1]	X	X
Energy data, neighbourhood level, [Demo 1]	X	X
Community engagement, [Demo 1]	X	X
The demo case in Trento, Italy, consists of four areas: 1) the former Italcementi industrial site; 2) a social and private housing area from the 50s–70s; 3) the Piedicastello Galleries (former highway tunnels); and 4) a parking lot. The project covers both, new construction and renovation of existing buildings and structures, [Demo 2]	X	X
Energy data, building level, [Demo 2]	X	X
Energy data, neighbourhood level, [Demo 2]	X	X
Community engagement, [Demo 2]	X	X
The Dutch demo case consists of two clusters of residential buildings in the Overvecht-Noord district and the Kanaleneiland-Zuid district in the city of Utrecht [Demo 3]	X	X
Energy data, building level, [Demo 3]	X	X
Energy data, neighbourhood level, [Demo 3]	X	X
Community engagement, [Demo 3]	X	X
The Czech demo case encompasses the renovation of Karviná Mizerov Health Centre in the city of Karviná. [Demo 4]. The Living Lab will educate citizens such as students in an effective way, creating energy and resource efficient	X	X

neighbourhoods that increase citizen and stakeholder awareness and engagement		
Energy data, building level, [Demo 4]	X	X
Energy data, neighbourhood level, [Demo 4]	X	X
Community engagement, [Demo 4]	X	X
Residential buildings. The Danish demo case is called SAB Department 22, Kløvermarken/Hvedemarken and is located in the central part of the City of Sønderborg. It includes 19 apartment blocks of 3 floors, in total 432 apartments [Demo 5]	X	X
Energy data, building level, [Demo 5]	X	X
Energy data, neighbourhood level, [Demo 5]	X	X
Community engagement, [Demo 5]	X	X
The Norwegian demo case is the Voldsløkka School and Cultural area. The project includes the construction of a secondary school, a new culture hall, a dance hall, and rehearsal space. The project includes the construction of new buildings and the renovation of an existing listed building [Demo 6]	X	X
Energy data, building level, [Demo 6]	X	X
Energy data, neighbourhood level, [Demo 6]	X	X
Community engagement, [Demo 6]	X	X

5.1.4 Third countries (= non-EU countries)

No third countries are involved in the ARV project.

5.2 Security[61]

All activities were and will be in line with the current EU regulations and laws. The objective is to establish an open and transparent scientific model community that shares its data and models under the open access and open-source guidelines in a harmonized and structured way.

[61] See article 37 of the Model Grant Agreement. For more information on the classification of Information, please refer to the Horizon 2020 guidance: https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/secur/h2020-hi-guide-classif_en.pdf.

The project will NOT involve activities or results raising security issues.

The project will also NOT involve 'EU-classified information' as background or results.

Annex 2a

Unit cost for SME owners/natural beneficiaries without salary

1. Costs for a SME owner not receiving a salary

Units: hours worked on the action

Amount per unit ('hourly rate'): calculated according to the following formula:

{the monthly living allowance for researchers in MSCA-IF actions / 143 hours}

multiplied by

{country-specific correction coefficient of the country where the beneficiary is established}

The monthly living allowance and the country-specific correction coefficients are set out in the Work Programme (section 3 MSCA) in force at the time of the call:

- for calls under Work Programme 2018-2020:
- for the monthly living allowance: EUR 4 880
- for the country-specific correction coefficients: see Work Programme 2018-2020 (available on the Participant Portal Reference Documents page)

For the following beneficiaries/linked third parties, the amounts per unit (hourly rate) are fixed as follows:

Beneficiary/linked third party	Monthly living allowance	Corrections coefficient	Hourly rate after application of correction coefficient
16. Buro de Haan	EUR 4 880	1,079 (NL)	EUR 36,83
21. RC Panels	EUR 4 880	1,079 (NL)	EUR 36,83
30. DTTN/Armalam	EUR 4 880	1,044 (IT)	EUR 35,63

Estimated number of units: see Annex 2

ESTIMATED BUDGET FOR THE ACTION

	Estimated eligible[1] costs (per budget category)										EU contribution			Additional information		
	A. Direct personnel costs				B. Direct costs of subcontracting	*[C. Direct costs of fin. support]*	D. Other direct costs		E. Indirect costs[2]	Total costs	Reimbursement rate %	Maximum EU contribution[3]	Maximum grant amount[4]	Information for indirect costs	Information for auditors	Other information:
	A.1 Employees (or equivalent) A.2 Natural persons under direct contract A.3 Seconded persons *[A.6 Personnel for providing access to research infrastructure]*		A.4 SME owners without salary A.5 Beneficiaries that are natural persons without salary				D.1 Travel D.2 Equipment D.3 Other goods and services *[D.4 Costs of large research infrastructure]*	D.5 Costs of internally invoiced goods and services						Estimated costs of in-kind contributions not used on premises	Declaration of costs under Point D.4	Estimated costs of beneficiaries/ linked third parties not receiving funding/ international partners
Form of costs[6]	Actual	Unit[7]	Unit[8]		Actual	Actual	Actual	Unit[9]	Flat-rate[10] 25%							
	a	Total b	No hours	Total c	d	*[e]*	f	Total g	h = 0,25 x (a +b+c+f+g +*[i1]*[13]+*[i2]*[13]-n)	j = a+b+c+d +*[e]*+f+g+h +*[i1]*+*[i2]*	k	l	m	n	Yes/No	
1. NTNU	1 552 004.00	0.00	0.00	0.00	0.00	0.00	111 041.00	0.00	415 761.25	2 078 806.25	100.00	2 078 806.25	2 078 806.25	0.00	No	n/a
2. ACE	189 428.00	0.00	0.00	0.00	0.00	0.00	52 000.00	0.00	60 357.00	301 785.00	100.00	301 785.00	301 785.00	0.00	No	n/a
3. CVUT	599 319.00	0.00	0.00	0.00	0.00	0.00	443 500.00	0.00	260 704.75	1 303 523.75	100.00	1 303 523.75	1 303 523.75	0.00	No	n/a
4. DTU	631 843.00	0.00	0.00	0.00	0.00	0.00	19 000.00	0.00	162 710.75	813 553.75	100.00	813 553.75	813 553.75	0.00	No	n/a
5. DANFOSS A/S	209 700.00	0.00	0.00	0.00	0.00	0.00	106 750.00	0.00	79 112.50	395 562.50	70.00	276 893.75	276 893.75	0.00	No	n/a
6. ENFOR	308 770.00	0.00	0.00	0.00	30 000.00	0.00	6 250.00	0.00	78 755.00	423 775.00	70.00	296 642.50	296 642.50	0.00	No	n/a
7. PROJECTZERO	290 250.00	0.00	0.00	0.00	20 000.00	0.00	27 000.00	0.00	79 312.50	416 562.50	100.00	416 562.50	416 562.50	0.00	No	n/a
8. EURAC	285 600.00	0.00	0.00	0.00	0.00	0.00	30 000.00	0.00	78 900.00	394 500.00	100.00	394 500.00	394 500.00	0.00	No	n/a
9. SINTEF	1 263 220.00	0.00	0.00	0.00	0.00	0.00	78 000.00	0.00	335 305.00	1 676 525.00	100.00	1 676 525.00	1 676 525.00	0.00	No	n/a
10. PALMA	827 631.00	0.00	0.00	0.00	130 000.00	0.00	138 600.00	0.00	241 557.75	1 337 788.75	100.00	1 337 788.75	1 337 788.75	0.00	No	n/a
11. IBAVI	239 776.00	0.00	0.00	0.00	229 173.00	0.00	74 130.00	0.00	78 476.50	621 555.50	100.00	621 555.50	621 555.50	0.00	No	n/a
12. IREC	761 173.00	0.00	0.00	0.00	40 000.00	0.00	47 450.00	0.00	202 155.75	1 050 778.75	100.00	1 050 778.75	1 050 778.75	0.00	No	n/a
13. MET	160 230.00	0.00	0.00	0.00	0.00	0.00	70 250.00	0.00	57 620.00	288 100.00	70.00	201 670.00	201 670.00	0.00	No	n/a
14. UAS Utrecht	607 500.00	0.00	0.00	0.00	0.00	0.00	95 250.00	0.00	175 687.50	878 437.50	100.00	878 437.50	878 437.50	0.00	No	n/a
15. HOUSING EUROPE	205 804.00	0.00	0.00	0.00	0.00	0.00	63 550.00	0.00	67 338.50	336 692.50	100.00	336 692.50	336 692.50	0.00	No	n/a
16. Buro de Haan	117 500.65	0.00	271.50	9 999.35	0.00	0.00	41 250.00	0.00	42 187.50	210 937.50	70.00	147 656.25	147 656.25	0.00	No	n/a
17. Center Denmark	469 986.00	0.00	0.00	0.00	0.00	0.00	10 250.00	0.00	120 059.00	600 295.00	100.00	600 295.00	600 295.00	0.00	No	n/a
18. SAB	151 725.00	0.00	0.00	0.00	0.00	0.00	57 250.00	0.00	52 243.75	261 218.75	100.00	261 218.75	261 218.75	0.00	No	n/a
19. GDFA	559 482.00	0.00	0.00	0.00	0.00	0.00	37 000.00	0.00	149 120.50	745 602.50	100.00	745 602.50	745 602.50	0.00	No	n/a
20. BOEX	150 000.00	0.00	0.00	0.00	170 000.00	0.00	545 250.00	0.00	173 812.50	1 039 062.50	100.00	1 039 062.50	1 039 062.50	0.00	No	n/a
21. Rc Panels B.V.	189 960.95	0.00	35.00	1 289.05	35 000.00	0.00	6 250.00	0.00	49 375.00	281 875.00	70.00	197 312.50	197 312.50	0.00	No	n/a
22. UU	360 000.00	0.00	0.00	0.00	0.00	0.00	35 250.00	0.00	98 812.50	494 062.50	100.00	494 062.50	494 062.50	0.00	No	n/a
23. CITY OF UTRECHT	157 500.00	0.00	0.00	0.00	35 000.00	0.00	6 250.00	0.00	40 937.50	239 687.50	100.00	239 687.50	239 687.50	0.00	No	n/a
24. BOSGROEP	307 500.00	0.00	0.00	0.00	0.00	0.00	6 250.00	0.00	78 437.50	392 187.50	70.00	274 531.25	274 531.25	0.00	No	n/a
25. iwell	165 000.00	0.00	0.00	0.00	0.00	0.00	6 250.00	0.00	42 812.50	214 062.50	70.00	149 843.75	149 843.75	0.00	No	n/a
26. MEX	165 000.00	0.00	0.00	0.00	0.00	0.00	6 250.00	0.00	42 812.50	214 062.50	70.00	149 843.75	149 843.75	0.00	No	n/a
27. Mitros	127 500.00	0.00	0.00	0.00	90 000.00	0.00	186 250.00	0.00	78 437.50	482 187.50	100.00	482 187.50	482 187.50	0.00	No	n/a
28. KARV	90 801.00	0.00	0.00	0.00	0.00	0.00	5 000.00	0.00	23 950.25	119 751.25	100.00	119 751.25	119 751.25	0.00	No	n/a
29. DOL	87 330.00	0.00	0.00	0.00	0.00	0.00	258 000.00	0.00	86 332.50	431 662.50	70.00	302 163.75	302 163.75	0.00	No	n/a
30. DTTN	126 240.00	0.00	0.00	0.00	0.00	0.00	5 000.00	0.00	32 810.00	164 050.00	100.00	164 050.00	164 050.00	0.00	No	n/a
- Armalam	0.00	0.00	3 817.23	136 007.90	0.00	0.00	0.00	0.00	34 001.98	170 009.88	70.00	119 006.92	119 006.92	0.00	No	n/a

ESTIMATED BUDGET FOR THE ACTION

	Estimated eligible[1] costs (per budget category)										EU contribution			Additional information		
	A. Direct personnel costs				B. Direct costs of subcontracting	*[C. Direct costs of fin. support]*	D. Other direct costs		E. Indirect costs[2]	Total costs	Reimbursement rate %	Maximum EU contribution[3]	Maximum grant amount[4]	Information for indirect costs	Information for auditors	Other information:
	A.1 Employees (or equivalent) A.2 Natural persons under direct contract A.3 Seconded persons *[A.6 Personnel for providing access to research infrastructure]*		A.4 SME owners without salary A.5 Beneficiaries that are natural persons without salary				D.1 Travel D.2 Equipment D.3 Other goods and services *[D.4 Costs of large research infrastructure]*	D.5 Costs of internally invoiced goods and services						Estimated costs of in-kind contributions not used on premises	Declaration of costs under Point D.4	Estimated costs of beneficiaries/ linked third parties not receiving funding/ international partners
Form of costs[6]	Actual	Unit[7]	Unit[8]		Actual	Actual	Actual	Unit[9]	Flat-rate[10] 25%							
	a	Total b	No hours	Total c	d	*[e]*	f	Total g	h = 0,25 x (a +b+c+f+g +*[i1]*[13]+*[i2]*[13]-n)	j = a+b+c+d +*[e]*+f+g+h +*[i1]*+*[i2]*	k	l	m	n	Yes/No	
- X-LAM DOLOMITI	64 825.00	0.00	0.00	0.00	0.00	0.00	454 000.00	0.00	129 706.25	648 531.25	70.00	453 971.88	453 971.88	0.00	No	n/a
- FANTI LEGNAMI	41 126.00	0.00	0.00	0.00	0.00	0.00	285 000.00	0.00	81 531.50	407 657.50	70.00	285 360.25	285 360.25	0.00	No	n/a
Total beneficiary	232 191.00	0.00	3 817.23	136 007.90	0.00	0.00	744 000.00	0.00	278 049.73	1 390 248.63		1 022 389.05	1 022 389.05	n/a	n/a	0.00
31. UNITN	308 000.00	0.00	0.00	0.00	0.00	0.00	5 000.00	0.00	78 250.00	391 250.00	100.00	391 250.00	391 250.00	0.00	No	n/a
32. POLITO	248 000.00	0.00	0.00	0.00	0.00	0.00	28 750.00	0.00	69 187.50	345 937.50	100.00	345 937.50	345 937.50	0.00	No	n/a
33. OBF	644 115.00	0.00	0.00	0.00	0.00	0.00	19 000.00	0.00	165 778.75	828 893.75	100.00	828 893.75	828 893.75	0.00	No	n/a
34. NANO	58 596.00	0.00	0.00	0.00	0.00	0.00	35 000.00	0.00	23 399.00	116 995.00	70.00	81 896.50	81 896.50	0.00	No	n/a
35. AIGUASOL SAEST	144 130.00	0.00	0.00	0.00	0.00	0.00	14 850.00	0.00	39 745.00	198 725.00	70.00	139 107.50	139 107.50	0.00	No	n/a
Total consortium	12 866 565.60	0.00		147 296.30	779 173.00	0.00	3 416 121.00	0.00	4 107 495.73	21 316 651.63		19 998 408.55	19 998 408.55			0.00

[1] See Article 6 for the eligibility conditions.
[2] Indirect costs already covered by an operating grant (received under any EU or Euratom funding programme; see Article 6.5.(b)) are ineligible under the GA. Therefore, a beneficiary/linked third party that receives an operating grant during the action's duration cannot declare indirect costs for the year(s)/reporting period(s) covered by the operating grant, unless it can demonstrate that the operating grant does not cover any costs of the action (see Article 6.2.E).
[3] This is the theoretical amount of EU contribution that the system calculates automatically (by multiplying all the budgeted costs by the reimbursement rate). This theoretical amount is capped by the 'maximum grant amount' (that the Agency decided to grant for the action) (see Article 5.1).
[4] The 'maximum grant amount' is the maximum grant amount decided by the Agency. It normally corresponds to the requested grant, but may be lower.
[5] Depending on its type, this specific cost category will or will not cover indirect costs. Specific unit costs that include indirect costs are: costs for energy efficiency measures in buildings, access costs for providing trans-national access to research infrastructure and costs for clinical studies.
[6] See Article 5 for the forms of costs.
[7] Unit : hours worked on the action; costs per unit (hourly rate) : calculated according to the beneficiary's usual accounting practice.
[8] See Annex 2a 'Additional information on the estimated budget' for the details (costs per hour (hourly rate)).
[9] Unit and costs per unit : calculated according to the beneficiary's usual accounting practices.
[10] Flat rate : 25% of eligible direct costs, from which are excluded: direct costs of subcontracting, costs of in-kind contributions not used on premises, direct costs of financial support, and unit costs declared under budget category F if they include indirect costs (see Article 6.2.E).
[11] See Annex 2a 'Additional information on the estimated budget' for the details (units, costs per unit).
[12] See Annex 2a 'Additional information on the estimated budget' for the details (units, costs per unit, estimated number of units, etc).
[13] Only specific unit costs that do not include indirect costs.
[14] See Article 9 for beneficiaries not receiving funding.
[15] Only for linked third parties that receive funding.

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

CONSEIL DES ARCHITECTES D'EUROPE (ACE), established in RUE PAUL EMILE JANSON 29, BRUXELLES 1050, Belgium, VAT number: BE0464884970, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('2')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

CESKE VYSOKE UCENI TECHNICKE V PRAZE (CVUT), established in JUGOSLAVSKYCH PARTYZANU 1580/3, PRAHA 160 00, Czech Republic, VAT number: CZ68407700, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('3')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

DANMARKS TEKNISKE UNIVERSITET (DTU), established in ANKER ENGELUNDSVEJ 1 BYGNING 101 A, KGS LYNGBY 2800, Denmark, VAT number: DK30060946, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('4')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

DANFOSS A/S (DANFOSS A/S), established in Nordborgvej 81, NORDBORG 6430, Denmark, VAT number: DK20165715, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('5')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

ENFOR AS (ENFOR), established in LYNGSO ALLE 3, HORSHOLM 2970, Denmark, VAT number: DK29421633, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('6')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

PROJECT ZERO A/S (PROJECTZERO), established in Alsion 2, Sonderborg 6400, Denmark, VAT number: DK29215642, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('7')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

ACCADEMIA EUROPEA DI BOLZANO (EURAC), established in VIALE DRUSO 1, BOLZANO 39100, Italy, VAT number: IT01659400210, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('8')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

SINTEF AS (SINTEF), established in STRINDVEGEN 4, TRONDHEIM 7034, Norway, VAT number: NO919303808MVA, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('9')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

AYUNTAMENT DE PALMA DE MALLORCA (PALMA), established in PLAZA DE CORT 1, PALMA DE MALLORCA 07001, Spain, VAT number: ESP0704000I, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('10')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

INSTITUTO BALEAR DE LA VIVIENDA (IBAVI), established in CALLE MANUEL AZANA 9 BAJOS, PALMA DE MALLORCA 07006, Spain, VAT number: ESQ5750001I, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('11')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

FUNDACIO INSTITUT DE RECERCA DE L'ENERGIA DE CATALUNYA (IREC), established in C/ JARDINS DE LES DONES DE NEGRE 1, SANT ADRIA DE BESOS 08930, Spain, VAT number: ESG64946387, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('12')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

METROVACESA, SA (MET), established in C QUINTANAVIDES 13 PARQUE EMPRESARIAL VIA NORTE ED 1 PLANTA 1, MADRID 28050, Spain, VAT number: ESA87471264, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('13')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

Stichting Hogeschool Utrecht (UAS Utrecht), established in PADUALAAN 99, UTRECHT 3584 CH, Netherlands, VAT number: NL806163185B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('14')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

COMITE EUROPEEN DE COORDINATION DE L'HABITAT SOCIAL AISBL (HOUSING EUROPE), established in SQUARE DE MEEUS 18, BRUXELLES 1050, Belgium, VAT number: BE0473324762, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('15')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

BURO DE HAAN INFORMATIE TECHNOLOGIE BV (Buro de Haan), established in ACHTHOEVENWEG 34, STAPHORST 7951 SK, Netherlands, VAT number: NL857548773B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('16')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

CENTER DANMARK DRIFT APS (Center Denmark), established in VENDERSGADE 74, FREDERICIA 7000, Denmark, VAT number: DK40868399, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('17')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

SONDERBORG ANDELSBOLIGFORENING (SAB), established in BYGTOFTEN 2, SONDERBORG 6400, Denmark, VAT number: DK45569810, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('18')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

GREEN DIGITAL FINANCE ALLIANCE (GDFA), established in CHEMIN DES ANEMONES 11-13, CHATELAINE 1219, Switzerland, VAT number: CHE496481826TVA, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('19')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

STICHTING BO-EX 91 (BOEX), established in JAN CORNELISZ MAYLAAN 18, UTRECHT 3526GV, Netherlands, VAT number: NL800519085B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('20')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

RC PANELS BV (Rc Panels B.V.), established in CONSTRUCTIEWEG 1, LEMELERVELD 8152 GA, Netherlands, VAT number: NL856857270B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('21')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

UNIVERSITEIT UTRECHT (UU), established in HEIDELBERGLAAN 8, UTRECHT 3584 CS, Netherlands, VAT number: NL001798650B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('22')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

GEMEENTE UTRECHT (CITY OF UTRECHT), established in STADSPLATEAU 1, UTRECHT 3521 AZ, Netherlands, VAT number: NL002220647B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('23')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

BOS INSTALLATIEWERKEN BV (BOSGROEP), established in TENNESSEEDREEF 17, UTRECHT 3565 CK, Netherlands, VAT number: NL801071197B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('24')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

IWELL BV (iwell), established in ATOOMWEG 7-9, UTRECHT 3542 AA, Netherlands, VAT number: NL856333268B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('25')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

ME X ARCHITECTS BV (MEX), established in SPOORLAAN 18, BILTHOVEN 3721 PB, Netherlands, VAT number: NL809748253B01, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('26')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

STICHTING MITROS (Mitros), established in KONINGIN WILHELMINALAAN 9, UTRECHT 3527 LA, Netherlands, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('27')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

STATUTARNI MESTO KARVINA (KARV), established in FRYSTATSKA 72 1, KARVINA FRYSTAT 733 24, Czech Republic, VAT number: CZ00297534, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('28')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

DOLOMITI ENERGIA RINNOVABILI SOCIETA A RESPONSABILITA' LIMITATA (DOL), established in VIA FERSINA 23, TRENTO 38123, Italy, VAT number: IT01840970220, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('29')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

DISTRETTO TECNOLOGICO TRENTINO SCARL (DTTN), established in PIAZZA MANIFATTURA 1, ROVERETO 38068, Italy, VAT number: IT01990440222, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('30')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

UNIVERSITA DEGLI STUDI DI TRENTO (UNITN), established in VIA CALEPINA 14, TRENTO 38122, Italy, VAT number: IT00340520220, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('31')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

POLITECNICO DI TORINO (POLITO), established in CORSO DUCA DEGLI ABRUZZI 24, TORINO 10129, Italy, VAT number: IT00518460019, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('32')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

OSLO KOMMUNE (OBF), established in RADHUSET, OSLO 0037, Norway, VAT number: NO958935420MVA, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('33')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

NANO POWER AS (NANO), established in TISKARSKA 599/12, PRAHA 108 00, Czech Republic, VAT number: CZ01719041, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('34')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

SISTEMES AVANCATS D ENERGIA SOLAR TERMICA SCCL (AIGUASOL SAEST), established in CALLE ROGER DE LLURIA 29 3R 2E, BARCELONA 08009, Spain, VAT number: ESF62787692, ('the beneficiary'), represented for the purpose of signing this Accession Form by the undersigned,

hereby agrees

to become beneficiary No ('35')

in Grant Agreement No 101036723 ('the Agreement')

between NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **and** the European Climate, Infrastructure and Environment Executive Agency (CINEA) ('the Agency'), under the powers delegated by the European Commission ('the Commission'),

for the action entitled 'Climate Positive Circular Communities (ARV)'.

and mandates

the coordinator to submit and sign in its name and on its behalf any **amendments** to the Agreement, in accordance with Article 55.

By signing this Accession Form, the beneficiary accepts the grant and agrees to implement it in accordance with the Agreement, with all the obligations and conditions it sets out.

SIGNATURE

For the beneficiary

ⓘ print format A4 landscape

MODEL ANNEX 4 FOR H2020 GENERAL MGA — MULTI

FINANCIAL STATEMENT FOR *[BENEFICIARY [name]/ LINKED THIRD PARTY [name]]* FOR REPORTING PERIOD [reporting period]

	Eligible[1] costs (per budget category)													Receipts	EU contribution			Additional information
	A. Direct personnel costs				B. Direct costs of subcontracting	*[C. Direct costs of fin. support]*	D. Other direct costs			E. Indirect costs[2]	*[F. Costs of …]*		Total costs	Receipts	Reimbursement rate %	Maximum EU contribution[3]	Requested EU contribution	Information for indirect costs :
	A.1 Employees (or equivalent) A.2 Natural persons under direct contract A.3 Seconded persons *[A.6 Personnel for providing access to research infrastructure]*		A.4 SME owners without salary A.5 Beneficiaries that are natural persons without salary			*[C.1 Financial support]* *[C.2 Prizes]*	D.1 Travel D.2 Equipment D.3 Other goods and services	*[D.4 Costs of large research infrastructure]*	D.5 Costs of internally invoiced goods and services		*[F.1 Costs of …]*	*[F.2 Costs of …]*		Receipts of the action, to be reported in the last reporting period, according to Article 5.3.3				Costs of in-kind contributions not used on premises
Form of costs[4]	Actual	Unit	Unit		Actual	Actual	Actual	Actual	Unit	Flat-rate[5] 25%	Unit		*[Unit][Lump sum]*					
	a	Total b	No hours	Total c	d	*[e]*	f	*[g]*	Total h	i=0,25 x (a+b+ c+f+*[g]* + h+ *[j 1]*[6] +*[j2]*[6] -p)	No units	Total *[j1]*	Total *[j2]*	k = a+b+c+d+*[e]* +*f* + *[g]* +h+ i + *[j1]* +*[j2]*	l	m	n	o	p
[short name beneficiary/linked third party]																		

The beneficiary/linked third party hereby confirms that:
The information provided is complete, reliable and true.
The costs declared are eligible (see Article 6).
The costs can be substantiated by adequate records and supporting documentation that will be produced upon request or in the context of checks, reviews, audits and investigations (see Articles 17, 18 and 22).
For the last reporting period: that all the receipts have been declared (see Article 5.3.3).

ⓘ Please declare all eligible costs, even if they exceed the amounts indicated in the estimated budget (see Annex 2). Only amounts that were declared in your individual financial statements can be taken into account lateron, in order to replace other costs that are found to be ineligible.

[1] See Article 6 for the eligibility conditions

[2] The indirect costs claimed must be free of any amounts covered by an operating grant (received under any EU or Euratom funding programme; see Article 6.2.E). If you have received an operating grant during this reporting period, you cannot claim indirect costs unless you can demonstrate that the operating grant does not cover any costs of the action.

[3] This is the *theoretical* amount of EU contribution that the system calculates automatically (by multiplying the reimbursement rate by the total costs declared). The amount you request (in the column 'requested EU contribution') may be less,

[4] See Article 5 for the forms of costs

[5] Flat rate : 25% of eligible direct costs, from which are excluded: direct costs of subcontracting, costs of in-kind contributions not used on premises, direct costs of financial support, and unit costs declared under budget category F if they include indirect costs (see Article 6.2.E)

[6] Only specific unit costs that do not include indirect costs

ANNEX 5

MODEL FOR THE CERTIFICATE ON THE FINANCIAL STATEMENTS

- **For options [*in italics in square brackets*]: choose the applicable option. Options not chosen should be deleted.**
- **For fields in [grey in square brackets]: enter the appropriate data**

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Terms of Reference for an Independent Report of Factual Findings on costs declared under a Grant Agreement financed under the Horizon 2020 Research and Innovation Framework Programme

This document sets out the '**Terms of Reference (ToR)**' under which

[OPTION 1: [insert name of the beneficiary] ('the Beneficiary')] [OPTION 2: [insert name of the linked third party] ('the Linked Third Party'), third party linked to the Beneficiary [insert name of the beneficiary] ('the Beneficiary')]

agrees to engage

[**insert legal name of the auditor**] ('the Auditor')

to produce an independent report of factual findings ('the Report') concerning the Financial Statement(s)[1] drawn up by the *[Beneficiary] [Linked Third Party]* for the Horizon 2020 grant agreement [insert number of the grant agreement, title of the action, acronym and duration from/to] ('the Agreement'), and

to issue a Certificate on the Financial Statements' ('CFS') referred to in Article 20.4 of the Agreement based on the compulsory reporting template stipulated by the Commission.

The Agreement has been concluded under the Horizon 2020 Research and Innovation Framework Programme (H2020) between the Beneficiary and *[OPTION 1: the European Union, represented by the European Commission ('the Commission')][OPTION 2: the European Atomic Energy Community (Euratom,) represented by the European Commission ('the Commission')][OPTION 3: the [Research Executive Agency (REA)] [European Research Council Executive Agency (ERCEA)] [Innovation and Networks Executive Agency (INEA)] [Executive Agency for Small and Medium-sized Enterprises (EASME)] ('the Agency'), under the powers delegated by the European Commission ('the Commission').]*

The *[Commission] [Agency]* is mentioned as a signatory of the Agreement with the Beneficiary only. The *[European Union][Euratom][Agency]* is not a party to this engagement.

1.1 Subject of the engagement

The coordinator must submit to the *[Commission][Agency]* the final report within 60 days following the end of the last reporting period which should include, amongst other documents, a CFS for each beneficiary and for each linked third party that requests a total contribution of EUR 325 000 or more, as reimbursement of actual costs and unit costs calculated on the basis of its usual cost accounting practices (see Article 20.4 of the Agreement). The CFS must cover all reporting periods of the beneficiary or linked third party indicated above.

The Beneficiary must submit to the coordinator the CFS for itself and for its linked third party(ies), if the CFS must be included in the final report according to Article 20.4 of the Agreement.

The CFS is composed of two separate documents:

- The Terms of Reference ('the ToR') to be signed by the *[Beneficiary] [Linked Third Party]* and the Auditor;

[1] By which costs under the Agreement are declared (see template 'Model Financial Statements' in Annex 4 to the Grant Agreement).

- The Auditor's Independent Report of Factual Findings ('the Report') to be issued on the Auditor's letterhead, dated, stamped and signed by the Auditor (or the competent public officer) which includes the agreed-upon procedures ('the Procedures') to be performed by the Auditor, and the standard factual findings ('the Findings') to be confirmed by the Auditor.

If the CFS must be included in the final report according to Article 20.4 of the Agreement, the request for payment of the balance relating to the Agreement cannot be made without the CFS. However, the payment for reimbursement of costs covered by the CFS does not preclude the Commission *[Agency,]* the European Anti-Fraud Office and the European Court of Auditors from carrying out checks, reviews, audits and investigations in accordance with Article 22 of the Agreement.

1.2 Responsibilities

The *[Beneficiary] [Linked Third Party]:*

- must draw up the Financial Statement(s) for the action financed by the Agreement in compliance with the obligations under the Agreement. The Financial Statement(s) must be drawn up according to the *[Beneficiary's] [Linked Third Party's]* accounting and book-keeping system and the underlying accounts and records;
- must send the Financial Statement(s) to the Auditor;
- is responsible and liable for the accuracy of the Financial Statement(s);
- is responsible for the completeness and accuracy of the information provided to enable the Auditor to carry out the Procedures. It must provide the Auditor with a written representation letter supporting these statements. The written representation letter must state the period covered by the statements and must be dated;
- accepts that the Auditor cannot carry out the Procedures unless it is given full access to the *[Beneficiary's] [Linked Third Party's]* staff and accounting as well as any other relevant records and documentation.

The Auditor:

- *[Option 1 by default:* is qualified to carry out statutory audits of accounting documents in accordance with Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts, amending Council Directives 78/660/EEC and 83/349/EEC and repealing Council Directive 84/253/EEC or similar national regulations*]*.
- *[Option 2 if the Beneficiary or Linked Third Party has an independent Public Officer:* is a competent and independent Public Officer for which the relevant national authorities have established the legal capacity to audit the Beneficiary*]*.
- *[Option 3 if the Beneficiary or Linked Third Party is an international organisation:* is an [internal] [external] auditor in accordance with the internal financial regulations and procedures of the international organisation*]*.

The Auditor:

- must be independent from the Beneficiary *[and the Linked Third Party]*, in particular, it must not have been involved in preparing the *[Beneficiary's] [Linked Third Party's]* Financial Statement(s);
- must plan work so that the Procedures may be carried out and the Findings may be assessed;
- must adhere to the Procedures laid down and the compulsory report format;
- must carry out the engagement in accordance with this ToR;
- must document matters which are important to support the Report;
- must base its Report on the evidence gathered;
- must submit the Report to the *[Beneficiary] [Linked Third Party]*.

The Commission sets out the Procedures to be carried out by the Auditor. The Auditor is not responsible for their suitability or pertinence. As this engagement is not an assurance engagement, the Auditor does not provide an audit opinion or a statement of assurance.

1.3 Applicable Standards

The Auditor must comply with these Terms of Reference and with[2]:

- the International Standard on Related Services ('ISRS') 4400 *Engagements to perform Agreed-upon Procedures regarding Financial Information* as issued by the International Auditing and Assurance Standards Board (IAASB);
- the *Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants (IESBA). Although ISRS 4400 states that independence is not a requirement for engagements to carry out agreed-upon procedures, the *[Commission][Agency]* requires that the Auditor also complies with the Code's independence requirements.

The Auditor's Report must state that there is no conflict of interests in establishing this Report between the Auditor and the Beneficiary *[and the Linked Third Party]*, and must specify - if the service is invoiced - the total fee paid to the Auditor for providing the Report.

1.4 Reporting

The Report must be written in the language of the Agreement (see Article 20.7).

Under Article 22 of the Agreement, the Commission*[, the Agency],* the European Anti-Fraud Office and the Court of Auditors have the right to audit any work that is carried out under the action and for which costs are declared from [*the European Union*] [*Euratom*] budget. This includes work related to this engagement. The Auditor must provide access to all working papers (e.g. recalculation of hourly rates, verification of the time declared for the action) related to this assignment if the Commission *[, the Agency]*, the European Anti-Fraud Office or the European Court of Auditors requests them.

1.5 Timing

The Report must be provided by *[*dd Month yyyy*]*.

1.6 Other terms

[*The [Beneficiary] [Linked Third Party] and the Auditor can use this section to agree other specific terms, such as the Auditor's fees, liability, applicable law, etc. Those specific terms must not contradict the terms specified above.*]

[legal name of the Auditor]	[legal name of the *[Beneficiary][Linked Third Party]*]
[name & function of authorised representative]	[name & function of authorised representative]
[dd Month yyyy]	[dd Month yyyy]
Signature of the Auditor	Signature of the *[Beneficiary][Linked Third Party]*

[2] Supreme Audit Institutions applying INTOSAI-standards may carry out the Procedures according to the corresponding International Standards of Supreme Audit Institutions and code of ethics issued by INTOSAI instead of the International Standard on Related Services ('ISRS') 4400 and the Code of Ethics for Professional Accountants issued by the IAASB and the IESBA.

Independent Report of Factual Findings on costs declared under Horizon 2020 Research and Innovation Framework Programme

(To be printed on the Auditor's letterhead)

To
[name of contact person(s)], [Position]
[[*Beneficiary's*] [*Linked Third Party's*] name]
[Address]
[dd Month yyyy]

Dear [Name of contact person(s)],

As agreed under the terms of reference dated [dd Month yyyy]

with *[OPTION 1: [insert name of the beneficiary] ('the Beneficiary')] [OPTION 2: [insert name of the linked third party] ('the Linked Third Party'), third party linked to the Beneficiary [insert name of the beneficiary] ('the Beneficiary')],*

we

[name of the auditor] ('the Auditor'),

established at

[full address/city/state/province/country],

represented by

[name and function of an authorised representative],

have carried out the procedures agreed with you regarding the costs declared in the Financial Statement(s)[3] of the *[Beneficiary] [Linked Third Party]* concerning the grant agreement [insert grant agreement reference: number, title of the action and acronym] ('the Agreement'),

with a total cost declared of
[total amount] EUR,

and a total of actual costs and unit costs calculated in accordance with the [*Beneficiary's*] [*Linked Third Party's*] usual cost accounting practices' declared of

[sum of total actual costs and total direct personnel costs declared as unit costs calculated in accordance with the *[Beneficiary's] [Linked Third Party's]* usual cost accounting practices] EUR

and **hereby provide our Independent Report of Factual Findings ('the Report')** using the compulsory report format agreed with you.

The Report

Our engagement was carried out in accordance with the terms of reference ('the ToR') appended to this Report. The Report includes the agreed-upon procedures ('the Procedures') carried out and the standard factual findings ('the Findings') examined.

[3] By which the Beneficiary declares costs under the Agreement (see template 'Model Financial Statement' in Annex 4 to the Agreement).

The Procedures were carried out solely to assist the *[Commission] [Agency]* in evaluating whether the *[Beneficiary's] [Linked Third Party's]* costs in the accompanying Financial Statement(s) were declared in accordance with the Agreement. The *[Commission] [Agency]* draws its own conclusions from the Report and any additional information it may require.

The scope of the Procedures was defined by the Commission. Therefore, the Auditor is not responsible for their suitability or pertinence. Since the Procedures carried out constitute neither an audit nor a review made in accordance with International Standards on Auditing or International Standards on Review Engagements, the Auditor does not give a statement of assurance on the Financial Statements.

Had the Auditor carried out additional procedures or an audit of the *[Beneficiary's] [Linked Third Party's]* Financial Statements in accordance with International Standards on Auditing or International Standards on Review Engagements, other matters might have come to its attention and would have been included in the Report.

Not applicable Findings

We examined the Financial Statement(s) stated above and considered the following Findings not applicable:

Explanation (to be removed from the Report):

*If a Finding was not applicable, it must be marked as '**N.A.**' ('Not applicable') in the corresponding row on the right-hand column of the table and means that the Finding did not have to be corroborated by the Auditor and the related Procedure(s) did not have to be carried out.*

The reasons of the non-application of a certain Finding must be obvious i.e.

i) if no cost was declared under a certain category then the related Finding(s) and Procedure(s) are not applicable;

ii) if the condition set to apply certain Procedure(s) are not met the related Finding(s) and those Procedure(s) are not applicable. For instance, for 'beneficiaries with accounts established in a currency other than euro' the Procedure and Finding related to 'beneficiaries with accounts established in euro' are not applicable. Similarly, if no additional remuneration is paid, the related Finding(s) and Procedure(s) for additional remuneration are not applicable.

List here all Findings considered not applicable for the present engagement and explain the reasons of the non-applicability.

….

Exceptions

Apart from the exceptions listed below, the *[Beneficiary] [Linked Third Party]* provided the Auditor all the documentation and accounting information needed by the Auditor to carry out the requested Procedures and evaluate the Findings.

Explanation (to be removed from the Report):

- *If the Auditor was not able to successfully complete a procedure requested, it must be marked as '**E**' ('Exception') in the corresponding row on the right-hand column of the table. The reason such as the inability to reconcile key information or the unavailability of data that prevents the Auditor from carrying out the Procedure must be indicated below.*
- *If the Auditor cannot corroborate a standard finding after having carried out the corresponding procedure, it must also be marked as '**E**' ('Exception') and, where possible, the reasons why the Finding was not fulfilled and its possible impact must be explained here below.*

List here any exceptions and add any information on the cause and possible consequences of each exception, if known. If the exception is quantifiable, include the corresponding amount.

….

Example (to be removed from the Report):

1. *The Beneficiary was unable to substantiate the Finding number 1 on … because ….*
2. *Finding number 30 was not fulfilled because the methodology used by the Beneficiary to calculate unit costs was different from the one approved by the Commission. The differences were as follows: …*
3. *After carrying out the agreed procedures to confirm the Finding number 31, the Auditor found a difference of _____ EUR. The difference can be explained by …*

Further Remarks

In addition to reporting on the results of the specific procedures carried out, the Auditor would like to make the following general remarks:

Example (to be removed from the Report):

1. *Regarding Finding number 8 the conditions for additional remuneration were considered as fulfilled because …*
2. *In order to be able to confirm the Finding number 15 we carried out the following additional procedures: ….*

Use of this Report

This Report may be used only for the purpose described in the above objective. It was prepared solely for the confidential use of the *[Beneficiary] [Linked Third Party]* and the [*Commission*] [*Agency*], and only to be submitted to the *[Commission] [Agency]* in connection with the requirements set out in Article 20.4 of the Agreement. The Report may not be used by the *[Beneficiary] [Linked Third Party]* or by the *[Commission] [Agency]* for any other purpose, nor may it be distributed to any other parties. The *[Commission] [Agency]* may only disclose the Report to authorised parties, in particular to the European Anti-Fraud Office (OLAF) and the European Court of Auditors.

This Report relates only to the Financial Statement(s) submitted to the *[Commission] [Agency]* by the *[Beneficiary] [Linked Third Party]* for the Agreement. Therefore, it does not extend to any other of the *[Beneficiary's] [Linked Third Party's]* Financial Statement(s).

There was no conflict of interest[4] between the Auditor and the Beneficiary *[and Linked Third Party]* in establishing this Report. The total fee paid to the Auditor for providing the Report was EUR _____ (including EUR_____ of deductible VAT).

We look forward to discussing our Report with you and would be pleased to provide any further information or assistance.

[legal name of the Auditor]
[name and function of an authorised representative]
[dd Month yyyy]
Signature of the Auditor

[4] A conflict of interest arises when the Auditor's objectivity to establish the certificate is compromised in fact or in appearance when the Auditor for instance:
- was involved in the preparation of the Financial Statements;
- stands to benefit directly should the certificate be accepted;
- has a close relationship with any person representing the beneficiary;
- is a director, trustee or partner of the beneficiary; or
- is in any other situation that compromises his or her independence or ability to establish the certificate impartially.

Agreed-upon procedures to be performed and standard factual findings to be confirmed by the Auditor

The European Commission reserves the right to i) provide the auditor with additional guidance regarding the procedures to be followed or the facts to be ascertained and the way in which to present them (this may include sample coverage and findings) or to ii) change the procedures, by notifying the Beneficiary in writing. The procedures carried out by the auditor to confirm the standard factual finding are listed in the table below.

If this certificate relates to a Linked Third Party, any reference here below to 'the Beneficiary' is to be considered as a reference to 'the Linked Third Party'.

The 'result' column has three different options: 'C', 'E' and 'N.A.':

- 'C' stands for 'confirmed' and means that the auditor can confirm the 'standard factual finding' and, therefore, there is no exception to be reported.
- 'E' stands for 'exception' and means that the Auditor carried out the procedures but cannot confirm the 'standard factual finding', or that the Auditor was not able to carry out a specific procedure (e.g. because it was impossible to reconcile key information or data were unavailable),
- 'N.A.' stands for 'not applicable' and means that the Finding did not have to be examined by the Auditor and the related Procedure(s) did not have to be carried out. The reasons of the non-application of a certain Finding must be obvious i.e. i) if no cost was declared under a certain category then the related Finding(s) and Procedure(s) are not applicable; ii) if the condition set to apply certain Procedure(s) are not met then the related Finding(s) and Procedure(s) are not applicable. For instance, for 'beneficiaries with accounts established in a currency other than the euro' the Procedure related to 'beneficiaries with accounts established in euro' is not applicable. Similarly, if no additional remuneration is paid, the related Finding(s) and Procedure(s) for additional remuneration are not applicable.

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
A	**ACTUAL PERSONNEL COSTS AND UNIT COSTS CALCULATED BY THE BENEFICIARY IN ACCORDANCE WITH ITS USUAL COST ACCOUNTING PRACTICE**		
	The Auditor draws a sample of persons whose costs were declared in the Financial Statement(s) to carry out the procedures indicated in the consecutive points of this section A. (*The sample should be selected randomly so that it is representative. Full coverage is required if there are fewer than 10 people (including employees, natural persons working under a direct contract and personnel seconded by a third party), otherwise the sample should have a minimum of 10 people, or 10% of the total, whichever number is the highest)* The Auditor sampled _____ people out of the total of _____ people.		

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
A.1	**PERSONNEL COSTS** For the persons included in the sample and working under an employment contract or equivalent act (general procedures for individual actual personnel costs and personnel costs declared as unit costs) To confirm standard factual findings 1-5 listed in the next column, the Auditor reviewed following information/documents provided by the Beneficiary: o a list of the persons included in the sample indicating the period(s) during which they worked for the action, their position (classification or category) and type of contract; o the payslips of the employees included in the sample; o reconciliation of the personnel costs declared in the Financial Statement(s) with the accounting system (project accounting and general ledger) and payroll system; o information concerning the employment status and employment conditions of personnel included in the sample, in particular their employment contracts or equivalent; o the Beneficiary's usual policy regarding payroll matters (e.g. salary policy, overtime policy, variable pay); o applicable national law on taxes, labour and social security and o any other document that supports the personnel costs declared. The Auditor also verified the eligibility of all components of the retribution (see Article 6 GA) and recalculated the personnel costs for employees included in the sample.	1) The employees were i) directly hired by the Beneficiary in accordance with its national legislation, ii) under the Beneficiary's sole technical supervision and responsibility and iii) remunerated in accordance with the Beneficiary's usual practices.	
		2) Personnel costs were recorded in the Beneficiary's accounts/payroll system.	
		3) Costs were adequately supported and reconciled with the accounts and payroll records.	
		4) Personnel costs did not contain any ineligible elements.	
		5) There were no discrepancies between the personnel costs charged to the action and the costs recalculated by the Auditor.	
	Further procedures if 'additional remuneration' is paid To confirm standard factual findings 6-9 listed in the next column, the Auditor: o reviewed relevant documents provided by the Beneficiary (legal form, legal/statutory	6) The Beneficiary paying "additional remuneration" was a non-profit legal entity.	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	obligations, the Beneficiary's usual policy on additional remuneration, criteria used for its calculation, the Beneficiary's usual remuneration practice for projects funded under national funding schemes…); o recalculated the amount of additional remuneration eligible for the action based on the supporting documents received (full-time or part-time work, exclusive or non-exclusive dedication to the action, usual remuneration paid for projects funded by national schemes) to arrive at the applicable FTE/year and pro-rata rate (see data collected in the course of carrying out the procedures under A.2 'Productive hours' and A.4 'Time recording system'). *'ADDITIONAL REMUNERATION' MEANS ANY PART OF THE REMUNERATION WHICH EXCEEDS WHAT THE PERSON WOULD BE PAID FOR TIME WORKED IN PROJECTS FUNDED BY NATIONAL SCHEMES.* *IF ANY PART OF THE REMUNERATION PAID TO THE EMPLOYEE QUALIFIES AS "ADDITIONAL REMUNERATION" AND IS ELIGIBLE UNDER THE PROVISIONS OF ARTICLE 6.2.A.1, THIS CAN BE CHARGED AS ELIGIBLE COST TO THE ACTION UP TO THE FOLLOWING AMOUNT:* *(A) IF THE PERSON WORKS FULL TIME AND EXCLUSIVELY ON THE ACTION DURING THE FULL YEAR: UP TO EUR 8 000/YEAR;* *(B) IF THE PERSON WORKS EXCLUSIVELY ON THE ACTION BUT NOT FULL-TIME OR NOT FOR THE FULL YEAR: UP TO THE CORRESPONDING PRO-RATA AMOUNT OF EUR 8 000, OR* *(C) IF THE PERSON DOES NOT WORK EXCLUSIVELY ON THE ACTION: UP TO A PRO-RATA AMOUNT CALCULATED IN ACCORDANCE TO ARTICLE 6.2.A.1.*	7) The amount of additional remuneration paid corresponded to the Beneficiary's usual remuneration practices and was consistently paid whenever the same kind of work or expertise was required.	
		8) The criteria used to calculate the additional remuneration were objective and generally applied by the Beneficiary regardless of the source of funding used.	
		9) The amount of additional remuneration included in the personnel costs charged to the action was capped at EUR 8,000 per FTE/year (up to the equivalent pro-rata amount if the person did not work on the action full-time during the year or did not work exclusively on the action).	
	Additional procedures in case "unit costs calculated by the Beneficiary in accordance with its usual cost accounting practices" is applied: Apart from carrying out the procedures indicated above to confirm standard factual findings 1-5 and, if applicable, also 6-9, the Auditor carried out following procedures to confirm standard	10) The personnel costs included in the Financial Statement were calculated in accordance with the Beneficiary's usual cost accounting practice. This methodology was consistently	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	factual findings 10-13 listed in the next column: o obtained a description of the Beneficiary's usual cost accounting practice to calculate unit costs;. o reviewed whether the Beneficiary's usual cost accounting practice was applied for the Financial Statements subject of the present CFS; o verified the employees included in the sample were charged under the correct category (in accordance with the criteria used by the Beneficiary to establish personnel categories) by reviewing the contract/HR-record or analytical accounting records; o verified that there is no difference between the total amount of personnel costs used in calculating the cost per unit and the total amount of personnel costs recorded in the statutory accounts; o verified whether actual personnel costs were adjusted on the basis of budgeted or estimated elements and, if so, verified whether those elements used are actually relevant for the calculation, objective and supported by documents.	used in all H2020 actions.	
		11) The employees were charged under the correct category.	
		12) Total personnel costs used in calculating the unit costs were consistent with the expenses recorded in the statutory accounts.	
		13) Any estimated or budgeted element used by the Beneficiary in its unit-cost calculation were relevant for calculating personnel costs and corresponded to objective and verifiable information.	
	<u>For natural persons included in the sample and working with the Beneficiary under a direct contract other than an employment contract, such as consultants (no subcontractors).</u> To confirm standard factual findings 14-17 listed in the next column the Auditor reviewed following information/documents provided by the Beneficiary: o the contracts, especially the cost, contract duration, work description, place of work, ownership of the results and reporting obligations to the Beneficiary; o the employment conditions of staff in the same category to compare costs and; o any other document that supports the costs declared and its registration (e.g. invoices, accounting records, etc.).	14) The natural persons worked under conditions similar to those of an employee, in particular regarding the way the work is organised, the tasks that are performed and the premises where they are performed.	
		15) The results of work carried out belong to the Beneficiary, or, if not, the Beneficiary has obtained all necessary rights to fulfil its obligations as if those	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
		results were generated by itself.	
		16) Their costs were not significantly different from those for staff who performed similar tasks under an employment contract with the Beneficiary.	
		17) The costs were supported by audit evidence and registered in the accounts.	
	<u>For personnel seconded by a third party and included in the sample (not subcontractors)</u> To confirm standard factual findings 18-21 listed in the next column, the Auditor reviewed following information/documents provided by the Beneficiary: o their secondment contract(s) notably regarding costs, duration, work description, place of work and ownership of the results; o if there is reimbursement by the Beneficiary to the third party for the resource made available (in-kind contribution against payment): any documentation that supports the costs declared (e.g. contract, invoice, bank payment, and proof of registration in its accounting/payroll, etc.) and reconciliation of the Financial Statement(s) with the accounting system (project accounting and general ledger) as well as any proof that the amount invoiced by the third party did not include any profit; o if there is no reimbursement by the Beneficiary to the third party for the resource made available (in-kind contribution free of charge): a proof of the actual cost borne by the Third Party for the resource made available free of charge to the Beneficiary such as a statement of costs incurred by the Third Party and proof of the registration in the Third Party's accounting/payroll;	18) Seconded personnel reported to the Beneficiary and worked on the Beneficiary's premises (unless otherwise agreed with the Beneficiary).	
		19) The results of work carried out belong to the Beneficiary, or, if not, the Beneficiary has obtained all necessary rights to fulfil its obligations as if those results were generated by itself..	
		If personnel is seconded against payment: 20) The costs declared were supported with documentation and recorded in the	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	○ any other document that supports the costs declared (e.g. invoices, etc.).	Beneficiary's accounts. The third party did not include any profit.	
		If personnel is seconded free of charge: 21) The costs declared did not exceed the third party's cost as recorded in the accounts of the third party and were supported with documentation.	
A.2	**PRODUCTIVE HOURS** To confirm standard factual findings 22-27 listed in the next column, the Auditor reviewed relevant documents, especially national legislation, labour agreements and contracts and time records of the persons included in the sample, to verify that: ○ the annual productive hours applied were calculated in accordance with one of the methods described below, ○ the full-time equivalent (FTEs) ratios for employees not working full-time were correctly calculated. If the Beneficiary applied method B, the auditor verified that the correctness in which the total number of hours worked was calculated and that the contracts specified the annual workable hours. If the Beneficiary applied method C, the auditor verified that the 'annual productive hours' applied when calculating the hourly rate were equivalent to at least 90 % of the 'standard annual workable hours'. The Auditor can only do this if the calculation of the standard annual workable	22) The Beneficiary applied method [*choose one option and delete the others*] [**A**: 1720 hours] [**B**: the 'total number of hours worked'] [**C**: 'standard annual productive hours' used correspond to usual accounting practices]	
		23) Productive hours were calculated annually.	
		24) For employees not working full-time the full-time equivalent (FTE) ratio was correctly applied.	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	hours can be supported by records, such as national legislation, labour agreements, and contracts. *BENEFICIARY'S PRODUCTIVE HOURS' FOR PERSONS WORKING FULL TIME SHALL BE ONE OF THE FOLLOWING METHODS:* ***A**. 1720 ANNUAL PRODUCTIVE HOURS (PRO-RATA FOR PERSONS NOT WORKING FULL-TIME)* ***B**. THE TOTAL NUMBER OF HOURS WORKED BY THE PERSON FOR THE BENEFICIARY IN THE YEAR (THIS METHOD IS ALSO REFERRED TO AS 'TOTAL NUMBER OF HOURS WORKED' IN THE NEXT COLUMN). THE CALCULATION OF THE TOTAL NUMBER OF HOURS WORKED WAS DONE AS FOLLOWS: ANNUAL WORKABLE HOURS OF THE PERSON ACCORDING TO THE EMPLOYMENT CONTRACT, APPLICABLE LABOUR AGREEMENT OR NATIONAL LAW PLUS OVERTIME WORKED MINUS ABSENCES (SUCH AS SICK LEAVE OR SPECIAL LEAVE).* ***C**. THE STANDARD NUMBER OF ANNUAL HOURS GENERALLY APPLIED BY THE BENEFICIARY FOR ITS PERSONNEL IN ACCORDANCE WITH ITS USUAL COST ACCOUNTING PRACTICES (THIS METHOD IS ALSO REFERRED TO AS 'STANDARD ANNUAL PRODUCTIVE HOURS' IN THE NEXT COLUMN). THIS NUMBER MUST BE AT LEAST 90% OF THE STANDARD ANNUAL WORKABLE HOURS.* *'ANNUAL WORKABLE HOURS' MEANS THE PERIOD DURING WHICH THE PERSONNEL MUST BE WORKING, AT THE EMPLOYER'S DISPOSAL AND CARRYING OUT HIS/HER ACTIVITY OR DUTIES UNDER THE EMPLOYMENT CONTRACT, APPLICABLE COLLECTIVE LABOUR AGREEMENT OR NATIONAL WORKING TIME LEGISLATION.*	*If the Beneficiary applied method B.* 25) The calculation of the number of 'annual workable hours', overtime and absences was verifiable based on the documents provided by the Beneficiary. 25.1) The Beneficiary calculates the hourly rates per full financial year following procedure A.3 (method B is not allowed for beneficiaries calculating hourly rates per month). *If the Beneficiary applied method C.* 26) The calculation of the number of 'standard annual workable hours' was verifiable based on the documents provided by the Beneficiary.	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
		27) The 'annual productive hours' used for calculating the hourly rate were consistent with the usual cost accounting practices of the Beneficiary and were equivalent to at least 90 % of the 'annual workable hours'.	
A.3	**HOURLY PERSONNEL RATES** I) For unit costs calculated in accordance to the Beneficiary's usual cost accounting practice (unit costs): If the Beneficiary has a "Certificate on Methodology to calculate unit costs " (CoMUC) approved by the Commission, the Beneficiary provides the Auditor with a description of the approved methodology and the Commission's letter of acceptance. The Auditor verified that the Beneficiary has indeed used the methodology approved. If so, no further verification is necessary. If the Beneficiary does not have a "Certificate on Methodology" (CoMUC) approved by the Commission, or if the methodology approved was not applied, then the Auditor: o reviewed the documentation provided by the Beneficiary, including manuals and internal guidelines that explain how to calculate hourly rates; o recalculated the unit costs (hourly rates) of staff included in the sample following the results of the procedures carried out in A.1 and A.2. II) For individual hourly rates: The Auditor: o reviewed the documentation provided by the Beneficiary, including manuals and internal guidelines that explain how to calculate hourly rates;	28) The Beneficiary applied [*choose one option and delete the other*]: [Option I: "Unit costs (hourly rates) were calculated in accordance with the Beneficiary's usual cost accounting practices"] [Option II: Individual hourly rates were applied] *For option I concerning unit costs and if the Beneficiary applies the methodology approved by the Commission (CoMUC):* 29) The Beneficiary used the Commission-approved methodology to calculate hourly rates. It corresponded to the organisation's usual cost accounting practices and was applied consistently for all	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	○ recalculated the hourly rates of staff included in the sample (recalculation of all hourly rates if the Beneficiary uses annual rates, recalculation of three months selected randomly for every year and person if the Beneficiary uses monthly rates) following the results of the procedures carried out in A.1 and A.2; ○ (only in case of monthly rates) confirmed that the time spent on parental leave is not deducted, and that, if parts of the basic remuneration are generated over a period longer than a month, the Beneficiary has included only the share which is generated in the month. *"UNIT COSTS CALCULATED BY THE BENEFICIARY IN ACCORDANCE WITH ITS USUAL COST ACCOUNTING PRACTICES":* *IT IS CALCULATED BY DIVIDING THE TOTAL AMOUNT OF PERSONNEL COSTS OF THE CATEGORY TO WHICH THE EMPLOYEE BELONGS VERIFIED IN LINE WITH PROCEDURE A.1 BY THE NUMBER OF FTE AND THE ANNUAL TOTAL PRODUCTIVE HOURS OF THE SAME CATEGORY CALCULATED BY THE BENEFICIARY IN ACCORDANCE WITH PROCEDURE A.2.* *HOURLY RATE FOR INDIVIDUAL ACTUAL PERSONAL COSTS:* *IT IS CALCULATED FOLLOWING ONE OF THE TWO OPTIONS BELOW:* *A) [OPTION BY DEFAULT] BY DIVIDING THE ACTUAL ANNUAL AMOUNT OF PERSONNEL COSTS OF AN EMPLOYEE VERIFIED IN LINE WITH PROCEDURE A.1 BY THE NUMBER OF ANNUAL PRODUCTIVE HOURS VERIFIED IN LINE WITH PROCEDURE A.2 (FULL FINANCIAL YEAR HOURLY RATE);* *B) BY DIVIDING THE ACTUAL MONTHLY AMOUNT OF PERSONNEL COSTS OF AN EMPLOYEE VERIFIED IN LINE WITH PROCEDURE A.1 BY 1/12 OF THE NUMBER OF ANNUAL PRODUCTIVE HOURS VERIFIED IN LINE WITH PROCEDURE A.2.(MONTHLY HOURLY RATE).*	activities irrespective of the source of funding.	
		For option I concerning unit costs and if the Beneficiary applies a methodology not approved by the Commission: 30) The unit costs re-calculated by the Auditor were the same as the rates applied by the Beneficiary.	
		For option II concerning individual hourly rates: 31) The individual rates re-calculated by the Auditor were the same as the rates applied by the Beneficiary. 31.1) The Beneficiary used only one option (per full financial year or per month) throughout each financial year examined. 31.2) The hourly rates do not include additional remuneration.	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
A.4	**TIME RECORDING SYSTEM** To verify that the time recording system ensures the fulfilment of all minimum requirements and that the hours declared for the action were correct, accurate and properly authorised and supported by documentation, the Auditor made the following checks for the persons included in the sample that declare time as worked for the action on the basis of time records: o description of the time recording system provided by the Beneficiary (registration, authorisation, processing in the HR-system); o its actual implementation; o time records were signed at least monthly by the employees (on paper or electronically) and authorised by the project manager or another manager; o the hours declared were worked within the project period; o there were no hours declared as worked for the action if HR-records showed absence due to holidays or sickness (further cross-checks with travels are carried out in B.1 below) ; o the hours charged to the action matched those in the time recording system. *ONLY THE HOURS WORKED ON THE ACTION CAN BE CHARGED. ALL WORKING TIME TO BE CHARGED SHOULD BE RECORDED THROUGHOUT THE DURATION OF THE PROJECT, ADEQUATELY SUPPORTED BY EVIDENCE OF THEIR REALITY AND RELIABILITY (SEE SPECIFIC PROVISIONS BELOW FOR PERSONS WORKING EXCLUSIVELY FOR THE ACTION WITHOUT TIME RECORDS).*	32) All persons recorded their time dedicated to the action on a **daily/ weekly/ monthly** basis using a **paper/computer-based** system. (*delete the answers that are not applicable)*	
		33) Their time-records were authorised at least monthly by the project manager or other superior.	
		34) Hours declared were worked within the project period and were consistent with the presences/absences recorded in HR-records.	
		35) There were no discrepancies between the number of hours charged to the action and the number of hours recorded.	
	<u>If the persons are working exclusively for the action and without time records</u> For the persons selected that worked exclusively for the action without time records, the Auditor verified evidence available demonstrating that they were in reality exclusively dedicated to the action and that the Beneficiary signed a declaration confirming that they have worked exclusively for the action.	36) The exclusive dedication is supported by a declaration signed by the Beneficiary and by any other evidence gathered.	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
B	**COSTS OF SUBCONTRACTING**		
B.1	**The Auditor obtained the detail/breakdown of subcontracting costs and sampled _____ cost items selected randomly** (*full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest*). To confirm standard factual findings 37-41 listed in the next column, the Auditor reviewed the following for the items included in the sample: o the use of subcontractors was foreseen in Annex 1; o subcontracting costs were declared in the subcontracting category of the Financial Statement; o supporting documents on the selection and award procedure were followed; o the Beneficiary ensured best value for money (key elements to appreciate the respect of this principle are the award of the subcontract to the bid offering best price-quality ratio, under conditions of transparency and equal treatment. In case an existing framework contract was used the Beneficiary ensured it was established on the basis of the principle of best value for money under conditions of transparency and equal treatment). In particular, i. if the Beneficiary acted as a contracting authority within the meaning of Directive 2004/18/EC (or 2014/24/EU) or of Directive 2004/17/EC (or 2014/25/EU), the Auditor verified that the applicable national law on public procurement was followed and that the subcontracting complied with the Terms and Conditions of the Agreement. ii. if the Beneficiary did not fall under the above-mentioned category the Auditor verified that the Beneficiary followed their usual procurement rules and respected the Terms and Conditions of the Agreement..	37) The use of claimed subcontracting costs was foreseen in Annex 1 and costs were declared in the Financial Statements under the subcontracting category.	
		38) There were documents of requests to different providers, different offers and assessment of the offers before selection of the provider in line with internal procedures and procurement rules. Subcontracts were awarded in accordance with the principle of best value for money. *(When different offers were not collected the Auditor explains the reasons provided by the Beneficiary under the caption "Exceptions" of the Report. The Commission will analyse this information to evaluate whether these costs might be accepted as eligible)*	
		39) The subcontracts were not awarded to other Beneficiaries	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	For the items included in the sample the Auditor also verified that: o the subcontracts were not awarded to other Beneficiaries in the consortium; o there were signed agreements between the Beneficiary and the subcontractor; o there was evidence that the services were provided by subcontractor;	of the consortium.	
		40) All subcontracts were supported by signed agreements between the Beneficiary and the subcontractor.	
		41) There was evidence that the services were provided by the subcontractors.	
C	**COSTS OF PROVIDING FINANCIAL SUPPORT TO THIRD PARTIES**		
C.1	**The Auditor obtained the detail/breakdown of the costs of providing financial support to third parties and sampled _____ cost items selected randomly** (*full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest*). The Auditor verified that the following minimum conditions were met: a) the maximum amount of financial support for each third party did not exceed EUR 60 000, unless explicitly mentioned in Annex 1; b) the financial support to third parties was agreed in Annex 1 of the Agreement and the other provisions on financial support to third parties included in Annex 1 were respected.	42) All minimum conditions were met	

D	OTHER ACTUAL DIRECT COSTS		
D.1	**COSTS OF TRAVEL AND RELATED SUBSISTENCE ALLOWANCES** **The Auditor sampled _____ cost items selected randomly** (*full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is the highest*). The Auditor inspected the sample and verified that: o travel and subsistence costs were consistent with the Beneficiary's usual policy for travel. In this context, the Beneficiary provided evidence of its normal policy for travel costs (e.g. use of first class tickets, reimbursement by the Beneficiary on the basis of actual costs, a lump sum or per diem) to enable the Auditor to compare the travel costs charged with this policy; o travel costs are correctly identified and allocated to the action (e.g. trips are directly linked to the action) by reviewing relevant supporting documents such as minutes of meetings, workshops or conferences, their registration in the correct project account, their consistency with time records or with the dates/duration of the workshop/conference; o no ineligible costs or excessive or reckless expenditure was declared (see Article 6.5 MGA).	43) Costs were incurred, approved and reimbursed in line with the Beneficiary's usual policy for travels.	
		44) There was a link between the trip and the action.	
		45) The supporting documents were consistent with each other regarding subject of the trip, dates, duration and reconciled with time records and accounting.	
		46) No ineligible costs or excessive or reckless expenditure was declared.	
D.2	**DEPRECIATION COSTS FOR EQUIPMENT, INFRASTRUCTURE OR OTHER ASSETS** **The Auditor sampled _____ cost items selected randomly** (*full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is the highest*). For "equipment, infrastructure or other assets" [from now on called "asset(s)"] selected in the sample the Auditor verified that: o the assets were acquired in conformity with the Beneficiary's internal guidelines and procedures;	47) Procurement rules, principles and guides were followed.	
		48) There was a link between the grant agreement and the asset charged to the action.	
		49) The asset charged to the action was traceable to the accounting records and the underlying documents.	

	○ they were correctly allocated to the action (with supporting documents such as delivery note invoice or any other proof demonstrating the link to the action) ○ they were entered in the accounting system; ○ the extent to which the assets were used for the action (as a percentage) was supported by reliable documentation (e.g. usage overview table); The Auditor recalculated the depreciation costs and verified that they were in line with the applicable rules in the Beneficiary's country and with the Beneficiary's usual accounting policy (e.g. depreciation calculated on the acquisition value). The Auditor verified that no ineligible costs such as deductible VAT, exchange rate losses, excessive or reckless expenditure were declared (see Article 6.5 GA).	50) The depreciation method used to charge the asset to the action was in line with the applicable rules of the Beneficiary's country and the Beneficiary's usual accounting policy. 51) The amount charged corresponded to the actual usage for the action. 52) No ineligible costs or excessive or reckless expenditure were declared.	
D.3	**COSTS OF OTHER GOODS AND SERVICES** **The Auditor sampled _____ cost items selected randomly** (*full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest*). For the purchase of goods, works or services included in the sample the Auditor verified that: ○ the contracts did not cover tasks described in Annex 1; ○ they were correctly identified, allocated to the proper action, entered in the accounting system (traceable to underlying documents such as purchase orders, invoices and accounting); ○ the goods were not placed in the inventory of durable equipment; ○ the costs charged to the action were accounted in line with the Beneficiary's usual accounting practices; ○ no ineligible costs or excessive or reckless expenditure were declared (see Article 6 GA). In addition, the Auditor verified that these goods and services were acquired in conformity with	53) Contracts for works or services did not cover tasks described in Annex 1. 54) Costs were allocated to the correct action and the goods were not placed in the inventory of durable equipment. 55) The costs were charged in line with the Beneficiary's accounting policy and were adequately supported. 56) No ineligible costs or excessive or reckless expenditure were declared. For internal invoices/charges only the cost element was charged, without any mark-ups.	

	the Beneficiary's internal guidelines and procedures, in particular: o if Beneficiary acted as a contracting authority within the meaning of Directive 2004/18/EC (or 2014/24/EU) or of Directive 2004/17/EC (or 2014/25/EU), the Auditor verified that the applicable national law on public procurement was followed and that the procurement contract complied with the Terms and Conditions of the Agreement. o if the Beneficiary did not fall into the category above, the Auditor verified that the Beneficiary followed their usual procurement rules and respected the Terms and Conditions of the Agreement. For the items included in the sample the Auditor also verified that: o the Beneficiary ensured best value for money (key elements to appreciate the respect of this principle are the award of the contract to the bid offering best price-quality ratio, under conditions of transparency and equal treatment. In case an existing framework contract was used the Auditor also verified that the Beneficiary ensured it was established on the basis of the principle of best value for money under conditions of transparency and equal treatment); *SUCH GOODS AND SERVICES INCLUDE, FOR INSTANCE, CONSUMABLES AND SUPPLIES, DISSEMINATION (INCLUDING OPEN ACCESS), PROTECTION OF RESULTS, SPECIFIC EVALUATION OF THE ACTION IF IT IS REQUIRED BY THE AGREEMENT, CERTIFICATES ON THE FINANCIAL STATEMENTS IF THEY ARE REQUIRED BY THE AGREEMENT AND CERTIFICATES ON THE METHODOLOGY, TRANSLATIONS, REPRODUCTION.*	57) Procurement rules, principles and guides were followed. There were documents of requests to different providers, different offers and assessment of the offers before selection of the provider in line with internal procedures and procurement rules. The purchases were made in accordance with the principle of best value for money. *(When different offers were not collected the Auditor explains the reasons provided by the Beneficiary under the caption "Exceptions" of the Report. The Commission will analyse this information to evaluate whether these costs might be accepted as eligible)*	
D.4	**AGGREGATED CAPITALISED AND OPERATING COSTS OF RESEARCH INFRASTRUCTURE** The Auditor ensured the existence of a positive ex-ante assessment (issued by the EC Services) of the cost accounting methodology of the Beneficiary allowing it to apply the guidelines on direct costing for large research infrastructures in Horizon 2020.	58) The costs declared as direct costs for Large Research Infrastructures (in the appropriate line of the Financial Statement) comply with the methodology described in the positive ex-ante assessment report.	

	In the cases that a positive ex-ante assessment has been issued *(see the standard factual findings 58-59 on the next column)***,** The Auditor ensured that the beneficiary has applied consistently the methodology that is explained and approved in the positive ex ante assessment; ***In the cases that a positive ex-ante assessment has NOT been issued*** *(see the standard factual findings 60 on the next column),* The Auditor verified that no costs of Large Research Infrastructure have been charged as direct costs in any costs category; ***In the cases that a draft ex-ante assessment report has been issued with recommendation for further changes*** *(see the standard factual findings 60 on the next column),* • The Auditor followed the same procedure as above (when a positive ex-ante assessment has NOT yet been issued) and paid particular attention (testing reinforced) to the cost items for which the draft ex-ante assessment either rejected the inclusion as direct costs for Large Research Infrastructures or issued recommendations.	59) Any difference between the methodology applied and the one positively assessed was extensively described and adjusted accordingly. 60) The direct costs declared were free from any indirect costs items related to the Large Research Infrastructure.	
D.5	**Costs of internally invoiced goods and services** **The Auditor sampled cost items selected randomly** (*full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest*). To confirm standard factual findings 61-65 listed in the next column, the Auditor: ○ obtained a description of the Beneficiary's usual cost accounting practice to calculate costs of internally invoiced goods and services (unit costs); ○ reviewed whether the Beneficiary's usual cost accounting practice was applied for the Financial Statements subject of the present CFS; ○ ensured that the methodology to calculate unit costs is being used in a consistent manner, based on objective criteria, regardless of the source of funding; ○ verified that any ineligible items or any costs claimed under other budget categories, in particular indirect costs, have not been taken into account when calculating the costs of	61) The costs of internally invoiced goods and services included in the Financial Statement were calculated in accordance with the Beneficiary's usual cost accounting practice. 62) The cost accounting practices used to calculate the costs of internally invoiced goods and services were applied by the Beneficiary in a consistent manner based on objective criteria regardless of the source of funding. 63) The unit cost is calculated using the actual costs for the good or service recorded in the Beneficiary's accounts, excluding any ineligible cost or costs included in other	

	internally invoiced goods and services (see Article 6 GA); ○ verified whether actual costs of internally invoiced goods and services were adjusted on the basis of budgeted or estimated elements and, if so, verified whether those elements used are actually relevant for the calculation, and correspond to objective and verifiable information. ○ verified that any costs of items which are not directly linked to the production of the invoiced goods or service (e.g. supporting services like cleaning, general accountancy, administrative support, etc. not directly used for production of the good or service) have not been taken into account when calculating the costs of internally invoiced goods and services. ○ verified that any costs of items used for calculating the costs internally invoiced goods and services are supported by audit evidence and registered in the accounts.	budget categories. 64) The unit cost excludes any costs of items which are not directly linked to the production of the invoiced goods or service. 65) The costs items used for calculating the actual costs of internally invoiced goods and services were relevant, reasonable and correspond to objective and verifiable information.	
E	**USE OF EXCHANGE RATES**		
E.1	a) For Beneficiaries with accounts established in a currency other than euros **The Auditor sampled _____ cost items selected randomly and verified that the exchange rates used for converting other currencies into euros were in accordance with the following rules established in the Agreement** (*full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest)*: *COSTS RECORDED IN THE ACCOUNTS IN A CURRENCY OTHER THAN EURO SHALL BE CONVERTED INTO EURO AT THE AVERAGE OF THE DAILY EXCHANGE RATES PUBLISHED IN THE C SERIES OF OFFICIAL JOURNAL OF THE EUROPEAN UNION (https://www.ecb.int/stats/exchange/eurofxref/html/index.en.html), DETERMINED OVER THE CORRESPONDING REPORTING PERIOD.* *IF NO DAILY EURO EXCHANGE RATE IS PUBLISHED IN THE OFFICIAL JOURNAL OF THE EUROPEAN UNION FOR THE CURRENCY IN QUESTION, CONVERSION SHALL BE MADE AT THE AVERAGE OF THE MONTHLY ACCOUNTING RATES ESTABLISHED BY THE COMMISSION AND PUBLISHED ON ITS WEBSITE (http://ec.europa.eu/budget/contracts_grants/info_contracts/inforeuro/inforeuro_en.cfm),*	66) The exchange rates used to convert other currencies into Euros were in accordance with the rules established of the Grant Agreement and there was no difference in the final figures.	

	DETERMINED OVER THE CORRESPONDING REPORTING PERIOD.		
	b) For Beneficiaries with accounts established in euros **The Auditor sampled _____ cost items selected randomly and verified that the exchange rates used for converting other currencies into euros were in accordance with the following rules established in the Agreement** (*full coverage is required if there are fewer than 10 items, otherwise the sample should have a minimum of 10 item, or 10% of the total, whichever number is highest)*: *COSTS INCURRED IN ANOTHER CURRENCY SHALL BE CONVERTED INTO EURO BY APPLYING THE BENEFICIARY'S USUAL ACCOUNTING PRACTICES.*	67) The Beneficiary applied its usual accounting practices.	

[legal name of the audit firm]
[name and function of an authorised representative]
[dd Month yyyy]
<Signature of the Auditor>

ANNEX 6

MODEL FOR THE CERTIFICATE ON THE METHODOLOGY

- **For options [*in italics in square brackets*]: choose the applicable option. Options not chosen should be deleted.**
- **For fields in [grey in square brackets]: enter the appropriate data.**

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Terms of reference for an audit engagement for a methodology certificate in connection with one or more grant agreements financed under the Horizon 2020 Research and Innovation Framework Programme

This document sets out the '**Terms of Reference (ToR)**' under which

[OPTION 1: [insert name of the beneficiary] ('the Beneficiary')] [OPTION 2: [insert name of the linked third party] ('the Linked Third Party'), third party linked to the Beneficiary [insert name of the beneficiary] ('the Beneficiary')]

agrees to engage

[**insert legal name of the auditor**] ('the Auditor')

to produce an independent report of factual findings ('the Report') concerning the *[Beneficiary's] [Linked Third Party's]* usual accounting practices for calculating and claiming direct personnel costs declared as unit costs ('the Methodology') in connection with grant agreements financed under the Horizon 2020 Research and Innovation Framework Programme.

The procedures to be carried out for the assessment of the methodology will be based on the grant agreement(s) detailed below:

[title and number of the grant agreement(s)] ('the Agreement(s)')

The Agreement(s) has(have) been concluded between the Beneficiary and *[OPTION 1: the European Union, represented by the European Commission ('the Commission')][OPTION 2: the European Atomic Energy Community (Euratom,) represented by the European Commission ('the Commission')][OPTION 3: the [Research Executive Agency (REA)] [European Research Council Executive Agency (ERCEA)] [Innovation and Networks Executive Agency (INEA)] [Executive Agency for Small and Medium-sized Enterprises (EASME)] ('the Agency'), under the powers delegated by the European Commission ('the Commission').]*.

The *[Commission] [Agency]* is mentioned as a signatory of the Agreement with the Beneficiary only. The *[European Union] [Euratom] [Agency]* is not a party to this engagement.

1.1 Subject of the engagement

According to Article 18.1.2 of the Agreement, beneficiaries *[and linked third parties]* that declare direct personnel costs as unit costs calculated in accordance with their usual cost accounting practices may submit to the *[Commission] [Agency]*, for approval, a certificate on the methodology ('CoMUC') stating that there are adequate records and documentation to prove that their cost accounting practices used comply with the conditions set out in Point A of Article 6.2.

The subject of this engagement is the CoMUC which is composed of two separate documents:

- the Terms of Reference ('the ToR') to be signed by the *[Beneficiary] [Linked Third Party]* and the Auditor;

- the Auditor's Independent Report of Factual Findings ('the Report') issued on the Auditor's letterhead, dated, stamped and signed by the Auditor which includes; the standard statements ('the Statements') evaluated and signed by the *[Beneficiary] [Linked Third Party]*, the agreed-upon procedures ('the Procedures') performed by the Auditor and the standard factual findings

('the Findings') assessed by the Auditor. The Statements, Procedures and Findings are summarised in the table that forms part of the Report.

The information provided through the Statements, the Procedures and the Findings will enable the Commission to draw conclusions regarding the existence of the *[Beneficiary's] [Linked Third Party's]* usual cost accounting practice and its suitability to ensure that direct personnel costs claimed on that basis comply with the provisions of the Agreement. The Commission draws its own conclusions from the Report and any additional information it may require.

1.2 Responsibilities

The parties to this agreement are the *[Beneficiary] [Linked Third Party]* and the Auditor.

The *[Beneficiary] [Linked Third Party]:*

- is responsible for preparing financial statements for the Agreement(s) ('the Financial Statements') in compliance with those Agreements;
- is responsible for providing the Financial Statement(s) to the Auditor and enabling the Auditor to reconcile them with the *[Beneficiary's] [Linked Third Party's]* accounting and bookkeeping system and the underlying accounts and records. The Financial Statement(s) will be used as a basis for the procedures which the Auditor will carry out under this ToR;
- is responsible for its Methodology and liable for the accuracy of the Financial Statement(s);
- is responsible for endorsing or refuting the Statements indicated under the heading 'Statements to be made by the Beneficiary/ Linked Third Party' in the first column of the table that forms part of the Report;
- must provide the Auditor with a signed and dated representation letter;
- accepts that the ability of the Auditor to carry out the Procedures effectively depends upon the *[Beneficiary] [Linked Third Party]* providing full and free access to the *[Beneficiary's] [Linked Third Party's]* staff and to its accounting and other relevant records.

The Auditor:

- *[Option 1 by default: is qualified to carry out statutory audits of accounting documents in accordance with Directive 2006/43/EC of the European Parliament and of the Council of 17 May 2006 on statutory audits of annual accounts and consolidated accounts, amending Council Directives 78/660/EEC and 83/349/EEC and repealing Council Directive 84/253/EEC or similar national regulations].*
- *[Option 2 if the Beneficiary or Linked Third Party has an independent Public Officer: is a competent and independent Public Officer for which the relevant national authorities have established the legal capacity to audit the Beneficiary].*
- *[Option 3 if the Beneficiary or Linked Third Party is an international organisation: is an [internal] [external] auditor in accordance with the internal financial regulations and procedures of the international organisation].*

The Auditor:

- must be independent from the Beneficiary *[and the Linked Third Party]*, in particular, it must not have been involved in preparing the Beneficiary's *[and Linked Third Party's]* Financial Statement(s);
- must plan work so that the Procedures may be carried out and the Findings may be assessed;
- must adhere to the Procedures laid down and the compulsory report format;
- must carry out the engagement in accordance with these ToR;
- must document matters which are important to support the Report;
- must base its Report on the evidence gathered;
- must submit the Report to the *[Beneficiary] [Linked Third Party]*.

The Commission sets out the Procedures to be carried out and the Findings to be endorsed by the Auditor. The Auditor is not responsible for their suitability or pertinence. As this engagement is not an assurance engagement the Auditor does not provide an audit opinion or a statement of assurance.

1.3 Applicable Standards

The Auditor must comply with these Terms of Reference and with[1]:

- the International Standard on Related Services ('ISRS') 4400 *Engagements to perform Agreed-upon Procedures regarding Financial Information* as issued by the International Auditing and Assurance Standards Board (IAASB);
- the *Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants (IESBA). Although ISRS 4400 states that independence is not a requirement for engagements to carry out agreed-upon procedures, the Commission requires that the Auditor also complies with the Code's independence requirements.

The Auditor's Report must state that there was no conflict of interests in establishing this Report between the Auditor and the Beneficiary *[and the Linked Third Party]* that could have a bearing on the Report, and must specify – if the service is invoiced - the total fee paid to the Auditor for providing the Report.

1.4 Reporting

The Report must be written in the language of the Agreement (see Article 20.7 of the Agreement).

Under Article 22 of the Agreement, the Commission, *[the Agency]*, the European Anti-Fraud Office and the Court of Auditors have the right to audit any work that is carried out under the action and for which costs are declared from *[the European Union] [Euratom]* budget. This includes work related to this engagement. The Auditor must provide access to all working papers related to this assignment if the Commission*[, the Agency]*, the European Anti-Fraud Office or the European Court of Auditors requests them.

1.5 Timing

The Report must be provided by [dd Month yyyy].

1.6 Other Terms

[The [Beneficiary] [Linked Third Party] and the Auditor can use this section to agree other specific terms, such as the Auditor's fees, liability, applicable law, etc. Those specific terms must not contradict the terms specified above.]

[legal name of the Auditor]	[legal name of the [Beneficiary] [Linked Third Party]]
[name & title of authorised representative]	[name & title of authorised representative]
[dd Month yyyy]	[dd Month yyyy]
Signature of the Auditor	Signature of the *[Beneficiary] [Linked Third Party]*

[1] Supreme Audit Institutions applying INTOSAI-standards may carry out the Procedures according to the corresponding International Standards of Supreme Audit Institutions and code of ethics issued by INTOSAI instead of the International Standard on Related Services ('ISRS') 4400 and the Code of Ethics for Professional Accountants issued by the IAASB and the IESBA.

Independent report of factual findings on the methodology concerning grant agreements financed under the Horizon 2020 Research and Innovation Framework Programme

(To be printed on letterhead paper of the auditor)

To
[name of contact person(s)], [Position]
[[Beneficiary's] [Linked Third Party's] name]
[Address]
[dd Month yyyy]

Dear [Name of contact person(s)],

As agreed under the terms of reference dated [dd Month yyyy]

with *[OPTION 1: [insert name of the beneficiary] ('the Beneficiary')] [OPTION 2: [insert name of the linked third party] ('the Linked Third Party'), third party linked to the Beneficiary [insert name of the beneficiary] ('the Beneficiary')]*,

we

[name of the auditor] ('the Auditor'),

established at

[full address/city/state/province/country],

represented by

[name and function of an authorised representative],

have carried out the agreed-upon procedures ('the Procedures') and provide hereby our Independent Report of Factual Findings ('the Report'), concerning the *[Beneficiary's] [Linked Third Party's]* usual accounting practices for calculating and declaring direct personnel costs declared as unit costs ('the Methodology').

You requested certain procedures to be carried out in connection with the grant(s)

[title and number of the grant agreement(s)] ('the Agreement(s)').

The Report

Our engagement was carried out in accordance with the terms of reference ('the ToR') appended to this Report. The Report includes: the standard statements ('the Statements') made by the *[Beneficiary] [Linked Third Party]*, the agreed-upon procedures ('the Procedures') carried out and the standard factual findings ('the Findings') confirmed by us.

The engagement involved carrying out the Procedures and assessing the Findings and the documentation requested appended to this Report, the results of which the Commission uses to draw conclusions regarding the acceptability of the Methodology applied by the *[Beneficiary] [Linked Third Party]*.

The Report covers the methodology used from [dd Month yyyy]. In the event that the *[Beneficiary] [Linked Third Party]* changes this methodology, the Report will not be applicable to any Financial Statement[1] submitted thereafter.

The scope of the Procedures and the definition of the standard statements and findings were determined solely by the Commission. Therefore, the Auditor is not responsible for their suitability or pertinence.

Since the Procedures carried out constitute neither an audit nor a review made in accordance with International Standards on Auditing or International Standards on Review Engagements, we do not give a statement of assurance on the costs declared on the basis of the *[Beneficiary's] [Linked Third Party's]* Methodology. Had we carried out additional procedures or had we performed an audit or review in accordance with these standards, other matters might have come to its attention and would have been included in the Report.

Exceptions

Apart from the exceptions listed below, the *[Beneficiary] [Linked Third Party]* agreed with the standard Statements and provided the Auditor all the documentation and accounting information needed by the Auditor to carry out the requested Procedures and corroborate the standard Findings.

List here any exception and add any information on the cause and possible consequences of each exception, if known. If the exception is quantifiable, also indicate the corresponding amount.

…..

Explanation of possible exceptions in the form of examples (to be removed from the Report):

i. the [Beneficiary] [Linked Third Party] did not agree with the standard Statement number … because…;

ii. the Auditor could not carry out the procedure … established because …. (e.g. due to the inability to reconcile key information or the unavailability or inconsistency of data);

iii. the Auditor could not confirm or corroborate the standard Finding number … because ….

Remarks

We would like to add the following remarks relevant for the proper understanding of the Methodology applied by the [Beneficiary] [Linked Third Party] or the results reported:

Example (to be removed from the Report):

Regarding the methodology applied to calculate hourly rates …

Regarding standard Finding 15 it has to be noted that …

The [Beneficiary] [Linked Third Party] explained the deviation from the benchmark statement XXIV concerning time recording for personnel with no exclusive dedication to the action in the following manner: …

Annexes

Please provide the following documents to the auditor and annex them to the report when submitting this CoMUC to the Commission:

[1] Financial Statement in this context refers solely to Annex 4 of the Agreement by which the Beneficiary declares costs under the Agreement.

1. Brief description of the methodology for calculating personnel costs, productive hours and hourly rates;
2. Brief description of the time recording system in place;
3. An example of the time records used by the [*Beneficiary] [Linked Third Party*];
4. Description of any budgeted or estimated elements applied, together with an explanation as to why they are relevant for calculating the personnel costs and how they are based on objective and verifiable information;
5. A summary sheet with the hourly rate for direct personnel declared by the [*Beneficiary*] [*Linked Third Party*] and recalculated by the Auditor for each staff member included in the sample (the names do not need to be reported);
6. A comparative table summarising for each person selected in the sample a) the time claimed by the [*Beneficiary*] [*Linked Third Party*] in the Financial Statement(s) and b) the time according to the time record verified by the Auditor;
7. A copy of the letter of representation provided to the Auditor.

Use of this Report

This Report has been drawn up solely for the purpose given under Point 1.1 Reasons for the engagement.

The Report:

- is confidential and is intended to be submitted to the Commission by the [*Beneficiary*] [*Linked Third Party*] in connection with Article 18.1.2 of the Agreement;
- may not be used by the [*Beneficiary*] [*Linked Third Party*] or by the Commission for any other purpose, nor distributed to any other parties;
- may be disclosed by the Commission only to authorised parties, in particular the European Anti-Fraud Office (OLAF) and the European Court of Auditors.
- relates only to the usual cost accounting practices specified above and does not constitute a report on the Financial Statements of the [*Beneficiary*] [*Linked Third Party*].

No conflict of interest[2] exists between the Auditor and the Beneficiary *[and the Linked Third Party*] that could have a bearing on the Report. The total fee paid to the Auditor for producing the Report was EUR _____ (including EUR _____ of deductible VAT).

We look forward to discussing our Report with you and would be pleased to provide any further information or assistance which may be required.

Yours sincerely

[legal name of the Auditor]
[name and title of the authorised representative]
[dd Month yyyy]
Signature of the Auditor

[2] A conflict of interest arises when the Auditor's objectivity to establish the certificate is compromised in fact or in appearance when the Auditor for instance:
- was involved in the preparation of the Financial Statements;
- stands to benefit directly should the certificate be accepted;
- has a close relationship with any person representing the beneficiary;
- is a director, trustee or partner of the beneficiary; or
- is in any other situation that compromises his or her independence or ability to establish the certificate impartially.

Statements to be made by the Beneficiary/Linked Third Party ('the Statements') and Procedures to be carried out by the Auditor ('the Procedures') and standard factual findings ('the Findings') to be confirmed by the Auditor

The Commission reserves the right to provide the auditor with guidance regarding the Statements to be made, the Procedures to be carried out or the Findings to be ascertained and the way in which to present them. The Commission reserves the right to vary the Statements, Procedures or Findings by written notification to the Beneficiary/Linked Third Party to adapt the procedures to changes in the grant agreement(s) or to any other circumstances.

If this methodology certificate relates to the Linked Third Party's usual accounting practices for calculating and claiming direct personnel costs declared as unit costs any reference here below to 'the Beneficiary' is to be considered as a reference to 'the Linked Third Party'.

Please explain any discrepancies in the body of the Report.	
Statements to be made by Beneficiary	**Procedures to be carried out and Findings to be confirmed by the Auditor**
A. Use of the Methodology I. The cost accounting practice described below has been in use since *[*dd Month yyyy*]*. II. The next planned alteration to the methodology used by the Beneficiary will be from [dd Month yyyy*]*.	**Procedure:** ✓ The Auditor checked these dates against the documentation the Beneficiary has provided. **Factual finding:** 1. The dates provided by the Beneficiary were consistent with the documentation.
B. Description of the Methodology III. The methodology to calculate unit costs is being used in a consistent manner and is reflected in the relevant procedures. *[Please describe the methodology your entity uses to calculate personnel costs, productive hours and hourly rates, present your description to the Auditor and annex it to this certificate]* *[If the statement of section "B. Description of the methodology" cannot be endorsed by the Beneficiary or there is no written methodology to calculate unit costs it should be listed here below and reported as exception by the Auditor in the main Report of Factual Findings:* - *…]*	**Procedure:** ✓ The Auditor reviewed the description, the relevant manuals and/or internal guidance documents describing the methodology. **Factual finding:** 2. The brief description was consistent with the relevant manuals, internal guidance and/or other documentary evidence the Auditor has reviewed. 3. The methodology was generally applied by the Beneficiary as part of its usual costs accounting practices.

Please explain any discrepancies in the body of the Report.	
Statements to be made by Beneficiary	**Procedures to be carried out and Findings to be confirmed by the Auditor**
C. **Personnel costs** General IV. The unit costs (hourly rates) are limited to salaries including during parental leave, social security contributions, taxes and other costs included in the remuneration required under national law and the employment contract or equivalent appointing act; V. Employees are hired directly by the Beneficiary in accordance with national law, and work under its sole supervision and responsibility; VI. The Beneficiary remunerates its employees in accordance with its usual practices. This means that personnel costs are charged in line with the Beneficiary's usual payroll policy (e.g. salary policy, overtime policy, variable pay) and no special conditions exist for employees assigned to tasks relating to the European Union or Euratom, unless explicitly provided for in the grant agreement(s); VII. The Beneficiary allocates its employees to the relevant group/category/cost centre for the purpose of the unit cost calculation in line with the usual cost accounting practice; VIII. Personnel costs are based on the payroll system and accounting system. IX. Any exceptional adjustments of actual personnel costs resulted from relevant budgeted or estimated elements and were based on objective and verifiable information. *[Please describe the 'budgeted or estimated elements' and their relevance to personnel costs, and explain how they were reasonable and based on objective and verifiable information, present your explanation to the Auditor and annex it to this certificate].* X. Personnel costs claimed do not contain any of the following ineligible costs: costs related to return on capital; debt and debt service charges; provisions for future losses or debts; interest owed; doubtful debts; currency exchange losses; bank costs charged by the Beneficiary's bank for transfers from the Commission/Agency; excessive or reckless expenditure; deductible VAT or costs incurred during suspension of the implementation of the action. XI. Personnel costs were not declared under another EU or Euratom grant	**Procedure:** *The Auditor draws a sample of employees to carry out the procedures indicated in this section C and the following sections D to F.* *[The Auditor has drawn a random sample of 10 employees assigned to Horizon 2020 action(s). If fewer than 10 employees are assigned to the Horizon 2020 action(s), the Auditor has selected all employees assigned to the Horizon 2020 action(s) complemented by other employees irrespective of their assignments until he has reached 10 employees.].* For this sample: ✓ the Auditor reviewed all documents relating to personnel costs such as employment contracts, payslips, payroll policy (e.g. salary policy, overtime policy, variable pay policy), accounting and payroll records, applicable national tax , labour and social security law and any other documents corroborating the personnel costs claimed; ✓ in particular, the Auditor reviewed the employment contracts of the employees in the sample to verify that: i. they were employed directly by the Beneficiary in accordance with applicable national legislation; ii. they were working under the sole technical supervision and responsibility of the latter; iii. they were remunerated in accordance with the Beneficiary's usual practices; iv. they were allocated to the correct group/category/cost centre for the purposes of calculating the unit cost in line with the Beneficiary's usual cost accounting practices; ✓ the Auditor verified that any ineligible items or any costs claimed under other costs categories or costs covered by other types of grant or by other grants financed from the European Union budget have not been taken into account when calculating the personnel costs; ✓ the Auditor numerically reconciled the total amount of personnel costs used to calculate the unit cost with the total amount of personnel costs recorded in the statutory accounts and the payroll system.

Please explain any discrepancies in the body of the Report.	
Statements to be made by Beneficiary	**Procedures to be carried out and Findings to be confirmed by the Auditor**
(including grants awarded by a Member State and financed by the EU budget and grants awarded by bodies other than the Commission/Agency for the purpose of implementing the EU or Euratom budget in the same period, unless the Beneficiary can demonstrate that the operating grant does not cover any costs of the action). <u>If additional remuneration as referred to in the grant agreement(s) is paid</u> XII. The Beneficiary is a non-profit legal entity; XIII. The additional remuneration is part of the beneficiary's usual remuneration practices and paid consistently whenever the relevant work or expertise is required; XIV. The criteria used to calculate the additional remuneration are objective and generally applied regardless of the source of funding; XV. The additional remuneration included in the personnel costs used to calculate the hourly rates for the grant agreement(s) is capped at EUR 8 000 per full-time equivalent (reduced proportionately if the employee is not assigned exclusively to the action). *[If certain statement(s) of section "C. Personnel costs" cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor in the main Report of Factual Findings:* *- …]*	✓ to the extent that actual personnel costs were adjusted on the basis of budgeted or estimated elements, the Auditor carefully examined those elements and checked the information source to confirm that they correspond to objective and verifiable information; ✓ if additional remuneration has been claimed, the Auditor verified that the Beneficiary was a non-profit legal entity, that the amount was capped at EUR 8 000 per full-time equivalent and that it was reduced proportionately for employees not assigned exclusively to the action(s). ✓ the Auditor recalculated the personnel costs for the employees in the sample. **Factual finding:** 4. All the components of the remuneration that have been claimed as personnel costs are supported by underlying documentation. 5. The employees in the sample were employed directly by the Beneficiary in accordance with applicable national law and were working under its sole supervision and responsibility. 6. Their employment contracts were in line with the Beneficiary's usual policy; 7. Personnel costs were duly documented and consisted solely of salaries, social security contributions (pension contributions, health insurance, unemployment fund contributions, etc.), taxes and other statutory costs included in the remuneration (holiday pay, thirteenth month's pay, etc.); 8. The totals used to calculate the personnel unit costs are consistent with those registered in the payroll and accounting records; 9. To the extent that actual personnel costs were adjusted on the basis of budgeted or estimated elements, those elements were relevant for calculating the personnel costs and correspond to objective and verifiable information. The budgeted or estimated elements used are: — (indicate the elements and their values). 10. Personnel costs contained no ineligible elements; 11. Specific conditions for eligibility were fulfilled when additional

Please explain any discrepancies in the body of the Report.	
Statements to be made by Beneficiary	**Procedures to be carried out and Findings to be confirmed by the Auditor**
	remuneration was paid: a) the Beneficiary is registered in the grant agreements as a non-profit legal entity; b) it was paid according to objective criteria generally applied regardless of the source of funding used and c) remuneration was capped at EUR 8 000 per full-time equivalent (or up to up to the equivalent pro-rata amount if the person did not work on the action full-time during the year or did not work exclusively on the action).
D. Productive hours XVI. The number of productive hours per full-time employee applied is *[delete as appropriate]*: A. 1720 productive hours per year for a person working full-time (corresponding pro-rata for persons not working full time). B. the total number of hours worked in the year by a person for the Beneficiary C. the standard number of annual hours generally applied by the beneficiary for its personnel in accordance with its usual cost accounting practices. This number must be at least 90% of the standard annual workable hours. <u>If method B is applied</u> XVII. The calculation of the total number of hours worked was done as follows: annual workable hours of the person according to the employment contract, applicable labour agreement or national law plus overtime worked minus absences (such as sick leave and special leave). XVIII. 'Annual workable hours' are hours during which the personnel must be working, at the employer's disposal and carrying out his/her activity or duties under the employment contract, applicable collective labour agreement or national working time legislation. XIX. The contract (applicable collective labour agreement or national working time legislation) do specify the working time enabling to calculate the annual workable hours.	**Procedure (same sample basis as for Section C: Personnel costs):** ✓ The Auditor verified that the number of productive hours applied is in accordance with method A, B or C. ✓ The Auditor checked that the number of productive hours per full-time employee is correct. ✓ If method B is applied the Auditor verified i) the manner in which the total number of hours worked was done and ii) that the contract specified the annual workable hours by inspecting all the relevant documents, national legislation, labour agreements and contracts. ✓ If method C is applied the Auditor reviewed the manner in which the standard number of working hours per year has been calculated by inspecting all the relevant documents, national legislation, labour agreements and contracts and verified that the number of productive hours per year used for these calculations was at least 90 % of the standard number of working hours per year. **Factual finding:** <u>General</u> 12. The Beneficiary applied a number of productive hours consistent with method A, B or C detailed in the left-hand column. 13. The number of productive hours per year per full-time employee was accurate. <u>If method B is applied</u> 14. The number of 'annual workable hours', overtime and absences was

Please explain any discrepancies in the body of the Report.	
Statements to be made by Beneficiary	**Procedures to be carried out and Findings to be confirmed by the Auditor**
<u>If method C is applied</u> XX. The standard number of productive hours per year is that of a full-time equivalent. XXI. The number of productive hours per year on which the hourly rate is based i) corresponds to the Beneficiary's usual accounting practices; ii) is at least 90% of the standard number of workable (working) hours per year. XXII. Standard workable (working) hours are hours during which personnel are at the Beneficiary's disposal preforming the duties described in the relevant employment contract, collective labour agreement or national labour legislation. The number of standard annual workable (working) hours that the Beneficiary claims is supported by labour contracts, national legislation and other documentary evidence. *[If certain statement(s) of section "D. Productive hours" cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor:* - *…]*	verifiable based on the documents provided by the Beneficiary and the calculation of the total number of hours worked was accurate. 15. The contract specified the working time enabling to calculate the annual workable hours. <u>If method C is applied</u> 16. The calculation of the number of productive hours per year corresponded to the usual costs accounting practice of the Beneficiary. 17. The calculation of the standard number of workable (working) hours per year was corroborated by the documents presented by the Beneficiary. 18. The number of productive hours per year used for the calculation of the hourly rate was at least 90% of the number of workable (working) hours per year.
E. Hourly rates The hourly rates are correct because: XXIII. Hourly rates are correctly calculated since they result from dividing annual personnel costs by the productive hours of a given year and group (e.g. staff category or department or cost centre depending on the methodology applied) and they are in line with the statements made in section C. and D. above. *[If the statement of section 'E. Hourly rates' cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor:* - *…]*	**Procedure** ✓ The Auditor has obtained a list of all personnel rates calculated by the Beneficiary in accordance with the methodology used. ✓ The Auditor has obtained a list of all the relevant employees, based on which the personnel rate(s) are calculated. For 10 employees selected at random (same sample basis as Section C: Personnel costs): ✓ The Auditor recalculated the hourly rates. ✓ The Auditor verified that the methodology applied corresponds to the usual accounting practices of the organisation and is applied consistently for all activities of the organisation on the basis of objective criteria irrespective of the source of funding. **Factual finding:**

Please explain any discrepancies in the body of the Report.	
Statements to be made by Beneficiary	**Procedures to be carried out and Findings to be confirmed by the Auditor**
	19. No differences arose from the recalculation of the hourly rate for the employees included in the sample.
F. Time recording XXIV. Time recording is in place for all persons with no exclusive dedication to one Horizon 2020 action. At least all hours worked in connection with the grant agreement(s) are registered on a **daily/weekly/monthly** basis *[delete as appropriate]* using a **paper/computer-based system** *[delete as appropriate]*; XXV. For persons exclusively assigned to one Horizon 2020 activity the Beneficiary has either signed a declaration to that effect or has put arrangements in place to record their working time; XXVI. Records of time worked have been signed by the person concerned (on paper or electronically) and approved by the action manager or line manager at least monthly; XXVII. Measures are in place to prevent staff from: i. recording the same hours twice, ii. recording working hours during absence periods (e.g. holidays, sick leave), iii. recording more than the number of productive hours per year used to calculate the hourly rates, and iv. recording hours worked outside the action period. XXVIII. No working time was recorded outside the action period; XXIX. No more hours were claimed than the productive hours used to calculate the hourly personnel rates. *[Please provide a brief description of the time recording system in place together with the measures applied to ensure its reliability to the Auditor and annex it to the*	**Procedure** ✓ The Auditor reviewed the brief description, all relevant manuals and/or internal guidance describing the methodology used to record time. The Auditor reviewed the time records of the random sample of 10 employees referred to under Section C: Personnel costs, and verified in particular: ✓ that time records were available for all persons with not exclusive assignment to the action; ✓ that time records were available for persons working exclusively for a Horizon 2020 action, or, alternatively, that a declaration signed by the Beneficiary was available for them certifying that they were working exclusively for a Horizon 2020 action; ✓ that time records were signed and approved in due time and that all minimum requirements were fulfilled; ✓ that the persons worked for the action in the periods claimed; ✓ that no more hours were claimed than the productive hours used to calculate the hourly personnel rates; ✓ that internal controls were in place to prevent that time is recorded twice, during absences for holidays or sick leave; that more hours are claimed per person per year for Horizon 2020 actions than the number of productive hours per year used to calculate the hourly rates; that working time is recorded outside the action period; ✓ the Auditor cross-checked the information with human-resources records to verify consistency and to ensure that the internal controls have been effective. In addition, the Auditor has verified that no more hours were charged to Horizon 2020 actions per person per year than the number of productive hours per year used to calculate the hourly rates, and verified that

Please explain any discrepancies in the body of the Report.	
Statements to be made by Beneficiary	**Procedures to be carried out and Findings to be confirmed by the Auditor**
present certificate[1]]. *[If certain statement(s) of section "F. Time recording" cannot be endorsed by the Beneficiary they should be listed here below and reported as exception by the Auditor:* - *…]*	no time worked outside the action period was charged to the action. **Factual finding:** 20. The brief description, manuals and/or internal guidance on time recording provided by the Beneficiary were consistent with management reports/records and other documents reviewed and were generally applied by the Beneficiary to produce the financial statements. 21. For the random sample time was recorded or, in the case of employees working exclusively for the action, either a signed declaration or time records were available; 22. For the random sample the time records were signed by the employee and the action manager/line manager, at least monthly. 23. Working time claimed for the action occurred in the periods claimed; 24. No more hours were claimed than the number productive hours used to calculate the hourly personnel rates; 25. There is proof that the Beneficiary has checked that working time has not been claimed twice, that it is consistent with absence records and the number of productive hours per year, and that no working time has been claimed outside the action period. 26. Working time claimed is consistent with that on record at the human-resources department.

[1] The description of the time recording system must state among others information on the content of the time records, its coverage (full or action time-recording, for all personnel or only for personnel involved in H2020 actions), its degree of detail (whether there is a reference to the particular tasks accomplished), its form, periodicity of the time registration and authorisation (paper or a computer-based system; on a daily, weekly or monthly basis; signed and countersigned by whom), controls applied to prevent double-charging of time or ensure consistency with HR-records such as absences and travels as well as it information flow up to its use for the preparation of the Financial Statements.

Please explain any discrepancies in the body of the Report.	
Statements to be made by Beneficiary	**Procedures to be carried out and Findings to be confirmed by the Auditor**
[official name of the *[Beneficiary] [Linked Third Party]**]*** ***[name and title of authorised representative]*** ***[dd Month yyyy]*** ***<Signature of the*** *[Beneficiary] [Linked Third Party]>*	***[official name of the Auditor]*** ***[name and title of authorised representative]*** ***[dd Month yyyy]*** ***<Signature*** *of the Auditor>*

EVROPSKÁ KOMISE

Evropská výkonná agentura pro klima,

infrastrukturu a životní prostředí

Ředitel

GRANTOVÁ DOHODA

ČÍSLO 101036723 — ARV

Tato Dohoda (dále jen „Dohoda“) je uzavřena mezi následujícími stranami:

na jedné straně,

Výkonná agentura pro evropské klima, infrastrukturu a životní prostředí (CINEA) (dále jen „agentura“) v rámci pravomocí svěřených Evropskou komisí (dále jen „Komise“), zastoupená pro účely podpisu této dohody vedoucím oddělení – Horizon Europe, Evropská výkonná agentura pro klima, infrastrukturu a životní prostředí, Zelený výzkum a inovace, Patrik KOLAR,

a

na straně druhé,

1. ‘koordinátor’:

NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU (NTNU), založena v HOGSKOLERINGEN 1, TRONDHEIM 7491, Norsko, DIČ: NO974767880MVA, zastoupena pro účely podpisu Smlouvy zákonným podpisem projektu, Tor GRANDE a další následující příjemci, pokud podepíší svůj „Přístupový formulář“’ (viz Příloha 3 a Článek 56):

2. **CONSEIL DES ARCHITECTES D'EUROPE (ACE)**, založena v RUE PAUL EMILE JANSON 29, BRUSEL 1050, Belgie, DIČ: BE0464884970,

3. **CESKE VYSOKE UCENI TECHNICKE V PRAZE (CVUT)**, založena v

JUGOSLAVSKYCH PARTYZANU 1580/3, PRAHA 160 00, Česká republika, DIČ:

CZ68407700,

4. **DANMARKS TEKNISKE UNIVERSITET (DTU)**, založena v ANKER ENGELUNDSVEJ 1 BYGNING 101 A, KGS LYNGBY 2800, Dánsko, DIČ: DK30060946,

5. **DANFOSS A/S (DANFOSS A/S)**, založena v Nordborgvej 81, NORDBORG 6430, Dánsko, DIČ: DK20165715,

6. **ENFOR AS (ENFOR)**, založena v LYNGSO ALLE 3, HORSHOLM 2970, Dánsko, DIČ: DK29421633,

7. **PROJECT ZERO A/S (PROJECTZERO)**, založena v Alsion 2, Sonderborg 6400, Dánsko, DIČ: DK29215642,

8. **ACCADEMIA EUROPEA DI BOLZANO (EURAC)**, založena v VIALE DRUSO 1, BOLZANO 39100, Itálie, DIČ: IT01659400210,

9. **SINTEF AS (SINTEF)**, založena v STRINDVEGEN 4, TRONDHEIM 7034, Norsko, DIČ: NO919303808MVA,

10. **AYUNTAMENT DE PALMA DE MALLORCA (PALMA)**, založena v PLAZA DE CORT , PALMA DE MALLORCA 07001, Španělsko, DIČ: ESP0704000I,

11. **INSTITUTO BALEAR DE LA VIVIENDA (IBAVI)**, založena v CALLE MANUEL AZANA 9 BAJOS, PALMA DE MALLORCA 07006, Španělsko, DIČ: ESQ5750001I,

12. **FUNDACIO INSTITUT DE RECERCA DE L'ENERGIA DE CATALUNYA (IREC)**, založena v C/ JARDINS DE LES DONES DE NEGRE 1, SANT ADRIA DE BESOS 08930, Španělsko, DIČ: ESG64946387,

13. **METROVACESA, SA (MET)**, založena v C QUINTANAVIDES 13 PARQUE EMPRESARIAL VIA NORTE ED 1 PLANTA 1, MADRID 28050, Španělsko, DIČ: ESA87471264,

14. **Stichting Hogeschool Utrecht (UAS Utrecht)**, založena v PADUALAAN 99, UTRECHT 584 CH, Nizozemsko, DIČ: NL806163185B01,

15. **COMITE EUROPEEN DE COORDINATION DE L'HABITAT SOCIAL AISBL (HOUSING EUROPE)**, založena v SQUARE DE MEEUS 18, BRUSEL 1050, Belgie, DIČ: BE0473324762,

16. **BURO DE HAAN INFORMATIE TECHNOLOGIE BV (Buro de Haan)**, založena v ACHTHOEVENWEG 34, STAPHORST 7951 SK, Nizozemsko, DIČ: NL857548773B01,

17. **CENTER DANMARK DRIFT APS (Center Dánsko)**, založena v VENDERSGADE 74, FREDERICIA 7000, Dánsko, DIČ: DK40868399,

18. **SONDERBORG ANDELSBOLIGFORENING (SAB)**, založena v BYGTOFTEN 2, SONDERBORG 6400, Dánsko, DIČ: DK45569810,

19. **GREEN DIGITAL FINANCE ALLIANCE (GDFA)**, založena v CHEMIN DES ANEMONES 11-13, CHATELAINE 1219, Švýcarsko, DIČ: CHE496481826TVA,

20. **STICHTING BO-EX 91 (BOEX)**, založena v JAN CORNELISZ MAYLAAN 18, UTRECHT 526GV, Nizozemsko, DIČ: NL800519085B01,

21. **RC PANELS BV (Rc Panels B.V.)**, založena v CONSTRUCTIEWEG 1, LEMELERVELD 152 GA, Nizozemsko, DIČ: NL856857270B01,

22. **UNIVERSITEIT UTRECHT (UU)**, založena v HEIDELBERGLAAN 8, UTRECHT 3584 CS, Nizozemsko, DIČ: NL001798650B01,

23. **GEMEENTE UTRECHT (CITY OF UTRECHT)**, založena v STADSPLATEAU 1, UTRECHT 3521 AZ, Nizozemsko, DIČ: NL002220647B01,

24. **BOS INSTALLATIEWERKEN BV (BOSGROEP)**, založena v TENNESSEEDREEF 17, UTRECHT 3565 CK, Nizozemsko, DIČ: NL801071197B01,

25. **IWELL BV (iwell)**, založena v ATOOMWEG 7-9, UTRECHT 3542 AA, Nizozemsko, DIČ: NL856333268B01,

26. **ME X ARCHITECTS BV (MEX)**, založena v SPOORLAAN 18, BILTHOVEN 3721 PB, Nizozemsko, DIČ: NL809748253B01,

27. **STICHTING MITROS (Mitros)**, založena v KONINGIN WILHELMINALAAN 9, UTRECHT 3527 LA, Nizozemsko,

28. **STATUTARNI MESTO KARVINA (KARV)**, založena v FRYSTATSKA 72 1, KARVINA FRYSTAT 733 24, Česká republika, DIČ: CZ00297534,

29. **DOLOMITI ENERGIA RINNOVABILI SOCIETA A RESPONSABILITA' LIMITATA (DOL)**, založena v VIA FERSINA 23, TRENTO 38123, Itálie, DIČ: IT01840970220,

30. **DISTRETTO TECNOLOGICO TRENTINO SCARL (DTTN)**, založena v PIAZZA MANIFATTURA 1, ROVERETO 38068, Itálie, DIČ: IT01990440222,

31. **UNIVERSITA DEGLI STUDI DI TRENTO (UNITN)**, založena v VIA CALEPINA 14, TRENTO 38122, Itálie, DIČ: IT00340520220,

32. **POLITECNICO DI TORINO (POLITO)**, založena v CORSO DUCA DEGLI ABRUZZI 4, TORINO 10129, Itálie, DIČ: IT00518460019,

33. **OSLO KOMMUNE (OBF)**, založena v RADHUSET, OSLO 0037, Norsko, DIČ: NO958935420MVA,

34. **NANO POWER AS (NANO)**, založena v TISKARSKA 599/12, PRAHA 108 00, Česká republika

35. **SISTEMES AVANCATS D ENERGIA SOLAR TERMICA SCCL (AIGUASOL SAEST)**, založena v CALLE ROGER DE LLURIA 29 3R 2E, BARCELONA 08009, Španělsko, DIČ: ESF62787692,

Není-li vedeno jinak, odkazy na „příjemce“ nebo „více příjemců“ zahrnují koordinátora.

Výše uvedené strany se dohodly na uzavření Dohody za níže uvedených podmínek.

Podpisem Dohody nebo přístupového formuláře příjemci grant přijmou a odsouhlasí jeho provedení na vlastní odpovědnost a v souladu s Dohodou, a to se všemi povinnostmi a podmínkami, které stanoví.

Dohoda se skládá z:

Podmínky

Příloha	Popis akce
Příloha 2	Odhadovaný rozpočet akce a
	2a Další informace o odhadovaném rozpočtu
Příloha 3	Přístupové formuláře
Příloha 4	Vzor pro účetní závěrku
Příloha 5	Vzor certifikátu o účetní závěrce
Příloha 6	Vzor certifikátu o metodice

PODMÍNKY

OBSAH

KAPITOLA 1 OBECNĚ

ČLÁNEK 1 - PŘEDMĚT DOHODY

Tato Dohoda stanoví práva, povinnosti a podmínky vztahující se na grant udělený příjemcům na provádění akce uvedené v Kapitole 2.

KAPITOLA 2 AKCE

ČLÁNEK 2 - AKCE, KTERÁ MÁ BÝT PROVEDENA

Grant se uděluje na akci nazvanou „**Climate Positive Circular Communities“ - „ARV“ („Akce“),** jak je popsáno v Příloze 1.

ČLÁNEK 3 - TRVÁNÍ A DATUM ZAČÁTKU AKCE

Od 1. ledna 2022 („datum zahájení akce“) bude akce trvat po dobu **48 měsíců.**

ČLÁNEK 4 - ODHADOVANÝ ROZPOČET A ROZPOČTOVÉ PŘEVODY

4.1 Odhadovaný rozpočet

„Odhadovaný rozpočet“ na akci je uveden v Příloze 2. Obsahuje odhadované způsobilé náklady a formy nákladů rozdělené podle příjemců (a připojených třetích stran) a rozpočtové kategorie (viz články 5, 6 a 14) .

4.2 Rozpočtové převody

Odhadovaný rozpis rozpočtu uvedený v Příloze 2 lze upravit – bez změny (viz Článek 55) - převody částek mezi příjemci, rozpočtovými kategoriemi a/nebo formami nákladů stanovených v Příloze 2, pokud je akce provedena podle popisu v Příloze 1.

Příjemci však nesmí přidávat náklady na subdodávky, které nejsou uvedeny v Příloze 1, pokud tyto dodatečné subdodávky nejsou schváleny dodatkem nebo nejsou v souladu s Článkem 13.

KAPITOLA 3 GRANT

ČLÁNEK 5 - VÝŠE GRANTU, FORMA GRANTU, SAZBY NÁHRAD A FORMY NÁKLADŮ

5.1 Maximální výše grantu

„**Maximální výše grantu“ je 19 998 408,55 EUR** (devatenáct milionů devět set devadesát osm tisíc čtyři sta osm eur a padesát pět eurocentů).

5.2 Forma grantu, sazby náhrad a formy nákladů

Grant nahrazuje **100 % způsobilých nákladů příjemců, kteří jsou neziskovými právnickými osobami, a 70 % způsobilých nákladů příjemců a přidružených subjektů, které jsou právnickými osobami se ziskem (**viz Článek 6**) („náhrada grantu způsobilých nákladů'**) (viz Příloha 2).

Odhadované způsobilé náklady na akci jsou v hodnotě 21 316 651,63 EUR (dvacet jedna milionů tři sta šestnáct tisíc šest set padesát jedna euro a šedesát tři eurocentů).

Způsobilé náklady (viz Článek 6) musí být vykázány v následujících formách („**formy nákladů**“):

a) pro **přímé personální** náklady:

- jako skutečně vynaložené náklady („**skutečné náklady**“) nebo
- na základě částky na jednotku vypočítané příjemcem v souladu s jeho obvyklými postupy účtování nákladů („**jednotkové náklady**“).

Personální náklady **vlastníků malých a středních podniků nebo příjemců**, kteří jsou fyzickými osobami nedostávajícími plat (viz Článek 6.2, body A.4 a A.5), musí být vykázány na základě částky na jednotku stanovenou v Příloze 2a (**jednotkové náklady**);

b) u **přímých nákladů na subdodávky**: jako skutečně vynaložené náklady (**skutečné náklady**);

c) pro **přímé náklady na poskytování finanční podpory třetím stranám**: nelze použít;

d) pro **ostatní přímé náklady**:

- u nákladů na zboží a služby fakturované interně: na základě částky na jednotku vypočítané příjemcem v souladu s jeho obvyklými postupy účtování nákladů („**jednotkové náklady**“);
- u všech ostatních nákladů: jako skutečně vynaložené náklady (**skutečné náklady**);

e) pro **nepřímé náklady**: na základě paušální sazby uplatňované podle Článku 6.2 bodu E (**„paušální náklady“);**

f) **konkrétní kategorie (více kategorií) nákladů**: nelze použít.

5.3 Konečná výše grantu – Výpočet

„**Konečná výše grantu**“ závisí na skutečném rozsahu, v jakém je akce realizována v souladu s podmínkami Dohody.

Tuto částku vypočítá Agentura – při platbě zůstatku (viz Článek 21.4)

- v následujících krocích:

Krok 1 - Aplikace sazeb náhrad na způsobilé náklady

Krok 2 - Omezení na maximální částku grantu

Krok 3 - Snížení kvůli pravidlu neziskovosti

Krok 4 - Snížení v důsledku podstatných chyb, nesrovnalostí nebo podvodu nebo závažného porušení povinností

5.3.1 Krok 1 - Použití sazeb náhrad na způsobilé náklady

Sazba (sazby) úhrad (viz Článek 5.2) se použije na způsobilé náklady (skutečné náklady, jednotkové náklady a paušální náklady; viz Článek 6) deklarované příjemci a připojenými třetími stranami (viz Článek 20) a schválené Agenturou (viz Článek 21).

5.3.2 Krok 2 - Omezení na maximální částku grantu

Pokud je částka získaná po kroku 1 vyšší než maximální výše grantu stanovená v Článku 5.1, bude omezena na druhou částku.

5.3.3 Krok 3 - Snížení kvůli pravidlu neziskovosti

Grant nesmí vytvářet zisk.

„**Ziskem**“ se rozumí přebytek částky získané podle kroků 1 a 2 plus celkové příjmy akce nad celkové způsobilé náklady akce.

„**Celkové způsobilé náklady akce**“ jsou konsolidované celkové způsobilé náklady schválené Agenturou.

„**Celkové příjmy akce**“ jsou konsolidované celkové příjmy vytvořené během jejího trvání (viz Článek 3).

Za **příjmy** se považuje:

a) příjem generovaný akcí; pokud je příjem generován prodejem zařízení nebo jiného majetku zakoupeného podle Dohody, platí do výše deklarované podle Dohody jako způsobilé;

b) finanční příspěvky poskytnuté třetími stranami příjemci nebo připojené třetí straně, jež mají být konkrétně použity na akci, a

c) věcné příspěvky poskytnuté třetími stranami zdarma a konkrétně určené k použití na akci, pokud byly prohlášeny za způsobilé náklady.

Následující příjmy však nejsou považovány za uznatelné:

a) příjem generovaný využíváním výsledků akce (viz Článek 28);

b) finanční příspěvky třetích stran, pokud je lze použít k pokrytí jiných než způsobilých nákladů (viz Článek 6);

c) finanční příspěvky třetích stran bez povinnosti vrátit jakoukoli částku, která nebyla na konci období uvedeného v Článku 3 využita.

Pokud existuje zisk, bude odečten ze částky získané podle kroků 1 a 2.

5.3.4 Krok 4 - Snížení v důsledku podstatných chyb, nesrovnalostí nebo podvodu či závažného porušení povinností – Snížená výše grantu – Výpočet

Pokud bude grant snížen (viz Článek 43), Agentura vypočítá částku sníženého grantu odečtením částky snížení (vypočítané úměrně závažnosti chyb, nesrovnalostí nebo podvodům či porušení povinností v souladu s Článkem 43.2) z maximální výše grantu stanovené v Článku 5.1.

Konečná výše grantu bude ta, která je z následujících dvou nižší:

- částka získaná podle kroků 1 až 3 nebo

- snížená výše grantu podle kroku 4.

5.4 Upravená konečná výše grantu – Výpočet

Pokud – po vyplacení zůstatku (zejména po kontrolách, přezkumech, auditech nebo šetřeních; viz Článek 22) - Agentura odmítne náklady (viz Článek 42) nebo sníží grant (viz Článek 43), vypočítá „**revidovanou konečnou výši grantu**“ pro příjemce, kterého se zjištění týkají.

Tuto částku vypočítá Agentura na základě zjištění následovně:

- v případě **zamítnutí nákladů**: použitím sazby náhrad na revidované způsobilé náklady schválené Agenturou pro dotyčného příjemce;

- v případě **snížení grantu**: výpočtem podílu dotyčného příjemce na částce grantu snížené v poměru k závažnosti chyb, nesrovnalostem nebo podvodu či porušení povinností (viz Článek 43.2).

V případě **zamítnutí nákladů a snížení grantu** bude revidovaná konečná výše grantu pro dotyčného příjemce ta nižší ze dvou výše uvedených částek.

ČLÁNEK 6 - ZPŮSOBILÉ A NEZPŮSOBITELNÉ NÁKLADY

6.1 Obecné podmínky způsobilosti nákladů

„Způsobilými náklady“ jsou náklady, které splňují následující kritéria:

a) pro **skutečné náklady**:

i) musí být příjemci skutečně vynaloženy;

ii) musí vzniknout ve lhůtě stanovené v Článku 3, s výjimkou nákladů spojených s předkládáním pravidelné zprávy za poslední vykazované období a závěrečné zprávy (viz Článek 20);

iii) musí být uvedeny v odhadovaném rozpočtu v Příloze 2;

iv) musí vzniknout v souvislosti s akcí popsanou v Příloze 1 a být nezbytné k jejímu provedení;

v) musí být identifikovatelné a ověřitelné, zejména zaznamenané v účtech příjemce v souladu s účetními standardy platnými v zemi, kde je příjemce usazen, a s obvyklými postupy příjemce v oblasti nákladového účetnictví;

vi) musí být v souladu s platnými vnitrostátními právními předpisy v oblasti daní, práce a sociálního zabezpečení a

vii) musí být přiměřené, odůvodněné a v souladu se zásadou řádného finančního řízení, zejména pokud jde o hospodárnost a účinnost;

b) pro **jednotkové náklady**:

i) musí být vypočteny takto:

{částky na jednotku stanovené v Příloze 2a nebo vypočtené příjemcem v souladu s jeho obvyklými postupy účtování nákladů (viz Článek 6.2, bod A a Článek 6.2.D.5) a vynásobené počtem skutečných jednotek};

ii) počet skutečných jednotek musí splňovat následující podmínky:

- jednotky musí být skutečně použity nebo vytvořeny v období stanoveném v Článku 3;

- jednotky musí být nezbytné k provedení akce nebo akcí vytvořené, a

- počet jednotek musí být identifikovatelný a ověřitelný, zejména doložený záznamy a dokumentací (viz Článek 18);

c) pro **paušální náklady** platí:

i) musí být vypočítány použitím paušální sazby stanovené v Příloze 2 a

ii) náklady (skutečné náklady nebo jednotkové náklady), na které je paušální sazba uplatňována, musí splňovat podmínky způsobilosti stanovené v tomto Článku.

6.2 Zvláštní podmínky pro uznatelnost nákladů

Náklady jsou způsobilé, pokud splňují obecné podmínky (viz výše) a specifické podmínky stanovené níže pro každou z následujících rozpočtových kategorií:

A. přímé personální náklady;

B. přímé náklady na subdodávky;

C. nelze použít;

D. ostatní přímé náklady;

E. nepřímé náklady;

F. nelze použít.

„Přímé náklady“ jsou náklady, které přímo souvisejí s prováděním akce, a lze je tedy přímo k akci přiřadit. Nesmí zahrnovat žádné nepřímé náklady (viz bod E níže).

„Nepřímé náklady“ jsou náklady, které přímo nesouvisejí s prováděním akce, a nelze je proto přímo k akci přiřadit.

A. Přímé personální náklady

<u>Druhy způsobilých personálních nákladů</u>

A.1 Personální náklady jsou způsobilé, pokud souvisejí s pracovníky příjemce na základě pracovní Dohody (nebo obdobného jmenovacího aktu) a jsou přiřazeny k akci („**náklady na zaměstnance** (nebo **jejich ekvivalent**)"). Musí být omezeny na platy (včetně rodičovské dovolené), příspěvky na sociální zabezpečení, daně a další náklady zahrnuté v **odměně**, pokud vyplývají z vnitrostátního práva nebo pracovní Dohody (či rovnocenného jmenovacího aktu).

Příjemci, kteří jsou neziskovými právnickými osobami[1], mohou také prohlásit za personální náklady **dodatečné odměny** pro pracovníky přiřazené k akci (včetně plateb na základě doplňkových smluv bez ohledu na jejich povahu), pokud:

a) jsou součástí obvyklých postupů odměňování příjemce a vyplácí se konzistentním způsobem, kdykoliv je požadován stejný druh práce nebo odborných znalostí;

b) kritéria použitá pro výpočet doplňkových plateb jsou objektivní a obecně uplatňovaná příjemcem bez ohledu na použitý zdroj financování.

„Dodatečnou odměnou" se rozumí jakákoliv část odměny, která přesahuje částku, kterou by osoba dostala za čas odpracovaný v projektech financovaných vnitrostátními systémy.

Další odměny pro pracovníky přiřazené k akci jsou způsobilé až do následující částky:

a) pokud osoba pracuje na plný úvazek a výhradně na akci během celého roku: do 8 000 EUR;

b) pokud osoba pracuje výhradně na akci, ale ne na plný úvazek nebo ne po celý rok: až do odpovídající poměrné částky 8 000 EUR, nebo

c) pokud osoba nepracuje výlučně na akci: až do poměrné částky vypočtené takto:

{{8 000 EUR

děleno

počtem ročních produktivních hodin (viz níže)},

vynásobeno počtem hodin, které daná osoba na akci během roku odpracovala}.

A.2 **Náklady na fyzické osoby pracující na základě přímé Dohody s příjemcem** jiné, než je pracovní Dohoda, jsou způsobilé personální náklady, pokud:

a) osoba pracuje za podobných podmínek jako zaměstnanec (zejména pokud jde o způsob organizace práce, úkoly, které jsou vykonávány, a prostory, kde jsou úkoly vykonávány);

b) výsledek provedené práce patří příjemci (není-li výjimečně dohodnuto jinak), a

[1] Definice viz čl. 2.1 odst. 14 nařízení o pravidlech účasti č. 1290/2013: „Neziskovou právnickou osobou" se rozumí právnická osoba, která je ze své právní formy nezisková nebo má právní či statutární povinnost nerozdělovat zisky svým akcionářům nebo jednotlivým členům.

c) náklady se významně neliší od nákladů na zaměstnance vykonávající podobné úkoly podle pracovní Dohody s příjemcem.

A.3 **Náklady na personál vyslaný třetí stranou za úplatu jsou způsobilé personální náklady**, pokud jsou splněny podmínky Článku 11.1.

A.4 **Náklady vlastníků příjemců**, kteří jsou malými a středními podniky (dále jen "**majitelé malých a středních podniků**"), kteří na akci pracují a nedostávají mzdu, jsou způsobilé personální náklady, pokud odpovídají částce na jednotku stanovenou v Příloze 2a vynásobené počtem skutečných hodin odpracovaných na akci.

A.5 **Náklady „příjemců, kteří jsou fyzickými osobami**“, které nedostávají plat, jsou způsobilé personální náklady, pokud odpovídají částce na jednotku stanovenou v Příloze 2a vynásobenou počtem skutečných hodin odpracovaných na akci.

Výpočet

Personální náklady musí příjemci vypočítat takto:

{{hodinová sazba

vynásobená počtem skutečných hodin odpracovaných na akci},

plus

pro neziskové právnické osoby: dodatečné odměny pracovníkům přiřazeným k akci za výše uvedených podmínek (Bod A.1)}.

Počet skutečných hodin deklarovaných pro osobu musí být identifikovatelný a ověřitelný (viz Článek 18).

Celkový počet hodin deklarovaných v grantech EU nebo Euratomu na osobu na rok nesmí být vyšší než roční produktivní hodiny použité pro výpočty hodinové sazby. Proto je maximální počet hodin, které lze pro grant deklarovat:

{počet produktivních hodin za rok (viz níže)

Mínus

celkový počet hodin deklarovaných příjemcem pro danou osobu v daném roce pro jiné granty EU nebo Euratomu}.

„**Hodinová sazba**“ je jedna z následujících:

a) u personálních nákladů deklarovaných jako **skutečné náklady** (tj. rozpočtové kategorie A.1, A.2, A.3) se hodinová sazba vypočítá *za celý účetní rok* takto:

{skutečné roční personální náklady (kromě dodatečných odměn) pro osobu

děleno

počtem produktivních hodin za rok}.

s využitím personálních nákladů a počtu produktivních hodin za každý celý účetní rok, na který se vztahuje dané vykazované období

Pokud finanční rok není na konci vykazovaného období uzavřen, musí příjemci použít hodinovou sazbu posledního dostupného uzavřeného rozpočtového roku.

Pro „počet produktivních hodin za rok“ si příjemci mohou vybrat jednu z následujících možností:

i) „pevný počet hodin“: 1 720 hodin pro osoby pracující na plný úvazek (nebo odpovídající poměrný podíl pro osoby nepracující na plný úvazek);

ii) „individuální roční produktivní hodiny“: celkový počet hodin odpracovaných osobou v daném roce pro příjemce, vypočteno takto:

{roční pracovní doba osoby (podle pracovní Dohody, příslušné kolektivní pracovní Dohody nebo vnitrostátního práva)

plus

odpracované přesčasy

mínus

absence (například nemocenská a zvláštní dovolená)}.

„Roční pracovní dobou“ se rozumí období, během kterého musí zaměstnanci pracovat, být k dispozici zaměstnavateli a vykonávat svou činnost nebo povinnosti podle pracovní Dohody, příslušné kolektivní pracovní Dohody nebo vnitrostátních právních předpisů o pracovní době.

Pokud Dohoda (nebo příslušná kolektivní pracovní Dohoda či národní legislativa o pracovní době) neumožňuje stanovit roční pracovní dobu, nelze tuto možnost použít;

iii) „standardní roční produktivní doba“: „standardní počet ročních hodin“ obecně uplatňovaný příjemcem pro jeho zaměstnance v souladu s jeho obvyklými postupy účtování nákladů. Toto číslo musí být alespoň 90 % „standardních pracovních hodin za rok“.

Pokud pro standardní roční pracovní hodiny neexistuje žádný relevantní odkaz, nelze tuto možnost použít.

U všech možností lze od počtu ročních produktivních hodin odečíst skutečný čas, který osoba přiřazená na akci strávila na **rodičovské dovolené**.

Alternativně mohou příjemci vypočítat hodinovou sazbu za měsíc takto:

{skutečné měsíční personální náklady (kromě dodatečných odměn) na osobu

Děleno

{počtem produktivních hodin za rok / 12}}

s využitím personálních nákladů za každý měsíc a (jedné dvanáctiny) ročních produktivních hodin vypočítaných podle výše uvedených možností (i) nebo (iii), tj.:

- pevný počet hodin nebo
- standardní roční produktivní hodiny.

Čas strávený **na rodičovské dovolené** nelze odečíst při výpočtu hodinové sazby za měsíc.

Příjemci však mohou vykázat personální náklady vzniklé během rodičovské dovolené v poměru k době, kdy osoba v daném rozpočtovém roce pracovala na akci.

Pokud jsou části základní odměny generovány za období delší než měsíc, mohou příjemci zahrnout pouze podíl, který je vytvořen v daném měsíci (bez ohledu na částku skutečně vyplacenou za daný měsíc).

Každý příjemce smí použít pouze jednu možnost (za celý finanční rok nebo za měsíc) za každý celý finanční rok;

b) u personálních nákladů vykázaných na základě **jednotkových nákladů** (tj. rozpočtové kategorie A.1, A.2, A.4, A.5) je hodinová sazba jedna z následujících:

i) pro vlastníky nebo příjemce MSP, které jsou fyzickými osobami: hodinová sazba stanovená v Příloze 2a (viz body A.4 a A.5 výše), nebo

ii) u personálních nákladů vykázaných na základě obvyklých postupů účtování nákladů příjemce:

hodinová sazba vypočítaná příjemcem v souladu s jeho obvyklými postupy účtování nákladů, pokud:

- používané postupy nákladového účetnictví jsou uplatňovány konzistentním způsobem a na základě objektivních kritérií bez ohledu na zdroj financování;
- hodinová sazba se vypočítá pomocí skutečných personálních nákladů zaznamenaných na účtech příjemce, s vyloučením jakýchkoliv nezpůsobilých nákladů nebo nákladů zahrnutých v jiných rozpočtových kategoriích.

  Skutečné personální náklady může příjemce upravit na základě rozpočtovaných nebo odhadovaných prvků. Tyto prvky musí být přiměřené, relevantní pro výpočet personálních nákladů a dále musí odpovídat objektivním a ověřitelným informacím; a
- hodinová sazba se vypočítá pomocí počtu ročních produktivních hodin (viz výše).

B. Přímé náklady na subdodávky (včetně souvisejících cel, daní a poplatků, jako je neodečitatelná daň z přidané hodnoty (DPH) placené příjemcem,) jsou způsobilé, pokud jsou splněny podmínky uvedené v Článku 13.1.1.

C. Přímé náklady na poskytování finanční podpory třetím stranám

Nelze použít

D. Ostatní přímé náklady

D.1 **Cestovní náklady a související příspěvky na živobytí** (včetně souvisejících cel, daní a poplatků, jako je neodečitatelná daň z přidané hodnoty (DPH) placená příjemcem) jsou způsobilé, pokud jsou v souladu s obvyklými postupy příjemce v oblasti cestování.

D.2 **Náklady na odpisy zařízení, infrastruktury nebo jiného majetku** (nového nebo použitého) zaznamenané na účtech příjemce jsou způsobilé, pokud byly zakoupeny v souladu s Článkem 10.1.1 a odepsány v souladu s mezinárodními účetními standardy a obvyklými účetními postupy příjemce.

Způsobilé jsou také **náklady na pronájem nebo leasing** zařízení, infrastruktury nebo jiných aktiv (včetně souvisejících cel, daní a poplatků, jako je neodečitatelná daň z přidané hodnoty (DPH) placená příjemcem), pokud nepřesahují náklady na odpisy podobných zařízení, infrastruktury nebo majetku a nezahrnují žádné poplatky za financování.

Náklady na zařízení, infrastrukturu nebo jiná **aktiva vložená v naturáliích za úplatu** jsou způsobilé, pokud nepřesahují náklady na znehodnocení podobného zařízení, infrastruktury nebo majetku,

nezahrnují žádné finanční poplatky a pokud jsou splněny podmínky uvedené v Článku 11.1.

Jediná část nákladů, která bude zohledněna, je ta, která odpovídá délce trvání akce a míře skutečného využití pro účely akce.

D.3 **Náklady na další zboží a služby** (včetně souvisejících cel, daní a poplatků, jako je neodečitatelná daň z přidané hodnoty (DPH) placená příjemcem) jsou způsobilé, pokud jsou:

a) zakoupeny speciálně pro akci a jsou v souladu s Článkem 10.1.1 nebo

b) přispěly věcnou částkou za úplatu a jsou v souladu s Článkem 11.1.

Mezi takové zboží a služby patří například spotřební materiál a zásoby, šíření (včetně otevřeného přístupu), ochrana výsledků, osvědčení o finančních výkazech (pokud to Dohoda vyžaduje), certifikáty metodiky, překlady a publikace.

D.4 **Kapitalizované a provozní náklady „velké výzkumné infrastruktury**“[2] přímo použité pro akci jsou způsobilé, pokud:

a) hodnota rozsáhlé výzkumné infrastruktury představuje alespoň 75 % celkových dlouhodobých aktiv (v historické hodnotě v její poslední uzavřené rozvaze před datem podpisu Dohody nebo jak je stanoveno na základě nákladů na pronájem a leasing výzkumné infrastruktury)[3];

b) metodika příjemce pro vykazování nákladů na velkou výzkumnou infrastrukturu byla Komisí pozitivně hodnocena („**hodnocení ex-ante**“);

c) příjemce deklaruje jako přímé způsobilé náklady pouze část, která odpovídá délce trvání akce a míře skutečného využití pro účely akce, a

d) splňují podmínky uvedené dále v anotacích grantových dohod H2020.

[2] "**Velkou výzkumnou infrastrukturou**“ se rozumí výzkumná infrastruktura v celkové hodnotě nejméně 20 milionů EUR pro příjemce, vypočítaná jako součet historických hodnot aktiv každé jednotlivé výzkumné infrastruktury daného příjemce, jak jsou uvedeny v jeho poslední uzavřené rozvaze před datem podpisu Dohody nebo jak je stanoveno na základě nákladů na pronájem a leasing výzkumné infrastruktury.

[3] Definici naleznete ve Čl. 2 odst. 6 nařízení rámcového programu H2020 č. 1291/2013: „**Výzkumná infrastruktura**“ jsou zařízení, zdroje a služby, které výzkumné komunity používají k provádění výzkumu a podpoře inovací ve svých oborech. Kde je to relevantní, mohou být použity nad rámec výzkumu, např. pro vzdělávání nebo veřejné služby. Zahrnují: hlavní vědecké vybavení (nebo sady nástrojů); zdroje založené na znalostech, jako jsou sbírky, archivy nebo vědecká data; e-infrastruktury, jako jsou datové a výpočetní systémy a komunikační sítě; a jakákoliv další infrastruktura jedinečné povahy nezbytná k dosažení excelence ve výzkumu a inovacích. Tyto infrastruktury mohou být „jednostranné“, „virtuální“ nebo „distribuované“.

D.5 Náklady na interně fakturované zboží a služby přímo použité pro akci jsou způsobilé, pokud:

a) jsou deklarovány na základě jednotkových nákladů vypočítaných v souladu s obvyklými postupy účtování nákladů příjemce;

b) používané postupy nákladového účetnictví jsou uplatňovány konzistentním způsobem na základě objektivních kritérií bez ohledu na zdroj financování;

c) jednotkové náklady se vypočítají pomocí skutečných nákladů na zboží nebo službu zaznamenaných v účtech příjemce, s výjimkou jakýchkoli nezpůsobilých nákladů nebo nákladů zahrnutých v jiných rozpočtových kategoriích.

Skutečné náklady může příjemce upravit na základě rozpočtovaných nebo odhadovaných prvků. Tyto prvky musí být přiměřené, relevantní pro výpočet nákladů a musí odpovídat objektivním a ověřitelným informacím;

d) jednotkové náklady nezahrnují žádné náklady na položky, které nejsou přímo spojeny s výrobou fakturovaného zboží nebo služby.

„Interně fakturovaným zbožím a službami“ se rozumí zboží nebo služby, které jsou poskytovány příjemcem přímo pro danou akci a které si příjemce cení na základě svých obvyklých postupů účtování nákladů.

E. Nepřímé náklady

Nepřímé náklady jsou způsobilé, pokud jsou deklarovány na základě paušální sazby 25 % způsobilých přímých nákladů (viz Článek 5.2 a body A až D výše), z nichž jsou vyloučeny:

a) náklady na subdodávky a

b) náklady na věcné příspěvky poskytnuté třetími stranami, které nejsou použity v prostorách příjemce;

c) nelze použít;

d) nelze použít.

Příjemci, kteří dostávají provozní grant[4] financovaný z rozpočtu EU nebo Euratomu, nemohou vykazovat nepřímé náklady za období pokryté provozním grantem, pokud nemohou prokázat, že provozní grant nepokrývá žádné náklady na akci.

F. Specifické kategorie nákladů

Nelze použít

6.3 Podmínky pro uznání nákladů spojených připojených třetích stran

[4] Definice viz čl. 121 odst. 1 písm. B) nařízení Evropského parlamentu a Rady (EU, Euratom) č. 966/2012 ze dne 25. října 2012 o finančních pravidlech použitelných na souhrnný rozpočet Unie a kterým se zrušuje nařízení Rady (ES, Euratom) č. 1605/2002 (dále jen „finanční nařízení č. 966/2012“) (Úř. věst. L 218, 26.10.2012, s. 1): „provozním grantem“ přímý finanční příspěvek formou daru, z rozpočtu za účelem financování fungování subjektu, který sleduje cíl obecného zájmu EU nebo má cíl, který je součástí politiky EU a podporuje ji.

Náklady vzniklé připojeným třetím stranám jsou způsobilé, pokud splňují – mutatis mutandis – obecné a zvláštní podmínky způsobilosti stanovené v tomto Článku (články 6.1 a 6.2) a Článku 14.1.1.

6.4 Podmínky způsobilosti věcných příspěvků poskytovaných bezplatně třetími stranami

Věcné příspěvky poskytnuté bezplatně jsou způsobilými přímými náklady (pro příjemce nebo připojenou třetí stranu), pokud náklady vzniklé třetí straně obdobně splňují obecné a specifické podmínky způsobilosti stanovené v tomto Článku (Článek 6.1 a 6.2) a Článku 12.1.

6.5 Nezpůsobilé náklady

„Nezpůsobilé náklady“ jsou:

a) náklady, které nesplňují výše uvedené podmínky (články 6.1 až 6.4), zejména:

i) náklady související s návratností kapitálu;

ii) dluh a poplatky za dluhovou službu;

(iii) rezervy na budoucí ztráty nebo dluhy;

iv) dlužný úrok;

v) pochybné dluhy;

vi) kurzové ztráty;

vii) bankovní náklady účtované bankou příjemce za převody od Agentury;

viii) nadměrné nebo neuvážené výdaje;

ix) odpočitatelná DPH;

x) náklady vzniklé během pozastavení provádění akce (viz Článek 49);

b) náklady vykázané v rámci jiného grantu EU nebo Euratomu (včetně grantů udělených členským státem a financovaných z rozpočtu EU nebo Euratomu a grantů udělených jinými orgány než Agenturou za účelem plnění rozpočtu EU nebo Euratomu); zejména nepřímé náklady, pokud příjemce již dostává provozní grant financovaný z rozpočtu EU nebo Euratomu ve stejném období, pokud nemůže prokázat, že provozní grant nepokrývá žádné náklady na akci.

6.6 Důsledky prohlášení o nezpůsobilých nákladech

Vykázané náklady, které nejsou způsobilé, budou zamítnuty (viz Článek 42). To může také vést k jakýmkoliv dalším opatřením popsaným v Kapitole 6.

KAPITOLA 4 PRÁVA A POVINNOSTI STRAN

SEKCE 1 PRÁVA A POVINNOSTI TÝKAJÍCÍ SE PROVÁDĚNÍ AKCE

ČLÁNEK 7 - OBECNÁ POVINNOST ŘÁDNĚ PROVÁDĚT AKCI

7.1 Obecná povinnost řádně provádět akci

Příjemci musí provést akci podle popisu v Příloze 1 a v souladu s ustanoveními Dohody a všemi právními závazky podle platného práva EU, mezinárodního a vnitrostátního práva.

7.2 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43). Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 8 - ZDROJE K PROVÁDĚNÍ AKCE – TŘETÍ STRANY ZAPOJENÉ DO AKCE

Příjemci musí mít k implementaci akce příslušné zdroje.

Pokud je to nutné k provedení akce, mohou příjemci:

- nakoupit zboží, práce a služby (viz Článek 10);

- používat věcné příspěvky poskytnuté třetími stranami za úplatu (viz Článek 11);

- používat věcné příspěvky poskytnuté třetími stranami zdarma (viz Článek 12);

- vyzvat subdodavatele k provedení akčních úkolů popsaných v Příloze 1 (viz Článek 13);

- vyzvat připojené třetí strany k provedení akčních úkolů popsaných v Příloze 1 (viz Článek 14);

- vyzvat mezinárodní partnery, aby provedli akční úkoly popsané v Příloze 1 (viz Článek 14a).

V těchto případech si příjemci ponechávají výhradní odpovědnost vůči Agentuře a ostatním příjemcům za provádění akce.

ČLÁNEK 9 - PROVÁDĚNÍ AKČNÍCH ÚKOLŮ PŘÍJEMCEMI, KTEŘÍ NEJSOU FINANCOVÁNI Z EU

Nelze použít

ČLÁNEK 10 - NÁKUP ZBOŽÍ, PRÁCE NEBO SLUŽEB

10.1 Pravidla pro nákup zboží, prací nebo služeb

10.1.1 Je -li to nutné k provedení akce, mohou příjemci nakupovat zboží, práce nebo služby.

Příjemci musí takové nákupy zajistit s nejlepším poměrem cena / výkon, případně nejnižší cena. Přitom musí zabránit jakémukoliv střetu zájmů (viz Článek 35).

Příjemci musí zajistit, aby Agentura, Komise, Evropský účetní dvůr (EÚD) a Evropský úřad pro boj proti podvodům (OLAF) mohly uplatňovat svá práva podle článků 22 a 23 také vůči svým dodavatelům.

10.1.2 Příjemci, kteří jsou „veřejnými zadavateli“ ve smyslu směrnice 2004/18/ES[5] (nebo 6 7 8 2014/24/EU[6]) nebo „zadavateli“ ve smyslu směrnice 2004/17/ES[7] (nebo 2014/ 25/EU[8]) musí být v souladu s platnými vnitrostátními právními předpisy o zadávání veřejných zakázek.

10.2 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle Článku 10.1.1, náklady související s příslušnou smlouvou budou nezpůsobilé (viz Článek 6) a budou zamítnuty (viz Článek 42).

Pokud příjemce poruší některou ze svých povinností podle Článku 10.1.2, může být grant snížen (viz Článek 43).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 11-POUŽÍVÁNÍ PŘÍSPĚVKŮ V RÁMCI POSKYTOVANÝCH TŘETÍMI STRANAMI PRO PLATBY

11.1 Pravidla pro používání věcných příspěvků za úplatu

Je-li to nutné k provedení akce, mohou příjemci za úplatu použít věcné příspěvky poskytnuté třetími stranami.

Příjemci mohou za způsobilé prohlásit náklady související s platbou věcných příspěvků (viz články 6.1 a 6.2), a to až do výše nákladů třetích stran, na vyslané osoby, přispívající vybavení, infrastrukturu nebo jiná aktiva a jiné nutné zboží a služby.

Třetí strany a jejich příspěvky musí být stanoveny v Příloze 1. Agentura však může schválit věcné příspěvky neuvedené v Příloze 1 bez změny (viz Článek 55), pokud:

- jsou konkrétně odůvodněny v pravidelné technické zprávě a

- jejich použití neznamená změnu Dohody, která by zpochybnila rozhodnutí o udělení grantu nebo porušila zásadu rovného zacházení se žadateli.

Příjemci musí zajistit, aby Agentura, Komise, Evropský účetní dvůr (EÚD) a Evropský úřad pro boj

[5] Směrnice Evropského parlamentu a Rady 2004/18/ES ze dne 31. března 2004 o koordinaci postupů při zadávání veřejných zakázek na práce, veřejných zakázek na dodávky a veřejných služeb (Úř. Věst.L 134, 30.04.2004, s. 5). 114).
[6] Směrnice Evropského parlamentu a Rady 2014/24/EU ze dne 26. února 2014 o zadávání veřejných zakázek a o zrušení směrnice 2004/18/ES. (Úř. Věst.L 94, 28.03.2014, s. 65).
[7] Směrnice Evropského parlamentu a Rady 2004/17/ES ze dne 31. března 2004 o koordinaci postupů při zadávání zakázek subjekty působícími v odvětví vodního hospodářství, energetiky, dopravy a poštovních služeb (Úř. Věst.L 134, 30.04.2004, s. 1)
[8] Směrnice Evropského parlamentu a Rady 2014/25/EU ze dne 26. února 2014 o zadávání veřejných zakázek subjekty působícími v odvětví vodního hospodářství, energetiky, dopravy a poštovních služeb a o zrušení směrnice 2004/17/ES (Úř. Věst.L 94, 28.03. 2014, s. 243).

proti podvodům (OLAF) mohly svá práva podle článků 22 a 23 uplatňovat také vůči třetím stranám.

11.2 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, náklady související s výplatou věcného příspěvku budou nezpůsobilé (viz Článek 6) a budou zamítnuty (viz Článek 42).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 12-VYUŽÍVÁNÍ VĚCNÝCH PŘÍSPĚVKŮ POSKYTOVANÝCH TŘETÍMI STRANAMI ZDARMA

12.1 Pravidla pro používání věcných příspěvků zdarma

Je-li to nutné k provedení akce, mohou příjemci bezplatně použít věcné příspěvky poskytnuté třetími stranami.

Příjemci mohou za způsobilé v souladu s Článkem 6.4 prohlásit náklady, které vznikly třetím stranám na vyslané osoby, vložené vybavení, infrastrukturu nebo jiná aktiva či jiné nutné zboží a služby.

Třetí strany a jejich příspěvky musí být stanoveny v Příloze 1. Agentura však může schválit věcné příspěvky neuvedené v Příloze 1 bez změny (viz Článek 55), pokud:

- jsou konkrétně odůvodněny v pravidelné technické zprávě a

- jejich použití neznamená změnu Dohody, která by zpochybnila rozhodnutí o udělení grantu nebo porušila zásadu rovného zacházení se žadateli.

Příjemci musí zajistit, aby Agentura, Komise, Evropský účetní dvůr (EÚD) a Evropský úřad pro boj proti podvodům (OLAF) mohly uplatňovat svá práva podle článků 22 a 23 také vůči třetím stranám.

12.2 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, náklady vzniklé třetím stranám související s věcným příspěvkem budou nezpůsobilé (viz Článek 6) a budou zamítnuty (viz Článek 42).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 13 - PROVÁDĚNÍ AKČNÍCH ÚKOLŮ subdodavateli

13.1 Pravidla pro subdodavatelské akční úkoly

13.1.1 Je-li to nutné k provedení akce, mohou příjemci zadat subdodávky pokrývající provádění určitých úkolů akce popsaných v Příloze 1.

Subdodávky mohou pokrývat pouze omezenou část akce.

Příjemci musí zadat subdodávky tak, aby byla zajištěna nejlepší hodnota v poměru cena / kvalita nebo případně nejnižší cena. Přitom musí zabránit jakémukoliv střetu zájmů (viz Článek 35). Úkoly, které mají být provedeny, a odhadované náklady na každou subdodávku musí být stanoveny v Příloze 1 a

celkové odhadované náklady na subdodávky na příjemce musí být stanoveny v Příloze 2. Agentura však může schválit subdodávky neuvedené v Přílohách 1 a 2 beze změny (viz Článek 55), pokud:

- jsou konkrétně odůvodněny v pravidelné technické zprávě a
- nezahrnují změny Dohody, které by zpochybnily rozhodnutí o udělení grantu nebo porušily zásadu rovného zacházení se žadateli.

Příjemci musí zajistit, aby Agentura, Komise, Evropský účetní dvůr (EÚD) a Evropský úřad pro boj proti podvodům (OLAF) mohly uplatňovat svá práva podle článků 22 a 23 také vůči svým subdodavatelům.

13.1.2 Příjemci musí zajistit, aby se jejich povinnosti podle článků 35, 36, 38 a 46 vztahovaly také na subdodavatele.

Příjemci, kteří jsou „veřejnými zadavateli“ ve smyslu směrnice 2004/18/ES (nebo 2014/24/EU) nebo „zadavateli“ ve smyslu směrnice 2004/17/ES (nebo 2014/25/EU), musí dodržovat platné vnitrostátní právní předpisy o zadávání veřejných zakázek.

13.2 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle Článku 13.1.1, náklady související s příslušnou subdodavatelskou smlouvou nebudou způsobilé (viz Článek 6) a budou zamítnuty (viz Článek 42).

Pokud příjemce poruší některou ze svých povinností podle Článku 13.1.2, může být grant snížen (viz Článek 43).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 14 - PROVÁDĚNÍ AKČNÍCH ÚKOLŮ PŘIPOJENÝMI TŘETÍMI STRANAMI

14.1 Pravidla pro vyzvání připojených třetích stran k provedení části akce

14.1.1 Následující **přidružené subjekty[9] a třetí strany s právním vztahem k příjemci[10] („připojené třetí strany“)** mohou provádět úkoly související s akcemi, které jsou jim přiřazeny v Příloze 11:

[9] Definice viz čl. 2.1 odst. 2 nařízení o účasti, nařízení č. 1290/2013: „přidruženým subjektem“ se rozumí jakýkoliv právní subjekt, který je:
- pod přímou nebo nepřímou kontrolou účastníka, nebo
- pod stejnou přímou nebo nepřímou kontrolou jako účastník, nebo
- přímo či nepřímo kontroluje účastníka.

„Kontrola“ může mít některou z následujících forem:
a) přímé nebo nepřímé držení více než 50 % jmenovité hodnoty vydaného základního kapitálu v konkrétní právnické osobě nebo většiny hlasovacích práv akcionářů nebo společníků tohoto subjektu;
b) přímé nebo nepřímé faktické nebo právní držení rozhodovacích pravomocí v dotyčném právním subjektu.
Následující vztahy mezi právnickými osobami však samy o sobě nebudou považovány za kontrolní vztahy:
a) stejná veřejná investiční společnost, institucionální investor nebo společnost rizikového kapitálu má přímý nebo nepřímý podíl více než 50 % jmenovité hodnoty vydaného základního kapitálu nebo většinu hlasovacích práv akcionářů nebo společníků;
b) na dotyčné právnické osoby dohlíží nebo je vlastní stejný veřejný orgán.

[10] „Třetí stranou s právním odkazem na příjemce“ je jakákoliv právnická osoba, která má právní spojení s příjemcem, což znamená spolupráci, která se neomezuje pouze na akci.

- ARMALAM SRL (Armalam), přidružená nebo propojená s DTTN

-X-LAM DOLOMITI SRL (X-LAM DOLOMITI), přidružená nebo propojená s DTTN

- FANTI LEGNAMI SRL (FANTI LEGNAMI), přidružená nebo propojená s DTTN

Propojené třetí strany mohou prohlásit za způsobilé náklady, které jim vzniknou při provádění akčních úkolů v souladu s Článkem 6.3.

Příjemci musí zajistit, aby Agentura, Komise, Evropský účetní dvůr (EÚD) a Evropský úřad pro boj proti podvodům (OLAF) mohly uplatňovat svá práva podle článků 22 a 23 také vůči svým připojeným třetím stranám.

14.1.2 Příjemci musí zajistit, aby se jejich povinnosti podle článků 18, 20, 35, 36 a 38 též vztahovaly na jejich připojené třetí strany.

14.2 Důsledky nedodržení

Pokud dojde k porušení jakékoliv povinnosti podle Článku 14.1.1, náklady připojené třetí strany budou nezpůsobilé (viz Článek 6) a budou zamítnuty (viz Článek 42).

Pokud dojde k porušení jakékoli povinnosti podle Článku 14.1.2, může být grant snížen (viz Článek 43).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 14a – PROVÁDĚNÍ AKČNÍCH ÚKOLŮ MEZINÁRODNÍMI PARTNERY

Nelze použít

ČLÁNEK 15 - FINANČNÍ PODPORA TŘETÍM STRANÁM

15.1 Pravidla pro poskytování finanční podpory třetím stranám

Nelze použít

15.2 Finanční podpora ve formě cen

Nelze použít

15.3 Důsledky nedodržení

Nelze použít

ČLÁNEK 16-POSKYTOVÁNÍ MEZINÁRODNÍHO NEBO VIRTUÁLNÍHO PŘÍSTUPU K VÝZKUMNÉ INFRASTRUKTUŘE

16.1 Pravidla pro poskytování nadnárodního přístupu k výzkumné infrastruktuře

Nelze použít

16.2 Pravidla pro poskytování virtuálního přístupu k výzkumné infrastruktuře

Nelze použít

16.3 Důsledky nedodržení

Nelze použít

SEKCE 2 PRÁVA A POVINNOSTI TÝKAJÍCÍ SE SPRÁVY GRANTU

ČLÁNEK 17 - OBECNÁ POVINNOST INFORMOVAT

17.1 Obecná povinnost poskytnout na žádost informace

Příjemci musí poskytnout – během provádění akce nebo poté a v souladu s Článkem 41.2 – veškeré informace požadované k ověření oprávněnosti nákladů, řádného provádění akce a dodržování jakýchkoliv dalších povinností podle Dohody.

17.2 Povinnost udržovat informace aktuální a informovat o událostech a okolnostech, které by mohly mít vliv na Dohodu

Každý příjemce musí udržovat informace uložené v Registru příjemců portálu účastníků (prostřednictvím systému elektronické výměny; viz Článek 52) v aktuální podobě, zejména jméno, adresu, zákonné zástupce, právní formu a typ organizace.

Každý příjemce musí okamžitě informovat koordinátora – který musí neprodleně informovat Agenturu a ostatní příjemce – o kterémkoliv z následujících:

a) události, které by mohly významně ovlivnit nebo oddálit provádění akce nebo finanční zájmy EU, zejména:

i) **změny** v jeho právní, finanční, technické, organizační nebo vlastnické situaci nebo ve změnách jeho připojených třetích stran a

ii) změny názvu, adresy, právní formy, typu organizace jejích připojených třetích stran;

b) **okolnosti** ovlivňující:

i) rozhodnutí o udělení grantu nebo

ii) soulad s požadavky podle Dohody.

17.3 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 18 - UCHOVÁVÁNÍ ZÁZNAMŮ – PODPORA DOKUMENTACE

18.1 Povinnost uchovávat záznamy a další podpůrnou dokumentaci

Příjemci musí – po dobu pěti let po vyplacení zůstatku – uchovávat záznamy a další podpůrnou dokumentaci, aby dokázali řádné provedení akce a náklady, které deklarují jako způsobilé.

Musí je poskytnout na vyžádání (viz Článek 17) nebo v rámci kontrol, přezkumů, auditů nebo vyšetřování (viz Článek 22).

Pokud probíhají průběžné kontroly, přezkumy, audity, vyšetřování, soudní spory nebo jiné sledování nároků podle Dohody (včetně rozšíření zjištění; viz Článek 22), musí příjemci uchovávat záznamy a další podpůrnou dokumentaci až do konce těchto postupů.

Příjemci si musí ponechat původní dokumenty. Digitální a digitalizované dokumenty jsou považovány za originály, pokud jsou schváleny příslušnými vnitrostátními právními předpisy. Agentura může přijmout neoriginální dokumenty, pokud se domnívá, že nabízejí srovnatelnou úroveň jistoty.

18.1.1 Záznamy a další podpůrná dokumentace o vědeckém a technickém provádění

Příjemci musí uchovávat záznamy a další podpůrnou dokumentaci o vědeckém a technickém provádění akce v souladu s přijatými normami v příslušné oblasti.

18.1.2 Záznamy a další dokumentace na podporu deklarovaných nákladů

Příjemci musí uchovávat záznamy a dokumentaci podporující deklarované náklady, zejména následující:

a) u **skutečných nákladů**: odpovídající záznamy a další podpůrná dokumentace k prokázání deklarovaných nákladů, jako jsou smlouvy, subdodávky, faktury a účetní záznamy. Kromě toho obvyklé postupy účtování nákladů a postupy vnitřní kontroly příjemců musí umožňovat přímé sladění mezi deklarovanými částkami, částkami zaznamenanými na jejich účtech a částkami uvedenými v podpůrné dokumentaci;

b) u **jednotkových nákladů**: odpovídající záznamy a další podpůrná dokumentace k prokázání počtu deklarovaných jednotek. Příjemci nemusí zjišťovat skutečné kryté způsobilé náklady ani si je ponechat nebo poskytnout podpůrnou dokumentaci (například účetní výkazy) k prokázání částky na jednotku.

Kromě toho u **jednotkových nákladů vypočítaných v souladu s obvyklými postupy účtování nákladů** příjemce musí příjemci vést odpovídající záznamy a dokumentaci, která prokáže, že použité postupy účtování nákladů splňují podmínky stanovené v Článku 6.2.

Příjemci a připojené třetí strany mohou Komisi předložit ke schválení osvědčení (vyhotovené v souladu s Přílohou 6), ve kterém se uvádí, že jejich obvyklé postupy účtování nákladů jsou v souladu s těmito podmínkami („**certifikát metodiky**“). Pokud bude certifikát schválen, náklady deklarované v souladu s touto metodikou nebudou dodatečně zpochybňovány, pokud příjemci nezatajili informace pro účely schválení.

c) u **paušálních nákladů**: odpovídající záznamy a další podpůrná dokumentace k prokázání způsobilosti nákladů, na které se paušální sazba vztahuje. Příjemci nemusí prokazovat kryté

náklady ani poskytovat podpůrnou dokumentaci (například účetní výkazy) k prokázání částky deklarované paušálně.

Navíc u **personálních nákladů** (deklarovaných jako skutečné náklady nebo na základě jednotkových nákladů) musí příjemci vést časové záznamy o deklarovaném počtu hodin. Časové záznamy musí být písemné a schvalované osobami pracujícími na akci a jejich nadřízenými nejméně jednou za měsíc. Pokud neexistují spolehlivé časové záznamy o hodinách odpracovaných na akci, může Agentura přijmout alternativní důkazy podporující deklarovaný počet hodin, pokud se domnívá, že nabízí adekvátní úroveň jistoty.

Výjimkou je, že u **osob pracujících výhradně na akci** není nutné uchovávat časové záznamy, pokud příjemce podepíše **prohlášení**, které prokáže, že dotyčné osoby pracovaly výhradně na akci.

U nákladů deklarovaných připojenými třetími stranami (viz Článek 14) je příjemce povinen uchovávat originály účetní závěrky a osvědčení o finančních výkazech připojené třetí strany

18.2 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, nedostatečně odůvodněné náklady budou nezpůsobilé (viz Článek 6) a budou zamítnuty (viz Článek 42) a grant může být snížen (viz Článek 43).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 19 - PŘEDKLÁDÁNÍ DODÁVEK

19.1 Povinnost předložit plnění

Koordinátor musí předložit „výstupy“ uvedené v Příloze 1 v souladu s načasováním a podmínkami v něm uvedenými.

19.2 Důsledky nedodržení

Pokud koordinátor poruší některou ze svých povinností podle tohoto Článku, může Agentura použít kterékoliv z opatření popsaných v Kapitole 6.

ČLÁNEK 20 - PODÁVÁNÍ ZPRÁV – ŽÁDOSTI O PLATBY

20.1 Povinnost předkládat hlášení

Koordinátor musí Agentuře (viz Článek 52) předložit technické a finanční zprávy stanovené v tomto Článku. Tyto zprávy obsahují žádosti o platbu a musí být sepsány pomocí formulářů a šablon poskytovaných v systému elektronické výměny (viz Článek 52).

20.2 Období vykazování

Akce je rozdělena do následujících „**vykazovacích období**“:

- RP1: od měsíce 1 do měsíce 18

- RP2: od měsíce 19 do měsíce 36

- RP3: od měsíce 37 do měsíce 48

20.3 Pravidelné zprávy – žádosti o průběžné platby

Koordinátor musí předložit pravidelnou zprávu do 60 dnů po skončení každého vykazovaného období.

Pravidelná zpráva musí obsahovat následující:

a) „**pravidelnou technickou zprávu**“ obsahující:

i) **vysvětlení práce odvedené příjemci**;

ii) **přehled pokroku při plnění cílů akce**, včetně milníků a výstupů uvedených v Příloze 1.

Tato zpráva musí obsahovat vysvětlení odůvodňující rozdíly mezi pracemi, u nichž se očekává, že budou prováděny v souladu s Přílohou 1, a skutečně vykonanými pracemi.

Zpráva musí podrobně uvádět využívání a šíření výsledků a – je-li to požadováno v Příloze 1 - aktualizovaný „**plán využívání a šíření výsledků**“.

Zpráva musí uvádět komunikační činnosti;

iii) **shrnutí** pro zveřejnění Agenturou;

iv) odpovědi na „**dotazník**“ pokrývající otázky související s prováděním akce a hospodářským a společenským dopadem, zejména v kontextu klíčových ukazatelů výkonnosti programu Horizont 2020 a požadavků na monitorování programu Horizont 2020;

b) **„pravidelnou finanční zprávu“** obsahující:

i) „**individuální účetní závěrku**“ (viz Příloha 4) od každého příjemce a od každé připojené třetí strany za příslušné vykazované období.

Individuální účetní závěrka musí podrobně uvádět způsobilé náklady (skutečné náklady, jednotkové náklady a paušální náklady; viz Článek 6) pro každou rozpočtovou kategorii (viz Příloha 2).

Příjemci a připojené třetí strany musí deklarovat všechny způsobilé náklady, i když u skutečných nákladů, jednotkových nákladů a paušálních nákladů přesahují částky uvedené v odhadovaném rozpočtu (viz Příloha 2). Částky, které nejsou uvedeny v individuální účetní závěrce, nebudou Agenturou zohledněny. Pokud individuální účetní závěrka není předložena za vykazované období, může být zahrnuta v pravidelné účetní závěrce za další vykazované období. Jednotlivé účetní závěrky za poslední vykazované období musí rovněž obsahovat **podrobné údaje o příjmech akce** (viz Článek 5.3.3).

Každý příjemce a každá připojená třetí strana musí **potvrdit**, že:

- poskytnuté informace jsou úplné, spolehlivé a pravdivé;

- deklarované náklady jsou způsobilé (viz Článek 6);

- náklady lze doložit odpovídajícími záznamy a podpůrnou dokumentací (viz Článek 18), které budou předloženy na vyžádání (viz Článek 17) nebo v souvislosti s kontrolami, přezkumy, audity a vyšetřováním (viz Článek 22), a

- za poslední vykazované období doložit, že všechny příjmy byly deklarovány (viz Článek 5.3.3);

ii) **vysvětlení použití zdrojů a informace o subdodávkách** (viz Článek 13) a věcných příspěvcích poskytovaných třetími stranami (viz články 11 a 12) od každého příjemce a od každé připojené třetí strany za dané sledované období;

iii) nelze použít;

iv) „**pravidelnou souhrnnou účetní závěrku**“, vytvořenou automaticky systémem elektronické výměny, konsolidující jednotlivé účetní závěrky za příslušné vykazované období a zahrnující – kromě posledního vykazovaného období – žádost o průběžnou platbu.

20.4 Závěrečnou zprávu – žádost o platbu zůstatku

Kromě pravidelné zprávy za poslední vykazované období musí koordinátor předložit závěrečnou zprávu do 60 dnů po skončení posledního vykazovaného období.

Závěrečná zpráva musí obsahovat následující:

a) „**závěrečnou technickou zprávu“ se shrnutím** ke zveřejnění, která obsahuje:

i) přehled výsledků a jejich využívání a šíření;

ii) závěry o akci a

iii) socioekonomický dopad akce;

b) **„závěrečnou finanční zprávu**“ obsahující:

i) „**konečný souhrnný finanční výkaz**“, vytvořený automaticky systémem elektronické výměny, konsolidující individuální účetní závěrku za všechna vykazovaná období a včetně žádosti o platbu zůstatku a

ii) „**osvědčení o finančních výkazech**“ (vypracované v souladu s Přílohou 5) pro každého příjemce a pro každou připojenou třetí stranu, pokud požaduje celkový příspěvek ve výši 325 000 EUR nebo více, jako náhradu skutečných nákladů a jednotky náklady vypočítané na na základě svých obvyklých postupů nákladového účetnictví (viz Článek 5.2 a Článek 6.2).

20.5 Informace o vzniklých kumulativních výdajích

Nelze použít

20.6 Měna pro účetní závěrku a převod na euro

Účetní závěrka musí být sepsána v eurech.

Příjemci a připojené třetí strany, jejichž účetnictví je založeno v jiné měně než v eurech, musí převést náklady zaznamenané na jejich účtech na eura průměrem denních směnných kurzů zveřejněných v řadě C Úředního věstníku Evropské unie, vypočtených z odpovídající vykazované období. Není-li pro danou měnu v *Úředním věstníku Evropské unie* zveřejněn žádný denní směnný kurz Eura, musí být přepočten průměrem měsíčních účetních kurzů zveřejněných na webových stránkách Komise, vypočítaných za odpovídající vykazované období.

Není-li pro danou měnu v *Úředním věstníku Evropské unie* zveřejněn žádný denní směnný kurz Eura, musí být přepočten průměrem měsíčních účetních kurzů zveřejněných na webových stránkách Komise, vypočítaných za odpovídající vykazované období. Příjemci a připojené třetí strany s účetnictvím zavedeným v eurech musí převést náklady vynaložené v jiné měně na euro podle svých obvyklých účetních postupů.

20.7 Jazyk zpráv

Všechny zprávy (technické a finanční zprávy, včetně finančních výkazů) musí být předloženy v jazyce Dohody.

20.8 Důsledky nedodržení

Pokud předložené zprávy nejsou v souladu s tímto Článkem, může Agentura pozastavit výplatní lhůtu (viz Článek 47) a použít jakákoli další opatření popsaná v Kapitole 6.

Pokud koordinátor poruší svou povinnost předložit zprávy a pokud tuto povinnost nesplní do 30 dnů po písemné upomínce, může Agentura dohodu vypovědět (viz Článek 50) nebo uplatnit jakékoliv jiné opatření popsané v Kapitole 6.

ČLÁNEK 21 - PLATBY A USTANOVENÍ O PLATBÁCH

21.1 Platby, které mají být provedeny

Koordinátorovi budou provedeny následující platby:

- jedna platba **předběžného financování**;
- jedna nebo více **průběžných plateb** na základě žádosti o průběžné platby (viz Článek 20) a
- jedna **platba zůstatku na základě žádosti** o platbu zůstatku (viz Článek 20).

21.2 Platba předběžného financování – Částka – Částka zadržená pro Záruční fond

Cílem předběžného financování je poskytnout příjemcům volnou částku.

Do výplaty zůstatku zůstává majetkem EU.

Výše platby předběžného financování bude **10 665 817,89 EUR** (deset milionů šest set šedesát pět tisíc osm set sedmnáct euro a osmdesát devět eurocentů).

Agentura-s výjimkou případů, kdy se použije Článek 48, odešle platbu předběžného financování koordinátorovi do 30 dnů od vstupu Dohody v platnost (viz Článek 58) nebo od 10 dnů před datem zahájení akce (viz Článek 3), podle toho, co nastane později.

Agentura si z platby předběžného financování ponechá částku **999 920,43 EUR** (devět set devadesát devět tisíc devět set dvacet euro a čtyřicet tři eurocenty), což odpovídá 5 % maximální částky grantu (viz Článek 5.1), a převede ji do „**Záručního fondu**“.

21.3 Průběžné platby – Částka – Výpočet

Průběžné platby nahrazují způsobilé náklady vzniklé při provádění akce během odpovídajících vykazovaných období.

Agentura zaplatí koordinátorovi částku splatnou jako průběžnou platbu do 90 dnů od obdržení pravidelné zprávy (viz Článek 20.3), pokud nebudou uplatněny články 47 nebo 48.

Platba podléhá schválení pravidelné zprávy. Jeho schválení neznamená uznání shody, pravosti, úplnosti nebo správnosti jeho obsahu.

Agentura vypočítá částku splatnou jako průběžnou platbu v následujících krocích:

Krok 1 - Použití sazeb náhrad

Krok 2 - Omezení na 90 % maximální částky grantu

21.3.1 Krok 1 - Použití sazeb náhrad

Sazba (sazby) náhrad (viz Článek 5.2) se použijí na způsobilé náklady (skutečné náklady, jednotkové náklady a paušální náklady; viz Článek 6) deklarované příjemci a připojenými třetími stranami (viz Článek 20) a schválené Agenturou (viz výše) pro příslušné vykazované období.

21.3.2 Krok 2 - Omezení na 90 % maximální částky grantu

Celková výše předběžného financování a průběžných plateb nesmí překročit 90 % maximální částky grantu stanovené v Článku 5.1. Maximální částka pro průběžnou platbu bude vypočítána následovně:

{90 % maximální výše grantu (viz Článek 5.1)

Mínus

{předběžné financování a předchozí průběžné platby}}.

21.4 Platba zůstatku – Částka – Výpočet – Uvolnění částky zadržené pro Garanční fond

Platba zůstatku nahradí zbývající část způsobilých nákladů, které příjemcům vznikly při provádění akce.

Pokud je celková částka dřívějších plateb vyšší než konečná výše grantu (viz Článek 5.3), má platba zůstatku formu zpětného získání (viz Článek 44).

Pokud je celková částka dřívějších plateb nižší než konečná výše grantu, Agentura vyplatí zůstatek do 90 dnů od obdržení závěrečné zprávy (viz Článek 20.4), s výjimkou případů, kdy jsou aplikovány články 47 nebo 48.

Platba podléhá schválení závěrečné zprávy. Schválení neznamená uznání shody, pravosti, úplnosti nebo správnosti jeho obsahu. Dlužnou částku jako zůstatek vypočítá Agentura odečtením celkové částky již provedeného předběžného financování a případných průběžných plateb od konečné výše grantu stanovené v souladu s Článkem 5.3:

{konečná výše grantu (viz Článek 5.3)

minus

{předběžné financování a provedené průběžné platby}}.

Při platbě zůstatku bude uvolněna částka zadržená pro Záruční fond (viz výše) a:

- pokud je zůstatek kladný: uvolněná částka bude v plné výši vyplacena koordinátorovi spolu s částkou splatnou jako zůstatek;

- pokud je zůstatek záporný (výplata zůstatku formou inkasa): bude odečteno z uvolněné částky (viz Článek 44.1.2). Pokud je výsledná částka:

- pozitivní, bude vyplacena koordinátorovi

- je negativní, bude obnovena.

Částka, kterou je třeba zaplatit, však může být – bez souhlasu příjemců – započtena proti jakékoliv jiné částce, kterou příjemce dluží Agentuře, Komisi nebo jiné výkonné Agentuře (v rámci rozpočtu EU nebo Euratomu), a to až do výše uvedeného maximálního příspěvku EU pro daného příjemce v odhadovaném rozpočtu (viz Příloha 2).

21.5 Oznámení splatných částek

Při provádění plateb Agentura formálně oznámí koordinátorovi splatnou částku s uvedením, zda se jedná o průběžnou platbu nebo o platbu zůstatku.

V případě platby zůstatku bude v oznámení rovněž uvedena konečná výše grantu.

V případě snížení grantu nebo vrácení neoprávněných částek bude oznámení předcházet rozporové řízení stanovené v článcích 43 a 44.

21.6 Měna pro platby

Agentura provede veškeré platby v eurech.

21.7 Platby koordinátorovi – distribuce příjemcům

Platby budou provedeny koordinátorovi.

Platby koordinátorovi zprostí Agenturu její platební povinnosti.

Koordinátor musí platby bez zbytečného odkladu rozdělit mezi příjemce.

Předběžné financování však může být distribuováno pouze:

a) pokud k Dohodě přistoupil minimální počet příjemců uvedený ve výzvě k předkládání návrhů (viz Článek 56) a

b) příjemcům, kteří přistoupili k Dohodě (viz Článek 56).

21.8 Bankovní účet pro platby

Všechny platby budou odeslány na následující bankovní účet:

Název banky: DNB BANK ASA

Celé jméno držitele účtu: NORGES TEKNISK

NATURVITENSKAPELIGEUNIVERSITET NTNU

Kód IBAN: NO8174500447293

21.9 Náklady na převody plateb

Náklady na převody plateb se hradí následovně:

- Agentura nese náklady na převody účtované její bankou;

- příjemce nese náklady na převody účtované jeho bankou;

- strana, která způsobila opakování převodu, nese veškeré náklady na opakovaný převod.

21.10 Datum platby

Platby Agentury se považují za provedené v den, kdy jsou odepsány z jejího účtu.

21.11 Důsledky nedodržení

21.11.1 Pokud Agentura nezaplatí ve lhůtách pro platby (viz výše), mají příjemci nárok na **úrok z prodlení** ve výši sazby uplatňované Evropskou centrální bankou (ECB) na její hlavní refinanční operace v eurech (dále jen „referenční sazba“). '), plus tři a půl bodu. Referenční sazba je sazba platná k prvnímu dni měsíce, ve kterém končí lhůta pro platbu, zveřejněná v řadě C *Úředního věstníku Evropské unie*.

Pokud je úrok z prodlení nižší nebo roven 200 EUR, bude vyplacen koordinátorovi pouze na základě žádosti podané do dvou měsíců od obdržení opožděné platby.

Úrok z prodlení není splatný, pokud jsou všemi příjemci členské státy EU (včetně regionálních a místních vládních orgánů nebo jiných veřejných orgánů jednajících jménem členského státu pro účely této Dohody).

Pozastavení termínu platby nebo plateb (viz články 47 a 48) nebude považováno za pozdní platbu.

Úrok z prodlení se vztahuje na období počínající dnem následujícím po datu splatnosti platby (viz výše) až do data platby včetně.

Úrok z prodlení se pro účely výpočtu konečné výše grantu nebere v úvahu.

21.11.2 Pokud koordinátor poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43) a Dohoda nebo účast koordinátora může být ukončena (viz.

Článek 50).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 22 - KONTROLY, RECENZE, AUDITY A ŠETŘENÍ – ROZŠÍŘENÍ ZJIŠTĚNÍ

22.1 Kontroly, posudky a audity prováděné Agenturou a Komisí

22.1.1 Právo provádět kontroly

Agentura nebo Komise – během provádění akce nebo později – zkontroluje řádný průběh akce a dodržování povinností podle Dohody, včetně posuzování výsledků a zpráv. Za tímto účelem mohou Agentuře nebo Komisi pomáhat externí osoby nebo orgány.

Agentura nebo Komise mohou rovněž požádat o doplňující informace v souladu s Článkem 17.

Agentura nebo Komise mohou požádat příjemce, aby jim takové informace poskytli přímo.

Poskytnuté informace musí být přesné, úplné a v požadovaném formátu, včetně elektronického formátu.

22.1.2 Právo provádět přezkumy

Agentura nebo Komise mohou – v průběhu akce nebo poté – provádět přezkumy správného průběhu akce (včetně hodnocení výsledků a zpráv), dodržování povinností podle Dohody a pokračujícího vědeckého nebo technologického významu akce. Kontroly lze zahájit až dva roky po vyplacení zůstatku. Budou formálně oznámeny příslušnému koordinátorovi nebo příjemci a budou považovány za zahájené v den formálního oznámení.

Pokud je kontrola prováděna na třetí straně (viz články 10 až 16), musí dotyčný příjemce tuto třetí stranu informovat.

Agentura nebo Komise mohou provádět kontroly přímo (pomocí vlastních zaměstnanců) nebo nepřímo (pomocí externích osob nebo orgánů k tomu určených). Informují dotyčného koordinátora nebo příjemce o totožnosti vnějších osob nebo orgánů. Mají právo vznést námitku proti jmenování z důvodu obchodní důvěrnosti.

Dotyčný koordinátor nebo příjemce musí – v požadovaném termínu – poskytnout veškeré informace a údaje kromě již předložených výstupů a zpráv (včetně informací o využívání zdrojů).

Agentura nebo Komise mohou požádat příjemce, aby jí takové informace poskytli přímo.

Dotyčného koordinátora nebo příjemce lze požádat o účast na setkáních, a to i s externími odborníky.

V případě přezkumů **na místě** musí příjemci umožnit přístup ke svým místům a prostorám, a to i externím osobám nebo orgánům, a musí zajistit, aby požadované informace byly snadno dostupné.

Poskytnuté informace musí být přesné, a úplné a v požadovaném formátu, včetně elektronického formátu.

Na základě zjištění z přezkumu bude vypracována „**zpráva o přezkoumání**“.

Agentura nebo Komise formálně oznámí zprávu o přezkumu dotyčnému koordinátorovi nebo příjemci, který má 30 dnů na formální oznámení připomínek („**postup rozporného přezkumu**“).

Posudky (včetně revizních zpráv) jsou v jazyce Dohody.

22.1.3 Právo provádět audity

Agentura nebo Komise mohou – během provádění akce nebo poté – provádět audity řádného provádění akce a dodržování povinností vyplývajících z Dohody.

Audity lze zahájit až dva roky po vyplacení zůstatku. Budou formálně oznámeny příslušnému koordinátorovi nebo příjemci a budou považovány za zahájené v den formálního oznámení.

Pokud je audit prováděn na třetí straně (viz články 10 až 16), musí dotyčný příjemce tuto třetí stranu informovat.

Agentura nebo Komise mohou provádět audity přímo (pomocí vlastních zaměstnanců) nebo nepřímo (pomocí externích osob nebo orgánů k tomu určených). Informují dotyčného koordinátora nebo příjemce o totožnosti vnějších osob nebo orgánů. Mají právo vznést námitku proti jmenování z důvodu obchodní důvěrnosti.

Dotyčný koordinátor nebo příjemce musí v požadovaném termínu poskytnout veškeré informace (včetně úplných účtů, individuálních platových výkazů nebo jiných personálních údajů), aby ověřil dodržování Dohody. Agentura nebo Komise mohou požádat příjemce, aby jim takové informace poskytli přímo.

V **případě auditů na místě** musí příjemci umožnit přístup na svá pracoviště a do prostor, a to i externím osobám nebo orgánům, a musí zajistit, aby požadované informace byly snadno dostupné.

Poskytnuté informace musí být přesné, úplné a v požadovaném formátu, včetně elektronického formátu.

Na základě zjištění auditu bude vypracován „**návrh zprávy o auditu“.**

Agentura nebo Komise formálně oznámí návrh zprávy o auditu příslušnému koordinátorovi nebo příjemci, který má 30 dnů na formální oznámení připomínek („protichůdný postup auditu“). Tuto lhůtu může Agentura nebo Komise v odůvodněných případech prodloužit.

„**Závěrečná zpráva o auditu**“ zohlední připomínky daného koordinátora nebo příjemce. Zpráva bude formálně ohlášena.

Audity (**včetně zpráv o auditu**) jsou v jazyce Dohody.

Agentura nebo Komise mají rovněž přístup k zákonným záznamům příjemců za účelem pravidelného hodnocení jednotkových nákladů nebo paušálních částek.

22.2 Vyšetřování Evropského úřadu pro boj proti podvodům (OLAF)

Podle nařízení č. 883/2013[11] a č. 2185/96[12] (a v souladu s jejich ustanoveními a postupy) může Evropský úřad pro boj proti podvodům (OLAF) - kdykoli během provádění akce nebo později – provádět vyšetřování, včetně kontroly a inspekce na místě s cílem zjistit, zda došlo k podvodu, korupci nebo jiné nezákonné činnosti poškozující finanční zájmy EU.

22.3 Kontroly a audity provedené Evropským účetním dvorem (EÚD)

Podle Článku 287 Dohody o fungování Evropské unie (SFEU) a Článku 161 18 finančního nařízení č. 966/2012[13] může Evropský účetní dvůr (EÚD) - kdykoli během provádění akce nebo později – provádět audity.

EÚD má právo přístupu za účelem kontrol a auditů.

22.4 Kontroly, posudky, audity a vyšetřování u mezinárodních organizací

Nelze použít

22.5 Důsledky zjištění při kontrolách, posudcích, auditech a vyšetřováních – Rozšíření zjištění

22.5.1 Zjištění v tomto grantu

Zjištění kontrol, přezkumů, auditů nebo šetření prováděných v rámci tohoto grantu může vést k zamítnutí nezpůsobilých nákladů (viz Článek 42), snížení grantu (viz Článek 43), zpětnému získání neoprávněných částek (viz Článek 44) nebo k jakémukoliv jinému opatření popsanému v Kapitole 6.

Odmítnutí nákladů nebo snížení grantu po vyplacení zůstatku povede k revidované konečné výši grantu (viz Článek 5.4).

Zjištění při kontrolách, posudcích, auditech nebo vyšetřováních mohou vést k žádosti o změnu úpravy Přílohy 1 (viz Článek 55).

[11] Nařízení Evropského parlamentu a Rady (EU, Euratom) č. 883/2013 ze dne 11. září 2013 o vyšetřování prováděném Evropským úřadem pro boj proti podvodům (OLAF) a o zrušení nařízení Evropského parlamentu (ES) č. 1073/1999 a Rady a nařízení Rady (Euratom) č. 1074/1999 (Úř. věst.L 248, 18.09.2013, s. 1).
[12] Nařízení Rady (Euratom, ES) č. 2185/1996 ze dne 11. listopadu 1996 o kontrolách a inspekcích na místě prováděných Komisí za účelem ochrany finančních zájmů Evropských společenství před podvody a jinými nesrovnalostmi (Úř. Věst.L 292, 15.11.1996, s. 2).
[13] Nařízení Evropského parlamentu a Rady (EU, Euratom) č. 966/2012 ze dne 25. října 2012 o finančních pravidlech použitelných na souhrnný rozpočet Unie a o zrušení nařízení Rady (ES, Euratom) č. 1605/2002 (Úř. Věst. L 298, 26.10.2012, s. 1).

Kontroly, posudky, audity nebo vyšetřování, která zjistí systémové nebo opakující se chyby, nesrovnalosti, podvody nebo porušení povinností, mohou také vést k důsledkům v jiných grantech EU nebo Euratomu udělených za podobných podmínek („**rozšíření zjištění z tohoto grantu na jiné granty**“).

Zjištění vyplývající z vyšetřování úřadu OLAF mohou navíc podle vnitrostátního práva vést až k trestnímu stíhání.

22.5.2 Zjištění v jiných grantech

Agentura nebo Komise mohou rozšířit zjištění z jiných grantů na tento grant **(„rozšíření zjištění z jiných grantů na tento grant“),** pokud:

a) v jiných grantech EU nebo Euratomu udělených za podobných podmínek bylo zjištěno, že se dotyčný příjemce dopustil systémových nebo opakujících se chyb, nesrovnalostí, podvodů nebo porušení povinností, které mají podstatný dopad na tento grant, a

b) tato zjištění jsou formálně oznámena dotyčnému příjemci – spolu se seznamem grantů ovlivněných zjištěními – nejpozději do dvou let po vyplacení zůstatku tohoto grantu.

Rozšíření zjištění může vést k zamítnutí nákladů (viz Článek 42), snížení grantu (viz Článek 43), zpětnému získání neoprávněných částek (viz Článek 44), pozastavení plateb (viz Článek 48),

pozastavení provádění akce (viz Článek 49) nebo ukončení (viz Článek 50).

22.5.3 Postup

Agentura nebo Komise formálně oznámí dotyčnému příjemci systémové nebo opakující se chyby a jeho záměr rozšířit tato zjištění auditu spolu se seznamem dotčených grantů.

22.5.3.1 Pokud se zjištění týkají **způsobilosti nákladů:** formální oznámení bude zahrnovat:

a) výzvu k předložení připomínek k seznamu grantů, kterých se zjištění týkají;

b) žádost o předložení **revidované účetní závěrky** pro všechny dotčené granty;

c) **opravný poměr pro extrapolaci** stanovený Agenturou nebo Komisí na základě systémových nebo opakujících se chyb, pro výpočet částek, které mají být zamítnuty, pokud dotyčný příjemce:

i) má za to, že předložení revidované účetní závěrky není možné nebo proveditelné nebo

(ii) nepředkládá revidovanou účetní závěrku.

Dotčený příjemce má 90 dnů od obdržení oznámení na předložení vyjádření, revidované účetní závěrky nebo na návrh řádně odůvodněné **alternativní metody opravy**. Tuto lhůtu může Agentura nebo Komise v odůvodněných případech prodloužit.

Agentura nebo Komise pak mohou zahájit postup zamítnutí v souladu s Článkem 42 na základě:

- revidované účetní závěrky, pokud byla schválena;

- navrhované alternativní metody opravy, je-li přijata nebo

- původně oznámené opravná sazba pro extrapolaci, pokud neobdrží žádné připomínky nebo revidovanou účetní závěrku, nepřijme vyjádření nebo navrhovanou alternativní metodu opravy nebo neschválí revidovanou účetní závěrku.

22.5.3.2 Pokud se zjištění týkají **podstatných chyb, nesrovnalostí, podvodu nebo závažného porušení povinností:** formální oznámení bude zahrnovat:

a) výzva k předložení připomínek k seznamu grantů ovlivněných zjištěními a

b) paušální sazbu, kterou hodlá Agentura nebo Komise uplatňovat podle zásady proporcionality.

Dotčený příjemce má 90 dnů od obdržení oznámení na předložení vyjádření nebo na návrh řádně odůvodněné alternativní paušální sazby.

Agentura nebo Komise pak mohou zahájit postup snižování v souladu s Článkem 43 na základě:

- navrhovaného alternativního paušálu, je-li přijat

nebo

-původně oznámené paušální sazby, pokud neobdrží žádné připomínky nebo nepřijmou vyjádření nebo navrhovanou alternativní paušální sazbu.

22.6 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, jakékoliv nedostatečně odůvodněné náklady budou nezpůsobilé (viz Článek 6) a budou zamítnuty (viz Článek 42). Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 23 - HODNOCENÍ DOPADU AKCE

23.1 Právo hodnotit dopad akce

Agentura nebo Komise mohou provádět průběžná a konečná hodnocení dopadu opatření měřeného vzhledem k cíli programu EU.

Hodnocení lze zahájit během provádění akce a až pět let po vyplacení zůstatku. Hodnocení se považuje za zahájené datem formálního oznámení koordinátorovi nebo příjemci.

Agentura nebo Komise mohou tato hodnocení provádět přímo (pomocí vlastních zaměstnanců) nebo nepřímo (pomocí externích orgánů nebo osob, které k tomu pověřila).

Koordinátor nebo příjemci musí poskytnout veškeré informace relevantní pro hodnocení dopadu akce, včetně informací v elektronickém formátu.

23.2 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může Agentura použít opatření popsaná v Kapitole 6.

SEKCE 3 PRÁVA A POVINNOSTI TÝKAJÍCÍ SE SOUVISLOSTI A VÝSLEDKŮ

PODSEKCE 1 OBECNĚ

ČLÁNEK 23a – SPRÁVA DUŠEVNÍHO VLASTNICTVÍ

23a.1 Povinnost přijmout opatření k provedení doporučení Komise o správě duševního vlastnictví v činnostech předávání znalostí

Příjemci, kteří jsou univerzitami nebo jinými veřejnými výzkumnými organizacemi, musí přijmout opatření k provedení zásad stanovených v bodech 1 a 2 Kodexu, který je Přílohou doporučení Komise o správě duševního vlastnictví při činnostech v oblasti přenosu znalostí.[14]

To nemění povinnosti stanovené v podsekcích 2 a 3 této sekce.

Příjemci musí zajistit, aby o nich věděli výzkumní pracovníci a třetí strany zapojené do akce.

23a.2 Důsledky nedodržení

Pokud příjemce poruší své povinnosti podle tohoto Článku, může Agentura použít kterékoliv z opatření popsaných v Kapitole 6.

PODSEKCE 2 PRÁVA A POVINNOSTI SOUVISEJÍCÍ S KONTEXTEM

ČLÁNEK 24 - DOHODA O KONTEXTU

24.1 Dohoda o kontextu

Příjemci musí určit a písemně odsouhlasit podklady pro akci („**Dohoda o kontextu**“).

„Kontextem“ se rozumí jakákoliv data, know-how nebo informace-bez ohledu na jejich formu nebo povahu (hmotné i nehmotné), včetně jakýchkoli práv, jako jsou práva duševního vlastnictví, která:

a) patřila příjemcům před tím, než přistoupili k Dohodě, a

b) jsou zapotřebí k provedení akce nebo využití výsledků.

24.2 Důsledky nedodržení

[14] Doporučení Komise C (2008) 1329 ze dne 10.4.2008 o správě duševního vlastnictví při činnostech v oblasti přenosu znalostí a Kodexu pro univerzity a další veřejné výzkumné instituce připojený k tomuto doporučení.

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 25 - PRÁVA PŘÍSTUPU KE KONTEXTU

25.1 Výkon přístupových práv – Zřeknutí se přístupových práv – Žádné sublicencování

Chcete-li uplatnit přístupová práva, musíte o to nejprve písemně požádat („**žádost o přístup**“).

„**Přístupová práva**“ označují práva k používání výsledků nebo kontextu za podmínek stanovených v této Dohodě.

Zřeknutí se přístupových práv není platné, pokud není podáno písemně.

Pokud není dohodnuto jinak, přístupová práva nezahrnují právo sublicence.

25.2 Přístupová práva pro ostatní příjemce k provádění jejich vlastních úkolů v rámci akce

Příjemci si musí navzájem poskytnout bezplatný přístup k základním informacím potřebným k plnění jejich vlastních úkolů v rámci akce, pokud příjemce, který má tyto znalosti, před přistoupením ke Dohodě:

a) informoval ostatní příjemce, že přístup k jeho kontextu podléhá zákonným omezením nebo limitům, včetně těch, které vyplývají z práv třetích stran (včetně zaměstnanců), nebo

b) dohodl se s ostatními příjemci, že přístup nebude poskytován bez licenčních poplatků.

25.3 Přístupová práva ostatních příjemců za využití jejich vlastních výsledků

Příjemci si musí navzájem poskytnout – za spravedlivých a přiměřených podmínek – přístup k základním informacím potřebným pro využití jejich vlastních výsledků, pokud příjemce, který je majitelem těchto znalostí, před přistoupením k Dohodě neinformoval ostatní příjemce, že přístup k jeho kontextu podléhá zákonným omezením včetně těch, která vyplývají z práv třetích stran (včetně zaměstnanců).

„**Spravedlivými a přiměřenými podmínkami**“ se rozumějí vhodné podmínky, včetně možných finančních podmínek nebo podmínek bez licenčních poplatků, s přihlédnutím ke konkrétním okolnostem žádosti o přístup, např. skutečné nebo potenciální hodnoty výsledků nebo kontextu, ke kterým je požadován přístup, a/nebo rozsahu či trvání předpokládaného využívání.

Žádosti o přístup lze podat – pokud není dohodnuto jinak – do jednoho roku po období stanoveném v Článku 3.

25.4 Přístupová práva pro přidružené subjekty

Není-li v Dohodě o konsorciu dohodnuto jinak, musí být rovněž umožněn přístup k základním informacím – za spravedlivých a přiměřených podmínek (viz výše; Článek 25.3) a pokud to nepodléhá zákonným omezením a limitům, včetně těch, které ukládají práva třetích stran (včetně zaměstnanců)

přidruženým subjektům[15] usazeným v členském státě EU nebo „**přidružené zemi**[16]“, pokud je nutné využívat výsledky generované příjemci, ke kterým jsou přidruženi.

Není-li dohodnuto jinak (viz výše; Článek 25.1), musí příslušný přidružený subjekt podat žádost přímo příjemci, který má daný kontext.

Žádosti o přístup lze podat – pokud není dohodnuto jinak – do jednoho roku po období stanoveném v Článku 3.

25.5 Přístupová práva pro třetí strany

Nelze použít

25.6 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43). Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

PODSEKCE 3 PRÁVA A POVINNOSTI TÝKAJÍCÍ SE VÝSLEDKŮ

ČLÁNEK 26 - VLASTNICTVÍ VÝSLEDKŮ

26.1 Vlastnictví příjemcem, který generuje výsledky

Výsledky jsou ve vlastnictví příjemce, který je generuje.

„Výsledky“ znamenají jakýkoliv (hmotný nebo nehmotný) výstup akce, jako jsou data, znalosti nebo informace bez ohledu na formu nebo povahu, bez ohledu na to, zda může být chráněn či nikoli, který je generován v rámci akce, jakož i jakákoliv s ním související práva včetně práv duševního vlastnictví.

26.2 Společné vlastnictví několika příjemců

Dva nebo více příjemců vlastní výsledky společně, pokud:

a) je společně vytvořili

b) není možné:

i) stanovit příslušný příspěvek každého příjemce, nebo

ii) oddělit je za účelem žádosti o jejich ochranu, získání nebo zachování (viz Článek 27).

[15] Definice v poznámce pod čarou „přidružený subjekt“ (Článek 14.1).

[16] Z definice v čl. 2.1 odst. 3 nařízení o účasti č. 1290/2013: „Přidruženou zemí“ se rozumí třetí země, která je stranou mezinárodní Dohody s Unií, jak je uvedeno v Článku 7 rámce Horizontu 2020 Nařízení o programu č. 1291/2013. Článek 7 stanoví podmínky pro přidružení zemí mimo EU k programu Horizont 2020.

Spoluvlastníci se musí (písemně) dohodnout na rozdělení a podmínkách výkonu svého spoluvlastnictví („**Dohoda o spoluvlastnictví**“), aby zajistili dodržování svých povinností podle této Dohody.

Není-li ve Dohodě o spoluvlastnictví stanoveno jinak, může každý spoluvlastník udělit nevýhradní licence třetím stranám k využívání výsledků ve společném vlastnictví (bez jakéhokoliv práva na sublicenci), pokud ostatní spoluvlastníci:

a) jsou upozorněni nejméně 45 dní předem a

b) dostanou spravedlivou a přiměřenou náhradu.

Jakmile jsou výsledky generovány, mohou spoluvlastníci souhlasit (písemně) o použití jiného režimu než spoluvlastnictví (jako je například převod na jediného vlastníka (viz Článek 30) s přístupem práva pro ostatní).

26.3 Práva třetích stran (včetně zaměstnanců)

Pokud si třetí strany (včetně zaměstnanců) mohou nárokovat práva na výsledky, musí dotyčný příjemce zajistit, aby splnil své závazky vyplývající z Dohody.

Pokud výsledky generuje třetí strana, musí příslušný příjemce získat všechna potřebná práva (převod, licence nebo jiné) od třetí strany, aby bylo možné respektovat její povinnosti, jako by tyto výsledky generoval sám příjemce.

Není-li získání práv možné, musí se příjemce zdržet používání třetí strany ke generování výsledků.

26.4 Vlastnictví Agentury k ochraně výsledků

26.4.1 Agentura může – se souhlasem dotyčného příjemce – převzít vlastnictví výsledků k jejich ochraně, pokud má příjemce v úmyslu do čtyř let po období stanoveném v Článku 3 šířit své výsledky bez jejich ochrany, s výjimkou kteréhokoliv z následujících případů:

a) nedostatečná ochrana je způsobena tím, že ochrana výsledků není možná, přiměřená ani odůvodněná (vzhledem k okolnostem);

b) nedostatek ochrany je způsoben nedostatkem potenciálu pro komerční nebo průmyslové využití, nebo

c) příjemce zamýšlí předat výsledky jinému příjemci nebo třetí straně usazené v členském státě EU nebo přidružené zemi, která je ochrání.

Před šířením výsledků a pokud se nepoužije některý z výše uvedených případů podle písmen a), b) nebo c), musí příjemce formálně informovat Agenturu o jakýchkoliv důvodech odmítnutí souhlasu. Příjemce může odmítnout souhlas pouze tehdy, pokud může prokázat, že by jeho oprávněné zájmy utrpěly značnou újmu.

Pokud se Agentura rozhodne převzít vlastnictví, formálně to oznámí dotyčnému příjemci do 45 dnů od obdržení oznámení.

Žádné šíření týkající se těchto výsledků nesmí probíhat před koncem tohoto období nebo v případě, že Agentura přijme kladné rozhodnutí, dokud nepřijme opatření nezbytná k ochraně výsledků.

26.4.2 Agentura může – se souhlasem dotyčného příjemce – převzít vlastnictví výsledků k jejich ochraně, pokud má příjemce v úmyslu je do čtyř let po období stanoveném v Článku 3 přestat je chránit s výjimkou některého z následujících případů:

a) ochrana je zastavena z důvodu nedostatku potenciálu pro komerční nebo průmyslové využití;

b) prodloužení by nebylo za daných okolností odůvodněné.

Příjemce, který má v úmyslu přestat chránit výsledky nebo neusilovat o jejich prodloužení, musí – pokud se nepoužije některý z případů uvedených výše pod písmeny a) nebo b) - formálně informovat Agenturu nejméně 60 dní před zánikem ochrany nebo jejím možném prodloužením a zároveň ji informovat o jakýchkoliv důvodech odmítnutí souhlasu. Příjemce může odmítnout souhlas pouze tehdy, pokud může prokázat, že by jeho oprávněné zájmy utrpěly značnou újmu.

Pokud se Agentura rozhodne převzít vlastnictví, formálně to oznámí dotyčnému příjemci do 45 dnů od obdržení oznámení.

26.5 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43). Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 27 - OCHRANA VÝSLEDKŮ – VIDITELNOST FINANCOVÁNÍ EU

27.1 Povinnost chránit výsledky

Každý příjemce musí prozkoumat možnost ochrany svých výsledků a musí je vhodně chránit – po přiměřenou dobu a s odpovídajícím územním pokrytím – pokud:

a) lze důvodně očekávat, že výsledky budou komerčně nebo průmyslově využívány a

b) jejich ochrana je možná, přiměřená a odůvodněná (vzhledem k okolnostem).

Při rozhodování o ochraně musí příjemce zvážit své vlastní oprávněné zájmy a oprávněné zájmy (zejména obchodní) ostatních příjemců.

27.2 Vlastnictví Agentury k ochraně výsledků

Pokud má příjemce v úmyslu nechránit své výsledky, přestat je chránit nebo neusilovat o prodloužení ochrany, může Agentura za určitých podmínek (viz Článek 26.4) převzít vlastnictví, aby zajistila jejich (pokračující) ochranu.

27.3 Informace o financování EU

Žádosti o ochranu výsledků (včetně patentových přihlášek) podané příjemcem nebo jeho jménem musí – pokud Agentura nepožádá nebo nesouhlasí jinak nebo pokud to není nemožné – zahrnout následující:

„Projekt vedoucí k této žádosti získal finanční prostředky z programu Evropské unie pro výzkum a inovace Horizont 2020 v rámci grantové Dohody č. 101036723“.

27.4 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43).

Takové porušení může také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 28 - VYUŽÍVÁNÍ VÝSLEDKŮ

28.1 Povinnost využít výsledky

Každý příjemce musí až čtyři roky po období stanoveném v Článku 3 přijmout opatření, jejichž cílem je zajistit „využití“ jeho výsledků (přímo nebo nepřímo, zejména převodem nebo licencí; viz Článek 30):

a) jejich využití v dalších výzkumných činnostech (mimo akci);

b) vývoj, tvorba nebo uvádění na trh produktu nebo postupu;

c) vytváření a poskytování služby nebo

d) jejich použití při standardizačních činnostech.

Tím se nemění bezpečnostní závazky uvedené v Článku 37, které stále platí.

28.2 Výsledky, které by mohly přispět k evropským nebo mezinárodním normám – Informace o financování EU

Pokud lze důvodně očekávat, že výsledky přispějí k evropským nebo mezinárodním normám, musí o tom dotyčný příjemce až čtyři roky po období stanoveném v Článku 3 informovat Agenturu.

Pokud jsou výsledky začleněny do normy, musí dotčený příjemce – pokud Agentura nepožádá nebo nesouhlasí jinak nebo není-li to nemožné – požádat standardizační orgán, aby do normy zahrnul následující prohlášení s danou informací:

„Výsledky zahrnuté v této normě obdržely finanční prostředky z programu Evropské unie pro výzkum a inovace Horizont 2020 v rámci grantové Dohody č. 101036723”.

28.3 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen v souladu s Článkem 43. Takové porušení může také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 29 - ŠÍŘENÍ VÝSLEDKŮ – OTEVŘENÝ PŘÍSTUP – VIDITELNOST FINANCOVÁNÍ EU

29.1 Povinnost šířit výsledky

Pokud to není v rozporu s jejich oprávněnými zájmy, musí každý příjemce co nejdříve

„**šířit**“ své výsledky vhodnými prostředky (jinými než těmi, které vyplývají z ochrany nebo využívání výsledků), a to i ve vědeckých publikacích (v jakémkoliv médiu).

Tím se nemění povinnost chránit výsledky v Článku 27, povinnosti důvěrnosti v Článku 36, bezpečnostní povinnosti v Článku 37 nebo povinnosti chránit osobní údaje v Článku 39, to vše stále platí.

Příjemce, který má v úmyslu šířit své výsledky, musí ostatní příjemce nejméně 45 dnů předem – není-li dohodnuto jinak – informovat s dostatečnými informacemi o výsledcích, jež bude dále šířit.

Každý jiný příjemce může do 30 dnů od obdržení oznámení vznést námitku, není-li dohodnuto jinak, pokud může prokázat, že by jeho oprávněné zájmy ve vztahu k výsledkům nebo kontextu byly výrazně poškozeny. V takových případech se šíření nesmí uskutečnit, pokud nejsou přijata vhodná opatření k ochraně těchto oprávněných zájmů.

Pokud má příjemce v úmyslu nechránit své výsledky, může – za určitých podmínek (viz Článek 26.4.1) - před šířením mít povinnost o tom formálně informovat Agenturu.

29.2 Otevřený přístup k vědeckým publikacím

Každý příjemce musí zajistit otevřený přístup (bezplatný online přístup pro libovolného uživatele) ke všem posuzovaným vědeckým publikacím týkajícím se jeho výsledků.

Zejména musí:

a) co nejdříve a nejpozději při zveřejnění uložit strojově čitelnou elektronickou kopii publikované verze nebo konečného rukopisu přijatého ke zveřejnění do úložiště vědeckých publikací;

Kromě toho se příjemce musí snažit současně uložit údaje z výzkumu potřebnému k ověření výsledků uvedených v uložených vědeckých publikacích.

b) zajistit otevřený přístup k uložené publikaci – prostřednictvím úložiště – nejpozději:

(i) při zveřejnění, pokud je elektronická verze k dispozici zdarma prostřednictvím vydavatele, nebo

ii) v každém jiném případě do šesti měsíců od zveřejnění (dvanáct měsíců u publikací v sociálních a humanitních vědách).

c) zajistit otevřený přístup – prostřednictvím úložiště – k bibliografickým metadatům, která identifikují uloženou publikaci.

Bibliografická metadata musí být ve standardním formátu a musí obsahovat všechny následující položky:

- pojmy „Evropská unie (EU)“ a „Horizont 2020“;

- název akce, zkratku a číslo grantu;

- datum zveřejnění a případně délku období embarga, a

- trvalý identifikátor

29.3 Otevřený přístup k datům výzkumu

Co se týče údajů z digitálního výzkumu generované v rámci akce („**údaje**“), příjemci musí:

a) uložit údaje do úložiště údajů o výzkumu a přijmout opatření, která třetím stranám umožní přístup, využívání, reprodukci a šíření – bezplatně pro jakéhokoliv uživatele – k následujícímu:

i) údaje, včetně souvisejících metadat, potřebné k ověření výsledků uvedených ve vědeckých publikacích co nejdříve;

ii) nelze použít

iii) další údaje, včetně souvisejících metadat, podle specifikace a ve lhůtách stanovených v „plánu správy údajů“ (viz Příloha 1);

b) poskytovat prostřednictvím úložiště informace o nástrojích, které mají příjemci k dispozici a které jsou nezbytné pro validaci výsledků (je-li to možné – poskytnout i nástroje samotné).

Tím se nemění povinnost chránit výsledky v Článku 27, povinnosti důvěrnosti v Článku 36, bezpečnostní povinnosti v Článku 37 nebo povinnosti chránit osobní údaje v Článku 39, přičemž všechny tyto podmínky stále platí. Výjimečně nemusí příjemci zajišťovat otevřený přístup ke konkrétním částem svých údajů z výzkumu podle písm. A) bodů i) a iii), pokud by bylo dosažení hlavního cíle akce (jak je popsáno v Příloze 1) ohroženo tím, že budou tyto specifické části výzkumných údajů otevřeně přístupné. V takovém případě musí plán správy dat obsahovat důvody neudělení přístupu.

29.4 Informace o financování z prostředků EU – Povinnost a právo používat znak EU

Pokud Agentura nepožádá nebo nestanoví jinak nebo pokud to není možné, jakékoliv šíření výsledků (ve všech formách včetně elektronické) musí:

a) zobrazovat znak EU a

b) obsahovat následující text:

„Tento projekt získal finanční prostředky z programu Evropské unie pro výzkum a inovace Horizont 2020 v rámci grantové Dohody č. 101036723“.

Pokud je znak EU zobrazen společně s jiným logem, musí mít patřičnou důležitost.

Pro účely plnění svých povinností podle tohoto Článku mohou příjemci používat znak EU, aniž by nejprve získali souhlas Agentury.

To jim však nedává právo na výhradní použití.

Kromě toho si nemusí přivlastňovat znak EU nebo jakoukoliv podobnou ochrannou známku nebo logo, a to ani registrací, ani jinými prostředky.

29.5 Prohlášení vylučující odpovědnost Agentury

Jakékoli šíření výsledků musí uvádět, že odráží pouze názor autora a že Agentura nenese odpovědnost za jakékoliv použití informací, které obsahuje.

29.6 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43).

Takové porušení může také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 30 - PŘEVOD A UDĚLOVÁNÍ VÝSLEDKŮ

30.1 Převod vlastnictví

Každý příjemce může převést vlastnictví svých výsledků.

Musí však zajistit, aby se jeho povinnosti podle článků 26.2, 26.4, 27, 28, 29, 30 a 31 vztahovaly i na nového vlastníka a aby tento vlastník měl povinnost je předat při každém dalším převodu.

Tím se nemění bezpečnostní závazky uvedené v Článku 37, které stále platí.

Pokud není dohodnuto jinak (písemně) pro konkrétně určené třetí strany nebo není-li to podle příslušných právních předpisů EU a vnitrostátních právních předpisů o fúzích a akvizicích nemožné, musí příjemce, který hodlá převést vlastnictví výsledků, informovat alespoň 45 dní předem (nebo méně, je-li dohodnuto v písemně) ostatní příjemce, kteří stále mají (nebo stále mohou požadovat) přístupová práva k výsledkům. Toto oznámení musí obsahovat dostatečné informace o novém majiteli, aby jakýkoliv dotčený příjemce mohl posoudit dopady na jeho přístupová práva.

Není-li u konkrétně určených třetích stran dohodnuto jinak (písemně), může jakýkoliv jiný příjemce vznést námitky do 30 dnů od obdržení oznámení (nebo méně, je-li to písemně dohodnuto), pokud může prokázat, že by převod negativně ovlivnil jeho přístupová práva. V takovém případě nesmí k převodu dojít, dokud nedojde k Dohodě mezi danými příjemci.

30.2 Udělení licencí

Každý příjemce může ke svým výsledkům udělit licence (nebo jinak dát právo je využívat), pokud:

a) to nebrání přístupovým právům podle Článku 31 a

b) nelze použít.

Kromě písmen a) a b) lze výlučné licence na výsledky udělit pouze tehdy, pokud se všichni ostatní dotčení příjemci vzdali svých přístupových práv (viz Článek 31.1).

Tím se nemění povinnosti šíření v Článku 29 ani bezpečnostní povinnosti v Článku 37, které nadále platí.

30.3 Právo Agentury vznést námitku proti převodům nebo licencování

Nelze použít

30.4 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43).

Takové porušení může také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 31 - PRÁVA PŘÍSTUPU K VÝSLEDKŮM

31.1 Výkon přístupových práv – Zřeknutí se přístupových práv – Žádné sublicencování

Platí podmínky stanovené v Článku 25.1.

Povinnosti stanovené v tomto Článku nemění bezpečnostní závazky v Článku 37, jež stále platí.

31.2 Přístupová práva pro ostatní příjemce k provádění jejich vlastních úkolů v rámci akce

Příjemci si musí navzájem poskytnout bezplatný přístup k výsledkům potřebným pro plnění vlastních úkolů v rámci akce.

31.3 Přístupová práva ostatních příjemců za využití jejich vlastních výsledků

Příjemci si musí navzájem poskytnout – za spravedlivých a přiměřených podmínek (viz Článek 25.3) - přístup k výsledkům potřebným pro využití vlastních výsledků.

Žádosti o přístup lze podat – pokud není dohodnuto jinak – do jednoho roku po období stanoveném v Článku 3.

31.4 Přístupová práva přidružených subjektů

Pokud není v Dohodě o konsorciu dohodnuto jinak, musí být přístup k výsledkům umožněn také – za spravedlivých a přiměřených podmínek (Článek 25.3) - přidruženým subjektům usazeným v členském státě EU nebo přidružené zemi, pokud je nutné, aby tyto subjekty využívaly výsledky generované příjemci, ke kterým jsou přidruženy.

Není-li dohodnuto jinak (viz výše; Článek 31.1), musí dotyčný přidružený subjekt podat jakoukoliv žádost přímo příjemci, který vlastní výsledky.

Žádosti o přístup lze podat – pokud není dohodnuto jinak – do jednoho roku po období stanoveném v Článku 3.

31.5 Přístupová práva pro instituce, orgány, úřady nebo Agentury EU a členské státy EU

Příjemci musí umožnit přístup ke svým výsledkům – a to bez licenčních poplatků – orgánům, institucím nebo jiným subjektům EU za účelem vývoje, provádění nebo sledování politik nebo programů EU.

Tato přístupová práva jsou omezena na nekomerční a nesoutěžní použití.

To nemění právo používat jakýkoliv materiál, dokument nebo informace obdržené od příjemců pro komunikační a propagační činnosti (viz Článek 38.2).

31.6 Přístupová práva pro třetí strany

Nelze použít

31.7 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

SEKCE 4 DALŠÍ PRÁVA A POVINNOSTI

ČLÁNEK 32 - NÁBOR A PRACOVNÍ PODMÍNKY VÝZKUMNÍKŮ

32.1 Povinnost přijmout opatření k provedení Evropské charty pro výzkumné pracovníky a Kodexu chování pro nábor výzkumných pracovníků

Příjemci musí přijmout veškerá opatření k provedení zásad stanovených v doporučení Komise k Evropské chartě pro výzkumné pracovníky[17] a v Kodexu chování pro nábor výzkumných pracovníků, zejména pokud jde o:

- pracovní podmínky;
- transparentní náborové procesy na základě zásluh a
- kariérní růst.

Příjemci musí zajistit, aby byli vědci a třetí strany zapojené do akce informováni.

32.2 Důsledky nedodržení

Pokud příjemce poruší své povinnosti podle tohoto Článku, může Agentura použít kterékoliv z opatření popsaných v Kapitole 6.

ČLÁNEK 33 – ROVNOST MUŽU A ŽEN

33.1 Povinnost usilovat o rovnost mužů a žen

Příjemci musí při provádění akce přijmout veškerá opatření na podporu rovných příležitostí mezi muži a ženami. Musí se v maximální možné míře snažit o vyvážené zastoupení žen a mužů na všech úrovních personálu přiřazeného k akci, včetně oblasti dohledu a řízení.

33.2 Důsledky nedodržení

Pokud příjemce poruší své povinnosti podle tohoto Článku, může Agentura použít kterékoliv z opatření popsaných v Kapitole 6.

[17] Doporučení Komise 2005/251/ES ze dne 11. března 2005 o Evropské chartě pro výzkumné pracovníky a o Kodexu chování pro nábor výzkumných pracovníků (Úř. Věst.L 75, 22.3.2005, s. 67).

ČLÁNEK 34 - ETIKA A INTEGRITA VÝZKUMU

34.1Povinnost dodržovat zásady etické a výzkumné integrity

Příjemci musí provést akci v souladu s:

a) etické zásady (včetně nejvyšších standardů integrity výzkumu)

a

b) platné mezinárodní, evropské a vnitrostátní právo

Financování nebude poskytnuto na činnosti prováděné mimo EU, pokud jsou zakázány ve všech členských státech, nebo na činnosti, které ničí lidská embrya (například pro získání kmenových buněk).

Příjemci musí zajistit, aby se činnosti v rámci akce soustředily výhradně na civilní aplikace.

Příjemci musí zajistit, aby se nejednalo o činnosti:

a) klonování lidí pro reprodukční účely;

b) které mají v úmyslu upravit genetické dědictví lidských bytostí, které by mohlo tyto změny učinit dědičnými (s výjimkou výzkumu souvisejícího s léčbou rakoviny gonád, jenž může být financován), nebo

c) které chtějí vytvářet lidská embrya výlučně pro účely výzkumu nebo pro účely získávání kmenových buněk, a to i prostřednictvím jaderného přenosu somatických buněk.

Kromě toho musí příjemci respektovat základní zásadu integrity výzkumu – jak je stanoveno například v Evropském kodexu chování pro integritu výzkumu[18].

To znamená dodržování následujících základních zásad:

- **spolehlivost** při zajišťování kvality výzkumu, který se odráží v návrhu, metodice, analýze a využívání zdrojů;

- **poctivost** při vývoji, provádění, hodnocení, podávání zpráv a sdělování výzkumu transparentním, spravedlivým a nezaujatým způsobem;

- r**espekt** k kolegům, účastníkům výzkumu, společnosti, ekosystémům, kulturnímu dědictví a životnímu prostředí;

- o**dpovědnost** za výzkum od nápadu po publikaci, za jeho řízení a organizaci, za odbornou přípravu, dohled a mentoring a za jeho širší dopady

Příjemci musí zajistit, aby osoby provádějící výzkumné úkoly dodržovaly osvědčené výzkumné postupy a aby se výzkumy zdržely porušení integrity popsané v tomto Kodexu.

[24] Evropský kodex chování pro integritu výzkumu ALLEA (všechny evropské akademie)
http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020-ethics_code-of-conduct_en.pdf

Tím se nemění ostatní závazky podle této Dohody ani závazky podle platných mezinárodních, unijních nebo vnitrostátních právních předpisů, které všechny stále platí.

34.2 Činnosti vyvolávající etické otázky

Činnosti vyvolávající etické problémy musí být v souladu s „**etickými požadavk**y“ stanovenými jako výstupy v Příloze 1.

Před zahájením činnosti vyvolávající etický problém musí každý příjemce získat:

a) názor etické komise požadovaný podle vnitrostátního práva a

b) veškerá oznámení nebo povolení k činnostem vyvolávajícím etické otázky vyžadované vnitrostátními a/nebo evropskými právními předpisy nezbytnými k provádění dotyčných akčních úkolů.

Dokumenty musí být vedeny ve spisu a na žádost koordinátora předloženy Agentuře (viz Článek 52). Pokud nejsou v angličtině, musí být předloženy společně s anglickým shrnutím, což ukazuje, že jsou zahrnuty příslušné akční úkoly a závěry dotyčného výboru nebo orgánu (jsou-li k dispozici).

34.3 Činnosti zahrnující lidská embrya nebo lidské embryonální kmenové buňky

Činnosti zahrnující výzkum na lidských embryích nebo lidských embryonálních kmenových buňkách, kromě Článku 34.1, mohou být prováděny pouze pokud:

-jsou stanoveny v Příloze 1 nebo

-koordinátor získal od Agentury výslovné (písemné) schválení (viz Článek 52).

34.4 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43) a Dohoda nebo účast příjemce může být ukončena (viz Článek 50).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 35 - STŘET ZÁJMŮ

35.1 Povinnost zabránit střetu zájmů

Příjemci musí přijmout veškerá opatření, aby zabránili jakékoliv situaci, kdy je ohroženo nestranné a objektivní provádění akce z důvodů zahrnujících hospodářský zájem, politický nebo národní příslušnost, rodinné nebo emocionální vazby nebo jakýkoliv jiný sdílený zájem („**střet zájmů**“).

Musí neprodleně oznámit Agentuře jakoukoliv situaci, která představuje nebo by mohla vést ke střetu zájmů, a neprodleně přijmout veškerá nezbytná opatření k nápravě této situace.

Agentura může ověřit, zda jsou přijatá opatření vhodná, a může požadovat, aby byla ve stanoveném termínu přijata další opatření.

35.2 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43) a Dohoda nebo účast příjemce může být ukončena (viz Článek 50).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 36 – DŮVĚRNOST

36.1 Obecná povinnost zachovávat důvěrnost

Během provádění akce a čtyři roky po období stanoveném v Článku 3 musí strany uchovávat důvěrné údaje, dokumenty nebo jiný materiál (v jakékoliv formě), který je v okamžiku zveřejnění označen jako důvěrný (dále jen „**důvěrné informace**“).

Pokud o to příjemce požádá, může Agentura souhlasit s tím, že bude tyto informace uchovávat v tajnosti po dobu delší než počáteční čtyři roky.

Pokud byly informace identifikovány jako důvěrné pouze ústně, budou považovány za důvěrné, pouze pokud budou písemně potvrzeny do 15 dnů od ústního vypovědění.

Není-li mezi stranami dohodnuto jinak, mohou používat důvěrné informace pouze k provedení Dohody.

Příjemci mohou sdělit důvěrné informace svým zaměstnancům nebo třetím stranám zapojeným do akce, pouze pokud:

a) potřebují znát provádění Dohody a

b) jsou vázáni povinností mlčenlivosti.

Tím se nemění bezpečnostní závazky uvedené v Článku 37, které stále platí.

Agentura může sdělit důvěrné informace svým zaměstnancům, jiným orgánům a institucím EU. Může sdělit důvěrné informace třetím stranám, pokud:

a) je to nezbytné k provedení Dohody nebo k ochraně finančních zájmů EU a

b) příjemci informací jsou vázáni povinností mlčenlivosti.

Za podmínek stanovených v Článku 4 nařízení o pravidlech účasti č. 1290/2013[19] musí Komise navíc zpřístupnit informace o výsledcích dalším orgánům, institucím nebo jiným subjektům EU, jakož i členským státům nebo přidruženým zemím.

Povinnost mlčenlivosti již neplatí, pokud:

a) zveřejňující strana souhlasí s uvolněním druhé strany;

[25] Nařízení Evropského parlamentu a Rady (EU) č. 1290/2013 ze dne 11. prosince 2013, kterým se stanoví pravidla pro účast a šíření v programu „Horizont 2020 - rámcový program pro výzkum a inovace na období 2014–2020“ (Úř. Věst. L 347, 20.12.2013 s.81).

b) informace již byla příjemci známa nebo je mu poskytnuta bez závazku důvěrnosti třetí stranou, která nebyla vázána žádným závazkem důvěrnosti;

c) příjemce prokáže, že informace byla vyvinuta bez použití důvěrných informací;

d) informace se stanou obecně a veřejně dostupnými, aniž by došlo k porušení povinnosti zachovávat důvěrnost, nebo

e) zveřejnění informací je vyžadováno právem EU nebo vnitrostátním právem.

36.2 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 37 - POVINNOSTI SOUVISEJÍCÍ BEZPEČNOST

37.1 Výsledky s bezpečnostním doporučením

Nelze použít

37.2 Utajované informace

Nelze použít

37.3 Činnosti zahrnující zboží dvojího užití nebo nebezpečné materiály a látky

Nelze použít

37.4 Důsledky nedodržení

Nelze použít

ČLÁNEK 38 - PODPORA AKCE – VIDITELNOST FINANCOVÁNÍ EU

38.1 Komunikační činnosti příjemců

38.1.1 Povinnost propagovat akci a její výsledky

Příjemci musí propagovat akci a její výsledky strategickým a účinným poskytováním cílených informací různým publikům (včetně médií a veřejnosti).

Tím se nemění povinnosti šíření v Článku 29, povinnosti důvěrnosti v Článku 36 ani bezpečnostní povinnosti v Článku 37, které stále platí.

Než se příjemci zapojí do komunikační činnosti, u níž se očekává významný mediální dopad, musí o tom informovat Agenturu (viz Článek 52).

38.1.2 Informace o financování z prostředků EU – Povinnost a právo používat znak EU

Pokud Agentura nepožádá nebo nestanoví jinak, nebo pokud to není možné, jakákoliv komunikační aktivita související s akcí (včetně elektronické formy, prostřednictvím sociálních médií atd.) a jakákoliv infrastruktura, vybavení a hlavní výsledky financované z grantu musí:

a) zobrazovat znak EU a

b) obsahovat následující text:

Pro komunikační činnosti:

„Tento projekt získal finanční prostředky z programu Evropské unie pro výzkum a inovace Horizont 2020 v rámci grantové Dohody č. 101036723".

U infrastruktury, vybavení a hlavních výsledků:

„Tato [infrastruktura] [zařízení] [vložte typ výsledku] je součástí projektu, který získal financování z programu Evropské unie pro výzkum a inovace Horizont 2020 v rámci grantové Dohody Č. 101036723 ".

Pokud je znak EU zobrazen společně s jiným logem, musí mít patřičnou důležitost. Pro účely plnění svých povinností podle tohoto Článku mohou příjemci používat znak EU, aniž by nejprve získali souhlas Agentury.

To jim však nedává právo na výhradní použití.

Kromě toho si nemusí přivlastňovat znak EU nebo jakoukoliv podobnou ochrannou známku nebo logo, a to ani registrací, ani jinými prostředky.

38.1.3 Prohlášení vylučující odpovědnost Agentury a Komise

Jakákoliv komunikační aktivita související s akcí musí uvádět, že odráží pouze názor autora a že Agentura a Komise nenesou odpovědnost za jakékoliv použití obsažených informací.

38.2 Komunikační činnosti Agentury a Komise

38.2.1 Právo používat materiály, dokumenty nebo informace příjemců

Agentura a Komise mohou pro své komunikační a propagační činnosti používat informace týkající se akce, dokumenty, zejména souhrny pro zveřejnění a veřejné výstupy, jakož i jakýkoli jiný materiál, například obrázky nebo audiovizuální materiály obdržené od jakéhokoli příjemce (včetně v elektronické podobě).

Tím se nemění povinnosti zachovávat důvěrnost v Článku 36 a bezpečnostní povinnosti v Článku 37, které všechny stále platí.

Pokud by použití těchto materiálů, dokumentů nebo informací Agenturou nebo Komisí mohlo ohrozit legitimní zájmy, může dotyčný příjemce požádat Agenturu nebo Komisi, aby je nepoužívala (viz Článek 52).

Právo používat materiály, dokumenty a informace příjemce zahrnuje:

a) **použití pro své vlastní účely** (zejména zpřístupnění osobám pracujícím pro Agenturu, Komisi nebo jakýkoliv jiný orgán, instituci, subjekt nebo orgán či instituce EU v členských státech EU; a jejich kopírování nebo reprodukci v plně nebo částečně neomezeném množství).

b) **distribuci veřejnosti** (zejména publikace v tištěné podobě a v elektronickém nebo digitálním formátu, publikace na internetu, jako soubor ke stažení, vysílání jakýmkoliv kanálem, veřejné zobrazení nebo prezentaci, komunikaci prostřednictvím tiskových informací služby nebo začlenění do široce přístupných databází nebo rejstříků);

c) **úpravy nebo přepracování** komunikačních a propagačních činností (včetně zkrácení, shrnutí, vložení dalších prvků (jako jsou metadata, legendy, jiné grafické, vizuální, zvukové nebo textové prvky), extrahování částí (např. zvukových nebo obrazových souborů), rozdělení na části, použití a sestavení);

d) překlad;

e) **poskytnutí přístupu v reakci** na individuální žádosti podle nařízení č. 1049/2001[20] bez práva reprodukovat nebo využívat;

f) s**kladování** v papírové, elektronické nebo jiné formě;

g) a**rchivaci** v souladu s příslušnými pravidly správy dokumentů a

h) právo zmocnit **třetí strany** k jednání svým jménem nebo sublicencovat způsoby použití stanovené v písmenech b), c), d) a f) třetím stranám, je-li to nezbytné pro komunikaci a propagaci činnosti Agentury nebo Komise.

Pokud právo na užívání podléhá právům třetí strany (včetně zaměstnanců příjemce), musí příjemce zajistit, aby plnil své povinnosti podle této Dohody (zejména získání souhlasu od příslušných třetích stran).

V příslušných případech (a pokud je poskytnou příjemci) vloží Agentura nebo Komise následující informace:

„© - [rok] - [jméno vlastníka autorských práv]. Všechna práva vyhrazena. Licencován Evropskou výkonnou Agenturou pro klima, infrastrukturu a životní prostředí (CINEA) a Evropskou unií (EU)."

38.3 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle tohoto Článku, může být grant snížen (viz Článek 43).

Taková porušení mohou také vést k jakémukoliv jinému opatření popsanému v Kapitole 6.

ČLÁNEK 39 - ZPRACOVÁNÍ OSOBNÍCH ÚDAJŮ

39.1 Zpracování osobních údajů Agenturou a Komisí

[27] Nařízení Evropského parlamentu a Rady (ES) č. 1049/2001 ze dne 30. května 2001 o přístupu veřejnosti k dokumentům Evropského parlamentu, Rady a Komise, Úř. Věst. L 145, 31.5.2001, s. 27. 43.

Veškeré osobní údaje podle Dohody budou zpracovávány Agenturou nebo Komisí podle nařízení č. 45/2001[21] a podle „oznámení o operacích zpracování“ pověřenci pro ochranu údajů (DPO) Agentury nebo Komise (veřejně přístupné v rejstříku DPO).

Tyto údaje budou zpracovávány „**správcem údajů**“ Agentury nebo Komise za účelem provádění, správy a sledování Dohody nebo ochrany finančních zájmů EU nebo Euratom (včetně kontrol, přezkumů, auditů a vyšetřování; viz Článek 22).

Osoby, jejichž osobní údaje jsou zpracovávány, mají právo na přístup ke svým vlastním osobním údajům a jejich opravu. Za tímto účelem musí zaslat jakékoliv dotazy týkající se zpracování svých personálních údajů správci údajů prostřednictvím kontaktního místa uvedeného v prohlášení o ochraně personálních údajů, která jsou zveřejněna na webových stránkách Agentury a Komise.

Mají také právo kdykoliv se obrátit na evropského inspektora ochrany údajů (EIOÚ).

39.2 Zpracování osobních údajů příjemci

Příjemci musí zpracovávat osobní údaje podle Dohody v souladu s příslušnými právními předpisy EU a vnitrostátními právními předpisy o ochraně údajů (včetně oprávnění nebo požadavků na oznámení).

Příjemci mohou svým zaměstnancům poskytnout přístup pouze k údajům, které jsou nezbytně nutné pro provádění, správu a monitorování Dohody.

Příjemci musí informovat zaměstnance, jejichž osobní údaje shromažďuje a zpracovává Agentura nebo Komise. Za tímto účelem jim musí před odesláním jejich údajů Agentuře nebo Komisi poskytnout prohlášení o ochraně osobních údajů (viz výše).

39.3 Důsledky nedodržení

Pokud příjemce poruší některou ze svých povinností podle Článku 39.2, může Agentura použít kterékoliv z opatření popsaných v Kapitole 6.

ČLÁNEK 40 – POSTOUPENÍ POHLEDÁVEK ZA PLATBY VUČI AGENTUŘE

Příjemci nesmí postoupit žádný ze svých nároků na platbu vůči Agentuře žádné třetí straně, s výjimkou případů, kdy to Agentura schválí na základě odůvodněné písemné žádosti koordinátora (jménem příslušného příjemce).

Pokud Agentura úkol nepřijme nebo nebudou dodrženy jeho podmínky, nebude mít na něj přiřazení žádný vliv.

Úkol v žádném případě nezbaví příjemce jeho povinností vůči Agentuře.

[28] Nařízení Evropského parlamentu a Rady (ES) č. 45/2001 ze dne 18. prosince 2000 o ochraně fyzických osob v souvislosti se zpracováním personálních údajů orgány a institucemi Společenství a o volném pohybu těchto údajů (Úř. Věst. L 8, 12.01.2001, s. 1).

KAPITOLA 5 ROZDĚLENÍ ÚLOH A ZODPOVĚDNOST PŘÍJEMCŮ – VZTAH S DOPLŇKOVÝMI PŘÍJEMCI – VZTAH S PARTNERY SPOLEČNÉ AKCE

ČLÁNEK 41 - ROZDĚLENÍ ÚLOH A ZODPOVĚDNOST PŘÍJEMCŮ – VZTAH S DOPLŇKOVÝMI PŘÍJEMCI – VZTAH S PARTNERY SPOLEČNÉ AKCE

41.1 Role a odpovědnost vůči Agentuře

Příjemci nesou plnou odpovědnost za provádění akce a dodržování Dohody.

Příjemci jsou společně a nerozdílně odpovědní za **technické provádění** akce, jak je popsáno v Příloze 1. Pokud příjemce svou část akce neprovede, ostatní příjemci se stanou odpovědnými za provádění této části (aniž by měli nárok na jakékoli další financování EU), pokud je Agentura této povinnosti výslovně nezbaví.

Finanční odpovědnost každého příjemce se řídí Článkem 44.

41.2 Vnitřní rozdělení rolí a odpovědností

Interní role a odpovědnosti příjemců jsou rozděleny následovně:

a) Každý **příjemce** musí:

i) udržovat informace uložené v registru příjemců (prostřednictvím systému elektronické výměny) v aktuální podobě (viz Článek 17);

ii) okamžitě informovat koordinátora o všech událostech nebo okolnostech, které by mohly ovlivnit nebo oddálit provádění akce (viz Článek 17);

iii) včas předložit koordinátorovi:

- individuální účetní závěrku a její připojené třetí strany a v případě potřeby osvědčení o účetní závěrce (viz Článek 20);
- údaje potřebné k vypracování technických zpráv (viz Článek 20);
- stanoviska etických komisí a oznámení nebo povolení pro činnosti vyvolávající etické otázky (viz Článek 34);
- jakékoliv další dokumenty nebo informace požadované Agenturou nebo Komisí podle Dohody, pokud Dohoda nevyžaduje, aby příjemce tyto informace předložil přímo Agentuře nebo Komisi.

b) Koordinátor musí:

i) sledovat, zda je akce řádně prováděna (viz Článek 7);

ii) působit jako prostředník veškeré komunikace mezi příjemci a Agenturou (zejména poskytuje Agentuře informace popsané v Článku 17), pokud Dohoda nestanoví jinak;

(iii) požadovat a kontrolovat veškeré dokumenty nebo informace požadované Agenturou a ověřit jejich úplnost a správnost před jejich předáním Agentuře;

iv) předkládat Agentuře výstupy a zprávy (viz články 19 a 20);

v) zajistit, aby všechny platby byly poslány ostatním příjemcům bez neoprávněného odkladu (viz Článek 21);

vi) informovat Agenturu o částkách vyplacených každému příjemci, pokud to vyžaduje Dohoda (viz články 44 a 50) nebo o to požádá Agentura.

Koordinátor nesmí výše uvedené úkoly delegovat ani zadat žádnému jinému příjemci nebo třetí straně (včetně připojených třetích stran).

41.3 Interní ujednání mezi příjemci – Dohoda o konsorciu

Příjemci musí mít interní opatření týkající se jejich fungování a koordinace, aby zajistili řádné provedení akce. Tato vnitřní ujednání musí být stanovena v písemné „**Dohodě o konsorciu**“ mezi příjemci, která může zahrnovat:

- vnitřní organizaci konsorcia;

- správu přístupu k systému elektronické výměny;

- rozdělování finančních prostředků EU;

- dodatečná pravidla o právech a povinnostech týkajících se kontextu a výsledků (včetně toho, zda přístupová práva zůstávají či nikoli, pokud příjemce porušuje své povinnosti) (viz sekce 3 kapitoly 4);

- řešení vnitřních sporů;

- ujednání o odpovědnosti, odškodnění a důvěrnosti mezi příjemci.

Dohoda o konsorciu nesmí obsahovat žádné ustanovení, které by bylo v rozporu se smlouvou.

41.4 Vztah s komplementárními příjemci – Dohoda o spolupráci

Nelze použít

41.5 Vztah s partnery společné akce – Koordinační dohoda

Nelze použít

KAPITOLA 6 ZAMÍTNUTÍ NÁKLADŮ – SNÍŽENÍ GRANTU – VÝMĚNA – SANKCE – ŠKODY – POZASTAVENÍ – UKONČENÍ – VYŠŠÍ SÍLA

SEKCE 1 ZAMÍTNUTÍ NÁKLADŮ – SNÍŽENÍ GRANTU – VYMÁHÁNÍ – SANKCE

ČLÁNEK 42 - ZAMÍTNUTÍ NEZPŮSOBITELNÝCH NÁKLADŮ

42.1 Podmínky

Agentura **po ukončení účasti příjemce, v době průběžné platby, při platbě zůstatku nebo později** odmítne jakékoliv náklady, které nejsou způsobilé (viz. Článek 6), zejména po kontrolách, posudcích, auditech nebo vyšetřováních (viz Článek 22).

Odmítnutí může být také založeno **na rozšíření zjištění z jiných grantů na tento grant** (viz Článek 22.5.2).

42.2 Nezpůsobilé náklady, které mají být zamítnuty – Výpočet – Postup

Nezpůsobilé náklady budou v plné výši zamítnuty.

Pokud zamítnutí nákladů nevede k vymáhání (viz Článek 44), Agentura formálně oznámí dotčenému koordinátorovi nebo příjemci zamítnutí nákladů, částky a důvody, proč se tak stalo (je-li to relevantní, spolu s oznámením splatných částek; viz Článek 21.5). Dotyčný koordinátor nebo příjemce může do 30 dnů od obdržení oznámení oficiálně informovat Agenturu o jeho nesouhlasu a důvodech, proč se tak stalo.

Pokud zamítnutí nákladů povede k vymáhání, bude Agentura postupovat v rozporném postupu s předběžným dopisem stanoveným v Článku 44.

42.3 Účinky

Pokud Agentura odmítne náklady v době **průběžné platby nebo platby zůstatku**, odečte je od celkových způsobilých nákladů vykázaných v rámci akce v pravidelném nebo konečném souhrnu nebo účetní závěrce (viz články 20.3 a 20.4). Poté vypočítá průběžnou platbu nebo platbu zůstatku podle článků 21.3 nebo 21.4.

Pokud Agentura odmítne náklady **po ukončení účasti příjemce**, odečte je od nákladů deklarovaných příjemcem ve zprávě o ukončení a zahrne odmítnutí do výpočtu po ukončení (viz články 50.2 a 50.3).

Pokud Agentura – po **průběžné platbě, ale před výplatou zůstatku** – odmítne náklady deklarované v pravidelné souhrnné účetní závěrce, odečte je od celkových způsobilých nákladů vykázaných pro danou akci v příštím pravidelném souhrnném finančním výkazu nebo v konečné souhrnné účetní závěrce. Poté vypočítá průběžnou platbu nebo platbu zůstatku podle článků 21.3 nebo 21.4.

Pokud Agentura náklady **po zaplacení zůstatku** zamítne, odečte částku zamítnutou od celkových způsobilých nákladů deklarovaných příjemcem v konečném souhrnném finančním výkazu. Poté bude počítat upravenou konečnou částku grantu podle Článku 5.4.

ČLÁNEK 43 - SNÍŽENÍ GRANTU

43.1 Podmínky

Agentura může – **po ukončení účasti příjemce, při platbě zůstatku nebo později** – snížit výši grantu (viz Článek 5.1), pokud:

a) příjemce (nebo fyzická osoba, která má pravomoc zastupovat nebo přijímat rozhodnutí jejím jménem) se dopustil:

i) podstatné chyby, nesrovnalosti nebo podvodu či

ii) závažného porušení povinností dle Dohody nebo během postupu udělování (včetně nesprávného provedení akce, předložení nepravdivých informací, neposkytnutí požadovaných informací, porušení etických zásad) nebo

b) se jako fyzická osoba, která má pravomoc svým jménem zastupovat nebo rozhodovat, dopustil – v jiných grantech EU nebo Euratomu, které mu byly uděleny za podobných podmínek – systémových nebo opakujících se chyb, nesrovnalostí, podvodu nebo závažného porušení závazků, které mají podstatný dopad na tento grant (rozšíření zjištění z jiných grantů na tento grant; viz Článek 22.5.2).

43.2 Částka, která má být snížena – Výpočet – Postup

Výše snížení bude úměrná závažnosti chyb, nesrovnalostí nebo podvodů nebo porušení povinností.

Před snížením grantu Agentura formálně zašle „**předběžný informační dopis**“ příslušnému koordinátorovi nebo příjemci:

- informuje jej o svém záměru snížit grant, částce, kterou hodlá snížit, a důvodech, proč to chce učinit

- vyzve jej k předložení připomínek do 30 dnů od obdržení oznámení.

Pokud Agentura neobdrží žádné připomínky nebo se rozhodne pro snížení, formálně oznámí **potvrzení** snížení (případně spolu s oznámením splatných částek; viz Článek 21).

43.3 Účinky

Pokud Agentura sníží grant **po ukončení účasti příjemce**, vypočítá sníženou částku grantu pro tohoto příjemce a poté určí částku splatnou tomuto příjemci (viz články 50.2 a 50.3)

Pokud Agentura sníží grant **při výplatě zůstatku**, vypočítá sníženou částku grantu na akci a poté určí částku splatnou jako platbu zůstatku (viz články 5.3.4 a 21.4).

Pokud Agentura sníží grant **po vyplacení zůstatku**, vypočítá revidovanou konečnou částku grantu pro dotyčného příjemce (viz Článek 5.4). Pokud bude revidovaná konečná výše grantu pro dotyčného příjemce nižší než jeho podíl na konečné výši grantu, Agentura rozdíl získá zpět (viz Článek 44).

ČLÁNEK 44 - VYMÁHÁNÍ NEOPRÁVNĚNÝCH ČÁSTEK

44.1 Částka, kterou je třeba získat zpět – Výpočet – Postup

Agentura bude – **po ukončení účasti příjemce, při platbě zůstatku nebo později** – požadovat vrácení jakékoliv částky, která byla vyplacena, ale není podle Dohody splatná.

Finanční odpovědnost každého příjemce v případě vymáhání je omezena na jeho vlastní dluh (včetně neoprávněných částek zaplacených Agenturou za náklady deklarované jejími připojenými třetími stranami), s výjimkou částky zadržené pro Záruční fond (viz Článek 21.4).

44.1.1 Vymáhání po ukončení účasti příjemce

Pokud k vymáhání dojde po ukončení účasti příjemce (včetně koordinátora), Agentura bude požadovat neoprávněnou částku od dotyčného příjemce zpět, a to formálním oznámením o vkladu (viz články 50.2 a 50.3). V této poznámce bude uvedena částka, která má být vrácena, podmínky a datum platby.

Pokud nebude platba provedena do data uvedeného v oznámení o vkladu, Agentura nebo Komise částku vrátí:

a) „**započtením**“ - bez souhlasu příjemce – vůči jakýmkoli částkám dlužným dotyčnému příjemci Agenturou, Komisí nebo jinou výkonnou Agenturou (z rozpočtu EU nebo Euratomu).

Ve výjimečných případech může Agentura nebo Komise za účelem ochrany finančních zájmů EU provést zápočet před datem platby uvedeným v oznámení o vkladu;

b) nelze použít;

c) **podáním žaloby** (viz Článek 57) nebo **přijetím vykonatelného rozhodnutí** podle Článku 299 Dohody o fungování EU (SFEU) a čl. 79 odst. 2 Finančního nařízení č. 966/2012.

Pokud není platba provedena do data uvedeného na žádosti o zaplacení dlužné částky, částka, která má být získána zpět (viz výše), se zvýší o **úrok z prodlení** ve výši stanovené v Článku 21.11 a to ode dne následujícího po datu platby až do data, kdy Agentura nebo Komise obdrží částku v plné výši.

Dílčí platby budou nejprve připsány na účet nákladů, poplatků a úroků z prodlení a poté na jistinu.

Bankovní poplatky vzniklé v procesu vymáhání bude hradit příjemce, pokud se nepoužije směrnice 2007/64/ES[22].

44.1.2 Vymáhání při vyplacení zůstatku

Pokud má výplata zůstatku formu zpětného získání částky (viz Článek 21.4), Agentura oficiálně koordinátorovi předloží „**předběžný dopis**“:

- informuje jej o svém záměru získat částku zpět, o dlužné částce jako o zůstatku a o důvodech, proč tento záměr má

[29] Směrnice Evropského parlamentu a Rady 2007/64/ES ze dne 13. listopadu 2007 o platebních službách na vnitřním trhu, kterou se mění směrnice 97/7/ES, 2002/65/ES, 2005/60/ES a 2006/48/ ES a zrušení směrnice 97/5/ES (Úř. Věst.L 319, 05.12.2007, s. 1).

- upřesňuje, že má v úmyslu odečíst částku, která má být získána zpět, od částky zadržené pro Záruční fond;
- žádá koordinátora, aby do 30 dnů od obdržení oznámení předložil zprávu o rozdělení plateb příjemcům, a
- vyzývá koordinátora k předložení připomínek do 30 dnů od obdržení oznámení.

Pokud nejsou předložena žádná vyjádření nebo se Agentura rozhodne pro vymáhání navzdory obdrženým připomínkám, **potvrdí zpětné získání** (spolu s oznámením splatných částek; viz Článek 21.5) a:

- zaplatí rozdíl mezi částkou, která má být získána zpět, a částkou zadrženou pro Záruční fond, **pokud je rozdíl kladný** nebo
- **pokud je rozdíl záporný**, formálně oznámí koordinátorovi žádostí o zaplacení dlužné částky rozdíl mezi částkou, která má být získána zpět, a částkou zadrženou pro Záruční fond. Tato žádost také uvede podmínky a datum platby.

Pokud koordinátor Agentuře do data uvedeného na žádosti nepředloží zprávu o rozdělení plateb: Agentura nebo **Komise vrátí** stanovenou částku v žádosti od koordinátora (viz níže).

Pokud koordinátor Agentuře do data uvedeného na žádosti o zaplacení dlužné částky peníze nevrátí, ale předloží zprávu o rozdělení plateb, Agentura:

a) určí příjemce, u nichž je vypočtená částka záporná:

{{{{náklady příjemce uvedené v závěrečné souhrnné Finanční závěrce a schválené Agenturou vynásobené sazbou úhrad stanovenou v Článku 5.2 pro dotyčného příjemce

plus

náklady na jeho připojené třetí strany deklarované v konečné souhrnné Finanční závěrce a schválené Agentura vynásobená sazbou úhrad stanovenou v Článku 5.2 pro každou dotčenou připojenou třetí stranu}

děleno

příspěvkem EU na akci vypočteným podle Článku 5.3.1}

vynásobeno

konečnou částkou grantu (viz Článek 5.3)},

mínus

{pre-financování a průběžné platby obdržené příjemcem}}.

b) formálně podá každému příjemci určenému podle písmene a) žádost o zaplacení dlužné částky s uvedením podmínek a data platby. Výše dluhopisu se vypočítá následovně:

{{částka vypočtená podle písmene a) pro dotyčného příjemce

vydělená

součtem částek vypočtených podle písmene a) pro všechny příjemce identifikované podle písmene a)}

vynásobená

částkou stanovenou v oznámení o dluhu formálně koordinátorovi}.

Pokud nebude platba provedena do data uvedeného v oznámení o vkladu, Agentura nebo Komise **částku vrátí:**

a) **započtením** – bez souhlasu příjemce – vůči jakýmkoli částkám dlužným dotyčnému příjemci Agenturou, Komisí nebo jinou výkonnou Agenturou (z rozpočtu EU nebo Euratomu). Ve výjimečných případech může Agentura nebo Komise za účelem ochrany finančních zájmů EU provést zápočet před datem platby uvedeném v oznámení o vkladu;

b) **čerpáním ze Záručního fondu**. Agentura nebo Komise formálně oznámí dotyčnému příjemci oznámení o dluhu jménem Záručního fondu a vrátí částku:

i) nelze použít;

ii) **právními kroky (viz Článek 57) nebo přijetím vykonatelného rozhodnutí** podle Článku 299 Dohody o fungování EU (SFEU) a čl. 79 odst. 2 finančního nařízení č. 966/2012.

Pokud není platba provedena do data uvedeného na žádosti o zaplacení dlužné částky, částka, která má být získána zpět (viz výše), bude navýšena o **úrok z prodlení** ve výši stanovené v Článku 21.11 ode dne následujícího po datu platby ve výzvě k úhradě až do data, kdy Agentura nebo Komise obdrží částku v plné výši.

Dílčí platby budou nejprve připsány na účet nákladů, poplatků a úroků z prodlení a poté na jistinu.

Bankovní poplatky vzniklé v rámci procesu zpětného získávání prostředků ponese příjemce, pokud se nepoužije směrnice 2007/64/ES.

44.1.3 Vymáhání částek po zaplacení zůstatku

Pokud je u příjemce revidovaná konečná výše grantu (viz Článek 5.4) nižší než jeho podíl na konečné výši grantu, musí rozdíl Agentuře vrátit. Podíl příjemce na konečné výši grantu se vypočítá takto:

{{{náklady příjemce uvedené v závěrečném souhrnném finančním výkazu a schválené Agenturou vynásobené sazbou úhrad stanovenou v Článku 5.2 pro dotyčného příjemce

Plus

náklady na jeho připojené třetí strany deklarované v konečném souhrnném finančním výkazu a schválené Agenturou vynásobené sazbou náhrady stanovenou v Článku 5.2 pro každou dotčenou připojenou třetí stranu}

dělené

příspěvkem EU na akci vypočítanou podle Článku 5.3.1}

vynásobené

konečnou částkou grantu (viz Článek 5.3)}.

Pokud koordinátor nerozdělil obdržené částky (viz Článek 21.7), Agentura také získá zpět tyto částky.

Agentura formálně odešle příslušnému příjemci **předběžný informační dopis** a:

- informuje je o svém záměru vymáhat dlužnou částku a důvodech, proč to chce udělat

- vyzve jej k předložení připomínek do 30 dnů od obdržení oznámení.

Pokud nejsou předložena žádná vyjádření nebo se Agentura rozhodne pro navrácení navzdory obdrženým připomínkám**, potvrdí** částku, která má být získána zpět, a formálně dodá dotyčnému příjemci žádost o zaplacení dlužné částky. Tato žádost také uvede podmínky a datum platby.

Pokud nebude platba provedena do data uvedeného v oznámení o vkladu, Agentura nebo Komise částku **vrátí:**

a) **započtením** – bez souhlasu příjemce – vůči jakýmkoliv částkám dlužným dotyčnému příjemci Agenturou, Komisí nebo jinou výkonnou Agenturou (z rozpočtu EU nebo Euratomu). Ve výjimečných případech může Agentura nebo Komise za účelem ochrany finančních zájmů EU provést zápočet před datem platby uvedeným na žádosti o zaplacení dlužné částky;

b) **čerpáním ze Záručního fondu**. Agentura nebo Komise formálně oznámí dotyčnému příjemci oznámení o dluhu jménem Záručního fondu a vrátí částku:

i) nelze použít;

ii) **právními kroky (viz Článek 57) nebo přijetím vykonatelného rozhodnutí** podle Článku 299 Dohody o fungování EU (SFEU) a čl. 79 odst. 2 Finančního nařízení č. 966/2012.

Není-li platba provedena do data uvedeného v oznámení o vkladu, částka, která má být získána zpět (viz výše), bude zvýšena o úrok z prodlení ve výši stanovené v Článku 21.11 ode dne následujícího po datu platby žádosti o vrácení, a to včetně data, kdy Agentura nebo Komise obdrží částku v plné výši.

Dílčí platby budou nejprve připsány na účet nákladů, poplatků a úroků z prodlení a poté na jistinu.

Bankovní poplatky vzniklé v rámci procesu zpětného získávání prostředků ponese příjemce, pokud se nepoužije směrnice 2007/64/ES.

ČLÁNEK 45 – ADMINISTRATIVNÍ SANKCE

Kromě smluvních opatření může Agentura nebo Komise rovněž přijmout správní sankce podle čl. 106 a čl. 131 odst. 4 Finančního nařízení č. 966/2012 (tj. Vyloučení z Dohody o budoucích zakázkách, granty, ceny a odborné Dohody a/nebo finanční sankce).

SEKCE 2 ODPOVĚDNOST ZA ŠKODY

ČLÁNEK 46 - ODPOVĚDNOST ZA ŠKODY

46.1 Odpovědnost Agentury

Agentura neodpovídá za žádnou škodu způsobenou příjemcům nebo třetím stranám v důsledku provádění Dohody, včetně hrubé nedbalosti.

Agentura nemůže být odpovědná za jakoukoliv škodu způsobenou některým z příjemců nebo třetích stran zapojených do akce v důsledku provádění Dohody.

46.2 Odpovědnost příjemců

S výjimkou případu vyšší moci (viz Článek 51) musí příjemci nahradit Agentuře veškerou škodu, kterou utrpí v důsledku provádění akce nebo proto, že akce nebyla implementována v plném souladu se smlouvou.

SEKCE 3 POZASTAVENÍ A UKONČENÍ

ČLÁNEK 47 - POZASTAVENÍ TERMÍNU PLATBY

47.1 Podmínky

Agentura může – kdykoliv – pozastavit platební lhůtu (viz články 21.2 až 21.4), pokud žádost o platbu (viz Článek 20) nelze schválit, protože:

a) není v souladu s ustanoveními Dohody (viz Článek 20);

b) technické nebo finanční zprávy nebyly předloženy nebo nejsou úplné nebo jsou zapotřebí další informace, nebo

c) existují pochybnosti o způsobilosti nákladů uvedených v účetní závěrce a jsou nezbytné dodatečné kontroly, přezkumy, audity nebo vyšetřování.

47.2 Postup

Agentura formálně oznámí koordinátorovi pozastavení a jeho důvody.

Pozastavení **nabude účinnosti** dnem odeslání oznámení Agenturou (viz Článek 52).

Pokud již nejsou splněny podmínky pro pozastavení platebního termínu, pozastavení **bude zrušeno** – a zbývající období bude pokračovat.

Pokud pozastavení přesáhne dva měsíce, může koordinátor požádat Agenturu, zda pozastavení bude pokračovat.

Pokud byla platební lhůta pozastavena z důvodu nedodržení technických nebo finančních zpráv (viz Článek 20) a revidovaná zpráva nebo prohlášení nebylo předloženo nebo bylo předloženo, ale je rovněž zamítnuto, může Agentura rovněž vypovědět Dohodu nebo účast příjemce (viz čl. 50.3.1 písm. l)).

ČLÁNEK 48 - POZASTAVENÍ PLATBY

48.1 Podmínky

Agentura může – kdykoliv – zcela nebo zčásti pozastavit platby a průběžné platby nebo platby zůstatku jednomu nebo více příjemcům, pokud:

a) příjemce (nebo fyzická osoba, která má pravomoc zastupovat nebo rozhodovat jeho jménem) se dopustil, nebo existuje podezření, že se dopustil:

i) podstatné chyby, nesrovnalosti nebo podvody nebo

ii) závažného porušení povinností podle Dohody nebo během postupu udělování (včetně nesprávného provedení akce, předložení nepravdivých informací, neposkytnutí požadovaných informací, porušení etických zásad) nebo

b) příjemce (nebo fyzická osoba, která má pravomoc jeho jménem zastupovat nebo rozhodovat), se dopustil – v jiných grantech EU nebo Euratomu, které mu byly uděleny za podobných podmínek – systémových nebo opakujících se chyb, nesrovnalostí, podvodu nebo závažného porušení závazků, které mají podstatný dopad na tento grant **(rozšíření zjištění z jiných grantů na tento grant**; viz Článek 22.5.2).

Pokud jsou platby pozastaveny pro jednoho nebo více příjemců, provede Agentura částečné platby za části, které nejsou pozastaveny. Pokud se pozastavení týká platby zůstatku, jakmile je pozastavení zrušeno, bude platba nebo vrácení příslušné částky (částek) považováno za platbu zůstatku, který uzavírá akci.

48.2 Postup

Před pozastavením plateb Agentura formálně uvědomí dotyčného koordinátora nebo příjemce:

- informuje jej o svém záměru pozastavit platby a o důvodech, proč tento záměr má

- vyzve jej k předložení připomínek do 30 dnů od obdržení oznámení.

Pokud Agentura neobdrží připomínky nebo se rozhodne pokračovat v postupu navzdory vyjádřením, která obdržela, formálně oznámí **potvrzení** pozastavení. V opačném případě formálně oznámí, že postup pozastavení nepokračuje.

Pozastavení **nabude účinnosti** dnem, kdy Agentura odešle potvrzovací oznámení

Pokud jsou splněny podmínky pro obnovení plateb, pozastavení **bude zrušeno.**

Agentura formálně uvědomí dotyčného koordinátora nebo příjemce. Během pozastavení nesmí pravidelné zprávy za všechna vykazovaná období kromě posledního (viz Článek 20.3) obsahovat žádné individuální finanční výkazy od dotyčného příjemce a jeho připojených třetích stran. Koordinátor je musí zahrnout do další pravidelné zprávy po pozastavení zrušení nebo – pokud pozastavení není zrušeno před koncem akce – do poslední pravidelné zprávy.

Příjemci mohou pozastavit provádění akce (viz Článek 49.1) nebo ukončit dohodu nebo účast dotyčného příjemce (viz články 50.1 a 50.2).

ČLÁNEK 49 - POZASTAVENÍ PROVÁDĚNÍ AKCE

49.1 Pozastavení provádění akce ze strany příjemců

49.1.1 Podmínky

Příjemci mohou pozastavit provádění akce nebo jakékoliv její části, pokud výjimečné okolnosti – zejména *vyšší moc* (viz Článek 51) - znemožňují nebo nadměrně ztěžují průběh.

49.1.2 Postup

Koordinátor musí neprodleně formálně oznámit Agentuře pozastavení (viz Článek 52) s uvedením:

- důvodů

- předpokládaného data obnovení.

Pozastavení nabude účinnosti dnem, kdy Agentura obdrží toto oznámení. Jakmile okolnosti umožní obnovení provádění, musí koordinátor okamžitě oficiálně informovat Agenturu a požádat **o změnu Dohody**, aby stanovil datum obnovení akce, prodloužil dobu trvání akce a provedl další změny nezbytné k přizpůsobení akce na novou situaci (viz Článek 55) - pokud nebyla ukončena Dohoda nebo účast příjemce (viz Článek 50).

Pozastavení bude zrušeno s účinností od data obnovení uvedeného v dodatku. Toto datum může předcházet datu, kdy změna vstoupí v platnost.

Náklady vzniklé během pozastavení provádění akce nejsou způsobilé (viz Článek 6).

49.2 Pozastavení provádění akce ze strany Agentury

49.2.1 Podmínky

Agentura může pozastavit provádění akce nebo jakékoliv její části, pokud:

a) příjemce (nebo fyzická osoba, která má pravomoc zastupovat nebo přijímat rozhodnutí jejím jménem) se dopustil nebo je podezření, že se dopustil:

   i) podstatné chyby, nesrovnalosti nebo podvodu či

   ii) závažného porušení povinností vyplývajících z Dohody nebo v průběhu zadávacího řízení

   (včetně nesprávné implementace akce, předložení nepravdivých informací, neposkytnutí požadovaných informací, porušení etických zásad);

b) příjemce (nebo fyzická osoba, která má pravomoc zastupovat nebo přijímat rozhodnutí jejím jménem) se dopustil – v jiných grantech EU nebo Euratomu, které mu byly uděleny za podobných podmínek – systémových nebo opakujících se chyb, nesrovnalostí, podvodu či závažného

porušení závazků, které mají podstatný dopad na tento grant (**rozšíření zjištění z jiných grantů na tento grant**; viz Článek 22.5.2), nebo

c) existuje podezření, že akce ztratila svůj vědecký nebo technologický význam.

49.2.2 Postup

Před pozastavením provádění akce Agentura formálně uvědomí dotyčného koordinátora nebo příjemce:

- informuje jej o svém záměru pozastavit provádění a uvede důvody

- vyzve jej k předložení připomínek do 30 dnů od obdržení oznámení.

Pokud Agentura neobdrží připomínky nebo se rozhodne pokračovat v postupu navzdory vyjádřením, která obdržela, formálně oznámí potvrzení pozastavení. V opačném případě formálně oznámí, že postup nepokračuje.

Pozastavení **nabude účinnosti** pět dní po přijetí potvrzovacího oznámení (nebo k pozdějšímu datu uvedenému v oznámení).

Bude zrušeno, pokud jsou splněny podmínky pro obnovení provádění akce.

Dotčený koordinátor nebo příjemce bude formálně informován o zrušení a **Dohoda bude pozměněna** tak, aby stanovila datum, kdy bude akce obnovena, prodloužila dobu trvání akce a provedla další změny nezbytné k přizpůsobení akce nové situaci (viz Článek 55) - pokud Dohoda již nebyla vypovězena (viz Článek 50).

Pozastavení bude zrušeno s účinností od data obnovení uvedeného v dodatku. Toto datum může předcházet datu, kdy změna vstoupí v platnost.

Náklady vzniklé během pozastavení nejsou způsobilé (viz Článek 6).

Příjemci nemohou požadovat náhradu škody v důsledku pozastavení ze strany Agentury (viz Článek 46).

Pozastavením provádění akce není dotčeno právo Agentury vypovědět dohodu nebo účast příjemce (viz Článek 50), snížit grant nebo získat zpět neoprávněně vyplacené částky (viz články 43 a 44).

ČLÁNEK 50 - UKONČENÍ DOHODY NEBO ÚČASTI JEDNOHO NEBO VÍCE PŘÍJEMCŮ

50.1 Ukončení Dohody ze strany příjemců

50.1.1 Podmínky a postup

Příjemci mohou Dohodu vypovědět.

Koordinátor musí formálně oznámit ukončení Agentuře (viz Článek 52) s uvedením:

- důvodů a

- data, kdy ukončení nabude účinnosti. Toto datum musí být po oznámení.

Pokud nejsou uvedeny žádné důvody nebo pokud se Agentura domnívá, že důvody neodůvodňují ukončení, bude Dohoda považována za „**nesprávně vypovězenou**“.

Ukončení nabude účinnosti dnem uvedeným v oznámení.

50.1.2 Účinky

Koordinátor musí – do 60 dnů od nabytí účinnosti ukončení – předložit:

i) pravidelnou zprávu (pro období otevřeného hlášení do ukončení; viz Článek 20.3) a

ii) závěrečnou zprávu (viz Článek 20.4).

Pokud Agentura neobdrží zprávy ve stanovené lhůtě (viz výše), budou brány v úvahu pouze náklady zahrnuté ve schválené pravidelné zprávě.

Agentura **vypočítá** konečnou výši grantu (viz Článek 5.3) a zůstatek (viz Článek 21.4) na základě předložených zpráv. Způsobilé jsou pouze náklady vynaložené do ukončení (viz Článek 6).

Náklady související se Dohodami splatnými k provedení až po ukončení nejsou způsobilé. Nesprávné ukončení může vést ke snížení grantu (viz Článek 43).

Po ukončení platí povinnosti příjemců (zejména články 20, 22, 23, sekce 3 kapitoly 4, 36, 37, 38, 40, 42, 43 a 44) i nadále.

50.2 Ukončení účasti jednoho nebo více příjemců ze strany příjemců

50.2.1 Podmínky a postup

Účast jednoho nebo více příjemců může být ukončena koordinátorem, na žádost dotyčného příjemce nebo jménem ostatních příjemců.

Koordinátor musí Agentuře formálně oznámit ukončení (viz Článek 52) a informovat dotyčného příjemce.

Pokud je účast koordinátora ukončena bez jeho souhlasu, formální oznámení musí provést jiný příjemce (jednající jménem ostatních příjemců). Oznámení musí obsahovat:

- důvody;
- stanovisko dotyčného příjemce (nebo důkaz, že toto stanovisko bylo požadováno písemně);
- datum, kdy ukončení nabývá účinnosti. Toto datum musí být po oznámení a
- žádost o změnu (viz Článek 55) s návrhem na přerozdělení úkolů a odhadovaným rozpočtem dotyčného příjemce (viz Přílohy 1 a 2) a v případě potřeby přidáním jednoho nebo více nových příjemců (viz Článek 56). Pokud ukončení nabude účinku po období stanoveném v Článku 3, nesmí být zahrnuta žádná žádost o změnu, pokud koordinátorem není dotčený příjemce. V takovém případě musí žádost navrhnout nového koordinátora.

Pokud tyto informace nebudou poskytnuty nebo pokud se Agentura domnívá, že důvody neodůvodňují ukončení, bude účast považována za **ukončenou neoprávněně**.

Ukončení **nabude účinnosti** dnem uvedeným v oznámení.

50.2.2 Účinky

Koordinátor musí – do 30 dnů od nabytí účinnosti ukončení – předložit:

i) zprávu o rozdělení plateb dotyčnému příjemci a

ii) pokud ukončení nabude účinku během období stanoveného v Článku 3, „**zprávu o ukončení**“ od dotčeného příjemce za období otevřeného vykazování až do ukončení, která obsahuje přehled postupu prací, přehled používání zdroje, individuální účetní závěrku a případně certifikát o účetní závěrce (viz články 20.3 a 20.4).

Informace ve zprávě o ukončení musí být rovněž zahrnuty v pravidelné zprávě pro příští vykazované období (viz Článek 20.3).

Pokud Agentura žádost o změnu zamítne (protože zpochybňuje rozhodnutí o udělení grantu nebo porušuje zásadu rovného zacházení se žadateli), lze dohodu vypovědět podle čl. 50.3.1 písm. C).

Pokud Agentura přijme žádost o změnu, **Dohoda se změní** tak, aby zavedla nezbytné změny (viz Článek 55).

Agentura na základě pravidelných zpráv, zpráv o ukončení a zpráv o rozdělení plateb **vypočítá částku**, která je splatná příjemci, a pokud platby (předběžné financování a průběžné) obdržené příjemcem tuto částku překročí.

Splatná částka se vypočítá v následujících krocích:

Krok 1 - Aplikace sazby náhrad na způsobilé náklady

Výše grantu pro příjemce se vypočítá tak, že se sazba (y) úhrad použije na celkové způsobilé náklady deklarované příjemcem a jeho připojenými třetími stranami ve zprávě o ukončení a schválené Agenturou.

Způsobilé jsou pouze náklady, které příslušnému příjemci vzniknou do doby, než ukončení nabude účinku (viz Článek 6). Náklady související se Dohodami splatnými k provedení až po ukončení nejsou způsobilé.

Krok 2 - Snížení v důsledku podstatných chyb, nesrovnalostí nebo podvodu či závažného porušení povinností

V případě snížení (viz Článek 43) Agentura vypočítá částku sníženého grantu pro příjemce odečtením částky snížení (vypočtené v poměru k závažnosti chyb, nesrovnalostí nebo podvodu nebo porušení povinností v souladu s s Článkem 43.2) z výše grantu pro příjemce.

Pokud přijaté platby **přesáhnou splatné částky**:

- pokud ukončení nabude účinku během období stanoveného v Článku 3 a žádost o změnu je přijata, musí příslušný příjemce vrátit koordinátorovi částku, která byla neoprávněně přijata. Agentura formálně oznámí částku neoprávněně obdrženou a požádá dotyčného příjemce o jeho vrácení koordinátorovi do 30 dnů od obdržení oznámení. Pokud se částka koordinátorovi nevrátí, Agentura čerpá ze Záručního fondu, aby koordinátora zaplatila, a poté příslušnému příjemci oznámí vklad jménem Záručního fondu (viz Článek 44); - ve všech ostatních případech, zejména pokud ukončení nabude účinku po období stanoveném v Článku 3, Agentura formálně oznámí vklad příslušnému příjemci. Není-li platba provedena do data uvedeného ve výzvě k úhradě, Záruční fond zaplatí Agentuře dlužnou částku a Agentura podá **žádost** jménem Záručního fondu dotyčnému příjemci (viz Článek 44);

- pokud je dotčeným příjemcem bývalý koordinátor, musí novému koordinátorovi vrátit výše uvedený postup, pokud:

- ukončení nabývá účinku po průběžné platbě a

- bývalý koordinátor nerozdělil částky přijaté jako předběžné financování nebo průběžné platby (viz Článek 21.7).

V takovém případě Agentura formálně oznámí inkaso bývalému koordinátorovi. Pokud nebude platba provedena do data uvedeného na **žádosti**, Záruční fond zaplatí Agentuře dlužnou částku.

Agentura poté zaplatí novému koordinátorovi a oznámí vklad jménem Záručního fondu bývalému koordinátorovi (viz Článek 44).

Pokud přijaté platby **nepřekročí splatné částky**: částky dlužné příslušnému příjemci budou zahrnuty do další průběžné nebo konečné platby.

Pokud Agentura neobdrží zprávu o ukončení ve stanovené lhůtě (viz výše), budou zohledněny pouze náklady zahrnuté ve schválené pravidelné zprávě.

Pokud Agentura neobdrží zprávu o rozdělení plateb ve stanovené lhůtě (viz výše), bude mít za to, že:

- koordinátor nerozdělil příjemci žádné platby a

- dotyčný příjemce nesmí koordinátorovi vrátit žádnou částku.

Nesprávné ukončení může vést ke snížení grantu (viz Článek 43) nebo ukončení Dohody (viz Článek 50).

Po ukončení platí povinnosti dotyčného příjemce (zejména Čl. 20, 22, 23, Sekce 3 Kapitoly 4, 36, 37, 38, 40, 42, 43 a 44).

50.3 Ukončení Dohody nebo účasti jednoho nebo více příjemců ze strany Agentury

50.3.1 Podmínky

Agentura může vypovědět dohodu nebo účast jednoho nebo více příjemců, pokud:

a) jeden nebo více příjemců k Dohodě nepřistoupí (viz Článek 56);

b) změna jejich právní, finanční, technické, organizační nebo vlastnické situace (nebo situace jejích připojených třetích stran) pravděpodobně podstatně ovlivní nebo oddálí provádění akce nebo zpochybní rozhodnutí o udělení grantu;

c) po ukončení účasti jednoho nebo více příjemců (viz výše) by nezbytné změny Dohody zpochybnily rozhodnutí o udělení grantu nebo porušení zásady rovného zacházení se žadateli (viz Článek 55);

d) realizaci akce brání vyšší moc (viz Článek 51) nebo ji pozastavuje koordinátor (viz Článek 49.1) a buď:

i) obnovení není možné, nebo

ii) nezbytné změny Dohody by zpochybnily rozhodnutí o udělení grantu nebo porušení zásady rovného zacházení se žadateli;

e) na příjemce je prohlášen konkurz, je v likvidaci, jeho záležitosti jsou spravované soudy, uzavřel dohodu s věřiteli, pozastavil obchodní činnost nebo se na něj vztahují jiná podobná řízení nebo postupy podle vnitrostátního práva;

f) příjemce (nebo fyzická osoba, která má pravomoc jeho jménem zastupovat nebo přijímat rozhodnutí), byl shledán vinným z profesního pochybení, které bylo prokázáno jakýmkoliv způsobem;

g) příjemce nedodržuje platné vnitrostátní právní předpisy v oblasti daní a sociálního zabezpečení;

h) akce ztratila vědecký nebo technologický význam;

i) nelze použít;

j) nelze použít;

k) příjemce (nebo fyzická osoba, která má pravomoc zastupovat nebo přijímat rozhodnutí jejím jménem) se dopustil podvodu, korupce nebo je zapojen do zločinecké organizace, praní peněz nebo jiné nezákonné činnosti;

l) příjemce (nebo fyzická osoba, která má pravomoc zastupovat nebo přijímat rozhodnutí jejím jménem) se dopustil:

   i) podstatné chyby, nesrovnalosti nebo podvodu či

   ii) závažného porušení povinností vyplývajících z Dohody nebo během postupu udělování (včetně nesprávného provedení akce, předložení nepravdivých informací, neposkytnutí požadovaných informací, porušení etických zásad);

m) příjemce (nebo fyzická osoba, která má pravomoc zastupovat nebo přijímat rozhodnutí jejím jménem) se dopustil – v jiných grantech EU nebo Euratomu, které mu byly uděleny za podobných podmínek – systémových nebo opakujících se chyb, nesrovnalostí, podvodu či závažného porušení závazků, které mají podstatný dopad na tento grant (r**ozšíření zjištění z jiných grantů na tento grant**; viz Článek 22.5.2);

n) navzdory konkrétní žádosti Agentury příjemce nepožaduje – prostřednictvím koordinátora – změnu Dohody o ukončení účasti jedné z jejích připojených třetích stran nebo mezinárodních partnerů, která je v jedné ze situací uvedených v bodech (e), (f), (g), (k), (l) nebo (m) o přerozdělení úkolů.

50.3.2 Postup

Před vypovězením Dohody nebo účasti jednoho nebo více příjemců Agentura formálně uvědomí dotyčného koordinátora nebo příjemce:

- informuje jej o svém záměru ukončení a důvodech,

- vyzve ji, aby do 30 dnů od obdržení oznámení předložila svá vyjádření, a – v případě výše uvedeného bodu l.ii) – informuje Agenturu o opatřeních k zajištění dodržování povinností podle Dohody. Pokud Agentura neobdrží připomínky nebo se rozhodne pokračovat v postupu navzdory připomínkám, které obdržela, formálně oznámí příslušnému koordinátorovi nebo příjemci **potvrzení** o ukončení a datu, kdy nabude účinnosti. V opačném případě formálně oznámí, že postup nepokračuje.

Ukončení **nabude účinnosti**:

- pro ukončení podle bodů b), c), e), g), h), j), l.ii) a n) výše: v den uvedený v oznámení o potvrzení (viz výše);

- pro ukončení podle písmen a), d), f), i), k), l.i) a m) výše: den po obdržení oznámení o potvrzení.

50.3.3 Účinky

(a) pro ukončení Dohody:

Koordinátor musí – do 60 dnů od nabytí účinnosti ukončení – předložit:

i) pravidelnou zprávu (za poslední otevřené vykazované období do ukončení; viz Článek 20.3) a

ii) závěrečnou zprávu (viz Článek 20.4).

Pokud je Dohoda vypovězena z důvodu porušení povinnosti podávat zprávy (viz čl. 20.8 a čl. 50.3 odst. 1 písm. L)), koordinátor nesmí po ukončení předložit žádné zprávy.

Pokud Agentura neobdrží zprávy ve stanovené lhůtě (viz výše), budou brány v úvahu pouze náklady zahrnuté ve schválené pravidelné zprávě.

Agentura **vypočítá** konečnou výši grantu (viz Článek 5.3) a zůstatek

(viz Článek 21.4) na základě předložených zpráv. Způsobilé jsou pouze náklady vynaložené do doby, než výpověď nabude účinku (viz Článek 6).

Náklady související se Dohodami splatnými až po provedení ukončení nejsou způsobilé.

Tím není dotčeno právo Agentury snížit grant (viz Článek 43) nebo uložit správní sankce (Článek 45).

Příjemci nemohou požadovat náhradu škody z důvodu ukončení ze strany Agentury (viz Článek 46).

Po ukončení jsou povinnosti příjemců (zejména články 20, 22, 23, sekce 3 Kapitol 4, 36, 37, 38, 40, 42, 43 a 44) nadále platí.

b) pro ukončení účasti jednoho nebo více příjemců:

Koordinátor musí – do 60 dnů od nabytí účinnosti ukončení – předložit:

i) zprávu o rozdělení plateb dotyčnému příjemci;

ii) žádost o změnu (viz Článek 55) s návrhem přerozdělení úkolů a odhadovaného rozpočtu dotčeného příjemce (viz Přílohy 1 a 2) a v případě potřeby přidání jednoho nebo více nových příjemců (viz Článek 56). Pokud je ukončení oznámeno po lhůtě stanovené v Článku 3, nesmí být podána žádná žádost o změnu, pokud koordinátorem není dotčený příjemce. V tomto případě musí žádost o změnu navrhnout nového koordinátora a

iii) pokud ukončení nabude účinku během období stanoveného v Článku 3, **zprávu o ukončení** od dotyčného příjemce za období otevřeného hlášení až do ukončení, která obsahuje přehled postupu prací, přehled využití zdrojů, individuální účetní závěrku a případně certifikát o účetní závěrce (viz Článek 20).

Informace ve zprávě o ukončení musí být také zahrnuty v pravidelné zprávě pro příští vykazované období (viz Článek 20.3).

Pokud Agentura žádost o změnu zamítne (protože zpochybňuje rozhodnutí o udělení grantu nebo porušuje zásadu rovného zacházení se žadateli), lze dohodu vypovědět podle čl. 50.3.1 písm. C).

Pokud Agentura přijme žádost o změnu, **Dohoda se změní tak**, aby zavedla nezbytné změny (viz Článek 55).

Agentura na základě pravidelných zpráv, zpráv o ukončení a zpráv o rozdělení plateb **vypočítá částku**, která je splatná příjemci, a pokud platby (předběžné financování a průběžné platby) obdržené příjemcem tuto částku překročí.

Splatná částka se vypočítá v následujících krocích:

Krok 1 - Aplikace sazby náhrad na způsobilé náklady

Výše grantu pro příjemce se vypočítá tak, že se sazba (y) úhrad použije na celkové způsobilé náklady deklarované příjemcem a jeho připojenými třetími stranami ve zprávě o ukončení a schválené Agenturou.

Způsobilé jsou pouze náklady, které příslušnému příjemci vzniknou do doby, než ukončení nabude účinku (viz Článek 6). Náklady související s Dohodami splatnými k provedení až po ukončení nejsou způsobilé.

Krok 2 - Snížení v důsledku podstatných chyb, nesrovnalostí nebo podvodu nebo závažného porušení povinností

V případě snížení (viz Článek 43) Agentura vypočítá částku sníženého grantu pro příjemce odečtením částky snížení (vypočtené v poměru k závažnosti chyb, nesrovnalostí nebo podvodu nebo porušení povinností v souladu s s Článkem 43.2) z výše grantu pro příjemce.

Pokud přijaté platby **přesáhnou splatné částky**:

- pokud ukončení nabude účinku během období stanoveného v Článku 3 a žádost o změnu je přijata, musí příslušný příjemce vrátit koordinátorovi částku, která byla neoprávněně přijata. Agentura formálně oznámí částku neoprávněně obdrženou a požádá dotyčného příjemce o jeho vrácení koordinátorovi do 30 dnů od obdržení oznámení. Pokud se koordinátorovi částka nevrátí, Agentura čerpá ze Záručního fond, aby koordinátora zaplatila, a poté příslušnému příjemci podá **žádost o zaplacení dlužné částky** jménem Záručního fondu (viz Článek 44);

- ve všech ostatních případech, zejména pokud ukončení nabude účinku po období stanoveném v Článku 3, Agentura formálně podá **žádost o zaplacení dlužné částky** příslušnému příjemci. Není-li platba provedena do data uvedeného ve výzvě k úhradě, Záruční fond zaplatí Agentuře dlužnou částku a Agentura oznámí vklad jménem Záručního fondu dotyčnému příjemci (viz Článek 44);

- pokud je dotčeným příjemcem bývalý koordinátor, musí novému koordinátorovi vrátit výše uvedený postup, pokud:

- ukončení nabývá účinku po průběžné platbě a

- bývalý koordinátor nerozdělil částky přijaté jako předběžné financování nebo průběžné platby (viz Článek 21.7).

V takovém případě Agentura formálně oznámí **žádost** bývalému koordinátorovi. Pokud nebude platba provedena do data uvedeného na této žádosti, Záruční fond zaplatí Agentuře dlužnou částku. Agentura poté zaplatí novému koordinátorovi a oznámí oznámení o vkladu jménem Záručního fondu bývalému koordinátorovi (viz Článek 44).

Pokud přijaté platby **nepřekročí splatné částky**: částky dlužné příslušnému příjemci budou zahrnuty do další průběžné nebo konečné platby.

Pokud Agentura neobdrží zprávu o ukončení ve stanovené lhůtě (viz výše), budou zohledněny pouze náklady zahrnuté ve schválené pravidelné zprávě.

Pokud Agentura neobdrží zprávu o rozdělení plateb ve stanovené lhůtě (viz výše), bude mít za to, že:

- koordinátor nerozdělil žádnou platbu dotyčnému příjemci a

- dotyčný příjemce nesmí koordinátorovi vrátit žádnou částku.

Po ukončení platí povinnosti dotyčného příjemce (zejména články 20, 22, 23, Sekce 3 Kapitoly 4, 36, 37, 38, 40, 42, 43 a 44).

SEKCE 4 VYŠŠÍ SÍLA

ČLÁNEK 51 – VYŠŠÍ SÍLA

„Vyšší mocí“ se rozumí jakákoli situace nebo událost, která:

- brání jedné ze stran v plnění jejich závazků vyplývajících ze Smlouvy,

- byla nepředvídatelná, výjimečná situace a strany ji nemohly ovlivnit,

- nebyla způsobeno chybou nebo nedbalostí na jejich straně (nebo na straně třetích stran zapojených do akce) a

- se ukazuje jako nevyhnutelná i přes veškerou náležitou péči.

Následující nelze použít jako vyšší moc:

- jakékoliv selhání služby, závada na zařízení nebo materiálu nebo zpoždění při jejich poskytování,

pokud nevyplývají přímo z příslušného případu vyšší moci,

- pracovní spory nebo stávky nebo

- finanční problémy.

Jakákoliv situace představující vyšší moc musí být druhé straně neprodleně formálně oznámena s uvedením povahy, pravděpodobného trvání a předvídatelných účinků.

Strany musí neprodleně učinit všechna nezbytná opatření k omezení škod způsobených vyšší mocí a udělají vše pro to, aby se provádění akce obnovilo co nejdříve.

Stranu, které vyšší moc brání v plnění svých závazků podle Dohody, nelze vinit jako stranu porušující Dohodu.

KAPITOLA 7 ZÁVĚREČNÁ USTANOVENÍ

ČLÁNEK 52 - KOMUNIKACE MEZI STRANAMI

52.1 Formy a způsoby komunikace

Komunikace podle Dohody (informace, žádosti, podání, „formální oznámení“ atd.) musí:

- být vyhotovena písemně a

- uvádět číslo Dohody.

Veškerá komunikace musí probíhat prostřednictvím systému **elektronické** výměny na portálu účastníků a pomocí zde uvedených formulářů a šablon.

Pokud po zaplacení zůstatku Agentura zjistí, že nebylo přijato formální oznámení, bude druhé formální oznámení učiněno doporučeně s dokladem o doručení („**formální písemné oznámení**“). Lhůty se počítají od okamžiku druhého oznámení.

Komunikaci v systému elektronické výměny musí provádět osoby oprávněné podle podmínek portálu účastníka. Pro pojmenování oprávněných osob musí každý příjemce před podpisem této Dohody určit „právnickou osobu jmenovanou zástupcem (LEAR)“. Role a úkoly LEAR jsou stanoveny v jeho jmenovacím dopise (viz Podmínky portálu účastníka).

Pokud je systém elektronické výměny dočasně nedostupný, budou pokyny uvedeny na webových stránkách Agentury a Komise.

52.2 Datum komunikace

Komunikace se považuje za uskutečněnou po odeslání odesílající stranou (tj. v den a čas, kdy je odeslána prostřednictvím systému elektronické výměny).

Formální oznámení prostřednictvím systému elektronické výměny se považují za učiněná v okamžiku, kdy je obdrží přijímající strana (tj. datum a čas přijetí přijímající stranou, jak je uvedeno v časovém razítku). Formální oznámení, které nebylo přijato do 10 dnů po odeslání, se považuje za přijaté.

Formální **písemná** oznámení zaslaná **doporučeně** s dokladem o doručení (až po zaplacení zůstatku) se považují za podaná buď:

- datem dodání registrovaným poštovní službou nebo

- termínem vyzvednutí na poště.

Pokud je systém elektronické výměny dočasně nedostupný, nelze považovat odesílající stranu za porušující svou povinnost zaslat sdělení ve stanovené lhůtě.

52.3 Adresy pro komunikaci

K systému **elektronické** výměny je nutné přistupovat prostřednictvím následující adresy URL:

https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/myarea/projects

Agentura předem formálně oznámí koordinátorovi a příjemcům jakékoliv změny této adresy URL.

Formální písemné oznámení (až po zaplacení zůstatku) adresované Agentuře musí být zasláno na oficiální poštovní adresu uvedenou na webových stránkách Agentury.

Formální písemné oznámení (až po zaplacení zůstatku) **adresované příjemcům** musí být zasláno na jejich právní adresu, jak je uvedeno v registru příjemců

ČLÁNEK 53 - INTERPRETACE DOHODY

53.1 Přednost podmínek před přílohami

Ustanovení v podmínkách Dohody má přednost před jeho Přílohami. Příloha 2 má přednost před Přílohou 1.

53.2 Výsady a imunity

Nelze použít

ČLÁNEK 54 - VÝPOČET OBDOBÍ, TERMÍNŮ A LHŮT

V souladu s nařízením č. 1182/71[23] se lhůty vyjádřené ve dnech, měsících nebo letech počítají od okamžiku, kdy nastane spouštěcí událost. Den, během kterého k této události dojde, není považován za den spadající do období.

ČLÁNEK 55 - ZMĚNY DOHODY

55.1 Podmínky

Dohoda může být pozměněna, pokud tato změna nezahrnuje změny Dohody, které by zpochybnily rozhodnutí o udělení grantu nebo porušily zásadu rovného zacházení se žadateli. Změny mohou být požadovány kteroukoliv ze stran.

55.2 Postup

Strana žádající o změnu musí podat žádost o změnu podepsanou v systému elektronické výměny (viz Článek 52). Koordinátor jménem příjemců předkládá a přijímá žádosti o změnu (viz Příloha 3).

Pokud je požadována změna koordinátora bez jejího souhlasu, musí podání předložit jiný příjemce (jednající jménem ostatních příjemců).

Žádost o změnu musí obsahovat:

- důvody, proč k ní dochází;
- příslušné podpůrné dokumenty a
- pro změnu koordinátora bez jejího souhlasu: stanovisko koordinátora (nebo důkaz, že toto stanovisko bylo vyžádáno písemně).

[30] Nařízení Rady (EHS, Euratom) č. 1182/71 ze dne 3. června 1971, kterým se stanoví pravidla pro období, data a lhůty (Úř. Věst.L 124, 8.6.1971, s. 1).

Agentura může požadovat dodatečné informace.

Pokud strana přijímající žádost souhlasí, musí dodatek podepsat v systému elektronické výměny do 45 dnů od obdržení oznámení (nebo jakýchkoliv dalších informací, které Agentura požadovala). Pokud nesouhlasí, musí ve stejné lhůtě formálně oznámit svůj nesouhlas. Lhůtu lze prodloužit, je-li to nutné pro posouzení žádosti. Pokud ve stanovené lhůtě neobdržíte žádné oznámení, považuje se žádost za zamítnutou.

Dodatek vstupuje v platnost dnem podpisu přijímající strany.

Dodatek nabývá účinnosti dnem dohodnutým stranami nebo, pokud taková Dohoda neexistuje, dnem, kdy změna vstoupí v platnost.

ČLÁNEK 56 - PŘÍSTUP K DOHODĚ

56.1 Přistoupení příjemců uvedených v preambuli

Ostatní příjemci musí k Dohodě přistoupit podpisem přístupového formuláře (viz Příloha 3) v systému elektronické výměny (viz Článek 52) do 30 dnů od vstupu v platnost (viz Článek 58). Převezmou práva a povinnosti podle Dohody s účinností ode dne jejího vstupu v platnost (viz Článek 58).

Pokud příjemce ve výše uvedené lhůtě k Dohodě nepřistoupí, musí koordinátor do 30 dnů požádat o změnu, aby byly včas provedeny veškeré změny nezbytné k zajištění řádného průběhu akce. Tím není dotčeno právo Agentury vypovědět dohodu (viz Článek 50).

56.2 Přidání nových příjemců

V odůvodněných případech mohou příjemci požádat o přidání nového příjemce. Za tímto účelem musí koordinátor předložit žádost o změnu v souladu s Článkem 55. Musí obsahovat přístupový formulář (viz Příloha 3) podepsaný novým příjemcem v systému elektronické výměny (viz Článek 52).

Noví příjemci musí převzít práva a povinnosti podle Dohody s účinností ode dne jejich přistoupení uvedeného ve formuláři o přistoupení (viz Příloha 3).

ČLÁNEK 57 - ROZHODNÉ PRÁVO A ŘEŠENÍ SPORŮ

57.1 Rozhodné právo

Dohoda se řídí příslušným právem EU, v případě potřeby doplněným belgickým právem.

57.2 Řešení sporů

Nelze-li spor týkající se interpretace, použití nebo platnosti Dohody vyřešit smírně, je výlučnou pravomocí Tribunálu nebo v případě odvolání Soudního dvora Evropské unie.

Takové žaloby musí být podány podle Článku 272 Dohody o fungování EU (SFEU).

Pokud je takový spor mezi Agenturou a NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU, SINTEF AS, GREEN DIGITAL FINANCE ALLIANCE, OSLO KOMMUNE, příslušné belgické soudy mají výlučnou jurisdikci.

Pokud se spor týká správních sankcí, započtení nebo vykonatelného rozhodnutí podle Článku 299 SFEU (viz články 44, 45 a 46), musí příjemci podat žalobu k Tribunálu – nebo v případě odvolání k Soudnímu dvoru Evropské unie – podle Článku 263 SFEU.

Akce proti započtení a vykonatelná rozhodnutí musí být vznesena proti Komisi (nikoli proti Agentuře).

ČLÁNEK 58 - VSTUP DOHODY V PLATNOST

Dohoda vstoupí v platnost dnem podpisu Agenturou nebo koordinátorem, podle toho, co proběhne později.

PODPISY

Za koordinátora	Za Agenturu
[podpis zde]	[podpis zde]

EVROPSKÁ KOMISE

Evropská výkonná agentura pro klima, infrastrukturu a životní prostředí (CINEA)

Ředitelství

PŘÍLOHA 1 (část A)

Inovační akce

ČÍSLO — 101036723 — ARV

Obsah

1.1. Shrnutí projektu

Číslo projektu [1]	101036723	Zkratka projektu [2]	ARV

Jeden formulář na projekt

Obecné informace	
Název projektu [3]	Klimaticky prospěšná cirkulární sousedství (Positive Circular Communities - CPCC)
Počáteční datum [4]	01/01/2022
Délka trvání v měs. [5]	48
Identifikátor (referenční č.) [6]	H2020-LC-GD-2020-7
Téma	LC-GD-4-1-2020 Budování a renovace energeticky a zdrojově efektivním způsobem
Přesná klíčová slova	Nízké/téměř nulové & energeticky efektivní budovy, udržitelný design (pro recyklaci, životní prostředí, ekologicky přívětivý design), architektura, smart buildings, smart cities, městské inženýrství, integrace obnovitelných zdrojů, ekodesign, analýza životního cyklu
Volná klíčová slova	CCCP, sousedství s nulovými emisemi, zapojení. zúčastněných stran do procesu, povědomí občanů, oběhové hospodářství, cirkulární ekonomika, zelené digitální financování, politika a předpisy, IEQ

Abstrakt [7]

Vizí projektu ARV je přispět k rychlé a široké implementaci Climate Positive Circular Communities (CPCC), kde společnost bude prosperovat pro příští generace. Souhrnným cílem je demonstrovat a uvést v platnost dostupná řešení, jež výrazně urychlí hloubkové energetické renovace a zavádění energetických a klimatických opatření v oblasti stavebního a energetického průmyslu.
Aby toho bylo dosaženo, bude ARV projekt využívat nový koncept spoléhající na kombinaci tří koncepčních pilířů, šesti demonstračních projektů a devíti tematických oblastí zaměření. Třemi pilíři jsou integrace, cirkulárnost a jednoduchost. Integrací se v ARV projektech myslí propojení občanů, ekologických budov a energetických systémů prostřednictvím spoluvytváření využívání nových inovativních digitálních nástrojů za přítomnosti zapojení všech zúčastněných stran. Cirkulárnost v projektech ARV znamená systematický způsob provádění cirkulární ekonomiky prostřednictvím automatizovaného používání metody posuzování životního cyklu. Jednoduchostí se v těchto projektech rozumí představení řešení, které jsou snadno pochopitelná a použitelná pro všechny zúčastněné strany od výrobců až ke koncovým uživatelům.
Šest demonstračních projektů jsou projekty regenerace měst v šesti lokalitách po celé Evropě. Ty byly pečlivě vybrány z důvodu reprezentace rozdílných aktuálních situací a ekologického kontextu, a také kvůli jejím vysokým ambicím dosahovat environmentální, sociální a ekonomické udržitelnosti. Projekty se specificky zaměřují na renovaci sociálního bydlení a veřejných budov. Celkově bude předvedeno více než 50 inovací na více než 150,00 m² obytných prostorů.
Devět tematických oblastí zájmů jsou: 1) efektivní plánování a provádění CPCC, 2) zapojení občanů, životní prostředí a blahobyt, 3) přepracování designu budov na udržitelnost, 4) zdrojově efektivní pracovní postupy výstavby a renovace, 5) integrované obnovitelné zdroje a skladování, 6) energetické hospodaření a flexibilita, 7) monitorování a hodnocení situaci, 8) obchodní modely, finanční a politické mechanismy a procesy zužitkování, 9) šíření odborných informací a dosah všech zainteresovaných stran.

1.2. Seznam příjemců

Číslo projektu [1]	101036723	Zkratka projektu [2]	ARV

Seznam příjemců

Číslo	Název	Zkratka	Země	Měsíc zahájení projektu[8]	Měsíc ukončení projektu
1	NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU	NTNU	Norsko	1	48
2	CONSEIL DES ARCHITECTES D'EUROPE	ACE	Belgie	1	48
3	CESKE VYSOKE UCENI TECHNICKE V PRAZE	CVUT	Česká republika	1	48
4	DANMARKS TEKNISKE UNIVERSITET	DTU	Dánsko	1	48
5	DANFOSS A/S	DANFOSS A/S	Dánsko	1	48
6	ENFOR AS	ENFOR	Dánsko	1	48
7	PROJECT ZERO A/S	PROJECTZERO	Dánsko	1	48
8	ACCADEMIA EUROPEA DI BOLZANO	EURAC	Itálie	1	48
9	SINTEF AS	SINTEF	Norsko	1	48
10	AYUNTAMENT DE PALMA DE MALLORCA	PALMA	Španělsko	1	48
11	INSTITUTO BALEAR DE LA VIVIENDA	IBAVI	Španělsko	1	48
12	FUNDACIO INSTITUT DE RECERCA DE L'ENERGIA DE CATALUNYA	IREC	Španělsko	1	48
13	METROVACESA, SA	MET	Španělsko	1	48
14	Stichting Hogeschool Utrecht	UAS Utrecht	Nizozemsko	1	48
15	COMITE EUROPEEN DE COORDINATION DE L'HABITAT SOCIAL AISBL	HOUSING EUROPE	Belgie	1	48
16	BURO DE HAAN INFORMATIE TECHNOLOGIE BV	Buro de Haan	Nizozemsko	1	48
17	CENTER DANMARK DRIFT APS	Center Denmark	Dánsko	1	48
18	SONDERBORG ANDELSBOLIGFORENING	SAB	Dánsko	1	48
19	GREEN DIGITAL FINANCE ALLIANCE	GDFA	Švýcarsko	1	48
20	STICHTING BO-EX 91	BOEX	Nizozemsko	1	48
21	RC PANELS BV	Rc Panels B.V.	Nizozemsko	1	48
22	UNIVERSITEIT UTRECHT	UU	Nizozemsko	1	48
23	GEMEENTE UTRECHT	CITY OF UTRECHT	Nizozemsko	1	48
24	BOS INSTALLATIEWERKEN BV	BOSGROEP	Nizozemsko	1	48
25	IWELL BV	iwell	Nizozemsko	1	48
26	ME X ARCHITECTS BV	MEX	Nizozemsko	1	48
27	STICHTING MITROS	Mitros	Nizozemsko	1	48

1.2. Seznam příjemců

Číslo	Název	Zkratka	Země	Měsíc zahájení projektu[8]	Měsíc ukončení projektu
28	STATUTARNI MESTO KARVINA	KARV	Česká republika	1	48
29	DOLOMITI ENERGIA RINNOVABILI SOCIETA A RESPONSABILITA' LIMITATA	DOL	Itálie	1	48
30	DISTRETTO TECNOLOGICO TRENTINO SCARL	DTTN	Itálie	1	48
31	UNIVERSITA DEGLI STUDI DI TRENTO	UNITN	Itálie	1	48
32	POLITECNICO DI TORINO	POLITO	Itálie	1	48
33	OSLO KOMMUNE	OBF	Norsko	1	48
34	NANO POWER AS	NANO	Česká republika	1	48
35	SISTEMES AVANCATS D ENERGIA SOLAR TERMICA SCCL	AIGUASOL SAEST	Španělsko	1	48

1.3. Tabulky pracovního plánu (WT) – Podrobná implementace

1.3.1. WT1 Seznam pracovních balíčků

Č. tabulky prac. plánu[9]	Název tabulky pracovního plánu	Příjemce[10]	Osoby-měsíce[11]	Měsíc zahájení[12]	Měsíc ukončení[13]
WT1	Řízení projektů a koordinace	1 - NTNU	162.00	1	48
WT2	Rámec a nástroje pro efektivní provádění a hodnocení CPCC	12 - IREC	197.50	1	48
WT3	Komunitní angažovanost, životní prostředí a blahobyt	9 - SINTEF	213.00	1	48
WT4	Přepracování designu budov na udržitelný	1 - NTNU	267.50	1	40
WT5	Výroba efektivně využívající udržitelné zdroje a pracovní toky stavby	14 - UAS Utrecht	231.50	1	48
WT6	Integrované obnovitelné a úložné systémy	3 - CVUT	192.50	1	46
WT7	Efektivní provoz a flexibilita	4 - DTU	253.50	1	48
WT8	Monitorování, hodnocení a stanovení dopadů	8 - EURAC	228.00	1	48
WT9	Obchodní modely, finanční nástroje, politické mechanismy a zužitkování	19 - GDFA	155.00	3	48
WT10	Komunikace, šíření a dosah zúčastněných stran	2 - ACE	87.00	1	48
		Celkem	1 987.50		

1.3.2. WT2 Seznam dodávek

Číslo dodávky[14]	**Název dodávky**	**Číslo pracov-ního balíčku**[9]	**Příjemce**	**Typ dodávky**[15]	**Úroveň diskrétnosti**[16]	**Datum splatnosti (v měs.)**[17]
D1.1	Plán konsorcia	WP1	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	3
D1.2	Zpráva o pokroku	WP1	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	12
D1.3	Plán řízení inovací	WP1	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	6
D1.4	Zprávy o pokroku v oblasti inovací projektu (každoročně)	WP1	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	12
D1.5	Plán zajištění kvality (QAP)	WP1	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	3
D1.6	Plán řízení rizik	WP1	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	3
D1.7	Plán řízení práv a znalostí	WP1	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	3
D1.8	ARV Data Management, DMP	WP1	1 - NTNU	Pilotní studie a průzkum (ORDP)	Důvěrné, pouze pro členy konsorcia (včetně Komise)	6

Číslo dodávky[14]	Název dodávky	Číslo pracov-ního balíčku[9]	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D2.1	Rámec pro hodnocení CPCC	WP2	12 - IREC	Zpráva	Veřejné	9
D2.2	Popis metod a nástrojů pro dodatečné vybavení v rámci CPCC	WP2	4 - DTU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	18
D2.3	Popis metod a nástrojů pro dodatečné vybavení v rámci CPCC	WP2	12 - IREC	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	15
D2.4	Aplikace nástrojů pro dodatečné vybavení. Dle pokynů za účelem replikovatelnosti	WP2	12 - IREC	Zpráva	Veřejné	46
D2.5	Aplikace nástrojů pro implementaci "Občanského energetického společenství". Dle pokynů za účelem replikovatelnosti	WP2	12 - IREC	Zpráva	Veřejné	42
D2.6	Demonstrační ukázky prostředí virtuální reality	WP2	9 - SINTEF	Předváděcí model	Veřejné	36
D2.7	Popis a učinění závěrů z informačních školení z virtuálního prostředí	WP2	9 - SINTEF	Zpráva	Veřejné	48
D2.8	Vytvoření rámce pro zhodnocení CPCC. Aktualizovaná verze	WP2	12 - IREC	Zpráva	Veřejné	48
D3.1	Plánování a celkový návrh metodiky fungování "CPCC Živé laboratoře", včetně mapování dosahu zainteresovaných stran	WP3	9 - SINTEF	Předváděcí model	Veřejné	12
D3.2	Realizační plán "CPCC Živých laboratoří. Demonstrace	WP3	10 - PALMA	Předváděcí model	Veřejné	13
D3.3	Zprávy o fungování "CPCC Živých laboratoří".	WP3	3 - CVUT	Zpráva	Veřejné	24

Číslo dodávky[14]	Název dodávky	Číslo pracov-ního balíčku[9]	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D3.4	Analýza nástrojů a procesů zapojení občanů	WP3	9 - SINTEF	Zpráva	Veřejné	40
D3.5	Strategie a nástroje zapojení občanů na komunitní úrovni	WP3	9 - SINTEF	Webové stránky, patenty atd.	Veřejné	48
D4.1	Návrh pokynů pro environmentálně přátelské budovy s nulovými emisemi v Oslu	WP4	9 - SINTEF	Zpráva	Veřejné	12
D4.2	Konfigurace návrhu modulárního a škálovatelného konceptu s dodatečným vybavením pro energeticky přátelské středně vysoké a vysoké budovy v "zelených čtvrtích" Utrechtu	WP4	14 - UAS Utrecht	Zpráva	Veřejné	12
D4.3	Návrh pokynů pro renovaci a výstavbu nových budov s důrazem na nulové emise v Palmě	WP4	12 - IREC	Zpráva	Veřejné	12
D4.4	Návrh energetické renovace Zdravotního střediska v Karviné s nulovými emisemi	WP4	3 - CVUT	Zpráva	Veřejné	12
D4.5	Návrh pokynů pro konstrukci dřevostaveb a renovace malých a středně velkých budov v Trentu	WP4	31 - UNITN	Zpráva	Veřejné	12
D4.6	Navrhování nových a dovybavení stávajících budov za účelem energetické renovace a zavedení nulových emisí	WP4	1 - NTNU	Zpráva	Veřejné	40
D5.1	Konfigurátor výroby pro	WP5	14 - UAS Utrecht	Zpráva	Veřejné	24

Číslo dodávky[14]	Název dodávky	Číslo pracov-ního balíčku[9]	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
	výškové bytové domy k přímému zahájení výroby (File2Factory) validované v zúčastněných evropských zemích.					
D5.2	Analýza pracovních toků a zjištění, jak přejít k prefabrikovanějším komponentům a omezit vynaloženou práci na místě	WP5	14 - UAS Utrecht	Zpráva	Veřejné	36
D5.3	Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Utrechtu	WP5	14 - UAS Utrecht	Zpráva	Veřejné	48
D5.4	Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Palmě	WP5	12 - IREC	Zpráva	Veřejné	48
D5.5	Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Oslu	WP5	33 - OBF	Zpráva	Veřejné	48
D5.6	Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Karviné	WP5	3 - CVUT	Zpráva	Veřejné	48
D5.7	Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Trentu	WP5	31 - UNITN	Zpráva	Veřejné	48
D5.8	Demonstrace CPCC v Utrechtu.	WP5	14 - UAS Utrecht	Předváděcí model	Veřejné	36
D5.9	Demonstrace CPCC v Palmě	WP5	10 - PALMA	Předváděcí model	Veřejné	36
D5.10	Demonstrace CPCC v Oslu.	WP5	33 - OBF	Předváděcí model	Veřejné	36
D5.11	Demonstrace CPCC v Karviné	WP5	3 - CVUT	Předváděcí model	Veřejné	36
D5.12	Demonstrace CPCC v Trentu	WP5	31 - UNITN	Předváděcí model	Veřejné	36

Číslo dodávky[14]	Název dodávky	Číslo pracovního balíčku[9]	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D6.1	Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Oslu	WP6	9 - SINTEF	Předváděcí model	Veřejné	42
D6.2	Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Sønderborgu	WP6	7 - PROJECTZERO	Předváděcí model	Veřejné	26
D6.3	Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Utrechtu	WP6	22 - UU	Předváděcí model	Veřejné	44
D6.4	Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Karviné	WP6	3 - CVUT	Předváděcí model	Veřejné	44
D6.5	Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Trentu	WP6	8 - EURAC	Předváděcí model	Veřejné	46
D7.1	Zřízení centrálního digitalizačního centra ARV a systému úložiště dat “data lake”	WP7	17 - Center Denmark	Předváděcí model	Důvěrné, pouze pro členy konsorcia (včetně Komise).	18
D7.2	Modely budování prototypů	WP7	3 - CVUT	Zpráva	Veřejné	32
D7.3	Prognózy počasí v městských částech demonstračního projektu	WP7	6 - ENFOR	Předváděcí model	Důvěrné, pouze pro členy konsorcia (včetně Komise).	12

Číslo dodávky[14]	Název dodávky	Číslo pracov-ního balíčku[9]	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D7.4	Prognózy rychlosti větru, záření Slunce, tlakové tíže a vývoje cen v městských částech demonstračního projektu	WP7	17 - Center Denmark	Předváděcí model	Důvěrné, jen pro členy konsorcia (včetně Komise)	18
D7.5	Prediktivní ovladače s rozhraním umožňující zvolení uživatelské preference	WP7	4 - DTU	Předváděcí model	Důvěrné, jen pro členy konsorcia (včetně Komise)	32
D7.6	Pokyny k popisu pojmů "chytrost a flexibilita"	WP7	4 - DTU	Zpráva	Veřejné	24
D7.7	Pokyny k zásadám návrhu souvisejícím s klimatickou zónou	WP7	1 - NTNU	Zpráva	Veřejné	32
D7.8	Příručka vysvětlující koncept chytrá komunita	WP7	22 - UU	Zpráva	Veřejné	42
D7.9	Zásady interakcí CEC-DSO	WP7	4 - DTU	Zpráva	Veřejné	46
D8.1	Rámec monitorování, hodnocení a posuzování dopadů	WP8	8 - EURAC	Zpráva	Veřejné	12
D8.2	Datová architektura, včetně popisu monitorovacích systémů na ukázkách ARV	WP8	17 - Center Denmark	Zpráva	Veřejné	18
D8.3	Struktura a využití datového skladu	WP8	17 - Center Denmark	Zpráva	Veřejné	48
D8.4	Zprávy o výsledcích hodnocení (včetně doporučení a pokynů pro budoucí projekty)	WP8	1 - NTNU	Zpráva	Veřejné	48
D8.5	Zjednodušené LCA-LCCA porovnávající scénáře alternativních řešení	WP8	8 - EURAC	Zpráva	Veřejné	24
D8.6	LCA a LCC implementovaných řešení a sociálních složek	WP8	8 - EURAC	Zpráva	Veřejné	48
D8.7	Zpráva o "multiple benefits analysis"	WP8	8 - EURAC	Zpráva	Veřejné	48

Číslo dodávky[14]	Název dodávky	Číslo pracov-ního balíčku[9]	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D8.8	Pokyny a doporučení pro replikaci a/nebo budoucí výzkum	WP8	8 - EURAC	Zpráva	Veřejné	48
D9.1	Vypracování výroční zprávy "ARV Innovation Intel for Impact"	WP9	19 - GDFA	Zpráva	Veřejné	12
D9.2	Vytvoření katalogu obchodních a finančních modelů osvědčených na jiných trzích za účelem přizpůsobení v EU, aby se urychlila renovační vlna	WP9	19 - GDFA	Zpráva	Veřejné	6
D9.3	Návrh plánu obchodního modelu pro energeticky pozitivní obnovu různých sfér jako vzor pro replikaci v celé EU	WP9	19 - GDFA	Zpráva	Veřejné	36
D9.4	Návrh obchodního modelu pro "prozumenty" založeného na platformě s jasnými zásadami a regulačními doporučeními	WP9	19 - GDFA	Předváděcí model	Veřejné	41
D9.5	Návrh finančních nástrojů souvisejících s budováním FI portfolia	WP9	19 - GDFA	Předváděcí model	Veřejné	36
D9.6	Vypracování průvodce zelenými dluhopisy ke škálování trhu s energií	WP9	19 - GDFA	Jiné	Veřejné	45
D9.7	Umožnění škálování energeticky pozitivních renovací na trzích EU	WP9	19 - GDFA	Jiné	Veřejné	46
D10.1	Firemní identita ARV	WP10	1 - NTNU	Jiné	Veřejné	3
D10.2	i) Základní plán komunikace a šíření informací ii) Uzpůsobené strategie pro 6 demonstračních ukázek „LL CPCC"	WP10	2 - ACE	Zpráva	Důvěrné, jen pro členy konsorcia (včetně Komise)	8
D10.3	Webové stránky projektu, e-marketplace a sociální média	WP10	15 - HOUSING EUROPE	Webové stránky, patenty atd.	Veřejné	6

Číslo dodávky[14]	Název dodávky	Číslo pracov-ního balíčku[9]	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D10.4	Zpravodaje a vytvoření materiálu pro šíření informací: leták, plakáty, video, infografika	WP10	15 - HOUSING EUROPE	Webové stránky, patenty atd.	Veřejné	6
D10.5	Brožura projektu shrnující výsledky dosažené v ARV	WP10	15 - HOUSING EUROPE	Zpráva	Veřejné	42
D10.6	Závěrečná zpráva o šíření informací a komunikačních aktivitách	WP10	2 - ACE	Zpráva	Veřejné	48
D10.7	Zpráva o příspěvku na společné aktivity H2020	WP10	2 - ACE	Zpráva	Veřejné	44
D10.8	Plán pro plánování, návrhy, (re)konstrukci, provoz a používání CPCC	WP10	1 - NTNU	Zpráva	Veřejné	12

1.3.3. WT3 Popisy pracovních balíčků

Číslo pracovního balíčku [9]	WP1	**Příjemce** [10]	1 - NTNU
Název pracovního balíčku	Řízení projektů a koordinace		
Měsíc zahájení	1	**Měsíc ukončení**	48

Cíle

Cílem WP1 je zajistit řádné řízení po celou dobu trvání projektu včetně smluvního a finančního řízení, projektové dokumentace, monitorování a podávání zpráv za účelem zjištění, zda projekt dosáhne stanovených cílů v rámci rozpočtových omezení a přiděleného času. WP1 má následující specifické cíle:

- Koordinovat činnosti projektu tak, aby bylo dosaženo souhrnných cílů, milníků, a aby jeho výstup byl v co nejvyšší možné kvalitě, dokončen včas a v rámci dodržení stanoveného rozpočtu.
- Účelně spravovat finance obdržené pro realizaci projektu a následné podání zprávy Evropské komisi.
- Pomáhat partnerům projektu v dodržování jejich smluvních závazků tak, jak je uvedeno v Dohodě o grantu, Dohodě o konsorciu a souvisejících přílohách.
- Systematicky zaznamenávat, podávat zprávy a rozvíjet inovace z demonstračních projektů a inovačních klastrů.
- Koordinovat a spravovat finanční, smluvní, etické a právní problémy ve všech fázích projektu, včetně monitorování pokroků a možných rizik.
- Zajištění efektivní výměny informací a sdílení znalostí v rámci konsorcia vytvořením komunikační struktury a pravidelnými schůzkami.
- Koordinovat s aktivitami inovačního klastru, poradními radami externích odborníků a souvisejícími projekty.

Popis práce a role partnerů

WP1 – Řízení projektů a koordinace [Měsíce: 1-48]
NTNU, ACE, CVUT, DTU, DANFOSS A/S, ENFOR, PROJECTZERO, EURAC, SINTEF, PALMA, IBAVI, IREC, MET, UAS Utrecht, HOUSING EUROPE, Buro de Haan, Center Denmark, SAB, GDFA, BOEX, Rc Panels B.V., UU, CITY OF UTRECHT, BOSGROEP, iwell, MEX, Mitros, KARV, DOL, DTTN, UNITN, POLITO, OBF, NANO, AIGUASOL SAEST
Úkol 1.1 (T1.1) Zahájení projektu: M1-M3. Vedoucí úkolu: NTNU
Zorganizování úvodní schůzky a revidování celkového plánu projektu včetně přiřazení jednotlivých rolí, odpovědností a zdrojů. Stanovení časového harmonogramu projektu a popisy jednotlivých dodávek. To bude dohodnuto se všemi partnery na zahajovacím setkání.

Úkol 1.2 (T1.2) Řízení projektu M1-M48. Vedoucí úkolu: NTNU; účastníci: Všichni
Tento úkol zajistí monitorování- a kontrolu průběhu projektu a komunikaci. Bude řídit administrativní a smluvní vztahy konsorcia a s Evropskou komisí. Řízení se skládá ze:
• Zajištění kontaktu s Komisí EU prostřednictvím kontaktů s projektovými poradci a úředníky, včetně pravidelných zpráv o pokroku a reakcí na případné administrativní nebo technické požadavky Komise.
• Vypracování dohody o konsorciu, zajištění kontroly rozpočtu, žádostí o proplacení nákladů, právních, finančních, administrativních a a různých dalších úkolů souvisejících s řízením smluv.
• Zajištění informačního toku v rámci konsorcia, koordinace technických činností a kontroly klíčových bodů.
•Dohled nad etickými otázkami, které by mohly být v projektu relevantní.
•Tvorba závěrečných zpráv o projektu.
The PMT vytvoří projektovou platformu MS Teams pro každodenní komunikaci a kontrolu dokumentů. PMT bude organizovat pravidelné telekonference s konsorciem, na kterých se bude diskutovat o probíhajících pracích, milnících, výsledcích atd. PMT je rovněž zodpovědný za pravidelnou komunikaci s agenturou INEA a za informování projektového manažera o veškerém aktuálním vývoji. Předpokládá se následující struktura schůzek:
Osobní schůzky o pokroku budou naplánovány minimálně jednou ročně, přičemž každých šest měsíců se budou konat průběžné schůzky, na kterých se bude jednat o pokroku, buď prostřednictvím elektronických komunikačních prostředků, nebo osobním setkáním. (Předběžný harmonogram těchto projektových akcí je stanoven na měsíce 6, 12, 18, 24, 30, 36, 42).

• Závěrečné setkání (47. měsíc): Monitorování plnění celého pracovního programu a kvality výsledků dosažených v rámci projektu během jeho trvání na základě obecných cílů návrhu projektu.

• Další internetové telekonference a schůzky se budou konat „ad hoc “(jen pro tento případ)za účelem: i) řešení otázek, které mohou
vzniknout ii) zajistit společné směřování výzkumu a inovací v rámci projektu; iii) minimalizování cestovních nákladů.
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T Úkol 1.3 (T1.3) Řízení inovací. M1-M48. Vedoucí úkolu: NTNU - manažer inovací, účastníci: Demo
Vedoucí, vedoucí pracovních balíčků
V rámci tohoto úkolu budou registrovány a vykazovány inovace z demonstračních projektů a inovačních klastrů s cílem realizovat potenciál pro rozšiřování a komercializaci inovací ARV. Úkol zajistí diskuse se všemi zástupci pilotních projektů a partnery. Rada pro inovace se bude pravidelně setkávat s Radou pro využívání ARV, aby bylo možné zajistit včasnou identifikaci a rozšiřování komerčně životaschopných inovací. Řízení inovací je důležité pro zajištění úspěchu při uvádění nápadů/inovací na vyšší stupeň TRL škály a jejich přijetí. Zabývá se opatřeními na podporu inovací v organizacích a jejich případným uvedením na širší trh. Úkol bude:
• Rozvíjet nejlepší prostředí pro inovace(interní).
• Pravidelně aktualizovat celkový Ganttův diagram projektu a matici zdrojů.
• Vytvořit společný přístup k tomu, co jsou inovace a jak s nimi pracovat v rámci ARV.
• Vyvinout nástroj pro registraci, sledování a vykazování inovací, např. pro podporu informovaného rozhodování o budoucích investicích.
• Analyzovat nahlášené nápady včetně náležité kontroly vlastnických a uživatelských práv a předpisů v příslušných smlouvách: Zpráva o stavu techniky a patentovatelnosti a patentování nebo jiná ochrana práv IPR.
• Vypracování strategie komercializace na základě analýzy technologie, trhu, partnerů, obchodního modelu, týmu a financování:
- Rozvoj podnikání a případné založení škálovatelné spin-off společnosti - vedení projektu komerčního testování, ověřování a výroby prototypů.
- Identifikace potenciálních nabyvatelů licencí a vyjednávání licenčních smluv na základě standardů NTNU.
- V případě potřeby uzavřít meziinstitucionální dohody s dalšími projektovými partnery o komercializaci.
• Posunout všechny inovace ARV alespoň o jeden stupeň na stupnici TRL a do konce projektového období dosáhnout TRL 7/8.
Pro sladění výsledků a očekávaných inovací projektu ARV a činností v pracovních skupinách poskytne každý vedoucí demonstračního projektu (DPL) přehled společných výzev, příležitostí, znalostí a otázek pro výměnu pro každou pracovní skupinu. Každý vedoucí pracovního balíčku poskytne plány pro výměnu a aktivity spolupráce s demo projekty, aby se vytvořil rámec spolupráce, který podpoří inovační klastry. Tento proces bude probíhat postupně:
• Následují schůzky „peer-2-peer “nebo „expert-2-peer “na konkrétní témata, která jsou důležitá pro demonstrační weby.
• Následovat budou osobní workshopy nebo návštěvy na stránkách, kde bude možné hlouběji proniknout do obsahu.
• Následovat budou společné publikace a/nebo zprávy, které skutečně upevní vyměněné poznatky.
DPL a WPL budou čtvrtletně podávat manažerovi pro inovace (IM) zprávy o postupu prací na pracovních skupinách a demo projektech, o stavu inovací, dodržování plánování a jeho aktualizaci, o případných problémech a jejich možném řešení. To pomůže IM sledovat stav demo projektu a vztahy pracovních balíčků, aby mohl projekt kontrolovat, přijímat včasná opatření a pravidelně aktualizovat celkový Ganttův diagram projektu a matici zdrojů.
Úkol 1.4 (T.1.4) Zajištění kvality: M1-M48. Vedoucí úkolu: NTNU, účastníci: Všichni
PMT vypracuje komplexní plán zajištění kvality (QAP) v úzké spolupráci s vedoucími pracovních balíčků. Ten bude zahrnovat standardní proces interního přezkoumání všech výstupů v rámci projektu, aby bylo zajištěno udržení standardu kvality projektu ARV. Pokud jde o podávání zpráv, bude PMT udržovat přehled o termínech a pokroku. Může partnerům připomínat jejich povinnosti a vyžadovat od vedoucích pracovních balíčků zprávy o pokroku. PMT ověří, zda jsou všechny dokumenty úplné a správné před jejich předložením EK. PMT bude sledovat pokrok v projektových činnostech se zaměřením na:
• Metodu práce a integraci partnerství zajišťující skutečné a včasné provádění činností;
• Interní komunikaci s využitím platforem popsaných v úkolu 1.2;
• Kontrolu nákladů, včas odhalit případy možného překročení a poskytnout alternativní řešení;
• Na produkci výstupů projektu a jejich kvalitu;
• Na seznam akcí vypracovaném na konci každé projektové schůzky.
Úkol 1.5 (T.1.5) Řízení rizik: M1-M48. Vedoucí úkolu: NTNU, účastníci: Všichni
Aktualizujte tabulku rizik uvedenou v oddíle 3.2 při každém šestiměsíčním přezkoumání postupu prací. Stávající rizika budou analyzována a v případě potřeby bude upraveno hodnocení jejich pravděpodobnosti a závažnosti, pokud některé riziko přesáhne střední úroveň, budou zavedena zmírňující opatření, aby se toto riziko vrátilo na nižší úroveň. Plán řízení rizik (RMP) bude každoročně aktualizován.
Úkol 1.6: Správa právních předpisů, znalostí a dat: M1-M48. Vedoucí úkolu: NTNU, účastníci: Všichni

V rámci tohoto úkolu se budou řídit všechny otázky týkající se práv duševního vlastnictví a vytvoří se plány právního řízení a řízení znalostí a dat, které se budou každoročně aktualizovat. Data vytvořená v rámci projektu budou „nalezitelná, přístupná, interoperabilní a opakovaně použitelná (FAIR)“ v souladu s pokyny H2020 pro správu dat FAIR. Konsorcium poskytne otevřená data, která vznikla v rámci projektu, na podporu srovnávání, šíření a využívání, zlepšení přístupu k datům vytvořeným v rámci projektu a jejich opakovanému použití a sdílení znalostí s občany a dalšími zúčastněnými stranami. Bude zřízen soukromý portál, kde budou všichni partneři projektu podávat zprávy o pokroku a nahrávat příslušné výsledky projektu. V rámci T1.6 budou rovněž analyzovány a popsány aspekty související s GDPR, daty a kybernetickou bezpečností a vykazováním/zásobováním stávajících databází EU (např. observatoř EU pro sledování stavu budov). Úkol bude prováděn v úzké spolupráci se všemi pracovními skupinami, zejména však s pracovními skupinami 7 a 8.

Účast na jednoho partnera

Číslo a zkrácený název partnera	Úsilí pracovního balíčku 1
1 - NTNU	77.00
2 - ACE	4.00
3 - ČVUT	7.00
4 - DTU	4.00
5 - DANFOSS A/S	1.00
6 - ENFOR	1.00
7 - PROJECTZERO	7.00
8 - EURAC	2.00
9 - SINTEF	4.00
10 - PALMA	7.00
11 - IBAVI	1.00
12 - IREC	4.00
13 - MET	1.00
14 - UAS Utrecht	10.00
15 - HOUSING EUROPE	1.00
16 - Buro de Haan	0.50
17 - Center Denmark	1.00
18 - SAB	1.00
19 - GDFA	4.00
20 - BOEX	1.00
21 - Rc Panels B.V.	0.50
22 - UU	1.00
23 - CITY OF UTRECHT	1.00
24 - BOSGROEP	1.00
25 - iwell	1.00
26 - MEX	1.00
27 - Mitros	1.00
28 - KARV	1.00
29 - DOL	1.00

Číslo a zkrácený název partnera	Úsilí pracovního balíčku 1
30 - DTTN	2.50
Armalam	1.50
31 - UNITN	1.00
32 - POLITO	1.00
33 - OBF	7.00
34 - NANO	1.00
35 - AIGUASOL SAEST	1.00
Celkem	162.00

Seznam dodávek

Číslo dodávky[14]	Název dodávky	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D1.1	Plán konsorcia	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	3
D1.2	Zpráva o pokroku	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	12
D1.3	Plán řízení inovací	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	6
D1.4	Zprávy o pokroku v oblasti inovací projektu (každoročně)	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	12
D1.5	Plán zajištění kvality (QAP)	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	3
D1.6	Plán řízení rizik	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	3
D1.7	Plán řízení práv a znalostí	1 - NTNU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	3
D1.8	ARV Data Management, DMP	1 - NTNU	Pilotní studie a průzkum (ORDP)	Důvěrné, pouze pro členy konsorcia (včetně Komise)	6

D1.1: Plán konsorcia [3] zajistí monitorování a kontrolu průběhu projektu a komunikaci. Bude řídit administrativní a smluvní vztahy konsorcia a Evropské komise. Plán konsorcia pro projekt, včetně podrobného rozdělení rolí, odpovědností a zdrojů, harmonogramu projektu a popisu jednotlivých výstupů, které mají být vytvořeny.

D1.2 : Zpráva o pokroku [12]

Krátká průběžná zpráva o stavu projektu Revize; M12, 24, 36 a 48

D1.3 : Plán řízení inovací [6] inovace z demonstračních projektů a inovačních klastrů budou registrovány a vykazovány s cílem realizovat potenciál pro rozšiřování a komercializaci inovací ARV Revize plánované pro M18, M30, M42

D1.4 : Zprávy o pokroku v oblasti inovací projektu (každoročně) [12] inovace z demonstračních projektů a inovačních klastrů budou evidovány a vykazovány s cílem realizovat potenciál pro rozšiřování a komercializaci inovací ARV. Revize v, M24, M36, M48

D1.5 : Plán zajištění kvality (QAP) [3]

PMT vypracuje komplexní plán zajištění kvality (QAP) v úzké spolupráci s vedoucími pracovních balíčků. Ten bude zahrnovat standardní proces interního přezkumu všech výstupů v rámci projektu, aby bylo zajištěno udržení standardu kvality projektu ARV. Revize v: M3, M15, M27, M39

D1.6 : Plán řízení rizik [3]

Aktualizujte tabulku rizik uvedenou v sekci 3.2 při každé šestiměsíční kontrole pokroku. Stávající rizika budou analyzována a v případě potřeby bude upraveno hodnocení jejich pravděpodobnosti a závažnosti; pokud některé riziko přesáhne střední úroveň, budou zavedena zmírňující opatření, aby se toto riziko vrátilo na nižší úroveň. Plán řízení rizik (RMP) bude každoročně aktualizován Revize M15, M27, M39

D1.7 : Plán řízení práv a znalostí [3]

Řídit všechny záležitosti týkající se práv IPR a vytvořit plány právního řízení, řízení znalostí a řízení dat, které se budou každoročně aktualizovat. Data vytvořená v rámci projektu budou "nalezitelná, přístupná, interoperabilní a opakovaně použitelná (FAIR)" v souladu s pokyny H2020 pro správu dat FAIR v revizích M15, M27, M39.

D1.8 : ARV Data Management Plan DMP [6] řídí všechny otázky týkající se práv IPR a vytváří plány řízení práv, znalostní a správy dat, které se každoročně aktualizují. Data vytvořená v rámci projektu budou "nalezitelná, přístupná, interoperabilní a opakovaně použitelná (FAIR)" v souladu s pokyny H2020 pro správu dat FAIR Revize v, M18, M30, M42.

Harmonogram důležitých milníků

Číslo milníku[18]	Název milníku	Příjemce	Datum splatnosti (v měs.)	Způsoby ověření
MS1	Zahájení projektu	1 - NTNU	3	CA & Minutes of KOM

Číslo pracovního balíčku[9]	WP2	**Příjemce**[10]	12 - IREC
Název pracovního balíčku	Rámec a nástroje pro efektivní provádění a hodnocení CPCC		
Začátek měsíce	1	**Ukončení měsíce**	48

Cíle

Cílem WP 2 je zdokonalit, zavést a otestovat metody a nástroje pro efektivní návrh, implementaci a hodnocení CPCC. Pracovní skupina vytvoří společný multikriteriální rámec pro integrované posuzování a hodnocení CPCC, který se bude používat v různých fázích plánování, navrhování, výstavby a provozu různých demonstrací v rámci projektu v úzké spolupráci s pracovní skupinou WP8. Specifické cíle pracovní skupiny zahrnují:

- Definovat, integrovat a rozšířit již dostupné rámce hodnocení pro čtvrti s nulovou spotřebou energie / nulovými emisemi na základě vícerozměrné perspektivy, aby bylo možné charakterizovat dopad CPCC a zlepšit integraci chybějících aspektů, jako je cirkularita a celková kvalita při renovaci / nové výstavbě na úrovni okresních projektů.
- Sladění rámce hodnocení CPCC a jeho klíčových ukazatelů výkonnosti KPI, které budou testovány a ověřovány prostřednictvím různých demonstrací v ARV a zavedeny do monitorovacích postupů (WP8).
- Přizpůsobení metod a nástrojů pro modelování a hodnocení dopadu stávajících a plánovaných CPCC z vícerozměrné a holistické perspektivy. To zahrnuje využití georeferencovaných městských datových souborů založených na GIS, modelů ve více měřítcích a technik společné simulace, které jsou připraveny k integraci do digitálních dvojčat okresu.
- Testování metod a nástrojů při navrhování, provádění a hodnocení hlavních intervencí na demonstračních webech: V rámci demonstračního projektu byly provedeny akce rozsáhlé modernizace a realizace občanských energetických komunit v CPCC.
- Integrace virtuální reality / rozšířené reality a prostředí propojených s výsledky hodnotících nástrojů a/nebo s údaji z živých senzorů, aby se dosáhlo účinné komunikace s různými zúčastněnými stranami CPCC. V souvislosti s integrovanou strategií v Living Labs (WP3) budou prostředí virtuální reality testována v rámci činností usnadňujících sociální inovace, podporujících vzdělávání a odbornou přípravu v oblasti udržitelnosti. Očekávaným dopadem pracovního balíčku 2 je prokázat, že použití a přijetí simulačních a hodnotících nástrojů v jasném a zavedeném hodnotícím rámci jsou klíčovými aspekty pro účinné a urychlené přijetí CPCC tím, že zjednodušují a pomáhají při rozhodování v integrovaných procesech navrhování a zároveň propojují příslušné zúčastněné strany (tvůrci politik, finanční orgány, průmyslové, regulační orgány atd.) a občany v rámci přístupu zaměřeného na člověka.

Popis práce a role partnerů

WP2 - Rámec a nástroje pro efektivní provádění a hodnocení CPCC [Months: 1-48]
IREC, NTNU, ACE, ČVUT, DTU, PROJECTZERO, EURAC, SINTEF, PALMA, IBAVI, UAS Utrecht, HOUSING EUROPE, Center Denmark, KARV, DTTN, OBF, AIGUASOL SAEST
Úkol 2.1 (T2.1). Inovační fórum pro WP2: M1-M48. Vedoucí úkolu: IREC; Účastníci: PALMA, HU, OBF, NTNU, ČVUT, DTTN, PZ, EURAC.
Cílem tohoto úkolu je podpořit implementaci hodnotícího rámce CPCC a hodnotících nástrojů na úrovni komunit/okresů v rámci demo projektů. Fórum bude fungovat jako spojovací uzel mezi technickými partnery, kteří testují a ověřují inovace v rámci WP2, a vývojáři demo projektů, aby se zlepšilo využití v rámci inovačních klastrů. Úkol 2.1 zajistí účinnou spolupráci mezi různými inovačními klastry v rámci demonstračních projektů s cílem vzájemného učení a zpětné vazby mezi demonstračními projekty a pracovními balíčky. Práce bude zahrnovat inovační workshopy mezi demo projekty a výsledky budou uvedeny a začleněny jako součást zprávy o inovacích (D1.4) v rámci WP1. Úkol 2.2 (T2.2). Rámec pro hodnocení klimaticky pozitivních cirkulárních komunit: M1 - M48. Vedoucí úkolu: Mgr: IREC; Účastníci: PALMA, IBAVI, NTNU, ČVUT, Housing Europe, AIGUA, ČVUT, EURAC, HU, ACE, KARV, PZ, OBF.
Na základě již existujících prací pro čtvrti s nulovými emisemi, udržitelné čtvrti s vyšší spotřebou energie, čtvrti a města s pozitivní energií bude definován rozšířený hodnotící rámec, který bude zohledňovat vícerozměrnou perspektivu a charakterizovat dopad CPCC. Hlavními kategoriemi, které budou v rámci CPCC zohledněny, jsou energie, životní prostředí, ekonomika, blahobyt, sociální aspekty, chytrost a cirkulárnost, přičemž budou řešeny aspekty na úrovni budov i čtvrtí.

Úkol 2.2 vytvoří společný výchozí bod pro ARV, který spojí hlavní zúčastněné strany z demonstračních webů a odborné partnery v konsorciu, aby společně připravili a definovali jasný rámec se specifikací řešených cílů udržitelného rozvoje SDGs, úrovní ambicí, okrajových podmínek a klíčových ukazatelů výkonnosti pro CPCC. V rámci budou navrženy konkrétní klíčové ukazatele výkonnosti a metriky pro hodnocení každé tematické oblasti, které podpoří realizaci CPCC v průběhu celého životního cyklu, od návrhu přes realizaci až po provoz. Práce bude úzce propojena s pracovním okruhem WP8, kde budou KPI definované v úkolu 2.2 základem pro definování specifikace a pokynů pro monitorování vlivu CPPC.

Tento úkol bude mít nejintenzivnější pracovní náplň během prvního roku projektu ARV, ale bude sledovat vývoj demo projektů, aby bylo možné sledovat, jak je rámec implementován a používán v demoverzích. To bude prováděno na každoročních workshopech a prostřednictvím následných dotazníků ve spolupráci s WP8. Předběžná verze hodnotícího rámce bude v M6 projektu předložena vývojářům demonstračních projektů, aby se shromáždila jejich zpětná vazba a dopracovala se konečná verze. Řada klíčových ukazatelů výkonnosti bude hodnocena na všech demonstračních webech, zatímco soubor dalších bude záviset na demonstračním webu. Na základě testování (WP8) a získaných zkušeností bude WP2 v průběhu projektu ARV revidovat a vylepšovat rámec. Tento kontinuální proces povede na konci projektu k dobře osvědčenému, validovanému a konzistentnímu rámci.

Úkol 2.3 (T2.3). Použití a testování nástrojů pro rozsáhlé modernizační akce v CPCC: M4 - M46. Vedoucí úkolu: IREC; Účastníci: PALMA, DTU, CenterDenmark, NTNU.

Cílem tohoto úkolu je zdokonalit a přizpůsobit nástroje pro simulaci okresní energetiky, aby bylo možné účinně plánovat, navrhovat a analyzovat rozsáhlé modernizace zastavěného prostředí a jejich dopad na úrovni okresů. Nástroje integrují různé strategie modelování fondu budov a nových staveb v okrese, založené na využití archetypů budov prostřednictvím různých přístupů, jako jsou podrobné modely bílé skříňky; modely šedé skříňky, modely založené na datech atd. a dostupnosti dat v měřítku města, např. dat založených na GIS. Spolupráce a koordinace bude navázána s WP4, kde budou vytvořeny nástroje BIM a digitální dvojčata (archetypy a formát CityGML) konkrétních budov v demonstračních webech. Konkrétní koordinační akce pro vzájemné učení budou zavedeny s úkolem 5.2 (WP5), kde se budou používat digitální metody v předvýrobním pracovním postupu. Budou integrovány metody a algoritmy pro výpočet příslušných klíčových ukazatelů výkonnosti na základě výsledků úkolu 2.2, které poskytnou technicko-sociálně-ekonomické výstupy. Bude navázána spolupráce s WP8 s cílem začlenit výsledky analýzy vedlejších přínosů do procesů renovace. Hlavním cílem využití těchto nástrojů je přijímat informovaná rozhodnutí a ukázat jejich užitečnost pro urychlení renovace stavebního fondu ve městech. Budou zaznamenány případy použití, které usnadní replikovatelnost v jiných prostředích v měřítku EU.

Podúkol 2.3.1 Inovativní metody a nástroje pro rozsáhlé modernizační akce v demoverzi Palmy de Mallorca: Testování metod a nástrojů pro technicko-sociálně-ekonomické hodnocení a implementaci obchodních modelů partnerství veřejného a soukromého sektoru pro rozsáhlé renovace v inovační čtvrti Llevant (oblast La Soledat Sud). Bude sloužit jako zkušební platforma pro hodnocení uhlíkové stopy při modernizaci stavebního fondu v městských plánech, jak je stanoveno v průkopnickém zákoně o změně klimatu a přechodu na energii na Baleárských ostrovech. Metodika bude testována ručně ve všech krocích procesu renovace od počátečních kroků plánování až po analýzu provozu a užívání po renovaci.

Podúkol 2.3.2 Inovativní metody a nástroje pro rozsáhlé modernizační akce v demonstrační verzi Sønderborgu:

V rámci projektu budou vytvořeny modely reprezentativních archetypů budov v síti dálkového vytápění s využitím různých modelovacích přístupů, tj. s využitím dostupných údajů z měřičů tepla pro modely založené na datech, nebo modely šedé skříňky a pro všechny budovy bez dostatečných údajů budou vytvořeny modely bílé skříňky. Tyto modely budov budou integrovány s modelem sítě dálkového vytápění, aby bylo možné identifikovat budovy, jejichž modernizace má velký vliv na energetickou účinnost celého energetického systému. U identifikovaných budov budou zkoumány různé možnosti modernizace s cílem optimalizovat nákladovou efektivitu.

Úkol 2.4 (T2.4). Využití a testování nástrojů pro implementaci občanských energetických společenství v CPCC. M7 - M42. Vedoucí úkolu: IREC; Účastníci: PALMA, ČVUT, AIGUA.

Cílem tohoto úkolu je integrovat stávající metody a nástroje pro vyhodnocování místní výroby energie z OZE v městském prostředí s využitím volných ploch ve veřejných budovách a na veřejných prostranstvích a propojit je s individuální a agregovanou spotřebou energie účastníků občanských energetických komunit. Přestože směrnice (EU) 2019/944 umožnila vznik Občanských energetických společenství (CEC), chybí integrované nástroje, které by se používaly při plánování, výběru, navrhování, realizaci a vyhodnocování nových Místních energetických společenství a společenství OZE. V rámci ARV budou testovány nástroje pro rozhodování, které integrují dostupné informace v městském měřítku, modely pro místní výrobu OZE a odhadují spotřebu energie potenciálních účastníků CEC. Metoda a nástroje by měly být schopny vypočítat výrobu z fotovoltaických a bipolárních zdrojů, energetickou poptávku komunity a měly by být přizpůsobeny kontextu místní regulace a různým aspektům správy a finančním modelům. Metody a nástroje budou testovány a ověřovány v reálném prostředí v rámci demo projektů s cílem vyhodnotit energetické a ekonomické aspekty různých obchodních modelů (WP9) strategií energetické flexibility (WP7), které povedou k optimalizaci ekonomických a environmentálních aspektů a zapojení občanů v dané oblasti jako účastníků CEC.

Podúkol 2.4.1 Inovativní metody a nástroje pro implementaci CEC v demonstračním projektu Palma de Mallorca:

Použití nástroje pro technicko-sociálně-ekonomické posouzení implementace CEC a soukromých inovativních mechanismů financovaných davem za účelem výroby obnovitelné energie na dostupných veřejných střechách v oblasti, např. školách a dalších veřejných budovách.

Podúkol 2.4.2 Inovativní metody a nástroje pro implementaci CEC v demonstračním projektu v Karviné:

ČVUT bude spolupracovat s městem Karviná, které pracuje na rámci Pozitivní energie. Provedení studie solárního potenciálu budovy ve vlastnictví obce pomocí 3D modelování v programu Rhino s nástroji Ladybug Tools & Radiance pro přesnější analýzy. Studie bude zahrnovat ekonomické a technické parametry s vizualizacemi.

Úkol 2.5 (T2.5) Virtuální vizualizační prostředí pro školení projektantů a informovanost občanů: M4 - M48. Vedoucí úkolu: SINTEF; Účastníci: IREC, PALMA, OBF

Cílem tohoto úkolu je prozkoumat, integrovat a použít různé 3D a/nebo vizualizační techniky virtuální reality (VR) a/nebo rozšířené reality (AR) pro případy použití výsledků v úkolu 2.3 a 2.4. Cílem je lépe zprostředkovat výsledky analýzy různých scénářů různým typům zúčastněných stran a usnadnit zapojení občanů. Vzhledem k tomu, že vývoj aplikací VR a AR může být zaměřen na několik různých zúčastněných stran, jako jsou plánovači měst a tvůrci politik až po školáky a koncové uživatele, budou identifikovány různé skupiny uživatelů a externí zúčastněné strany. Rozhodnutí o technickém aspektu vývoje aplikace bude přijato tak, aby bylo co nejlépe dosaženo cílů šíření pro každou skupinu uživatelů/zúčastněných stran. To zahrnuje: (1) definování, zda je pro konkrétní skupinu/cíl vyžadován přístup VR nebo AR a zda je vyžadována kompatibilita s desktopem; (2) definování a návrh metody lokomoce ve světě VR; (3) definování návrhu interakce; (4) definování a návrh přístupu k navádění uživatele pro navigaci ve virtuálním modelu nebo fyzickém světě na základě cílů šíření a (5) definování a návrh vizualizace dat výsledků renovace a všech živých datových toků ze senzorů na základě cílů šíření. Návrh a implementace bude zahrnovat přístup zaměřený na uživatele v prostředí živé laboratoře. Prostředí VR/AR jsou plánována jako nedílná součást celkové metodiky Living Labs LLs (úkol 3.2) a budou aplikována ve vhodných ukázkách/kontextech (úkol 3.3). Implementace aplikací AR/VR bude probíhat v souvislosti s aktivitami úkolu 3.4. Formát a dostupnost modelů BIM, laserových skenů, digitálních dvojčat a všech dostupných živých datových toků ze senzorů určí technické možnosti a omezení pro vývoj aplikací. Tento úkol úzce souvisí s pracovním okruhem WP5, úkolem 5.2 a úkoly 2.3 a 2.4.

Podúkol 2.5.1 Inovativní prostředí AR/VR v demonstrační verzi Palma de Mallorca.

3D prostředí virtuální reality / digitální dvojče inovační čtvrti Llevant Inovace Llevant pomocí integrace s herním systémem Unreal pro vytvoření interaktivní vizualizace a zážitků na základě 3D dat města v souvislosti s aktivitami Living Lab v rámci WP3. Propojení s daty a výsledky úkolu 2.3 a úkolu 2.4 v Palmě.

Podúkol 2.5.2 Inovativní prostředí AR/VR v demonstrační verzi Osla.

Využití nástrojů a prostředí AR/VR v souvislosti s aktivitami Living Lab v rámci WP3. Použití těchto nástrojů zajistí 1) integraci různých zúčastněných stran zapojených do vývoje dema Osla a 2) zjednoduší plánování CPPC.

Účast na jednoho partnera	
Číslo a zkrácený název partnera	**Úsilí pracovního balíčku 2**
1 - NTNU	9.00
2 - ACE	1.00
3 - ČVUT	6.50
4 - DTU	16.00
7 - PROJECTZERO	3.00
8 - EURAC	3.00
9 - SINTEF	12.00
10 - PALMA	47.00
11 - IBAVI	3.00
12 - IREC	67.00
14 - UAS Utrecht	3.00
15 - HOUSING EUROPE	1.00
17 - Center Denmark	4.00

Číslo a zkrácený název partnera	Úsilí pracovního balíčku 2
28 - KARV	2.00
30 - DTTN	3.50
33 - OBF	7.00
35 - AIGUASOL SAEST	9.50
Celkem	197.50

Seznam dodávek

Číslo dodávky[14]	Název dodávky	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D2.1	Rámec pro hodnocení CPCC	12 - IREC	Zpráva	Veřejné	9
D2.2	Popis metod a nástrojů pro dodatečné vybavení v rámci CPCC	4 - DTU	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	18
D2.3	Popis metod a nástrojů pro dodatečné vybavení v rámci CPCC	12 - IREC	Zpráva	Důvěrné, pouze pro členy konsorcia (včetně Komise)	15
D2.4	Aplikace nástrojů pro dodatečné vybavení. Dle pokynů za účelem replikovatelnosti.	12 - IREC	Zpráva	Veřejné	46
D2.5	Aplikace nástrojů pro implementaci "Občanského energetického společenství". Dle pokynů za účelem replikovatelnosti	12 - IREC	Zpráva	Veřejné	42
D2.6	Demonstrační ukázky prostředí virtuální reality	9 - SINTEF	Předváděcí model	Veřejné	36
D2.7	Popis a učinění závěrů z informačních školení z virtuálního prostředí.	9 - SINTEF	Zpráva	Veřejné	48
D2.8	Vytvoření rámce pro zhodnocení CPCC. Aktualizovaná verze.	12 - IREC	Zpráva	Veřejné	48

Popis dodávek

D2.1 : Rámec pro hodnocení CPCC [9]
bude definován hodnotící rámec s ohledem na vícerozměrnou perspektivu, aby bylo možné charakterizovat vliv CPCC. Hlavními kategoriemi, které budou v rámci CPCC zohledněny, jsou energie, životní prostředí, ekonomika, blahobyt, sociální aspekty, chytrost a cirkularita, přičemž budou řešeny aspekty na úrovni budov i sousedství.

D2.2 : Popis metod a nástrojů pro dodatečné vybavení v rámci CPCC [18]

Tento dodatek bude obsahovat zprávu o tom, jak zlepšit a přizpůsobit nástroje pro simulaci okresní energetiky, aby bylo možné účinně plánovat, navrhovat a analyzovat rozsáhlé modernizace zastavěného prostředí a jejich dopad na úrovni okresů.

D2.3 : Popis metod a nástrojů pro dodatečné vybavení v rámci CPCC [15]

Jak zlepšit a přizpůsobit nástroje pro simulaci okresní energetiky, aby bylo možné účinně plánovat, navrhovat a analyzovat rozsáhlé modernizace zastavěného prostředí a jejich dopad na úrovni okresu. Nástroje integrují různé strategie modelování fondu budov a nových staveb v okrsku, založené na využití archetypů budov prostřednictvím různých přístupů.

D2.4 : Aplikace nástrojů pro dodatečné vybavení. Dle pokynů za účelem replikovatelnosti. [46]

Použití metodiky uvedené v části D2.3. Zprávy ve formě pokynů pro replikovatelnost

D2.5 : Aplikace nástrojů pro implementaci „Občanského energetického společenství“. Dle pokynů za účelem replikovatelnosti [42]

Dodávka prezentující zkušenosti s integrací stávajících metod a nástrojů pro hodnocení místní výroby energie z OZE v městském prostředí s využitím volných ploch ve veřejných budovách a na veřejných prostranstvích a propojení s individuální a agregovanou spotřebou energie účastníků občanských energetických komunit.

D2.6 : Demonstrační ukázky prostředí virtuální reality [36] integruje a používá různé 3D a/nebo vizualizační techniky virtuální reality (VR) a/nebo rozšířené reality (AR) pro případy použití výsledků v úkolu 2.3 a 2.4. Cílem je lépe zprostředkovat výsledky analýzy různých scénářů různým typům zúčastněných stran a usnadnit zapojení občanů.

D2.7 : Popis a učinění závěrů z informačních školení z virtuálního prostředí. [48]

3D prostředí virtuální reality / digitální dvojče bude testováno a Palma Demo a) integrace různých zúčastněných stran zapojených do vývoje Osla demo. Tento výstup se zaměří na to, jak zjednodušit plánování CPPC.

D2.8 : Vytvoření rámce pro zhodnocení CPCC. Aktualizovaná verze. [48]

Viz popis dodávky 2.1

Harmonogram relevantních milníků

číslo milníku[18]	**Název milníku**	**Příjemce**	**Datum splatnosti (v měs.)**	**Způsoby ověření**
MS2	Rámec hodnocení ARV	12 - IREC	9	Vymezení rámce hodnocení
MS3	Implementace nástrojů	12 - IREC	15	Zahájení implementace nástrojů pro rozsáhlé modernizační akce
MS4	Prostředí virtuální reality	12 - IREC	36	Použitá a implementovaná prostředí virtuální reality

Číslo pracovního balíčku[9]	WP3	**Příjemce**[10]	9 - SINTEF
Název pracovního balíčku	Zapojení komunity, životní prostředí a dobré životní podmínky		
Začátek měsíce	1	**Ukončení měsíce**	48

Cíle

Cílem pracovního balíčku 3 je podpořit aktivní zapojení občanů do procesů udržitelné přeměny sousedství. Je nezbytné zaměřit se na kompetence a zkušenosti občanů a zajistit jejich aktivní zapojení do tvorby plánů pro budovy a čtvrti, které snižují energetickou náročnost a zvyšují energeticky účinné chování. Aktivní a explicitní zapojení občanů a zpětná vazba jsou často chybějícím krokem na cestě k udržitelné transformaci sousedství. Přístupy „živých laboratoří" (Living labs, LL) jsou známé tím, že zapojují skupiny více zúčastněných stran v reálném prostředí. Živá laboratoř je inovační prostředí, kde se nová řešení navrhují a testují společně s uživateli, čímž se překlenuje propast mezi sociálním a technickým kontextem a uplatňuje se přístup zaměřený na uživatele a využívající více metod. ARV LL budou vytvořeny se zapojením různých pohledů na roli občana - např. občané jako uživatelé budov, občané jako obyvatelé CPCC, občané jako zelení ambasadoři. Pracovní skupina 3 se zaměří na zlepšení metod zapojení občanů, přičemž bude věnovat pozornost časové a finanční náročnosti, snížení nedostatečného zastoupení a pochopení tichých a skrytých potřeb občanů. Očekává se, že výsledek většího zapojení občanů bude mít pozitivní dopad na jejich spokojenost a pohodu a zajistí, že energeticky účinné chování se stane pevnou součástí každodenního života.

Pracovní balíček 3 zahrnuje tyto cíle:
- Plánování a vypracování celkové metodiky pro demonstrační projekty za účelem vytvoření a provozování komunitních aktivit a živých laboratoří.
- Pracovní balíček se zaměřuje na obyvatele transformačních projektů všech věkových kategorií, ale zvláštní důraz bude kladen na zapojení a posílení mladých občanů jako zástupců budoucích generací a na zapojení škol na demonstračních místech.
- Nabízet vzdělávání a školení o snižování energetické náročnosti a podporovat energeticky účinné chování.
- Vytvořit LL se dvěma tematickými zaměřeními: sociální inovace a energetická transformace.
- Zapojit občany v různých rolích a v různých fázích rozhodovacích procesů.
- Shromáždit kvalitativní a kvantitativní údaje o přístupech k celoživotnímu učení a příslušných nástrojích a metodách zapojení občanů.
- Zachycení zpětné vazby a poznatků z CPCC Living Labs. Identifikovat a klasifikovat relevantní metody, nástroje a procesy zapojení občanů podle časové a finanční náročnosti, úrovně inkluzivity a potenciálu odhalit tiché úrovně zkušeností a skryté potřeby obyvatel, kteří preferují využívání budovy a okolí.
- Posoudit překážky a podněty pro zapojení občanů do renovačních procesů.
- Prokázat potenciál pro replikaci a rozšíření nástrojů pro zapojení občanů do budoucích projektů.

Popis práce a role partnerů

WP3 - Zapojení komunity, životní prostředí a dobré životní podmínky [Měsíce: 1-48]
SINTEF, NTNU, ACE, ČVUT, PROJECTZERO, EURAC, PALMA, IREC, MET, UAS Utrecht, HOUSING EUROPE, Center Denmark, SAB, GDFA, BOEX, CITY OF UTRECHT, Mitros, KARV, DOL, DTTN, OBF Task3.1 (T3.1) Inovační fórum pro WP3. M1-48. Vedení úkolu: SINTEF, Partneři: ČVUT, PALMA, IREC, KARV, OBF, HU, EURAC, NTNU, PZ.
Cílem tohoto úkolu je koordinovat vývoj stručných a cenově dostupných nástrojů a pokynů pro zapojení občanů ve spolupráci s demo projekty a dalšími pracovními skupinami. Úkol T3.1 zajistí účinnou spolupráci mezi jednotlivými inovačními klastry v rámci demo projektů, čímž bude zajištěn cíl vzájemného učení a zpětnovazebních smyček mezi demo projekty a pracovními skupinami. Práce bude zahrnovat inovační workshopy mezi jednotlivými demonstračními projekty v rámci pracovní skupiny a zajistí spojení mezi demonstračními projekty. Výsledky budou uvedeny a začleněny jako součást zprávy o inovacích (D1.4) v rámci WP1.

Úkol 3.2 (T3.2) Naplánovat a vypracovat celkovou metodiku pro komunitní aktivity a živé laboratoře. M1-12. Vedoucí úkolu: SINTEF, Partneři: ČVUT, IREC, PALMA, EURAC, MET, SAB, Utrecht, Housing Europe, Center Denmark, NTNU, DTTN.
Cílem tohoto úkolu je vypracovat celkovou metodiku pro CPCC Živá laboratoř se zaměřením na sociální renovaci a energetickou transformaci. V rámci T3.2 zůstanou metody a nástroje otevřené, flexibilní a různorodé, ale s jasným zaměřením na opatření pro posílení zapojení místních uživatelů/občanů, zvyšování povědomí a učení. Metody a nástroje relevantní pro vývoj celkové metodiky:
- Fyzický HUB v okresech pro organizaci participačních procesů a poskytování obecných informací.

• Spoluvytváření workshopů (alespoň jeden na demonstrační projekt) zaměřených na různé segmenty zúčastněných stran, jako jsou starší lidé, rodiny, lidé postižení energetickou chudobou atd.
• Průzkumy před a po renovaci (s WP8 a Housing Europe)
• Šampioni pozitivní energie, soutěže, zelení ambasadoři, influenceři
• Deníky a blogy občanů (ACE)
• VR vizualizace různých scénářů renovace jako základ pro posouzení potřeb a spoluvytváření (s úkolem 2.5).
• Zasedání pro sdílení nápadů, metoda světové kavárny, deskové hry nebo podobně (fyzicky nebo/i online).
• Mentální mapování zahrnující a znázorňující znalosti, preference, požadavky a nápady občanů.
• Testování prototypových řešení v oblasti energetiky, zpětná vazba a iterace
• Systémy monitorování spotřeby energie v domácnostech a energetický koučink obyvatel.

Důležitým aspektem je úroveň odolnosti některých opatření proti koroně. Plánuje se hybridní přístup využívající jak digitální komunikační platformy a nástroje, tak i přístupy vyžadující fyzická setkání. Jako podklad pro plánování komunitních aktivit v živých laboratořích se provádí mapování zainteresovaných stran.

Úkol 3.3 (T3.3) Realizace komunitních aktivit a živých laboratoří. M6-36. Vedoucí úkolu: PALMA, Partneři: SINTEF, Utrecht, IREC, ČVUT, ACE, GDFA, PZ, NTNU, MET, SAB, BOEX, MITROS, KARV, OBF, DTTN, EURAC, Center Denmark.

Cílem tohoto úkolu je přizpůsobit metodiku živých laboratoří vyvinutou v sekci 3.2 místnímu, socioekonomickému a kulturnímu kontextu příslušné demonstrační verze. Zatímco LLs pro sociální renovaci se zaměří na zapojení komunity před renovací, během procesu návrhu a na inovativní řešení financování, LLs pro energetickou transformaci vytvoří fyzický prostor (HUB) a zaměří se na nová řešení týkající se energetické transformace a cirkulace (skladování, elektrická vozidla, obnovitelné zdroje, opětovné využití atd.), testování a iteraci inovativních a prototypových řešení, jakož i na energetické trénování obyvatel. T3.3 bude také úzce spolupracovat s úkolem 10.4.1 na koordinaci nezbytného školení zelených ambasadorů a na přípravě vhodných komunikačních materiálů pro cílovou skupinu. Každá ukázka provede sérii spolutvorných workshopů a komunitních aktivit souvisejících s jejich plánovanými inovacemi. Inovace týkající se tematických témat, kterými se budou zabývat LL, budou následující:

Podúkol 3.3.1 Inovace v Demo Oslo (OBF, SINTEF)

. Energetický přechod: Škola je jádrem norské demonstrační akce a bude sloužit jako HUB pro zapojení, angažovanost a výuku žáků o technologiích energetického přechodu a udržitelnosti. Součástí budovy bude demoprostor pro vzdělávání občanů a dětí se zaměřením na nové technologie, jako je skladování, elektrická vozidla, obnovitelné zdroje energie atd. Předpokládají se zde aktivity, jako jsou zelení ambasadoři a influenceři, kteří propagují energeticky účinné chování a oběhová řešení mezi svými vrstevníky, participativní metody, při nichž si hrají, zapojují, informují a vzdělávají se mladí lidé a jejich prostřednictvím také jejich rodiče. Tyto aktivity budou vyvíjeny a realizovány s pomocí nástrojů ICT (prostředí AR/VR, úkol 2.5) a zajistí hladký proces integrace místní komunity do rozvoje okresu.

Podúkol 3.3.2 Inovace v Demo Sønderborg (PZ)

Energetický přechod: Zapojení nájemníků a občanů do nově vyvinutého systému inteligentního řízení domů. Výsledky plánovaných inovativních energetických technologií v oblasti úspor energie významně závisí na každodenním energetickém chování nájemníků v demonstračních budovách. Proto se plánují informační a školicí aktivity, které zajistí, aby nájemníci a pracovníci údržby získali dostatek informací o nových inteligentních řídicích systémech a naučili se obsluhovat nové energeticky úsporné spotřebiče. Budou jmenováni zelení ambasadoři, jeden ambasador pro každou z 19 budov, kteří budou vyškoleni, aby pomáhali svým sousedům a kolegům.

Podúkol 3.3.3 Inovace v Demo Utrecht (City of Utrecht, MITROS, BOEX)

Sociální renovace: Před samotnou renovací budou obě bytové společnosti v Utrechtu spolupracovat s nájemníky, aby prozkoumaly a řešily sociální problémy (např. zadluženost, chudobu, zdravotní problémy) a identifikovaly možnosti, jak vytvořit angažovanější komunitu. Tento dílčí úkol se zaměří na následné aktivity po renovaci v oblasti sociální renovace. Očekávaným dopadem je větší míra posílení postavení občanů a větší míra podpory renovace, jakož i zlepšení sociálního i fyzického životního prostředí.

Utrecht realizuje program lidského kapitálu s názvem „Bouw=Wouw!“, který se zaměřuje na přilákání mladých lidí z okresu k práci ve stavebnictví a technologickém sektoru. Dvě bytové společnosti a zapojené společnosti stavebního hodnotového řetězce vytvoří pracovní místa a stáže související s realizací a údržbou demonstračních aktivit ARV. Očekávanými dopady jsou výuka, stáže, vytváření pracovních míst, zapojení a posílení postavení mladých lidí do ambiciózních stavebních a renovačních projektů.

Energetický přechod: Předpovědi o snížení účtů za energie pro obyvatele se často používají k propagaci programů energeticky účinnýchrekonstrukcí v sociálních bytových společnostech. To však do značné míry závisí na budoucím chování obyvatel. Energetický koučink obyvatel je klíčovým opatřením, které je podpoří v užívání jejich renovovaných domů. Tato akce navazuje na program energetického koučování realizovaný v rámci modernizace budovy s pozitivní

energií (provedené před zahájením ARV) a je doplněna o údaje z monitorování spotřeby energie v reálném čase (prostřednictvím systému řízení spotřeby energie v domácnosti HEMS). V rámci této sociální akce jsou někteří obyvatelé zapojeni a vzděláváni, aby působili jako místní agenti změny, kteří koučují své spolubydlící.
Fyzické HUB v okrese: v roce 2021 se předpokládá výstavba kruhového pavilonu v okrese. Tento kruhový pavilon bude podporovat zapojení a rozvoj komunity pomocí školení, propagace a šíření programů přechodu na energetiku a renovace okresu. Tento uzel bude sloužit jako místo ve čtvrti, kde budou probíhat spolutvůrčí aktivity související se sociální renovací, Bouw=Wouw! a energetický koučink.

Podúkol 3.3.4 Inovace v Demo Karviná, (KARV; ČVUT)
Energetický přechod: Centrum zdraví Karviná Mizerov jako živá laboratoř pro město Karviná a další obce v České republice. LL bude vzdělávat občany, např. studenty, vytvářet energeticky a zdrojově efektivní čtvrti, které zvýší informovanost a zapojení občanů a zúčastněných stran. Propagovat uživatelsky přívětivá inovativní a udržitelná stavební řešení prostřednictvím vzdělávání a dalších komunikačních kanálů, implementovat uživatelsky orientovaný design stavebních systémů. Podporovat vytváření dlouhodobých ekosystémů zainteresovaných stran, které se zabývají energetickou transformací a úlohou jednotlivých projektů při prosazování širších organizačních a procesních změn.
Akce zapojení komunity s mladými lidmi ve škole (16-19 let), zkoumání metod spoluvytváření. Činitelé změny propagující udržitelnost mezi svými vrstevníky, rodiči a komunitou.

Podúkol 3.3.5 Inovace v Demo Palma (Město Palma, IREC, MET)

Sociální renovace: Mechanismus partnerství soukromého a veřejného sektoru na jednom místě pro rozsáhlou renovaci městských oblastí, včetně participativních strategií, které zapojují obyvatele čtvrti do procesu LL a plánování před zahájením renovace.
Energetický přechod: Centrum pro energetickou transformaci TE21 bude fungovat jako HUB a výstavní prostor pro zapojení občanů do energetické transformace v městském prostoru a nových udržitelných technologií. Bude propojeno s místními energetickými komunitami kolem škol, což umožní soubor vzdělávacích akcí a osvětových kampaní se zvláštním důrazem na zapojení mladé generace. Aktivity budou kombinovat využití digitálních nástrojů, vizualizaci VR (úkol 2.5), testování prototypových řešení a otevřené návštěvy živých laboratoří. Nové budovy budou využity jako LL, kde budou navrženy akce šité na míru obyvatelům s cílem zvýšit povědomí o využívání energie a řešeních energetického přechodu.
CEC - občanské energetické společenství, jako soukromý crowd-funded / inovativní mechanismus pro výrobu obnovitelné energie v dostupných veřejných střechách v oblasti, např. školy, veřejné budovy. Pro přímé zapojení obyvatel čtvrti a rodin do CEC budou navrženy workshopy na míru, energetické kavárny a zapojovací akce.

Podúkol 3.3.6 Inovace v Demo Trento (DTTN, EURAC, DOL)
Přechod energii: Realizace místní energetické komunity spojené s geotermální strukturou s využitím bývalých dálničních tunelů jako umělecké a výstavní galerie a zároveň umožnění těžby geotermální energie. Budou uplatněny strategie zapojení občanů při připojování ke geotermální energii, aby bylo možné dosáhnout nižších tarifů.
Sociální renovace: Koncepce jednotného kontaktního místa spojeného s inovativními finančními pobídkami, které zapojí kritickou masu obyvatelstva do renovace (fasády na bázi dřeva) v okresním měřítku. Budou použity strategie zapojení občanů pro posouzení proveditelnosti komunitního financování a pro renovaci čtvrti z urbanistického hlediska, aniž by byla ohrožena estetika nebo architektonické kvality.

Úkol 3.4 (T3.4) Monitorování a podávání zpráv o živých laboratořích CPCC na demonstračních ukázkách. M8-48. Vedoucí úkolu: ČVUT, Partneři: SINTEF, Utrecht, PALMA, IREC, ACE, NTNU, MET, SAB, BOEX, MITROS, KARV, OBF, Center Denmark, Housing Europe, DTTN, EURAC, DOL.
Cílem tohoto úkolu je sledovat vývoj v živých laboratořích a podávat o něm zprávy, jakož i dokumentovat překážky a podněty, které se vyskytly v souvislosti s použitými metodami zapojení. Tento úkol bude vyžadovat zapojení příslušných demonstračních partnerů za účelem sledování pokroku. T3.4 bude také spolupracovat s WP8 na analýze vícenásobných přínosů a na hodnocení průzkumu ex-ante, interim a ex-post, jakož i s WP10 na koordinaci nezbytných mechanismů podávání zpráv relevantních pro CPCC Living Labs.
Zdokumentovat důvody a překážky související s přístupem k sociálním inovacím, s nimiž se experimentuje v každé ukázce.
C Shromáždit kvalitativní a kvantitativní údaje a výsledky o každém z LL.
Základní údaje: Pochopení sociokulturní a ekonomické struktury demo komunit, jakož i zájmů a potřeb zúčastněných stran.
Úkol 3.5 (T3.5) Zpětná vazba a učení se pro vytvoření nové strategie pro zapojení občanů. M16-48. Vedoucí úkolu: SINTEF, Partneři: ČVUT, Housing Europe, PALMA, IREC, MET, ACE, SAB, KARV, OBF, Center Denmark, EURAC, DTTN.

Cílem tohoto úkolu je zlepšit zkoumané inovativní přístupy k sociálnímu zapojení na základě analýzy překážek a důvodů, jejich účinnosti, nákladů a potenciálu učení. Cílem je podpořit replikovatelné a proveditelné nástroje v rámci projektů hloubkové renovace v Evropě, aby se plně využil potenciál nadcházející evropské renovační vlny.
Výsledek většího zapojení občanů ovlivní úroveň spokojenosti a pohody a také zakotví energeticky účinné chování jako přijatelnou součást každodenního života již od raného stádia. Úkol 3.5 bude vyžadovat zapojení všech demonstračních partnerů, aby analyzovali zpětnou vazbu a poznatky z Živých laboratoří a aby tyto poznatky zpracovali do příručky s pokyny pro budoucí projekty.
Analyzovat náklady, míru inkluzivity a potenciál odhalit skryté potřeby občanů pomocí přístupu Citizen Design Science. (zatímco WP2 a WP8 se zaměřují na celkový rámec a hodnocení CPCC).

- Na základě mapování a průzkumů ve spolupráci s WP 8 vyhodnotit změnu spokojenosti, vnímané pohody a dopad opatření na poptávku po energii.
- Zlepšit a zajistit příslušné nástroje a metody pro zapojení občanů a poskytnout digitální příručku pro budoucí projekty nad rámec ARV (s WP10).

Účast na jednoho partnera

Číslo a zkrácený název partnera	**Úsilí pracovního balíčku3**
1 - NTNU	12.00
2 - ACE	4.00
3 - ČVUT	18.00
7 - PROJECTZERO	3.00
8 - EURAC	4.00
9 - SINTEF	37.00
10 - PALMA	50.00
12 - IREC	16.00
13 - MET	8.00
14 - UAS Utrecht	1.00
15 - HOUSING EUROPE	6.00
17 - Center Denmark	4.00
18 - SAB	3.00
19 - GDFA	1.00
20 - BOEX	5.00
23 - CITY OF UTRECHT	11.00
27 - Mitros	5.00
28 - KARV	7.00
29 - DOL	1.00
30 - DTTN	6.00
33 - OBF	11.00
Celkem	213.00

Seznam dodávek

Číslo dodávky[14]	Název dodávky	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D3.1	Plánování a celkový návrh metodiky fungování „CPCC Živé laboratoře “, včetně mapování dosahu zainteresovaných stran	9 - SINTEF	Předváděcí model	Veřejné	12
D3.2	Realizační plan „CPCC Živých laboratoři “. Demonstrace.	10 - PALMA	Předváděcí model	Veřejné	13
D3.3	Zprávy o fungování „CPCC Živých laboratoří“.	3 - ČVUT	Zpráva	Veřejné	24
D3.4	Analýza nástrojů a procesů zapojení občanů.	9 - SINTEF	Zpráva	Veřejné	40
D3.5	Strategie a nástroje zapojení občanů na komunitní úrovni.	9 - SINTEF	Webové stránky, podávání patentů atd.	Veřejné	48

Popis dodávek

D3.1 : Plánování a celkový návrh metodiky fungování „CPCC Živé laboratoře“, včetně mapování dosahu zainteresovaných stran [12]

Plánování a celkový návrh metodiky fungování „CPCC Živé laboratoře“ se zaměřením na sociální renovaci a energetickou transformaci, metody a nástroje otevřené, flexibilní a různorodé, ale s jasným zaměřením na opatření pro zvýšení zapojení místních uživatelů/občanů, zvyšování povědomí a učení. Metody a nástroje relevantní pro vývoj celkové metodiky.

D3.2 : Realizační plán „CPCC Živých laboratoří“. Demonstrace [13]

Fyzický prostor (HUB) a zaměření na nová řešení týkající se energetického přechodu a oběhového hospodářství (skladování, elektrická vozidla, obnovitelné zdroje, opětovné využití atd.), testování a iterace inovativních a prototypových řešení, jakož i na energetický trénink obyvatel.

D3.3 : Zprávy o fungování „CPCC Živých laboratoří“. [24]

Každá ukázka provede sérii workshopů a komunitních aktivit souvisejících s plánovanými inovacemi. Cílem je monitorovat a informovat o vývoji v oblasti celoživotního učení a také dokumentovat překážky a podněty, na které se při použitých metodách zapojení naráží. Tento úkol bude vyžadovat zapojení příslušných partnerů demonstrací do sledování pokroku Revize M36, M48

D3.4 : Analýza nástrojů a procesů zapojení občanů [40analyzuje překážky a hnací síly, jejich účinnost, náklady a potenciál učení. Cílem je podpořit opakovatelné a proveditelné nástroje v rámci projektů hloubkové renovace v Evropě, aby se plně využil potenciál nadcházející evropské renovační vlny.

D3.5 : Strategie a nástroje zapojení občanů na komunitní úrovni. [48]

Pokud jde o dodávku „Analýza nástrojů a procesů zapojení občanů s využitím přístupu občanské vědy“, jejím výsledkem bude příručka pro budoucí projekty.

Harmonogram relevantních milníků

číslo milníku[18]	Název milníku	Příjemce	Datum splatnosti (v měs.)	Způsoby ověření
MS5	Celková metodologie v T3.2	9 - SINTEF	9	Odpovídající metodika s vyplněni dodávkou
MS6	Zprávy „živých laboratoří“	9 - SINTEF	24	Dokončení prvních zpráv o živých laboratořích

Číslo pracovního balíčku[9]	WP4	**Příjemce** [10]	1 - NTNU
Název pracovního balíčku	Přepracování designu budov na udržitelný		
Začátek měsíce	1	**Ukončení měsíce**	40

Cíle

Pracovní skupina 4 se zabývá (re)designem nových a modernizací stávajících budov jako budov s nulovými emisemi a pozitivní energií v udržitelných klimaticky pozitivních cirkulárních komunitách (CPCC). Hlavními cíli jsou (i) snížení ztělesněné energie a emisí, (ii) zvýšení energetické účinnosti a (iii) sladění udržitelnosti s estetikou a kvalitou života prostřednictvím integrovaných procesů cirkulárního designu. Činnosti v rámci WP4 jsou rozděleny do šesti hlavních úkolů, které se zabývají strategiemi navrhování budov integrovaných do CPCC. Integrovaný cirkulární design ARV zahrnuje přizpůsobení se místním klimatickým podmínkám, hloubkovou renovaci s minimálním narušením pro obyvatele budov, významné snížení emisí CO2, vysokou energetickou účinnost s aktivními/pasivními řešeními, vysoký důraz na cirkulárnost, tj. snížení, opětovné použití a recyklaci materiálů, prvků a modulů, přidanou hodnotu a integraci fotovoltaických zdrojů, tj. systémů BIPV a BAPV, účinně využívajících zdroje a zároveň splňujících požadavky na pohodu obyvatel a architektonické aspekty. Projekční hlediska se budou zabývat škálovatelností, flexibilitou, trvanlivostí, udržovatelností, požární a seizmickou bezpečností budov. Budovy a čtvrti s pozitivní cirkulární energií budou zasazeny do prostorového, ekonomického, technického, environmentálního, regulačního a sociálního kontextu demonstračních projektů. Konečným cílem WP4 je integrovaný cirkulární design, který kultivuje estetiku a zlepšuje vybavení pro obyvatele budov a zároveň zlepšuje výkon budov v souladu s novou evropskou strategií Bauhaus.

Popis práce a role partnerů

WP4 - Přepracování designu budov na udržitelný [Měsíce: 1-40]
NTNU, ACE, ČVUT, PROJECTZERO, EURAC, SINTEF, PALMA, IBAVI, IREC, UAS Utrecht, BOEX, Rc Panels B.V., UU, BOSGROEP, MEX, KARV, DTTN, UNITN, POLITO, OBF, AIGUASOL SAEST
Úkol 4.1. Inovační fórum pro WP4. M1-M40. Vedoucí úkolu: NTNU, Účastníci: OBF SINTEF, HU, UU, IREC, PALMA, ČVUT, KARV, EURAC, DTTN, PZ, ACE
Cílem tohoto úkolu je podpořit zavádění inovací v oblasti designu v demonstračních projektech a posílit jejich využívání v rámci inovačních klastrů. Fórum bude fungovat jako inkubátor pro spoluvytváření sociálně a esteticky perspektivních zelených, energeticky pozitivních a cirkulárních budov/čtvrtí s využitím digitálních designových řešení, modulů a technologií, a to jak pro nové budovy, tak pro projekty rekonstrukcí. T4.1 zajistí účinnou spolupráci mezi různými inovačními klastry v rámci demonstračních projektů s cílem vzájemného učení a zpětné vazby mezi demonstracemi a pracovními skupinami. Práce bude zahrnovat inovační workshopy o integrovaném cirkulárním designu mezi demonstracemi v rámci WP a zajistí propojení s ostatními WP.
Klíčovým výstupem T4.1 bude D4.6 o pokynech pro navrhování reálných demonstračních projektů ARV pro dosažení udržitelných budov s pozitivní spotřebou energie v měřítku čtvrti. Demonstrační projekty představují různé způsoby realizace CPCC zahrnující jak novou výstavbu, tak rekonstrukce v různých evropských kontextech, klimatických podmínkách, kulturách a trzích. Výsledky budou navíc uvedeny a začleněny jako součást zprávy o inovacích (D1.4) v rámci WP1.
Úkol 4.2. Integrovaný cirkulární design demonstračního projektu v Oslu. M1-M36. Vedoucí úkolu: SINTEF, Účastníci: NTNU, OBF
Hlavním cílem je integrovaný cirkulární design a hodnocení různých konceptů budov s nulovými emisemi a pozitivní energií v klimaticky pozitivní čtvrti v Oslu. V rámci T4.2 budeme analyzovat různé scénáře s kombinacemi nejmodernějších materiálů, komponentů, technologií a inteligentních řídicích systémů s ohledem na klíčové ukazatele výkonnosti ARV definované ve WP2. V rámci demonstračního projektu v Oslu se zaměříme na následující:

- Digitální konstrukce pro optimální výkon během životního cyklu. Návrh nové budovy s pozitivní spotřebou energie a 50% snížením emisí skleníkových plynů z materiálů. BIM a digitální dvojčata budou použita k dokumentaci a optimalizaci výkonnosti v průběhu celého procesu návrhu. Bude posouzen environmentální a ekonomický dopad různých strategií s ohledem na parametry, jako jsou LCA, LCC a energetické potřeby, ale také kulturní a sociální aspekty. Součástí návrhové strategie budou víceúčelové strategie návrhu budov, které mají zapojit místní komunitu a poskytnout jí prostory pro společenská setkávání.
- Konstrukce přizpůsobená klimatickým podmínkám s využitím inovativního řešení otevřených povrchových vod. To je výchozí bod pro návrh projektu školy. Konceptem je zelený a jiný školní dvůr, kde se vegetace a hospodaření s povrchovou vodou využívají jako zdroj pro vytvoření kvalitních a rozmanitých venkovních prostor.
- Efektivní použití nízkouhlíkového betonu, který dosahuje o 40 % nižších emisí než standardní beton..
- Strategie cirkulární renovace, při níž bude většina stěn a oken ve staré továrně znovu použita a modernizována podle nových standardů energetické náročnosti. Mapování místně dostupných stavebních materiálů a komponentů ze

stávajících a zbouraných budov. Návrhové strategie pro využití znovu použitých materiálů a komponentů ve vztahu k technickým a estetickým omezením.

• Návrh renovace budovy kulturního dědictví s vysokými energetickými ambicemi s využitím strategie cirkulární renovace. Některé ze soupisů LCI budou znovu použity v dalších projektech.

• Nový systém vytápění/chlazení využívající nízkoteplotní tepelné vytápění a vysokoteplotní tepelné chlazení pomocí stejné infrastruktury ve spojení se zemním tepelným čerpadlem (dálkové vytápění pro maximální zatížení).

• Návrh architektonicky integrovaného fotovoltaického systému pro fasády s použitím nových, hranatých a barevných modulů s vysokým stupněm standardizace velikostí modulů a řešení upevnění, což výrazně snižuje čas a náklady na aplikaci takového systému. Návrhové strategie zaměřené na propojení panelu s panelem a panelu s povrchem budovy pro snadnou instalaci/výměnu komponent a replikaci v jiných budovách/kontextech.

• Integrovaný návrh zeleného řešení, kde vegetace a otevřená manipulace s povrchovou vodou jsou zdroji pro vytvoření atraktivních venkovních prostor, které jsou integrovány s přilehlými oblastmi. Integrované strategie zelených typů se zaměřením na potenciální přínosy pro místní klima, tj. snížení efektu tepelného ostrova, snížení znečišťujících látek.

Úkol 4.3. Integrovaný cirkulární design demonstračního projektu v Utrechtu. M1-M36. Vedoucí úkolu: HU, Účastníci: UU, BOEX, RCP, Bos Groep, MEX.

Demonstrační akce v Utrechtu se zaměřují na systematickou modernizaci čtyř středně velkých bytových domů ze 60. let na budovy s pozitivní spotřebou energie a šesti bytových domů na budovy s téměř nulovými emisemi energie (se záměrem vlastníků budov přejít v rámci projektu na budovy s pozitivní spotřebou energie s využitím inovací ARV) zasazené do zelené čtvrti. Inovace a výzkum zhodnotí současný přístup k modernizaci HeMuBo (aplikovaný na 6 budov dosahujících cílů téměř nulových emisí) a současný přístup Inside-Out 1.0 (dříve aplikovaný v rámci jednoho projektu financovaného z národních zdrojů, který končí v roce 2021) a vyústí v koncept Inside-Out 2.0. Integrovaný projekt bude zahrnovat specifické stavební prvky, které povedou k 30% snížení nákladů ve srovnání s tradičními systémy a výrazně sníží emise skleníkových plynů. Pro dosažení těchto cílů se přepracovaný návrh zaměří na střešní, fasádní a balkonové systémy, přičemž se prozkoumají následující témata

- Řešení modernizace budou navržena pro industrializaci a budou škálovatelná, aby mohla sloužit různým typologiím poválečných budov, jako jsou 4podlažní, 6podlažní a 10podlažní výškové budovy a jiné charakteristiky fasád, a to prostřednictvím modulárních a přizpůsobitelných částí střechy, fasády a balkonů.
- Pro čtyři středně vysoké obytné domy (typ Bredero-4) bude navrženo řešení Inside-Out 2.0 pro modernizaci na míru.
- U čtyř středně vysokých bytových domů (typ Intervam-4) a dvou výškových bytových domů (typ Intervam-10) bude posouzeno řešení modernizace HeMuBo, které se předběžně plánuje v roce 2022, a bude navržen pokrok v tomto řešení modernizace na základě prvků Inside-Out. Očekávaná zlepšení se týkají zvýšení energetické náročnosti z NZEB (Budova s nulovou energií) na PEB (Přenosná elektrická budova) a snížení doby a nákladů na modernizaci díky použití prvků Inside-Out (fasády s energetickými a vzduchotechnickými instalacemi s použitím sendvičových panelů) vyrobených mimo staveniště a instalovaných plug-and-play přímo na místě a použití dodatečné BIPV / BAPV. Rozhodnutí o provedení těchto změn závisí na výsledcích tohoto úkolu a na vnějších faktorech, jako jsou stávající smluvní dohody mezi společnostmi Bo-Ex, Mitros a jejich dodavateli (mimo konsorcium ARV) a požadované investice.

• Modulární konstrukce instalace, která umožňuje různé typy vytápění a větrání pro jednotlivé byty v závislosti na potřebách obyvatel a umístění.

• Koncepce renovace pro vytvoření architektonické rozmanitosti vzhledu, přizpůsobené kontextu. Důležitou součástí je architektonické propojení návrhu při poválečných renovacích a návrh adaptabilního řešení modernizace.

• Návrh pro standardizaci a flexibilitu rozhraní spojujících moduly, např. detailů. Včetně flexibilního upevnění fasády, které získá vyšší potenciál přizpůsobení.

• Návrh pro kompaktnost infrastruktury, na vnější straně budovy a integrovaný do střechy, balkonu a fasádních prvků, včetně připojení fotovoltaických modulů pro optimální sběr energie.

• Integrace ukládání dat o materiálu do systému sledování zdrojů, tj. materiálového pasu.

• Návrh pro minimální narušení: Design pro integrované instalační řešení plug-and-play pro propojení více fasád (včetně integrovaných energetických a/o ventilačních zařízení) zvyšuje modularitu a snižuje celkové náklady na vlastnictví.

• Demonstrace architektonické a estetické plug-and-play integrace řešení BIPV/BAPV:

- Analýza současných a nových řešení integrace fotovoltaiky do stavebních prvků. Inovativní řešení BIPV budou hodnocena z hlediska estetiky a energetické účinnosti a z hlediska proveditelnosti prefabrikace, industrializace, integrace a snížení nákladů, s různými vlastnostmi, jako je tvar a barva.

- Definice a návrh BIPV v předvýrobním procesu s cílem integrovat fotovoltaiku do továrny, což povede ke zkrácení doby výstavby a snížení nákladů na výstavbu. Propojení s WP5.4

- Definice a návrh plug-and-play BIPV, generování řešení pro propojení kabeláže fotovoltaických panelů a monitorovacích zařízení mezi stavebními prvky.

Úkol 4.4. Integrovaný cirkulární design demonstračního projektu v Palmě. M1-M36. Vedoucí úkolu: IREC, Účastníci: PALMA, IBAVI, AIGUA.

Hlavním cílem je integrovaný cirkulární design a hodnocení různých konceptů budov s nulovými emisemi a pozitivní energií v rámci udržitelných cirkulárních čtvrtí s pozitivním klimatem v Palmě. Klíčová opatření v okrsku lze shrnout takto:

- Rozsáhlá akce modernizace 250 soukromých obydlí v La Soledat Sud prostřednictvím nového mechanismu partnerství veřejného a soukromého sektoru
- Nová budova sociálního bydlení s 36 byty s pozitivní spotřebou energie
- Energetická renovace stěžejní památkově chráněné budovy ze 70. let 20. století moderní hnutí

Projekt nových budov sociálního bydlení s vysokou energetickou účinností a pozitivní energií se zaměří na využití inovativních místních materiálů. Integrovaný proces cirkulárního navrhování založený na strategiích křížového větrání, využití vernakulárních stínicích systémů, prostorů založených na vysoké setrvačnosti a zeleni, s vysokou architektonickou kvalitou. Integrovaný návrh zváží hybridní řešení větrání podle ukazatelů IAQ jak pro chlazení, tak pro vytápění, např. použití skleníků orientovaných na východ/západ. Za účelem snížení ztělesněných emisí budou testována řešení založená na využití ekologicky šetrných místních řemeslných výrob se surovinami km 0. Hlavní řešení, která budou v rámci projektu posuzována, budou následující:

- Tepelná izolace z trávy Neptun, přírodní řešení, které bude provedeno na demonstrační budově a které lze použít pouze na místech, kde je Posidonia Oceanica místním zdrojem.
- "Pedra de Marés", místní kámen Marés, který se používá v lidové architektuře a těží se z místních a km0 zdrojů.
- Certifikované dřevo pro podlahy a stínicí prvky

Nákladově optimální řešení pro rozsáhlou modernizaci s cílem dosáhnout 50% snížení energetické náročnosti a výrazného zlepšení tepelné pohody. Bude odvozen katalog technických řešení pro opakovatelnost. Rozsah roku výstavby budov určených k renovaci je 1920-1980.

Integrovaný energetický projekt modernizace památkově chráněné administrativní budovy z období moderny (1970). Předběžné testování několika posledních generací řešení BIPV, tj. systémů na bázi opláštění a poloprůhledného fotovoltaického skla, a modelování dopadu v integrovaném návrhu. Navrhněte nejlepší řešení pro kancelářské budovy s vysokým prosklením z hlediska estetiky, vlivu na vytápění a chlazení a výroby energie. Památkově chráněná budova se vyznačuje prosklenou závěsovou stěnou a integrované konstrukční řešení obvodového pláště je nutností pro snížení energetické náročnosti na 50 % ve srovnání se stavem před rekonstrukcí. Bude analyzováno a navrženo několik řešení a strategií HVAC přizpůsobených místnímu klimatu pomocí integrovaného návrhu spojeného s řešením obvodového pláště na fasádách, tj. inteligentní řešení pláště přizpůsobené ročním podmínkám.

Úkol 4.5. Integrovaný cirkulární design demonstračního projektu v Karviné. M1-M36. Vedoucí dílčího úkolu: ČVUT, Účastníci: KARV. Český demo případ zahrnuje rekonstrukci zdravotního střediska Karviná Mizerov ve městě Karviná. V rámci projektu Demo v Karviné se zaměříme na následující oblasti:

- Stát se energeticky pozitivní budovou díky pasivnímu standardu a výrobě energie z obnovitelných zdrojů.
- Digitální návrh a 3D simulace, tj. digitální dvojčata, pro potenciál slunečního záření a návrh optimálních stínicích zařízení.
- Pilotní projekty řešení odolných vůči klimatu v malém měřítku - využití tepelných čerpadel pro letní chlazení
- LCA systémů HVAC se zaměřením na uhlíkovou stopu
- BIPV, BAPV, PV-T, solární termické systémy, tepelná čerpadla, aktivní stínicí systémy s předpovědí počasí, inovativní řešení chlazení. BIPV integrovaná do větraných fasád
- Zelená střecha pro zmírnění efektu tepelného ostrova a hospodaření s dešťovou vodou, např. dešťové zahrady, zeleň.

Úkol 4.6. Integrovaný cirkulární design demonstračního projektu v Trento. M1-M36. Vedoucí dílčího úkolu: UNITN, Účastníci: DTTN, POLITO, EURAC.

Demo projekt v Trentu zahrnuje jak novou výstavbu, tak renovaci stávajících budov a staveb. Ambicí jsou nulové emise a plusová úroveň energie a vysoká úroveň energetické účinnosti. V Trentu se zaměříme na tyto oblasti:

- Vývoj katalogu řešení integrovaného cirkulárního designu pro rekonstrukce budov s 50% snížením spotřeby energie a pozitivní energetickou novou výstavbu, využívající obálky budov s aktivními (BAPV/BIPV) a pasivními prvky.
- Integrace řešení založených na přírodě. Informační Průmysl 4.0 prostřednictvím digitálních průzkumů. Zlepšení komfortu (psychologického, fyziologického). Přístup spoluvytváření na jednom místě umožňující šíření technologie designu: replikovatelnost řešení. Spoluvýhody požární a seismické odolnosti konstrukcí/rekonstrukcí na bázi dřeva.
- Scénáře (nové) výstavby, renovace a nadstavby na bázi dřeva (místní a cirkulární hodnotový řetězec). Zjednodušená inventarizace životního cyklu. Proces navrhování založený na oběhovém hospodářství. Snížení využití půdy prostřednictvím supervýstavby (vývoj scénářů) - Nové stavby, renovace stávajících budov a supervýstavba - dodatečné (nové) objemy na stávajících budovách.

• Koncepce přirozeného a mechanického větrání pro budovy reagující na klimatické podmínky.
• Integrace tepelných čerpadel pro vytápění a chlazení (napojení na NSGE - tunely, základy, silnice). Integrace pasivních tepelných systémů do obvodových plášťů budov. Aktivní tepelná hmota, akumulace tepla. Integrace aktivních/pasivních systémů prostřednictvím systémů automatizace budov. Architektonická a estetická integrace řešení BIPV/BAPV. Výběr materiálů. Integrace fotovoltaických, solárně-termických a CMV systémů.
• Analýza stávajících modelů pro vypracování scénářů, které budou sloužit jako podklad pro hybridní řešení na bázi energie a přírody na povrchu budov/měst. Inovativní materiály (nové a odpadní/vedlejší produkty).
• Architektonická a estetická integrace řešení BIPV/BAPV. Výběr materiálů. Integrace fotovoltaických, solárně-termických a CMV systémů.
-Definice řešení BIPV s vysokou úrovní přizpůsobivosti schopných zajistit výkonnost, spolehlivost, trvanlivost a replikovatelnost nákladově konkurenceschopným způsobem a určité zkrácení doby výstavby.
- Analýza nových řešení energetické integrace s cílem definovat hlavní rysy prvků BIPV jako udržitelného pláště budovy s vysokými standardy řešení geometrické modularity, úrovně prefabrikace, konstrukčních technologií, povrchů materiálů, chromatických a materiálových vlastností fotovoltaických článků, disimulace/imitace prvků atd.
- Identifikace nejnovějších komponentů PV a PVT (PV + solární kolektory) na evropském trhu s cílem definovat nové konstrukční prvky kombinující dobrou estetiku, multifunkčnost, nákladovou efektivitu, hromadné přizpůsobení atd.
- Definice konstrukčního a výrobního systému pro vysokou přizpůsobivost komponentů PV/PVT různým podmínkám.
- modernizace budov, nová výstavba atd. - s vysokými standardy efektivní výroby a instalace, vysokou úrovní účinnosti výroby energie a tepelného chování, environmentální a ekonomickou udržitelností.

Účast na jednoho partnera

Číslo a zkrácený název partnera	Úsilí pracovního balíčku4
1 - NTNU	25.50
2 - ACE	2.00
3 - ČVUT	18.00
7 - PROJECTZERO	1.00
8 - EURAC	3.00
9 - SINTEF	14.00
10 - PALMA	22.00
11 - IBAVI	16.00
12 - IREC	23.00
14 - UAS Utrecht	19.00
20 - BOEX	1.00
21 - Rc Panels B.V.	13.00
22 - UU	5.00
24 - BOSGROEP	13.00
26 - MEX	6.00
28 - KARV	4.00
30 - DTTN	4.00
Armalam	3.00
X-LAM DOLOMITI	0.50
FANTI LEGNAMI	0.50

Číslo a zkrácený název partnera	Úsilí pracovního balíčku4
31 - UNITN	22.00
32 - POLITO	20.00
33 - OBF	9.00
35 - AIGUASOL SAEST	23.00
Celkem	267.50

Seznam dodávek

Číslo dodávky[14]	Název dodávky	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D4.1	Návrh pokynů pro enviromentálně přátelské budovy s nulovými emisemi v Oslu.	9 - SINTEF	Zpráva	Veřejné	12
D4.2	Konfigurace návrhu modulárního a škálovatelného konceptu s dodatečným vybavením pro energeticky přátelské středně vysoké a vysoké budovy v „zelených čtvrtích“ Utrechtu.	14 - UAS Utrecht	Zpráva	Veřejné	12
D4.3	Návrh pokynů pro renovaci a výstavbu nových budov s důrazem na nulové emise v Palmě.	12 - IREC	Zpráva	Veřejné	12
D4.4	Návrh energetické renovace Zdravotního střediska v Karviné s nulovými emisemi.	3 - ČVUT	Zpráva	Veřejné	12
D4.5	Návrh pokynů pro konstrukci dřevostaveb a renovace malých a středně velkých budov v Trentu.	31 - UNITN	Zpráva	Veřejné	12
D4.6	Navrhování nových a dovybavení stávajících budov za účelem energetické renovace a zavedení nulových emisí.	1 - NTNU	Zpráva	Veřejné	40

Popis dodávek

D4.1 : Návrh pokynů pro enviromentálně přátelské budovy s nulovými emisemi v Oslu. [12]
Integrovaný cirkulární design a hodnocení různých konceptů pro budovy s nulovými emisemi a pozitivní energií v klimaticky pozitivní čtvrti. Každá ukázka o tom podá zprávu v samostatném výstupu. Bude každoročně revidován (M24 a M36).
D4.2 : Konfigurace návrhu modulárního a škálovatelného konceptu s dodatečným vybavením pro energeticky přátelské středně vysoké a vysoké budovy v „zelených čtvrtích" Utrechtu. [12]
Integrovaný cirkulární design a hodnocení různých konceptů pro budovy s nulovými emisemi a pozitivní energií v klimaticky pozitivní čtvrti. Každá ukázka o tom podá zprávu v samostatném výstupu. Revize M24 a M36
D4.3 : Návrh pokynů pro renovaci a výstavbu nových budov s důrazem na nulové emise v Palmě. [12]
Integrovaný kruhový design a hodnocení různých konceptů pro budovy s nulovými emisemi a pozitivní energií v klimaticky pozitivní čtvrti. Každá ukázka o tom podá zprávu v samostatném výstupu. Revize M24 a M36
D4.4 : Návrh energetické renovace Zdravotního střediska v Karviné s nulovými emisemi.
[12]
Integrovaný cirkulární design a hodnocení různých konceptů pro budovy s nulovými emisemi a pozitivní energií v klimaticky pozitivní čtvrti. Každá ukázka o tom podá zprávu v samostatném výstupu. Revize M24 a M36
D4.5 : Návrh pokynů pro konstrukci dřevostaveb a renovace malých a středně velkých budov v Trentu. [12]
Integrated cirkulární design a hodnocení různých konceptů pro budovy s nulovými emisemi a pozitivní energií v klimaticky pozitivní čtvrti. O každé demonstraci bude podána zpráva v samostatném výstupu. Revize M24 a M36
D4.6 : Navrhování nových a dovybavení stávajících budov za účelem energetické renovace a zavedení nulových emisí. [40]
Souhrnná zpráva se zjištěními z výstupů D4.1 až D4.5. Konečným cílem WP4 je integrovaný cirkulární design, který kultivuje estetiku a zlepšuje vybavení pro obyvatele budov a zároveň zlepšuje výkonnost budov v souladu s novou evropskou strategií Bauhausu

Harmonogram relevantních milníků

číslo milníku[18]	**Název milníku**	**Příjemce**	**Datum splatnosti (v měs.)**	**Způsoby ověření**
MS7	Pokrok v integrovaném cirkulárním designu Pokrok v integrovaném kruhovém designu	1 - NTNU	20	Zprávy o návrhu budov s nulovými emisemi a pozitivní energií v CPCC D4.2-4.6

Číslo pracovního balíčku[9]	WP5	**Příjemce**[10]	14 - UAS Utrecht
Název pracovního balíčku	Výroba efektivně využívající udržitelné zdroje a pracovní toky stavby		
Začátek měsíce	1	**Ukončení měsíce**	48

Objectives

WP5 si klade za cíl vytvořit a otestovat pracovní postupy pro modernizaci a novostavby ve stavebnictví středně vysokých a vysokých budov a podobných typologií, které účinně využívají zdroje. „Business as usual" neboli tradiční pracovní postup prodeje, projektování, inženýringu a výstavby je příliš drahý, nepřináší výsledky (rozdíl mezi výkonem projektu a výkonem stavby), spotřebovává velké množství specializovaných a stále vzácnějších pracovních sil, způsobuje dopravu, přetížení a využití prostoru ve městech a je nepříjemný pro obyvatele (při retrofitu). Proto se snažíme snížit celkové náklady o 30 %, emise CO2 a obtěžování obyvatel. Abychom těchto cílů dosáhli, budeme zkoumat následující:

- Realizace modernizací a novostaveb zaměřených na energeticky neutrální nebo dokonce energeticky výhodné pláště, aniž by se přehlížela hodnota designu.
- Snížení nákladů na výstavbu na místě
- Vývoj pokročilých ICT nástrojů/procesů pro automatizované shromažďování a rozpoznávání dat o modernizovaných budovách a stavbách a také nový přístup nulového inženýrství, který snižuje náklady a čas v předvýrobní fázi.
- Konstrukce k údržbě. Demonstrace této údržby je jedním z hlavních cílů ukázek.
- Snížení emisí CO2 ze stavebního procesu a ekonomické zhodnocení (obchodování s uhlíkem).
- Snížení obtěžování z dopravy a emisí CO2
- Snížení množství odpadu na místě výroby i mimo něj ((před)výroba).

Rozdíl ve výkonnosti je třeba snížit integrací inteligentních technologických řešení pro monitorování a řízení vnitřního ovzduší, energetické výkonnosti a degradace (pohyblivých) částí.WP5 si dále klade za cíl zlepšit zavádění technologie modernizace během fáze výstavby v projektech hloubkové modernizace. Cílem WP5 je aplikovat, vyvinout, přepracovat a ověřit nové pracovní postupy v rámci přístupu Průmysl 4.0 pro (před)výrobu a výstavbu (hloubkové) modernizace a nových stavebních konceptů s účinným využitím zdrojů, a to jak ve virtuálním, tak ve fyzickém světě. V tomto pracovním balíčku identifikujeme tři fáze: 1) předvýrobní, 2) výrobní a 3) stavební. Vyvinutím inovativních nástrojů a procesů v tomto pracovním postupu lze realizovat na trhu hodnotnou modernizaci nebo nově postavený koncept, který by mohl být na trhu vážně převratný. Ve předvýrobní fázi se IT-inovace zaměřují na zlepšení procesů výroby stavebních dílů a výstavby pomocí metody sběru digitálních dat nezávislé na projektu, a to rozpoznáním a klasifikací specifických vlastností budovy a jejich propojením s typologickými údaji v parametrickém informačním systému (BIM). Na základě typologických údajů se automatizuje konfigurace řešení modernizace. Při pořizování projektu se drony a další technika používají přímo ve výrobě „file2factory ". Ve výrobní fázi prefabrikací a dokonce integrací instalací do stavebních prvků a spojů mezi nimi výrazně snižujeme jak množství potřebné pracovní síly na stavbě, tak i potřebné specializované dovednosti: plug-and-play. Ve fázi výstavby se snažíme realizovat navržené inovace v demonstracích tím, že vyvíjíme inovativní procesy, abychom minimalizovali množství úsilí při výstavbě, uhlíkovou stopu a obtěžování obyvatel a všichni se snažíme o efektivní využívání zdrojů v tomto procesu.

Popis práce a role role partnerů

WP5 - Výroba efektivně využívající udržitelné zdroje a pracovní toky stavby[Měsíce: 1-48]
UAS Utrecht, NTNU, ACE, ČVUT, EURAC, SINTEF, PALMA, IBAVI, IREC, Buro de Haan, BOEX, Rc Panels B.V., UU, CITY OF UTRECHT, BOSGROEP, MEX, KARV, DTTN, UNITN, POLITO, OBF

Úkol 5.1 Inovační fórum WP5. M1-M48. Vedoucí úkolu: HU, Účastníci: NTNU, ACE, EURAC, PALMA, DTTN, UNITN, POLITO, OBF

Tento úkol zajistí účinnou spolupráci mezi různými inovačními klastry v rámci demo projektů s cílem vzájemného učení a zpětné vazby mezi demo projekty a pracovními skupinami. Práce bude zahrnovat inovační workshopy mezi demonstracemi v rámci pracovní skupiny a zajistí propojení s ostatními pracovními skupinami. Cílem tohoto úkolu je podpořit realizaci a integraci dílčích úkolů ve vztahu k výrobním a konstrukčním procesům v rámci demonstračních projektů a posílit využití v rámci inovačních klastrů. Fórum bude fungovat jako inkubátor pro spoluvytváření inovativních výrobních a stavebních procesů. Výsledky budou uvedeny a začleněny jako součást zprávy o inovacích (D1.4) v rámci WP1.

Úkol 5.2 Předvýrobní pracovní postup M1-M48. Vedoucí úkolu: HU, Účastníci: Buro de Haan, Bos Groep, MEX, UU, BOEX, EURAC, UNITN.

T5.2 zaměřený na digitální pracovní postup pro tvorbu rozhodnutí o modernizaci s nulovou spotřebou energie. V předchozích projektech byla vyvinuta koncepce nulového inženýrského procesu a sklízení charakteristik nezávislých na projektu a automatizované konfigurace. Všechny kroky dílčích úkolů od 5.2.1 do 5.2.5 jsou již vyvinuty pro typologii přízemního bydlení v evropských projektech (např. InduZero) a národních projektech (např. Factory Zero, Inside Out, IEBB). V rámci ARV budou tyto poznatky přeneseny na typologii výškových bytových domů. T5.2 je spojen s WP2, kde bude zkoumán rámec pro pracovní postupy před zahájením výroby, zatímco ve WP5 bude aplikován a testován.

Podúkol 5.2.1 Předběžné rozpoznání typologie fasád, střech a kontextu a předpověď výkonnosti
Pro v podstatě pozemní domy vyvinuté identifikace typologií budov budeme tyto poznatky extrapolovat a přizpůsobovat typologiím výškových bytových domů.
V části 5.2.1 identifikujeme a zaznamenáme specifické charakteristiky typologií bytových domů se zaměřením na vnější plášť. Získané údaje budou použity k vytvoření uživatelsky přívětivé integrace konfigurace budovy do modelů BIM.
Podúkol 5.2.2 Identifikace polohy a orientace pomocí GIS
K identifikaci budov s podobnými charakteristikami budou použity GIS a další zdroje dat, jako jsou letecké snímky a místní fotografie fasád pořízené drony. Údaje o těchto budovách budou použity k vylepšení modelů, které mohou být použity ke zlepšení znalostí o variabilitě v rámci specifických typologií budov. Rozpoznání typů budov (bytů) v demonstrační zemi podpoří rozšiřování, industrializaci integrovaných konceptů renovace.
Podúkol 5.2.3 Automatizované konfigurace řešení střech a fasád
Při návrhu výroby dodatečné výbavy pomáhá softwarový generátor, který vytváří alternativy návrhu. Ty budou předloženy bytovým družstvům, sdružením soukromých bytů a nájemníkům, ale také továrně.
Podúkol 5.2.4 Nulové inženýrství na úrovni projektu
Při tradičních postupech trvá projektování výškových modernizačních řešení na stávající budově mnoho hodin. Zkrácení tohoto procesu povede ke snížení nákladů a zároveň zvýší úspěšnost ve fázích rozhodování o projektu. Rovněž se otevřou nové trhy: menší projekty se stanou realizovatelnými za ceny větších (z úspor z rozsahu směrem k masovému přizpůsobení). Proto je cílem vytvořit proces Zero Engineering zaměřený na File2Factory. To nakonec povede k procesu bez zapojení lidských inženýrských kapacit. K dosažení tohoto cíle budou v rámci demo projektů zkoumány následující kroky:

- 3D skenování mračna bodů pomocí dronů a automatická korekce modelu BIM
- Aplikace rozpoznávání stavebních prvků a možných náhradních řešení pomocí umělé inteligence
- Automatizovaná kalibrace prognózovaného výkonu údržby
- Automatizovaná integrace technologie renovace budov do BIM prostřednictvím nástrojů pro parametrické navrhování (automatizovaná konfigurace).
- Vstup do průmyslového výrobního zařízení (File2Factory a systémy pro podporu výrobních procesů)

Úkol 5.3 Výroba mimo lokalitu M1-M48. Vedoucí úkolu: UNITN, Účastníci: DTTN, UNITN, POLITO, Bos Groep, RCP, HU, IREC, IBAVI, PALMA, SINTEF, EURAC.
Všechny demonstrační projekty se zaměřují na použití prefabrikace. V T5.3 společně identifikujeme výrobní metodiky a vytvoříme výhled na Průmysl 4.0 v rámci výrobních procesů. Analýza vychází z projektů EU InduZero a Build-in-wood. Prostřednictvím analýzy pracovních postupů také určíme, které činnosti lze přesunout do fáze prefabrikace. Identifikací omezení ve výrobě učiníme další krok k integraci instalací (např. větracích jednotek, potrubí, systémů) do fasádních a střešních modulů. Tradiční výrobu a instalaci na místě je tak možné z velké části převést na výrobu mimo místo. Tím se snižuje narušení životního prostředí ve městech. Snižují se také náklady na poruchy, a to jak díky řízené průmyslové výrobě, tak díky inteligentním plug-and-play připojením na místě. Prostřednictvím aplikace, ověřování a rozvíjení znalostí jsou zkoumána následující témata:

- Identifikace metodik výroby mimo staveniště pro MMC (moderní metody výstavby) v suché technologii, založené na hlavním systému používaném pro výrobu panelů: CLT a/nebo rámové stěny
- Definice standardních modulů (tvar a rozměry) s určitou flexibilitou (rozměry, materiály, vrstvy) pro snadné přizpůsobení stávajícím budovám (tkanina a systémy).
- Identifikace postupů BIM pro design panelů, aby byly plně kompatibilní s výrobním a řídicím softwarem, přímo propojené s vyřizováním objednávek klientů, řízením zásob atd.
- Definice možných vrstev a materiálů (na biologické bázi a/nebo recyklovaných): vnější povrchová úprava (včetně ekologických řešení, materiálů na bázi nanomateriálů, reflexních povrchových úprav, fotovoltaických panelů), větraná fasáda, izolace, průchod systému/zařízení (v rámci modulu nebo uvnitř modulů), vnitřní povrchová úprava (včetně PCM a masivních řešení).
- Systémová integrace: průchod pro potrubí a elektrický systém (plug-and-play: korelace se stávajícími systémy), BAPVa BIPV, mini MV stroj u oken.
- Souvislost se stávajícími dveřmi a okny (snadná výměna a nenáročné stavební práce).

• Systém upevnění panelu na stávající stěnu musí být jednoduchý, rychlý, bezpečný, oboustranný (dřevo/dřevo, dřevo/ocel, ocel/ocelové spoje) s ohledem na instalaci a úpravu: zvláštní pozornost bude věnována stěnám mimo čtverec a nestandardním prvkům (rohové, půdní a střešní spoje, balkony atd.).
Definice vodotěsnosti a vzduchotěsnosti: panely-panely a panely-stěny
Úkol 5.4 Optimalizace stavebních procesů na staveništi pro modernizaci obývaných budov a nově postavených budov M1-M48. Vedoucí úkolu: HU Účastníci: Všichni uvedení v bodech 5.4.1 - 5.4.5.

V rámci tohoto podúkolu se vytvářejí nástroje pro řízení logistiky a plánování a monitorování montáže, které slouží ke koordinaci dodávek komponentů z různých zdrojů a míst. Cílem je rychlé (re)plánování a simulace alternativních montážních sekvencí, řízení rušivých vlivů a vyhodnocování stavu dokončení. Různé ukázky mají obsah, který se vztahuje k fázi výstavby, aby přispěl k cílům stanoveným jednotlivými stavbami.
Podúkol 5.4.1 Výstavba na místě Utrechtské demo M1-M48. Vedoucí úkolu : HU, Účastníci: Bos Groep, BOEX, město Utrecht, MEX, RCP.
Cirkulární HUB: Uzavření dodavatelských řetězců, které integrují místní/regionální výrobní/montážní zařízení do cirkulárních center umožňujících zpracování sklizených materiálů a stavebního a demoličního odpadu na nové (udržitelné) materiály a jejich opětovné využití v (integrálních) stavebních komponentech. Komponenty jsou konstruovány a vyráběny podle navrhovaného řešení výroby mimo staveniště, jak je popsáno v předchozím odstavci.
Optimalizace stavebních, materiálových a pracovních metod na stavbě u všech dodavatelů a subdodavatelů, které zabraňují ztrátám materiálu a snižují množství produkovaného odpadu (prostřednictvím integrovaného BIM). Bude navržen, otestován a vyhodnocen tok jednoho kusu a postup práce po jednom (N=1) tak, aby byl zaveden a ověřen stavební proces šetrný k obyvatelům pro modernizaci středně vysokých a vysokých budov v plném rozsahu v obsazeném stavu. Ke koordinaci toku dodávek komponentů a vracení vybouraných materiálů bude použit kruhový HUB. Cílem bude včasná a přímá montáž prvků modernizace.
Konstrukce pro udržení „energie a komfortu“ Jako řešení Retrofit Service. Prostřednictvím rychlé reakce na údržbu. Zařízení plug-and-play (vyměnitelnost) jsou mimořádně důležitá.
Celkově je v procesu Utrecht Demo Construction cílem snížit množství lidských zdrojů a snížit množství firem potřebných k aplikaci/montáži řešení modernizace. Jsou nutné relativně malé multifunkční týmy.
Podúkol 5.4.2 Stavba na místě Palma demo M1-M48. Vedoucí úkolu: PALMA, Účastníci: IBAVI, IREC
Integrovaný pracovní postup pro rozsáhlou renovaci hustě obydlených městských oblastí prostřednictvím partnerství veřejného a soukromého sektoru (PPP)
- Partner PALMA- Městská rada Palma. Ověřit a prokázat zkrácení doby realizace a nákladů při rozsáhlé renovaci (200-300 bytů; několik budov) v integrovaném procesu s jedním projektovým manažerem / dodavatelem ve srovnání s procesem, který probíhá po jednotlivých budovách.
- Palma (IBAVI) Nová budova sociálního bydlení s 36 byty. Demonstrovat a ověřit použití opakujících se stavebních modulů pro třípodlažní bytové domy s masivními stěnami na bázi místního vytěženého kamene „marés “a s minimálním použitím materiálu. Integrace a výroba prefabrikovaných dřevěných podlah mimo staveniště s cílem zkrátit dobu realizace stavby o 2 měsíce. Proces bude dokumentován, monitorován a analyzován.
Podúkol 5.4.3 Výstavba na staveništi Oslo demo M1-M48. Vedoucí úkolu: SINTEF, Účastníci: OBF
Uhlíkově neutrální stavební proces: Budou testovány stavební stroje na elektřinu a biopaliva, aby se snížily emise při výstavbě. Budou rovněž testovány strategie/systémy pro elektrické vytápění staveniště. Výsledky monitorování z WP8 budou použity k analýze požadavků na spotřebu energie a přítomnosti strojů pro dimenzování zásobování staveniště energií. V rámci Circular HUB mohou být mimo staveniště zřízeny materiálové HUBy, takže velká vozidla zde mohou vykládat zboží a menší (elektrická) vozidla zajistí dopravu na poslední úsek na staveniště. Tím se také sníží hluk a místní znečištění ovzduší. Takové aktivity jsou součástí implementace pilíře Circularity ARV v demonstraci Oslo.
Podúkol 5.4.4 Výstavba na místě Karviná demo M1-M48. Vedoucí úkolu: ČVUT, Účastníci: KARV
V Karviné budou během provozu budovy pilotně instalována opatření přizpůsobující se změně klimatu, která zahrnují letní chlazení tepelnými čerpadly a vzorek zelené střechy pro ochlazování tepelných ostrovů a místní hospodaření s dešťovou vodou (dešťové zahrady, zeleň). Instalace výměnných fasádních integrovaných OZE (flexibilní řešení umožňující snadnou aplikaci FV/PV-T/solárních tepelných/fasádních výměníků tepla pro případné propojení s tepelnými čerpadly).

Podúkol 5.4.5 Výstavba na místě Demo Trento. M12-M48. Vedoucí úkolu: DTTN, Účastníci: UNITN, POLITO, EURAC
Dřevěné a biologické konstrukce/renovace na místě (modulární/plug-and-play) během provozu budovy budou pilotovány v Trentu při instalaci opatření přizpůsobujících se změně klimatu, která zahrnují letní chlazení pomocí tepelných čerpadel a vzorek zelené střechy pro zmírnění tepelného ostrova a místní hospodaření s dešťovou vodou (dešťové zahrady, zeleň). Instalace výměnných fasádních výměníků integrovaných do BAS řízených OZE (flexibilní řešení umožňující snadnou aplikaci FV/PV-T/solárních tepelných výměníků/fasádních výměníků tepla pro případné

propojení s tepelnými čerpadly). Pasivní/aktivní řešení pro zlepšení komfortu v návaznosti na psychologické a fyziologické aspekty. Systém uhlíkových kreditů spojený se zásobami uhlíku v řešeních na bázi dřeva.

Účast na jednoho partnera

Číslo a zkrácený název partnera	Úsilí pracovního balíčku5
1 - NTNU	3.50
2 - ACE	1.00
3 - ČVUT	19.00
8 - EURAC	3.50
9 - SINTEF	7.00
10 - PALMA	16.00
11 - IBAVI	8.50
12 - IREC	10.00
14 - UAS Utrecht	35.00
16 - Buro de Haan	15.00
20 - BOEX	5.00
21 - Rc Panels B.V.	6.00
22 - UU	2.00
23 - CITY OF UTRECHT	2.00
24 - BOSGROEP	13.00
26 - MEX	9.00
28 - KARV	5.00
30 - DTTN	6.00
Armalam	12.00
X-LAM DOLOMITI	11.50
FANTI LEGNAMI	7.50
31 - UNITN	22.00
32 - POLITO	8.00
33 - OBF	4.00
Celkem	231.50

Seznam dodávek

Číslo dodávky[14]	Název dodávky	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D5.1	Konfigurátor výroby pro výškové bytové domy k přímému zahájení výroby (File2Factory) validované v zúčastněných evropských zemích.	14 - UAS Utrecht	Zpráva	Veřejné	24
D5.2	Analýza pracovních toků a zjištění, jak přejít k prefabrikovanějším komponentům a omezit vynaloženou práci na místě.	14 - UAS Utrecht	Zpráva	Veřejné	36
D5.3	Pracovní postupy efektivní (před)výroby a stavby. Demostrační projekt v Utrechtu.	14 - UAS Utrecht	Zpráva	Veřejné	48
D5.4	Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Palmě.	12 - IREC	Zpráva	Veřejné	48
D5.5	Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Oslu.	33 - OBF	Zpráva	Veřejné	48
D5.6	Pracovní postupy efektivní (před)výrobya stavby. Demonstrační projekt v Karviné.	3 - ČVUT	Zpráva	Veřejné	48
D5.7	Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Trentu.	31 - UNITN	Zpráva	Veřejné	48
D5.8	Demonstrace CPCC v Utrechtu.	14 - UAS Utrecht	Předváděcí model	Veřejné	36
D5.9	Demonstrace CPCC v Palmě.	10 - PALMA	Předváděcí model	Veřejné	36
D5.10	Demonstrace CPCC v Oslu.	33 - OBF	Předváděcí model	Veřejné	36
D5.11	Demonstrace CPCC v Karviné.	3 - ČVUT	Předváděcí model	Veřejné	36
D5.12	Demonstrace CPCC v Trentu.	31 - UNITN	Předváděcí model	Veřejné	36

Popis dodávek
D5.1: Konfigurátor výroby pro výškové bytové domy k přímému zahájení výroby (File2Factory) validované v zúčastněných evropských zemích. [24] Nástroj pro konfiguraci. Cílem je snížit celkové náklady o 30 %, emise CO2 a podstatně snížit obtěžování cestujících. D5.2: Analýza pracovních toků a zjištění, jak přejít k prefabrikovanějším komponentům a omezit vynaloženou práci na místě. [36] Rozhodnutí o modernizaci s nulovou spotřebou energie. V předchozích projektech byla vyvinuta koncepce nulového inženýrského procesu a sklízení charakteristik nezávislých na projektu a automatizovaných postupů. D5.3: Pracovní postupy efektivní (před)výroby a stavby. Demostrační projekt v Utrechtu. [48] Pracovní skupina WP2 vytvoří rámec pro pracovní postupy před výrobou. V rámci tohoto výstupu bude rámec aplikován a testován pro příslušný demonstrační případ. D5.4: Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Palmě. [48] Pracovní skupina WP2 vytvoří rámec pro pracovní postupy před výrobou. V rámci tohoto výstupu bude rámec aplikován a testován pro příslušný demonstrační případ. D5.5: Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Oslu. [48] Pracovní skupina WP2 vytvoří rámec pro pracovní postupy před výrobou. V rámci tohoto výstupu bude rámec aplikován a testován pro příslušný demonstrační případ. D5.6: Pracovní postupy efektivní (před)výrobya stavby. Demonstrační projekt v Karviné. [48] Pracovní skupina WP2 vytvoří rámec pro pracovní postupy před výrobou. V rámci tohoto výstupu bude rámec aplikován a testován pro příslušný demonstrační případ. D5.7: Pracovní postupy efektivní (před)výroby a stavby. Demonstrační projekt v Trentu. [48] Pracovní skupina WP2 vytvoří rámec pro pracovní postupy před výrobou. V rámci tohoto výstupu bude rámec aplikován a testován pro příslušný demonstrační případ. D5.8: Demonstrace CPCC v Utrechtu. [36] „Každý demonstrační případ bude samostatně informovat o následujících tématech, která budou v demonstracích zkoumána. • Realizace retrofitů a nově postavených skeletů, jejichž cílem je dosažení energetické neutrality nebo dokonce energetické plus, aniž by se přehlížela hodnota designu Snížení nákladů na výstavbu na místě • Vývoj pokročilých ICT nástrojů / procesů pro automatizované shromažďování a rozpoznávání dat o retrofitech budov a staveništ. A také nový přístup „zero engineering“, který snižuje náklady a čas v předvýrobní fázi. • Konstrukce k údržbě. Demonstrace toho, že údržba je jedním z hlavních cílů demonstrací. • Snížení emisí CO2 z procesu výstavby a ekonomické zhodnocení (obchodování s uhlíkem). • Snížení nepříjemností souvisejících s dopravou a emisí CO2. •Snížení množství odpadu na staveništi a mimo něj ((před)výroba).“ D5.9: Demonstrace CPCC v Palmě. [36] „Každý demonstrační případ bude samostatně informovat o následujících tématech, která budou v demonstracích zkoumána. • Realizace retrofitů a nově postavených skeletů, jejichž cílem je dosažení energetické neutrality nebo dokonce energetické plus, aniž by se přehlížela hodnota designu • Snížení nákladů na výstavbu na místě • Vývoj pokročilých ICT nástrojů / procesů pro automatizované shromažďování a rozpoznávání dat o retrofitech budov a staveništ. A také nový přístup „zero engineering“, který snižuje náklady a čas v předvýrobní fázi. • Konstrukce k údržbě. Demonstrace toho, že údržba je jedním z hlavních cílů demonstrací. • Snížení emisí CO2 z procesu výstavby a ekonomické zhodnocení (obchodování s uhlíkem). • Snížení nepříjemností souvisejících s dopravou a emisí CO2. •Snížení množství odpadu na staveništi a mimo něj ((před)výroba).“ D5.10: Demonstrace CPCC v Oslu. [36] „Každý demonstrační případ bude samostatně informovat o následujících tématech, která budou v demonstracích zkoumána. • Realizace retrofitů a nově postavených skeletů, jejichž cílem je dosažení energetické neutrality nebo dokonce energetické plus, aniž by se přehlížela hodnota designu • Snížení nákladů na výstavbu na místě • Vývoj pokročilých ICT nástrojů / procesů pro automatizované shromažďování a rozpoznávání dat o retrofitech budov a staveništ. A také nový přístup „zero engineering“;, který snižuje náklady a čas v předvýrobní fázi. • Konstrukce k údržbě. Demonstrace toho, že údržba je jedním z hlavních cílů demonstrací. • Snížení emisí CO2 z procesu výstavby a ekonomické zhodnocení (obchodování s uhlíkem). • Snížení nepříjemností souvisejících s dopravou a emisí CO2. •Snížení množství odpadu na staveništi a mimo něj ((před)výroba).“ D5.11: Demonstrace CPCC v Karviné. [36] „Každý demonstrační případ bude samostatně informovat o následujících tématech, která budou v demonstracích zkoumána. • Realizace retrofitů a nově postavených skeletů, jejichž cílem je dosažení energetické neutrality nebo dokonce energetické plus, aniž by se přehlížela hodnota designu • Snížení nákladů na výstavbu na místě • Vývoj pokročilých ICT nástrojů / procesů pro automatizované shromažďování a rozpoznávání dat o retrofitech budov a staveništ. A také nový přístup „zero engineering“, který snižuje náklady a čas v předvýrobní fázi. • Konstrukce k údržbě. Demonstrace toho, že údržba je jedním z hlavních cílů demonstrací. • Snížení emisí CO2 z procesu výstavby a

ekonomické zhodnocení (obchodování s uhlíkem). • Snížení nepříjemností souvisejících s dopravou a emisí CO2. •Snížení množství odpadu na staveništi a mimo něj ((před)výroba).“
D5.12: Demonstrace CPCC v Trentu. [36]

„Každý demonstrační případ bude samostatně informovat o následujících tématech, která budou v demonstracích zkoumána. • Realizace retrofitů a nově postavených skeletů, jejichž cílem je dosažení energetické neutrality nebo dokonce energetické plus, aniž by se přehlížela hodnota designu • Snížení nákladů na výstavbu na místě • Vývoj pokročilých ICT nástrojů / procesů pro automatizované shromažďování a rozpoznávání dat o retrofitech budov a staveništ. A také nový přístup „zero engineering “, který snižuje náklady a čas v předvýrobní fázi. • Konstrukce k údržbě. Demonstrace toho, že údržba je jedním z hlavních cílů demonstrací. • Snížení emisí CO2 z procesu výstavby a ekonomické zhodnocení (obchodování s uhlíkem). • Snížení nepříjemností souvisejících s dopravou a emisí CO2. •Snížení množství odpadu na staveništi a mimo něj ((před)výroba). “

Harmonogram relevantních milníků

číslo milníku[18]	**Název milníku**	**Příjemce**	**Datum splatnosti (v měs.)**	**Způsoby ověření**
MS8	První iterace uznávaných typologií	14 - UAS Utrecht	12	Množství a kvalita uznaných typologií
MS9	Konečná iterace uznaných typologií a pracovního postupu před výrobou.	14 - UAS Utrecht	24	Ověření automatizovaně dodaného vstupu pro File2Factory
MS10	První iterace analýz výrobních pracovních postupů	14 - UAS Utrecht	30	Množství činností změněných na výrobu mimo lokalitu.
MS11	Realizované výrobní principy	14 - UAS Utrecht	36	Analýzy výstupní výroby. Dodané moduly na staveniště
MS12	Realizace demo projektů	14 - UAS Utrecht	36	Výstavba projektů dokončena

Číslo pracovního balíčku [9]	WP6	**Příjemce** [10]	3 - ČVUT
Název pracovního balíčku	Integrované systémy obnovitelných zdrojů a skladování		
Začátek měsíce	1	**Ukončení měsíce**	46

Cíle

Pracovní skupina 6 se zabývá návrhem systému, nasazením a hodnocením celkových inovativních řešení ARV na různých demonstračních místech s ohledem na obnovitelné zdroje energie (OZE) a systémy skladování energie (ESS) implementované v budovách a čtvrtích. To je nezbytné pro dosažení ambicí projektu ARV při vytváření komunit s čistou pozitivní energií a nulovými emisemi, jakož i pro urychlení rozsáhlého zavádění CPCC v celé Evropě. Mezi WP6 a ostatními pracovními balíčky existuje silná spolupráce, pokud jde o shromažďování zpětné vazby a poskytování vstupů pro návrh (pro WP4), účast občanů (pro WP3), simulační modely (pro WP2), jakož i efektivní fungování inovativních řešení (pro WP7). Konečná inovativní řešení OZE a ESS tak budou zahrnovat různé aspekty týkající se estetiky, životního prostředí, přijetí uživateli, ekonomiky životního cyklu a flexibility. Kromě toho bude tento WP sdílet zkušenosti a znalosti mezi šesti demonstračními místy v průběhu vývoje projektu, aby se překonaly problémy, které se mohou vyskytnout během zavádění inovativních řešení.

Hodnocení inovativních řešení ESS a OZE se provádí prostřednictvím pokročilých simulací, které jsou vynuceny reálnými údaji z měření a klíčovými ukazateli výkonnosti definovanými ve WP2. Získané výsledky z hodnocení demonstračních lokalit umožní vytvořit ucelené přístupy ke zlepšení energetických systémů budov a oblastí a replikovatelnost/škálovatelnost řešení v jiných lokalitách s odlišnými klimatickými podmínkami. Hlavní cíle tohoto WP jsou následující:

- Integrovaný energetický návrh pro implementaci řešení OZE a ESS pro splnění elektrických a tepelných potřeb budov/čtvrti.
- Poskytnout postupy pro implementaci, návrh, škálovatelnost a recirkulaci energetických systémů v budovách a čtvrtích.
- Podpora a sdílení znalostí při vývoji všech inovativních řešení OZE a ESS v rámci demonstrací.

Popis práce a role partnerů

WP6 - Integrované systémy obnovitelných zdrojů a skladování [Měsíce: 1-46]
ČVUT, NTNU, DTU, DANFOSS A/S, ENFOR, PROJECTZERO, EURAC, SINTEF, PALMA, IREC, UAS Utrecht, Center Denmark, SAB, BOEX, Rc Panels B.V., UU, BOSGROEP, MEX, Mitros, KARV, DOL, POLITO, OBF, NANO

Práce v tomto pracovním balíčku sdružuje příspěvky demonstračních míst ARV, jejichž cílem je implementace inovativních řešení v oblasti obnovitelných zdrojů energie a skladování. Kromě úkolu T6.1, do kterého jsou zapojeny všechny demonstrační projekty, bude každý úkol od T6.2 do T6.6 věnován konkrétnímu demonstračnímu projektu a bude implicitně zahrnovat činnosti související s hlavními cíli tohoto pracovního balíčku.

Úkol 6.1 Inovační fórum pro zavádění OZE a skladování v CPCC. M1-M46.Vedoucí: ČVUT, Partneři: KARV, HU, PALMA, PZ, OBF, DTTN, NTNU, IREC, SINTEF, DTU, EURAC, GDFA, ACE.

Cílem tohoto úkolu je podpořit zavádění inovativních řešení v oblasti OZE a skladování energie v šesti demonstračních lokalitách projektu ARV a zdůraznit úlohu OZE při rozsáhlém zavádění CPCC v Evropě. T6.1 bude zahrnovat workshopy, které zajistí spolupráci a sdílení znalostí mezi partnery zapojenými do návrhu, výstavby a provozu inovativního řešení každého demo projektu. Výsledky tohoto úkolu budou přidány k výstupům D1.4 / WP1.

Úkol 6.2 Integrované inovativní řešení OZE a ESS v ukázkovém Oslu. M1-M42. Vedoucí: SINTEF, Partneři: OBF, NTNU, ENFOR

- Elektřina: Systém výroby energie z obnovitelných zdrojů na místě se skládá z inovativních systémů BIPV a BAPV. Inovace spočívá v rozdílném zbarvení a vertikální orientaci fotovoltaických panelů, aby byla zajištěna optimální rovnováha mezi výrobou energie z fotovoltaiky a estetickým výrazem a vzhledem. Pokud jde o místní skladování energie, ARV se bude snažit navrhnout a vybudovat inovativní systém využívající recyklované baterie. Alternativním a ekologickým řešením k novým bateriím je vybudování bateriového úložiště z recyklovaných baterií z elektromobilů. Obvykle se baterie elektromobilu vyměňuje, když se její kapacita sníží na méně než 70-80 % startovací kapacity, což je stále velká kapacita. Toto řešení je nákladově efektivní a šetrné k životnímu prostředí, protože se očekává, že sníží

50 % emisí skleníkových plynů v celém procesu výroby baterií a 20 % jejich dopadu na životní prostředí. Navíc se může stát stále důležitější alternativou, až bude v blízké budoucnosti nutné vyměnit baterie u řady elektromobilů.

- Teplo: Inovativní systém vytápění/chlazení, tj. systém LowEx, využívající nízkoteplotní tepelné vytápění a vysokoteplotní tepelné chlazení s využitím stejné infrastruktury ve spojení se zemním tepelným čerpadlem a dálkovým vytápěním jako zařízením pro špičkové zatížení. Tento typ superúčinné tepelněenergetické technologie může zajišťovat tepelné potřeby s velmi nízkou spotřebou primární energie, obvykle v řádu 3 až 10 kWh/m2rok, pro dodávku vytápění a chlazení v budovách s téměř nulovou spotřebou energie, nulovou spotřebou energie ZEB nebo pozitivních budovách. Řešení umožňuje výrazně snížit špičkové zatížení elektrické sítě a také umožňuje vyšší vlastní využití místně vyrobené obnovitelné energie, což činí místní výrobu elektřiny ekonomicky výhodnější při současných tarifech za elektřinu. Kromě toho vytváří velmi stabilní tepelné klima v interiéru po celý rok, což zvyšuje tepelný komfort a IAQ. Systém LowEx bude integrován do demonstračního projektu v Oslu s využitím stávající infrastruktury, čímž se ušetří náklady a ztělesněná energie z použití materiálu.

Úkol 6.3 Integrované inovativní řešení OZE a ESS v demonstraci Sønderborg. M1-M26. Vedoucí: PZ, Partneři: ENFOR, SAB, DTU, DAN, Center Denmark.

- Elektřina: Střešní integrovaný fotovoltaický systém v kombinaci s nově vyvinutými průtokovými bateriemi pro maximalizaci spotřeby lokálně získané energie. V roce 2017 bylo na střechy všech 19 bytových domů vybraných jako demonstrační místo integrováno více než 3 000 m2 solárních fotovoltaických panelů. Solární FV systém dokáže vyrobit 460 kW solární elektřiny odpovídající 408 000 kWh ročně, což pokrývá 37 % celkové spotřeby elektřiny. Solární fotovoltaický systém se v posledních třech letech osvědčil velmi dobře a v každém bloku se plánuje instalace bateriových systémů společně se solárními fotovoltaickými panely. Na začátku roku 2021 budou v každém z 19 bloků implementovány baterie s kapacitou po 15 kWh/4 kW. Instalace 19 baterií znamená, že v budovách lze potenciálně ročně využít dalších 60 000 kWh solární elektřiny namísto jejího exportu do sítě. Inovace spočívá v provozu baterií na základě předpovědi vlastní spotřeby a výpočtu dostupné flexibility pro podporu sítě.

- Teplo: Teplá voda pro domácnost s podporou tepelného čerpadla: Obvykle je teplota zpátečky z dálkového vytápění příliš vysoká kvůli nezbytné vysoké teplotě v cirkulačním systému teplé vody. Teplotu zpátečky dálkového vytápění lze snížit zavedením malého tepelného čerpadla (3-5 kW) do systému. Tepelné čerpadlo odebírá teplo z okruhu cirkulačního potrubí, a tím snižuje teplotu zpátečky. V závislosti na skutečných nákladech na elektřinu a hodnotě bonusu za zpětné vytápění lze provoz tepelného čerpadla optimalizovat (zapnout/vypnout), což vede k možnosti přesunu paliva mezi dálkovým vytápěním a elektřinou.

Úkol 6.4 Integrované inovativní řešení OZE a ESS v demo Utrechtu. M1-M44. Vedoucí: UU, Partneři: Bos Groep, MITROS, HU, MEX, RCP, BOEX, DTU, ENFOR.

- Elektřina: V budovách v zelené čtvrti bude demonstrováno inovativní řešení sestávající z BIPV/BAPV pro maximalizaci sběru solární energie v kombinaci s místním a regionálním skladováním elektřiny, které poskytuje podporu síti, a také EV-V2G. Před ARV je výšková budova modernizována tak, aby se stala PEB, přičemž jsou implementovány BAPV a BIPV spolu s tepelnými čerpadly pro výrobu tepla a teplé vody a bateriovým úložištěm přispívajícím ke snížení spotřeby v budově (TRL5-6). Tato první výšková budova s pozitivní energetickou bilancí poskytuje příležitost odečíst parametry návrhu pro přístupy k modernizaci, které integrují prefabrikované stavební prvky s předinstalovanými energetickými zařízeními v provedení plug-and-play. Tento optimalizovaný přístup bude podpořen předpovědí výroby energie z fotovoltaických panelů pomocí kamer pro detekci mraků a údajů z meteorologických stanic spolu s rychlou sítí senzorů, které měří ozáření a teplotu přibližně 1100 panelů BAPV/BIPV, a poptávkou po elektřině a bude demonstrován na dalších typech budov, tj. různých výškách a typech konstrukcí, aby se vytvořil průmyslový přístup, který jej dovede do úrovně TRL7-8. Kroky v T6.4 zahrnují energetickou analýzu demonstračních budov a implementaci BIPV/BAPV do pracovního procesu renovace a přímé využití výpadku stejnosměrného proudu z BIPV/BAPV ke snížení energetických ztrát.
- Teplo: Implementace a demonstrace modulární infrastruktury pro vytápění, větrání a chlazení výškových budov. Tento modulární systém HVAC je kompatibilní pro více zdrojů vytápění, jako jsou např: Nízkoteplotní a střednëteplotní dálkové vytápění, geotermální systémy tepelných čerpadel a systémy tepelných čerpadel vzduch-voda. Kromě toho je toto řešení kompatibilní s plně elektrickými řešeními, jako je infračervené nebo kombinované elektrické a ventilační vytápění. Důsledky pro řešení větrání a rekuperace tepla a požadavky na izolaci jsou odečteny s cílem modernizovat bytové domy na úrovni běžných nákladů a zároveň zvýšit energetickou náročnost budovy a úroveň komfortu pro obyvatele.

Úkol 6.5 Integrované inovativní řešení OZE a EZS v demonstraci Karviná. M1-M42. Ved: Vedoucí: ČVUT, Partneři: KARV,NANO

- Elektřina: V demonstraci bude zvažována implementace inovativního fotovoltaického systému kombinujícího BIPV a BAPV. Fotovoltaický systém se bude skládat z panelů s vysokou účinností, které budou budově dodávat dostatek energie. FV systém navíc přispěje ke zlepšení vnitřního prostředí tím, že bude dodávat energii pro pohon

vnějších stínicích prvků omezujících přístup slunečního světla do interiéru, přičemž architektonická estetika BIPV zůstane na nejvyšší úrovni. Centrální úložiště energie s druhým životním cyklem bude navrženo tak, aby bylo možné provozovat demo jako místní mikrosíť, která podporuje různé funkce související s flexibilitou energie v budově, změnou zatížení a snížením spotřeby ve špičkách. Kromě toho se uvažuje také o nabíjecích stanicích pro elektromobily a implementaci služeb V2G/V2H. Nakonec budou instalovány místní snímače slunečního záření a teploty, jakož i řešení snímání oblohy pro přesné předpovědi výroby fotovoltaických článků a provozu celého systému, které zajistí WP7.

• Teplo: Implementace inovativního systému tepelného čerpadla pro rekonstrukci budov, které zajišťuje vytápění a chlazení. Systém bude kombinovat tepelné čerpadlo s PVT a využitím odpadního tepla. Kromě toho bude zvážena konstrukce tepelné akumulace pro vyvážení tepelných čerpadel, která poskytuje potenciál pro flexibilitu poptávky po vytápění v budově a zajišťuje potřebnou energii pro vytápění v zimě a chlazení v létě a cílové požadavky na pozitivní energii. Pro efektivní provoz systémů HVAC bude zavedena místní meteorologická stanice s měřením vnitřní teploty.

Úkol 6.6 Integrované inovativní řešení OZE a ESS v demonstraci Trento. M1-M46. Vedoucí: EURAC, Partneři: ENFOR

• Elektřina: Budou zvažovány baterie s 1. a 2. životností, včetně aplikací typu vozidlo-domácnost (V2H) v rekonstruovaných budovách. Piedicastello Destra Adige se vyznačuje integrací inovativních řešení a přístupů pro udržitelný rozvoj měst, jako je využití baterií s druhou životností, technologie V2G/V2H (vehicle-to-grid/home). DOL zváží zahrnutí této oblasti do plánu infrastruktury pro dobíjecí stanice V2G pro elektromobily na výměnném parkovišti Ex-Zuffo.

• Teplo: DOL a POLITO budou pracovat na realizaci nového prototypu energetického tunelu ve stávajícím Piedicastellotunelu, který se skládá ze dvou dvojitých tunelů o délce přibližně 200 m, vedených paralelně s odstupem několika metrů a maximálním krytím přibližně 130 m. Úsek tunelů o délce 15 m, který se nachází ve vzdálenosti 100 m od portálů (tj. v oblasti maximálního krytí), bude přeměněn na prototyp energetického tunelu pro demonstraci technologie v příslušném prostředí. Prototyp bude mít tyto vlastnosti:

- Instalace radiálních vrtných výměníků tepla o délce 30 m na obrysu koruny (3 na průřez, pod úhlem 15°, 60° a 105° od svislice koruny). Jeden úsek každých 7 m, celkem budou instalovány 3 úseky radiálních BHE. - Instalace okruhu trubek v intradosu koruny tunelu, ve stejné délce 15 m, pokrytých 5 cm silným stříkaným železobetonem a izolační pěnou.
- Potrubí pro připojení k systému tepelného čerpadla umístěné na portálu.
- Sekundární systém pro vytápění a chlazení ve výstavní hale.
- Plán měření včetně snímačů teploty v zemi, v tunelu, tepelného toku atd.

Očekává se, že systém umožní využití tepelného výkonu v řádu 25 kW a bude sloužit pro rekonstruovaný blok budov. Předpokládá se, že systém může sloužit jak v zimním, tak v letním období. Na podporu rozsahu projektu vytvoření budov s téměř nulovou spotřebou energie v oblasti 1 (bývalý areál Ex-Italcementi) budou přijaty energetické geostruktury. Lze předpokládat následující charakteristiky:

- tepelná aktivace základů díky instalaci okruhu trubek v základové desce.
- tepelná aktivace opěrných zdí pomocí prvků GeothermSkin. (patentová priorita n°. 102016000020821).

Účast na jednoho partnera

Číslo a zkrácený název partnera	Úsilí pracovního balíčku 6
1 - NTNU	15.00
3 - ČVUT	37.00
4 - DTU	20.00
5 - DANFOSS A/S	1.00
6 - ENFOR	18.00
7 - PROJECTZERO	3.50
8 - EURAC	2.00
9 - SINTEF	4.00
10 - PALMA	1.00
12 - IREC	1.00
14 - UAS Utrecht	2.00

17 - Center Denmark	4.00
Číslo a zkrácený název partnera	**Úsilí pracovního balíčku 6**
18 - SAB	2.00
20 - BOEX	2.00
21 - Rc Panels B.V.	2.00
22 - UU	14.00
24 - BOSGROEP	10.00
26 - MEX	2.00
27 - Mitros	6.00
28 - KARV	6.00
29 - DOL	15.00
32 - POLITO	11.00
33 - OBF	4.00
34 - NANO	10.00
Celkem	192.50

Seznam dodávek

Číslo dodávky[14]	**Název dodávky**	**Příjemce**	**Typ dodávky[15]**	**Úroveň diskrétnosti[16]**	**Datum splatnosti (v měs.)[17]**
D6.1	Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Oslu.	9 - SINTEF	Předváděcí model	Veřejné	42
D6.2	Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Sønderborgu.	7 - PROJECTZERO	Předváděcí model	Veřejné	26
D6.3	Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Utrechtu.	22 - UU	Předváděcí model	Veřejné	44
D6.4	Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Karviné.	3 - ČVUT	Předváděcí model	Veřejné	44

D6.5	Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Trentu.	8 - EURAC	Předváděcí model	Veřejné	46

Popis dodávek

D6.1: Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Oslu. [42]

Dodávky shrnují příspěvky demonstračních míst ARV, jejichž cílem je implementace inovativních řešení v oblasti obnovitelných zdrojů energie a skladování. Každý demonstrační případ bude podán samostatně jako Pokyny pro integrovaný návrh a implementaci OZE a ESS pro energetické potřeby budov/čtvrti.

D6.2: Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Sønderborgu. [26]

Dodávky shrnují příspěvky demonstračních míst ARV, jejichž cílem je implementace inovativních řešení v oblasti obnovitelných zdrojů energie a skladování. Každý demonstrační případ bude podán samostatně jako Pokyny pro integrovaný návrh a implementaci OZE a ESS pro energetické potřeby budov/čtvrti.

D6.3: Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Utrechtu. [44]

Dodávky shrnují příspěvky demonstračních míst ARV, jejichž cílem je implementace inovativních řešení v oblasti obnovitelných zdrojů energie a skladování. Každý demonstrační případ bude podán samostatně jako Pokyny pro integrovaný návrh a implementaci OZE a ESS pro energetické potřeby budov/čtvrti.

D6.4: Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Karviné. [44]

Dodávky shrnují příspěvky demonstračních míst ARV, jejichž cílem je implementace inovativních řešení v oblasti obnovitelných zdrojů energie a skladování. Každý demonstrační případ bude podán samostatně jako Pokyny pro integrovaný návrh a implementaci OZE a ESS pro energetické potřeby budov/čtvrti.

D6.5: Stanovení pokynů pro integrovaný návrh a implementaci systémů RES a ESS pro energetické potřeby budov/sousedství v Trentu. [46]

Dodávky shrnují příspěvky demonstračních míst ARV, jejichž cílem je implementace inovativních řešení v oblasti obnovitelných zdrojů energie a skladování. Každý demonstrační případ bude podán samostatně jako Pokyny pro integrovaný návrh a implementaci OZE a ESS pro energetické potřeby budov/čtvrti.

Harmonogram relevantních milníků

číslo milníku[18]	**Název milníku**	**Příjemce**	**Datum splatnosti (v měs.)**	**Způsoby ověření**
MS13	Pokrok v oblasti integrovaných systémů obnovitelných zdrojů energie a skladování	3 - ČVUT	20	Procesní zprávy o integrovaných systémech obnovitelných zdrojů energie a skladování v CPCC D6.2-6.6

Číslo pracovního balíčku [9]	WP7	**Příjemce** [10]	4 - DTU
Název pracovního balíčku	Efektivní provoz a flexibilita		
Začátek měsíce	1	**Ukončení měsíce**	48

Cíle

Tento pracovní balíček se zaměřuje na zavádění řešení pro optimalizaci výkonu během provozu šesti demonstračních míst v ARV. Výkonnost bude měřena na základě uživatelsky orientovaných preferenčních ukazatelů týkajících se energetické účinnosti, flexibility a nákladové efektivity, přičemž se vážně uvažuje směrem k energeticky pozitivním čtvrtím a budovám. To se realizuje pomocí hierarchie digitálních řešení, která se skládají z centrálního cloudového centra ARV (Center Denmark), národních center a místních systémů energetického managementu zaměřených na budovy. Digitální řešení budou odrážet geografickou strukturu a budou tak získány cenné zkušenosti, jak efektivně provozovat čtvrti v různých evropských klimatických zónách. ARV Cloud Hub také umožní testovat a optimalizovat regulační rámec pro umožnění efektivní a rychlejší cesty k nízkouhlíkové společnosti.

V budoucím energetickém systému řízeném počasím bude hrát důležitou roli flexibilita koncových uživatelů, a proto budeme v rámci ARV spolupracovat s jednotlivými demonstračními místy, abychom maximalizovali zapojení, transparentnost, spravedlnost a přijetí. K tomu přispějí neenergetické přínosy, jako je kvalita vzduchu v místnosti, zdraví, pohodlí a vzájemná spolupráce, které budou sledovány a vyhodnocovány ve spolupráci s pracovními skupinami WP3, WP6, WP8 a WP9. Nasazení digitálního cloudového centra ARV bude mít zásadní význam pro harmonizaci interakce mezi budovou, čtvrtí a uživateli.

Bude zavedena nová generace systémů řízení spotřeby energie v budovách (BEMS) optimalizovaných pro interakci s energetickou sítí, místní výrobu energie, reakci na poptávku a interakci s uživateli. BEMS budou založeny na modelech šedé skříňky a digitálních dvojčatech, které se budou používat pro řízení založené na modelech, jež zohledňuje preference a omezení uživatelů. Inteligentnost jednotlivých budov bude popsána pomocí ukazatele inteligentní připravenosti (SRI). Praktická a pozorovaná chytrost budov a okresů bude popsána pomocí funkcí flexibility (FF) a indexů flexibility (FI). Index flexibility pro budovu lze optimalizovat pro specifické výzvy klimatické zóny. V důsledku toho bude WP7 spolupracovat s WP4 na optimálním návrhu energeticky účinných budov a CPCC.

Pro řízení geograficky rozptýlených zdrojů na různých úrovních (např. na úrovni budov, okresů a měst) budou využity funkce flexibility a koncepty virtuálních elektráren (VPP). V obou případech nasadíme hierarchickou optimalizaci a řízení, které umožní zajištění flexibility na všech relevantních úrovních. Ke koordinaci a k vytvoření rozhraní mezi okresy a operátory trhu s energií/sítě budou využity ekonomické a technické agregátory. Souhrnně řečeno, WP7 se zaměří na digitální řešení a infrastruktury pro efektivní provoz v ARV. Zaměří se na uvolnění dostupné flexibility ve všech šesti demonstračních lokalitách pro optimalizaci vlastní spotřeby a minimalizaci uhlíkové stopy pomocí inteligentních operací založených na datech. WP7 využije informace a popis řešení pro ukládání energie z WP6, optimální řešení z WP4 a informace o senzorech a akčních členech z WP8. Řešení budou respektovat ochranu osobních údajů, GDPR a budou mít za cíl vytvořit robustní a odolné systémy již od návrhu.

Popis práce a role partnerů

WP7 - Efektivní provoz a flexibilita [Měsíce: 1-48]

DTU, NTNU, ČVUT, DANFOSS A/S, ENFOR, PROJECTZERO, EURAC, SINTEF, PALMA, IREC, MET, UAS Utrecht, HOUSING EUROPE, Center Denmark, SAB, BOEX, UU, CITY OF UTRECHT, iwell, Mitros, KARV, DOL, DTTN, UNITN, OBF, NANO

Práce v tomto pracovním balíčku shromažďuje příspěvky ze všech demonstračních míst uvažovaných v projektu ARV a práce je organizována na základě následujících úkolů:

Úkol 7.1 Inovační fórum pro zpracování dat a efektivní provoz. M1-M48. Vedoucí: Center Denmark, Partneři: všechny demonstrace.

Cílem tohoto úkolu je zajistit účinnou spolupráci mezi inovačními klastry v šesti demonstračních lokalitách. To zahrnuje i snahu o vzájemné učení a smyčky zpětné vazby mezi klastry a centrálním cloudovým uzlem ARV (Center Denmark) v oblasti ukládání dat, komunikace, výpočetní techniky a softwaru. Inovační fórum bude organizovat kombinaci otevřených inovačních aktivit a inovačních workshopů a aktivit mezi šesti klastry. Tyto činnosti posílí využití napříč inovačními klastry a budou fungovat jako inkubátor pro společnou tvorbu účinných a flexibilních inovačních řešení pro rozsáhlé nasazení v CPCC v různých klimatických zónách v Evropě.

Úkol 7.2 Evropské digitalizační centrum pro inteligentní budovy a čtvrti. M1-M48. Vedoucí úkolu: Center Denmark, Partneři: DTU, UU, ENFOR, IREC, PALMA, ČVUT, NTNU, SINTEF

Nastavení federovaného úložiště dat „data lake“ včetně analýzy dat z prostředí fog, edge a cloud computingu, včetně GDPR, kybernetické bezpečnosti a dodržování etických pravidel. ARV nasadí centralizovaný evropský digitalizační

uzel (úroveň cloudu) napojený na dílčí uzly (úroveň fog) na jednotlivých demonstračních místech, které jsou opět napojeny na systémy nebo aplikace budov a jejich obyvatel (úroveň edge). Cloudové centrum ARV bude na principu nejmodernějšího datového úložiště poskytovat úložiště pro monitorovací data a umožní efektivní využití dat v různých měřítcích. Bude také poskytovat uživatelská rozhraní pro uživatele, provozovatele, vlastníky budov a další zúčastněné strany. Vytvoření nastavení datového jezera pro software, správu a ukládání dat (D7.1).

Úkol 7.3 Modely energeticky účinného provozu budov a čtvrtí. M1-M36. Vedoucí: ČVUT, Partneři: DTU, všechny demo projekty, IREC, UU, SINTEF, NTNU.
Identifikace modelů pro energeticky účinné řízení budov a čtvrtí. Modely pro vnitřní klima, odhad stavu a virtuální (softwarové) senzory. Modely s integrovanými charakteristikami HVAC a baterií. Interakce s uživateli na bázi APP a WEBu. Modely pro integraci fotovoltaiky a integraci s místními meteorologickými stanicemi. Modely s integrovanou krátkodobou předpovědí počasí (včetně snímků oblohy). Tento úkol bude vycházet z informací o systémech skladování WP6. Archetypové modely budov (D7.2).

Podúkol 7.3.1 Zavedení modelů nízkého řádu optimalizovaných pro nízkoteplotní sítě dálkového vytápění (demonstrační projekt Sønderborg)
Podúkol 7.3.2 Model se sezónním zaměřením pro městskou energetickou geostrukturu v bývalých 400m dálničních tunelech pro dlouhodobé skladování pro zásobování nové městské čtvrti tepelnou a chladicí energií (demo Trento)
Podúkol 7.3.3 Modely nízkého řádu přizpůsobené pro centralizované systémy HVAC ve vícebytových budovách (demo Palma)
Podúkol 7.3.4 Zavedení předpovědi fotovoltaických zdrojů pro modelování provozu BAPV/BIPV a bateriových úložišť v budovách (demo Karviná a demo Utrecht)
Dílčí úkol 7.3.5 Nasazení modelů nízkého řádu pro řízení systému LowEx (ukázka v Oslu)
Úkol 7.4 Zavedení řešení pro předpovědi. M4-M42. Vedoucí: ENFOR, Partneři: DTU, Center Denmark, všechny Demos, ČVUT, KARV, UU, IREC, SINTEF.
V rámci tohoto úkolu budou zavedeny a vyhodnoceny metody místní předpovědi počasí založené na místních meteorologických stanicích provozovaných obcemi nebo městy v kombinaci s meteorologickou předpovědí počasí. Předpověď klimatu města a okresu s jemným rozlišením. Implementace s využitím centrálního cloudového uzlu ARV v kombinaci s místními městskými uzly. Předpověď místní a agregované výroby fotovoltaických panelů. Použití kombinované předpovědi pro optimalizaci přesnosti. Předpovídání cen energie. Prognóza profilu CO2 v energetickém mixu. Zohlednění smluv s globálním geodetickým pozorovacím systémem GGO. Pravděpodobnostní předpovědi. Tvorba scénářů pro rozhodování v podmínkách nejistoty. Společné a vícerozměrné předpovědi všech relevantních parametrů (větrná energie, solární energie, zatížení, ceny, emise, ...). Osvědčené postupy v oblasti předpovídání počasí ve městech s jemným rozlišením (D7.3). Implementace v cloudovém centru ARV a v místních cloudech souvisejících s některými demonstračními místy (D7.4).
Podúkol 7.4.1 Nasazení řešení snímání oblohy pro velmi krátkodobou předpověď slunečního záření (ukázka Karviná)
Podúkol 7.4.2 Zavedení a vyhodnocení místní předpovědi počasí (všechny demonstrace).
Podúkol 7.4.3 Předpovídání místní výroby fotovoltaických panelů (Sønderborg demo, Utrecht demo, Karviná demo, Oslo demo)
Podúkol 7.4.4 Prognózování profilů zatížení elektřinou a teplem (ARV Demos: Sønderborg, Utrecht, Palma, Karviná, Oslo)
Podúkol 7.4.5 Prognózování výroby energie pro BIPV a BAPV (ARV Demos: Utrecht, Palma, Karviná, Oslo)
Podúkol 7.4.6 Předpověď nasazení fotovoltaiky s ohledem na specifické povětrnostní podmínky v městském prostředí (demo Karviná)
Úkol 7.5 Nasazení a vyhodnocení řídicích algoritmů. M4 - M44). Vedoucí úkolu: VEDOUCÍ: DTU. Přispěvatelé: UU, IWELL, Bos Groep, MITROS, BOEX, Utrecht, IREC, MET, Center Denmark, NANO, ČVUT, KARV, SINTEF.
Modelové prediktivní regulátory (MPC) s integrovanou předpovědí počasí a zatížení. Regulátory pro okresní a BEMS. Regulátory s integrovanou předpovědí obsazenosti. Vstupy z monitorování (WP8). Optimální řízení systémů BIPV a BAPV. Řízení tepelných čerpadel v budovách a městských systémech. Prediktivní řízení vnitřního komfortu. Víceúčelové regulátory (např. náklady, energie a emise). Stochastické regulátory. Regulátory zohledňující zpětnou vazbu od uživatelů prostřednictvím aplikací a webu. Implementace v centrálním cloudovém uzlu ARV, místních uzlech a v BEMS. Pokyny (D7.5).
Podúkol 7.5.1 Řídicí jednotky pro systémy řízení spotřeby energie v budovách (BEMS) (všechny demonstrace).
Podúkol 7.5.2 Regulátory pro nízkoteplotní provoz dálkového vytápění (Sønderborg, ...)
Podúkol 7.5.3 Regulátory pro ovládání teplotních zón v síti dálkového vytápění (Sønderborg, ...)
Podúkol 7.5.4 Řízení bateriových systémů (Utrecht, Sønderborg, Karviná, ...)
Podúkol 7.5.5 Řízení tepelných čerpadel a teplot v centralizovaných systémech HVAC v budovách pro více rodin (Palma)

Podúkol 7.5.6 Řízení tepelných čerpadel a provozních teplot v centralizovaném systému HVAC LowEx ve vzdělávacích a multifunkčních budovách (Oslo)

Úkol 7.6 Popiš funkce a opatření energetické flexibility (M6-M46) Vedoucí úkolu: NTNU. Přispěvatelé: NTNU: DTU, ENFOR, všichni Demos, IREC, PALMA, UU, SINTEF.
Úkol využívá metody pro popis a identifikaci energetické flexibility související s řešeními odezvy na straně poptávky. S přispěním WP6 a WP5 úkol formuluje funkce flexibility (FF) pro poskytování místní podpory sítě nebo jiných služeb energetického systému. Na základě provozních údajů z demonstračních projektů vyhodnocuje index flexibility (FI) a ukazatel inteligentní připravenosti (SRI). Ten je přizpůsoben a navržen pro optimalizovanou místní flexibilitu pro klimatické zóny související se šesti demo projekty a implementován prostřednictvím centrálního cloudového centra ARV. Metodiky pro provozní popis flexibility (D7.6). Pokyny pro zásady projektování související s klimatem (D7.7).
Podúkol 7.6.1 Funkce flexibility pro tepelná čerpadla v sítích dálkového vytápění (Sønderborg)
Podúkol 7.6.2 Funkce sezónní flexibility pro městský tunel (Trento)
Podúkol 7.6.2 Identifikace flexibility v budovách (Utrecht) Podúkol 7.6.3 Funkce flexibility v systému LowEx (Oslo)
Úkol 7.7 Inteligentní komunity a optimalizace. M18-M48. Vedoucí úkolu: UU. Přispěvatelé: UU: IWELL, Bos Groep, město Utrecht, MITROS, BOEX , Center Denmark, DTU, DAN, PZ, ČVUT, KARV, NTNU, SINTEF.
Tento úkol bude integrovat řešení modelování, předpovídání a řízení pro inteligentní energetické budovy a komunity z T7.3-T7.6. K využití flexibility, která je vlastní agregaci distribuovaných zdrojů, pro účely optimalizace trhu i poskytování podpůrných služeb systému (viz T7.8) bude použit hierarchický řídicí rámec. Umožní interakci mezi místními komunitami a energetickými sítěmi a optimální využití místní výroby energie z obnovitelných zdrojů včetně algoritmů nabíjení EV/V2G. Použitý rámec bude obecným a škálovatelným rámcem umožňujícím zajistit flexibilitu provozu energetických systémů prostřednictvím agregátorů. Důraz je kladen jak na velkoobchodní obchod s energií, tak na poskytování podpůrných služeb systému, jako jsou rychlé provozní rezervy pro vyrovnávání systému a podpora místní sítě. Systémy BEMS různých budov účastnících se demonstrací budou propojeny prostřednictvím agregátorů, které budou využívat buď principy virtuální energetické platformy (VPP), nebo koncept hierarchických regulátorů pro aktivaci flexibility. Obchodování P2P (Peer-to-Peer) mezi pozitivními a běžnými budovami bude rovněž zkoumáno následovně: i) návrh funkcí trhu P2P pro každou demonstrační lokalitu, ii) testování a simulace rámců P2P, iii) implementace trhů P2P v každé demonstrační lokalitě a sledování jejich vhodnosti a ekonomické životaschopnosti pro dosažení TRL6-7. Metody budou integrovat vstupy ze senzorů sítě (WP8), preference uživatelů (WP3, WP5) a interakci s trhy flexibility. Implementace v centrálním cloudovém uzlu ARV. Příručka pro inteligentní komunity (D7.8).
Podúkol 7.7.1 Optimalizace sítí dálkového vytápění pro optimální využití přebytečného tepla ze supermarketů (Sønderborg)
Podúkol 7.7.2 Optimální provoz propojených bateriových úložišť a elektrických vozidel (Utrecht, Sønderborg, Karviná)
Podúkol 7.7.3 Propojení různých platforem BEMS pro agregaci flexibility a umožnění flexibility v okresním měřítku (Utrecht, Sønderborg, Karviná)
Podúkol 7.7.4 Optimální provoz systému LowEx (Oslo)
Úkol 7.8 Rozhraní trhu. M24-M48. Vedoucí úkolu: DTU. Přispěvatelé: DTU: UU, IWELL, Center Denmark, IREC, PALMA.
Propojení konvenčních trhů s agregovanou flexibilitou pro budovy a čtvrti. Rozhraní s vyrovnávacími trhy a trhy s flexibilitou. Pokyny pro nové obchodní modely pro energetické komunity. Trhy pro integraci energetických systémů (vytápění, chlazení, plyn, elektřina). Modely pro aukce související s dlouhodobými smlouvami. Řešení V2G/V2B. Nástroje pro plánování investic a energetických systémů. Metody pro interakci mezi CEC a provozovateli distribučních soustav k řešení možných problémů a konfliktů mezi provozovateli distribučních soustav. Interakce s WP9 v oblasti finančních nástrojů (včetně P2P obchodování/DLT, jako je blockchain mezi CEC). Obchodní modely a pokyny. Zásady pro interakce mezi CEC a provozovateli přenosových soustav (D7.9).
Podúkol 7.8.1 Snížení špičkového zatížení a řízení přetížení ve spolupráci s provozovateli distribučních soustav (Utrecht)
Podúkol 7.8.2 Síť pro nabíjení V2G-EV a bateriové úložiště pro zajištění flexibility sítě a vyrovnávacích rezerv na různých úrovních rozsahu (Utrecht, Sønderborg)
Podúkol 7.8.3 Vyhodnocení různých investičních, optimalizačních politik a tržních struktur pro CEC (Palma)

Účast na jednoho partnera

Číslo a zkrácený název partnera	Úsilí pracovního balíčku 7
1 - NTNU	14.00
3 - ČVUT	23.50
4 - DTU	46.00
5 - DANFOSS A/S	9.00
6 - ENFOR	18.00
7 - PROJECTZERO	4.00
8 - EURAC	3.00
9 - SINTEF	7.00
10 - PALMA	5.00
12 - IREC	20.00
13 - MET	4.00
14 - UAS Utrecht	1.00
15 - HOUSING EUROPE	2.00
17 - Center Denmark	33.00
18 - SAB	3.00
20 - BOEX	3.00
22 - UU	19.00
23 - CITY OF UTRECHT	2.00
25 - iwell	17.00
27 - Mitros	3.00
28 - KARV	5.00
29 - DOL	1.00
30 - DTTN	2.00
Armalam	1.00
31 - UNITN	2.00
33 - OBF	2.00
34 - NANO	4.00
Celkem	253.50

Seznam dodávek

Číslo dodávky[14]	Název dodávky	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D7.1	Zřízení centrálního digitalizačního centra ARV a systému úložiště dat "data lake".	17 - Center Denmark	Předváděcí model	Důvěrné, pouze pro členy konsorcia (včetně Komise).	18
D7.2	Modely budování prototypů	3 - ČVUT	Zpráva	Veřejné	32
D7.3	Předpověď počasí ve městě s dobrým rozlišením na demonstračních místech	6 - ENFOR	Předváděcí model	Důvěrné, pouze pro členy konsorcia (včetně Komise).	12
D7.4	Předpověď větru, solární energie, zatížení, ceny na demonstračních místech	17 - Center Denmark	Předváděcí model	Důvěrné, pouze pro členy konsorcia (včetně Komise).	18
D7.5	Ovladače s rozhraním pro zadávání uživatelských preferencí	4 - DTU	Předváděcí model	Důvěrné, pouze pro členy konsorcia (včetně Komise).	32
D7.6	Pokyny k popisu pojmů „chytrost a flexibilita"	4 - DTU	Zpráva	Veřejné	24
D7.7	Pokyny k zásadám návrhu souvisejícím s klimatickou zónou	1 - NTNU	Zpráva	Veřejné	32
D7.8	Příručka vysvětlující concept chytrá komunita	22 - UU	Zpráva	Veřejné	42
D7.9	Zásady interakcí CEC-DSO	4 - DTU	Zpráva	Veřejné	46

Popis dodávek

D7.1 : Zřízení centrálního digitalizačního centra ARV a systému úložiště dat „data lake". [18]

Nastavení federovaného datového úložiště včetně analýzy dat z prostředí fog, edge a cloud computingu, včetně GDPR, kybernetické bezpečnosti a dodržování etických pravidel. ARV nasadí centralizovaný evropský digitalizační uzel (úroveň cloudu) napojený na dílčí uzly (úroveň fog) na jednotlivých demonstračních místech, které jsou opět napojeny na systémy nebo aplikace budov a jejich obyvatel (úroveň edge). Cloudové centrum ARV bude na principu nejmodernějšího datového úložiště poskytovat úložiště pro monitorovací data a umožní efektivní využití dat v různých měřítcích. Bude také poskytovat uživatelská rozhraní pro uživatele, provozovatele, vlastníky budov a další zúčastněné strany. Vytvoření konfigurace datového úložiště pro software, správu a ukládání dat.

D7.2 : Modely budování prototypů [32]

Identifikace modelů pro energeticky účinné řízení budov a čtvrtí. Modely pro vnitřní klima, odhad stavu a virtuální (softwarové) senzory. Modely s integrovanými charakteristikami HVAC a baterií. Interakce s uživateli na bázi APP a WEBu. Modely pro integraci fotovoltaiky a integraci s místními meteorologickými stanicemi. Modely s integrovanou krátkodobou předpovědí počasí (včetně snímků oblohy). Tento úkol bude vycházet z informací o systémech skladování WP6. Archetypové modely budov

D7.3 : Předpověď počasí ve městě s dobrým rozlišením na demonstračních místech [12]

Zavedení a vyhodnocení metod pro místní předpověď počasí na základě místních meteorologických stanic provozovaných obcemi nebo městy v kombinaci s meteorologickou předpovědí počasí. Předpověď klimatu města a okresu s jemným rozlišením. Implementace s využitím centrálního cloudového uzlu ARV v kombinaci s místními městskými uzly.

D7.4 : Předpověď větru, solární energie, zatížení, ceny na demonstračních místech [18]

Implementace v cloudovém centru ARV a v místních cloudech souvisejících s některými demonstračními místy. Zavedení a vyhodnocení metod pro místní předpověď počasí na základě místních meteorologických stanic provozovaných obcemi nebo městy v kombinaci s meteorologickou předpovědí počasí. Předpověď klimatu města a okresu s jemným rozlišením. Implementace s využitím centrálního cloudového uzlu ARV v kombinaci s místními městskými uzly.

D7.5 : Ovladače s rozhraním pro zadávání uživatelských preferencí [32]

Modelové prediktivní regulátory (MPC) s integrovanou předpovědí počasí a zatížení. Regulátory pro okresní a BEMS. Regulátory s integrovanou předpovědí obsazenosti. Vstupy z monitorování (WP8).

D7.6 : Pokyny k popisu pojmů „chytrost a flexibilita“ [24]

Metodiky provozního popisu flexibility založené na provozních údajích demo projektů, úkol vyhodnocuje index flexibility (FI) a indikátor inteligentní připravenosti (SRI). Ten je přizpůsoben a navržen pro optimalizovanou místní flexibilitu pro klimatické zóny související se šesti demo projekty a implementován prostřednictvím centrálního cloudového centra ARV.

D7.7 : Pokyny k zásadám návrhu souvisejícím s klimatickou zónou [32]

Pokyny k zásadám navrhování v souvislosti s klimatem, založené na provozních údajích z demonstračních projektů, vyhodnocují index flexibility (FI) a indikátor inteligentní připravenosti (SRI). Ten je přizpůsoben a navržen pro optimalizovanou místní flexibilitu pro klimatické zóny související se šesti demo projekty a implementován prostřednictvím centrálního cloudového centra ARV. Metodiky pro provozní popis flexibility (D7.6).

D7.8 : Příručka vysvětlující concept chytrá komunita [42]

Metody budou integrovat vstupy ze senzorů sítě (WP8), preference uživatelů (WP3, WP5) a interakci s trhy flexibility. Implementace v centrálním cloudovém uzlu ARV. Příručka pro inteligentní komunity

D7.9 : Zásady interakcí CEC-DSO [46]

Metody interakce mezi CEC a DSO pro řešení možných problémů a konfliktů DSO. Interakce s WP9 v oblasti finančních nástrojů (včetně P2P obchodování/DLT, jako je blockchain mezi CEC). Obchodní modely a pokyny. Zásady pro interakce mezi CEC a provozovateli distribučních soustav (D7.9

Harmonogram relevantních milníků

Číslo milníku [18]	**Název milníku**	**Příjemce**	**Datum splatnosti (v měs.)**	**Způsoby ověření**
MS14	Efektivní provoz a flexibilita	4 - DTU	34	Efektivní a flexibilní provoz na demonstračních místech

Číslo pracovního balíčku [9]	WP8	**Příjemce**[10]	8 - EURAC
Název pracovního balíčku	Monitorování, hodnocení a stanovení dopadů		
Začátek měsíce	1	**Ukončení měsíce**	48

Cíle

Tento pracovní balíček zahrnuje: (OB.1) vypracování a zavedení rámců pro monitorování, hodnocení a posouzení dopadů demonstrací ARV; (OB.2) provedení kontroly kvality, hodnocení a závěrečné zprávy o celkové výkonnosti demonstrací ARV; (OB.3) vytvoření a nasazení rozhraní mezi sledovanými, shromážděnými a zpracovanými daty a konečnými uživateli; (OB.4) provedení hodnocení environmentálních, sociálních a ekonomických dopadů zásahů ARV, a to jak pro podporu návrhu a realizace řešení v průběhu projektu, tak pro podrobné vyhodnocení výsledků, s perspektivou „od kolébky ke kolébce“ a s (OB.5) analýzou více přínosů.

Popis práce a role partnerů

WP8 - Monitorování, hodnocení a stanovení dopadů [Měsíce : 1-48]
EURAC, NTNU, ACE, ČVUT, DTU, DANFOSS A/S, PROJECTZERO, SINTEF, PALMA, IBAVI, IREC, MET, UAS Utrecht, Center Denmark, SAB, GDFA, BOEX, Rc Panels B.V., UU, CITY OF UTRECHT, BOSGROEP, iwell, MEX, KARV, DOL, DTTN, UNITN, POLITO, OBF, NANO
Tento pracovní balíček začíná na začátku projektu (i) návrhem a vývojem rámců pro monitorování, hodnocení a posouzení dopadu šesti demonstrací ARV. Za druhé (ii) proběhne hodnocení ex-ante (tj. před zásahem) (včetně monitorování stávajících budov, které mají být modernizovány). Poté (iii) bude provedeno zjednodušené posouzení dopadů na životní prostředí a nákladů na alternativní řešení (scénáře), které podpoří návrh zásahů. Kromě toho (iv) bude probíhat průběžné monitorování a zpětná vazba k demonstracím a zúčastněným stranám během nasazení v demonstracích a (v) průběžné monitorování a hodnocení stavebních činností na místě. Po realizaci bude provedeno (vi) následné hodnocení ARV Demos, včetně podrobného posouzení environmentálních, ekonomických a sociálních dopadů během životního cyklu s ohledem na „od kolébky ke kolébce“ a (vii) analýza vícenásobných přínosůNa základě výsledků (viii) bude poskytnuta syntéza, včetně interpretace, pokynů a doporučení pro replikaci. Tento pracovní balíček má silnou vazbu na pracovní balíček 2, neboť vychází z jeho klíčových ukazatelů výkonnosti, metod a nástrojů; s pracovním balíčkem 3 o informování uživatelů (a jejich energetickém chování); s pracovním týmem WP4, který informuje zúčastněné strany ve fázích integrovaného návrhu a zavádění, s pracovním týmem WP5, který informuje o výrobním procesu, s pracovním týmem WP6, který se zabývá monitorováním výroby energie, elektrické sítě a systémů skladování, a s pracovním týmem WP7, který se zabývá propojením mezi chováním uživatelů, energetickým řízením budov (BEM) a řídicími systémy.
Úkol 8.1 Vypracování specifikací a pokynů pro monitorování, hodnocení a posuzování dopadů. M01 - M12. Vedoucí: EURAC; Účastníci: IREC, PZ
Podúkol 8.1.1. Vypracování specifikací a pokynů pro monitorování údajů
Tento podúkol stanoví standardy, specifikace a pokyny pro monitorovací systémy v šesti demonstracích ARV. Konkrétně vytvoří společný rámec pro monitorování dat a požadavky na kvalitu konkrétních monitorovacích systémů, které budou přizpůsobeny potřebám jednotlivých demonstrací (definovaných v úkolu 8.2), a usnadní harmonizaci dat demonstrací v centralizovaném datovém skladu v cloudovém centru ARV. Pro podporu hodnocení a posouzení dopadů intervencí budou sledované údaje zahrnovat spotřebu a výrobu energie v budovách, kvalitu vnitřního prostředí (IEQ), chování uživatelů, hluk, prach a další emise během stavebních činností na staveništi a venkovní (vnější) mikroklimatické podmínky. Očekávají se vstupy z pracovního balíčku 7 o řízení energetických systémů budov.
Podúkol 8.1.2 Vypracování specifikací a pokynů pro hodnocení
Tento podúkol definuje cíl, rozsah, zdroje dat a metody používané pro hodnocení demo intervencí ARV. Zejména vybere a vymezí: procesy, které budou předmětem hodnocení; způsob, jakým budou hodnoceny nedostatky ve výkonnosti budov; jak odhadnout dobu výstavby a/nebo modernizace (aby se zajistilo snížení o > 30 %), jakož i související hluk, prach a další emise (které by se měly snížit o > 30 %); jak analyzovat potenciální faktory ovlivňující výkonnost a výsledky zásahů, seismické chování stavebních systémů, hodnocení IEQ (aby se zajistilo zlepšení o > 30 %) a hodnocení celkové kvality a hodnocení demonstrací ARV.
Podúkol 8.1.3 Vypracování specifikací a pokynů pro hodnocení dopadů
Tento podúkol definuje cíl, rozsah, materiály a metody hodnocení dopadu demonstrací ARV. Budou hodnoceny environmentální, sociální a ekonomické dopady na základě mezinárodně standardizovaných a vědecky podložených metodik, např. hodnocení životního cyklu (LCA), kalkulace nákladů životního cyklu (LCC) a hodnocení sociálního životního cyklu (SLCA). Budou vytvořeny dva rámce, z nichž jeden bude porovnávat alternativy v rané fázi a bude sloužit jako podklad pro návrh a vývoj antiretrovirových intervencí a druhý bude hodnotit provedené intervence.

Hodnocení zajistí snížení emisí skleníkových plynů (v t CO2 ekv/rok) a znečištění okolního ovzduší (např. kg PM2,5/rok), mimo jiné v porovnání s výchozím stavem. Nakonec bude definován přístup založený na vícenásobných přínosech, který se bude zabývat environmentálními, ekonomickými a sociálními aspekty (viz T8.5). U zásahů modernizace bude posouzení dopadů porovnávat monitorování před zásahem a po něm; u nové výstavby budou výchozí hodnoty definovány na základě právních požadavků, norem nebo průměrné výkonnosti (u nové/nedávné výstavby) v závislosti na rozsahu a dostupnosti údajů.

Úkol 8.2 Sběr a monitorování statických a dynamických dat. M01 - M48. Vedoucí: Center Denmark; Účastníci: EURAC, PZ, IBAVI, PCC, MET, IREC, HU, UU.

Podúkol 8.2.1 Popis monitorovacích systémů v šesti demonstracích ARV
V tomto podúkolu budou definovány a popsány monitorovací systémy v jednotlivých ukázkách ARV v souladu s požadavky (podúkol 8.1.1). Tento popis bude zahrnovat seznam technologií, požadavků na data a zdroje, zahrnující fyzickou architekturu monitorovacích systémů, jejich síťovou architekturu, instalované senzory, fungování procesů sběru dat (frekvence měření, místní úložiště, zálohovací systémy) a protokoly související s daty. Monitorovací systém každé demonstrační akce bude vytvořen na míru a bude zohledňovat podněty od hlavních partnerů demonstrační akce. V každé demonstraci budou sledovány následující aspekty: (i) výroba energie (monitorování na místě), (ii) distribuce energie (monitorování na místě), (iii) spotřeba energie (monitorování na místě), (iv) komfort (vnitřní) (TH - CO2), (v) chování uživatelů (tj. otevírání oken, CMV atd.) a (vi) vnější mikroklimatické podmínky (v měřítku okresu).
Podúkol 8.2.2 Návrh datové architektury
V tomto podúkolu bude navržena datová architektura, která bude vycházet z výsledků podúkolu 8.2.1 a bude používat otevřené standardy. Nejprve budou vybrány databázové technologie, které budou použity. Poté budou společně s vedoucími demonstrací definovány společné protokoly pro sběr dat a data pocházející z jednotlivých monitorovacích systémů budou sjednocena do jedinečné databáze. EURAC poskytne platformu pro centralizovaný sběr monitorovaných dat produkovaných jednotlivými demo systémy ARV
Podúkol 8.2.3 Posouzení kvality dat (použití otevřených standardů)
Tento podúkol bude zahrnovat pravidelné kontroly kvality dat a poskytování zpětné vazby příslušným demonstracím ARV ohledně kvality zasílaných dat, aby byla zajištěna vysoká kvalita a konzistence dat. Pro identifikaci nesprávného fungování monitorovacích systémů budeme do automatizovaného pracovního postupu integrovat specifický systém výstrah, který vyhodnocuje kvalitu dat a kontroluje úplnost údajů (např. chybějící údaje) a přítomnost anomálií (např. odlehlých hodnot).

Podúkol 8.2.4 Implementace datového skladu a populace dat
V rámci tohoto podúkolu budou data z demonstrací integrována do centralizovaného datového skladu v ARV Cloud Hub, včetně procesů extrakce, transformace a načítání. Budeme zahrnovat údaje o stavebních činnostech a obsazenosti v nových budovách, činnostech při modernizaci, obsazenosti před a po zásahu v případě modernizovaných budov, aplikovaných průzkumech a simulacích.

Úkol 8.3 Vyhodnocení zásahů a analýza nedostatků ve výkonnosti budov. M06-M48. Vedoucí: VEDOUCÍ: NTNU;
Účastníci: EURAC, DAN, IBAVI, PCC, MET, IREC, UU, iWell, HU, RC, Bos Groep, MEX
Podúkol 8.3.1 Kvalita intervence
V rámci tohoto podúkolu bude vyhodnocena kvalita intervencí na základě klíčových ukazatelů výkonnosti stanovených v rámci pracovního balíčku 2 spolu s monitorovanými údaji, údaji o projektu a údaji z literatury. Bude se zabývat několika aspekty, včetně.: IEQ, úspory primární energie, investice do udržitelné energie, výroba energie z OZE a kvalita návrhu. Bude analyzována kvalita vnitřního prostředí a pohodlí, včetně kvality vzduchu, přirozeného větrání, osvětlení a akustických ukazatelů. Tato analýza bude propojena s pracovním balíčkem 7 o systémech řízení spotřeby energie v budovách (BEM). Budou vypočteny provozní úspory primární energie v členění na obnovitelnou a neobnovitelnou energii (v GWh/rok), vč. vytápění prostor, spotřeby teplé užitkové vody (TUV) a elektřiny. Pro všechny demoverze ARV budou rovněž odhadnuty investice do ekologicky udržitelné energie (v mil. EUR) a podíl energie a elektřiny dodávané z OZE (místní výroba a dodávky ze sítě). A konečně, v návaznosti na ukazatel kvality návrhu (DQI) budou vybrané zásahy v demoverzích ARV hodnoceny (prostřednictvím zapojení zúčastněných stran) z hlediska funkčnosti (uživatelské zkušenosti), kvality konstrukce a architektonického obrazu (včetně formy, designu a integrace).
Podúkol 8.3.2 Hodnocení a analýza nedostatků ve výkonnosti budov
V rámci tohoto podúkolu budou vyhodnoceny nedostatky ve výkonnosti budovy (tj. odchylky mezi plánovanou a skutečnou výkonností budovy). Mezery v energetické náročnosti budov budou vyhodnoceny pro šest demonstračních projektů ARV, přičemž budou porovnány energetické simulace a cíle projektu (plánovaná nebo očekávaná energetická náročnost a provozní požadavky) a monitorované údaje. Podle dostupnosti údajů budou ve vybraných demoverzích řešeny i další nedostatky ve výkonnosti, včetně IEQ a provozních nákladů. Bude provedena analýza možných faktorů,

které přispívají k nedostatkům ve výkonnosti (např. chování uživatelů, technologické problémy), na základě údajů o konkrétním místě a literatury, a budou poskytnuta doporučení (včetně protiopatření).

Podúkol 8.3.3 Vyhodnocení stavebních činností a modernizace na staveništi
Bude provedeno vyhodnocení stavebních činností na staveništi a/nebo modernizace, včetně (i) času, (ii) hluku, prachu a dalších emisí do ovzduší a (iii) dalších vybraných ukazatelů z literatury o produktivitě/efektivitě výstavby. Doba výstavby/retrofitu na místě a náklady by se měly snížit alespoň o 30 %, aby se umožnilo uplatnění na trhu a sociální dostupnost. Bude provedeno hodnocení stavebních/rekonstrukčních činností na staveništi, pokud jde o hluk, prach a další emise, s cílem zajistit zlepšení konečné kvality vnitřního prostředí a snížení prašnosti a hluku (nejméně o 30 %), což povede k vyšší míře spokojenosti uživatelů, prokázané příslušnou normou CEN (nebo rovnocennou normou).

Podúkol 8.3.4 Analýza faktorů, které ovlivňují sledované ukazatele a výsledky hodnocení
Tento podúkol se skládá z analýzy faktorů, které ovlivňují (příčinné a/nebo korelační vazby) sledované ukazatele a výsledky hodnocení, jako jsou: (i) faktory, které mohou ovlivnit spotřebu energie (ukazatele včetně sledované elektřiny, vytápění prostor a ohřevu TUV): obsazenost, charakteristiky domácnosti; okna, sluneční záření, vnitřní teplota atd.; a ii) faktory ovlivňující kvalitu vnitřního prostředí (ukazatele včetně teploty, CO2, PM, hluku): způsoby užívání a chování (např. otevírání oken, doba pobytu doma, obsazenost, přirozené větrání).
Úkol 8.4 Posouzení environmentálních, sociálních a ekonomických dopadů. M06-M48. Vedoucí: EURAC; Účastníci: NTNU, IREC, IBAVI, PCC, HU, BOEX, MU.

Podúkol 8.4.1 Zjednodušené posuzování dopadů na životní prostředí a nákladů na podporu zásahů ARV ve fázi návrhu
V rámci tohoto podúkolu bude vyvinut integrovaný zjednodušený model hodnocení LCA-LCC s perspektivou "od kolébky ke kolébce", který bude specificky zaměřen na informování a podporu návrhu řešení pro demonstrační projekty ARV. Posouzení se zaměří na potenciální požadavky na neobnovitelnou energii (NRE), emise skleníkových plynů a náklady na obytnou plochu za rok (m2•rok). Aby se překonala omezená dostupnost a kvalita údajů o intervencích, bude tento přístup zahrnovat algoritmus pro stanovení atributů dopadu. Kromě toho bude provedena analýza více scénářů s cílem porovnat alternativní strategie a řešení, potenciální posuny a kompromisy a určit nákladově optimální řešení a body zvratu mezi snížením provozních požadavků a zvýšenými ztělesněnými dopady na životní prostředí a náklady.
Podúkol 8.4.2 Komplexní posouzení životního cyklu a nákladů na zavedená řešení ARV
V rámci tohoto podúkolu bude provedeno komplexní posouzení potenciálních dopadů životního cyklu na životní prostředí a nákladů (LCA a LCC) konečných (implementovaných) řešení v každé demonstraci ARV, a to z pohledu "od kolébky ke kolébce". Posouzení se bude týkat široké škály kategorií dopadů, včetně požadavků na primární neobnovitelnou a obnovitelnou energii, emisí skleníkových plynů, znečištění okolního ovzduší (např. PM2,5), acidifikace a eutrofizace. Pro usnadnění interpretace a srovnatelnosti se použijí dvě funkční jednotky, na osobu a m2•rok. Analýza citlivosti umožní nahlédnout do vlivu kritických parametrů na výsledky (např. obsazenost, chování; mix elektrické energie; a analýza nejistoty. Hodnocení by mělo prokázat (i) vysokou energetickou náročnost budovy (téměř nulová spotřeba energie, směrnice 2010/31/EU); (ii) snížení emisí skleníkových plynů (v t CO2 ekv.); (iii) snížení ztělesněné energie o 50 % bez kompromisů v oblasti spotřeby energie a komfortu (v souvislosti s T8.3); a snížení znečištění ovzduší (v kg).
Podúkol 8.4.3 Posouzení sociálního životního cyklu zavedených řešení ARV
Na základě pokynů UNEP/SETAC bude provedena SLCA s ohledem na dopady na čtyři skupiny zúčastněných stran: pracovníky (včetně těžby surovin, výroby stavebních výrobků a výstavby na místě), obyvatele budov, místní komunity (tj. žijící v blízkosti výrobních/stavebních areálů) a společnost (široká veřejnost v regionech, kde je ARV Demo). Kategorie dopadů (vybrané na základě stávajících hodnocení sociálních dopadů budov a dostupnosti údajů) budou zahrnovat: (i) pracovníci: zdraví a bezpečnost, spravedlivá mzda, pracovní doba, diskriminace, nucená práce; (ii) obyvatelé budov: funkčnost/uživatelnost, zdraví a pohodlí, dostupnost; (iii) místní komunity: zdraví a bezpečnost, dostupnost, místní zaměstnanost; a iv) společnost: rozvoj technologií, angažovanost veřejnosti v otázkách udržitelnosti. Tyto kategorie budou řešeny prostřednictvím kvantitativních a semikvantitativních ukazatelů s využitím obecných údajů i údajů specifických pro danou lokalitu.
Úkol 8.5 Analýza a posouzení vícenásobných přínosů. M1-M48. Vedoucí: EURAC; Účastníci: POLITO; SINTEF, IREC, GDFA, vedoucí demonstrací.
Rozvoj projektů regenerace měst a činností souvisejících s CPCC zahrnuje širokou škálu zásahů, které přesahují nové budovy a rozvoj energetické infrastruktury (a/nebo rekonstrukci/modernizaci stávajících budov). Cílem těchto projektů je sociální začlenění, zvýšení kvality života občanů, zhodnocení místních sociálních a kulturních hodnot, ochrana zdrojů životního prostředí, podpora udržitelného hospodářského rozvoje atd. Z tohoto pohledu je třeba se zabývat i dalšími dopady, náklady a přínosy v rámci přístupu založeného na vícenásobných přínosech (Ürge-Vorsatz et al. 2016) (Bisello, 2020), aby bylo možné získat komplexní přehled o jejich velikosti. V rámci tohoto úkolu bude uplatněn koncept vícenásobných přínosů a jeho praktická aplikace směrem k dosažení cílů udržitelného rozvoje OSN. Teoretické zázemí

vytvoří POLITO a EURAC. Cílem je maximalizovat mezioborovou a meziodvětvovou spolupráci (urbanismus, sociální vědy, ekonomie, stavební fyzika).
Dílčí úkol 8.5.1 Analýza vícenásobných přínosů: testování a doladění na demonstračních případech ARV
Ve spolupráci se SINTEF (vedoucí WP3), IREC a v úzké spolupráci s vedoucími demonstračních projektů ARV a v souladu s rámcem definovaným v části 8.1.3 bude provedena analýza vícenásobných přínosů na místní úrovni (v měřítku demonstračních projektů / CPCC / města). Díky zapojení zúčastněných stran a jejich aktivnímu zapojení budou na místní úrovni definovány a porovnány mapy dopadů a myšlenkové mapy vícenásobných přínosů, aby byl vytvořen společný rámec.

Podúkol 8.5.2 Měření úspěšnosti ARV, směrem k přístupu investování do dopadu
Obecně přijímanou definicí dopadového investování je investice, která vytváří sociální nebo environmentální přínosy a zároveň zajišťuje návratnost jistiny, přičemž návratnost se pohybuje od nulové po tržní. Cílem tohoto podúkolu je udržet přístup k investování s dopadem, kdy se úspěšnost projektu (investice) měří na základě finančních a ekonomických kritérií spolu s kritérii environmentálními, sociálními a správními (ESG), aby se podpořily další investice a přispělo se k jejich rozšíření a replikaci. Testuje se přístup k investování do dopadu přizpůsobený výsledkům projektu ARV s ohledem na výsledky dílčího úkolu 8.5.1, shromažďování údajů a analýzu klíčových ukazatelů výkonnosti z demonstrací a v úzké spolupráci s WP9 - GDFA.

Účast na jednoho partnera

Číslo a zkrácený název partnera	Úsilí pracovního balíčku 8
1 - NTNU	15.00
2 - ACE	0.50
3 - ČVUT	19.50
4 - DTU	9.00
5 - DANFOSS A/S	3.00
7 - PROJECTZERO	5.00
8 - EURAC	36.00
9 - SINTEF	6.00
10 - PALMA	25.00
11 - IBAVI	21.00
12 - IREC	15.00
13 - MET	8.00
14 - UAS Utrecht	3.00
17 - Center Denmark	8.00
18 - SAB	3.00
19 - GDFA	2.00
20 - BOEX	1.00
21 - Rc Panels B.V.	1.00
22 - UU	2.00
23 - CITY OF UTRECHT	1.00

24 - BOSGROEP	1.00
Číslo a zkrácený název partnera	**Úsilí pracovního balíčku 8**
25 - iwell	1.00
26 - MEX	1.00
28 - KARV	9.00
29 - DOL	1.00
30 - DTTN	2.00
Armalam	1.00
31 - UNITN	8.00
32 - POLITO	10.00
33 - OBF	7.00
34 - NANO	3.00
Celkem	228.00

Seznam dodávek

Číslo dodávky[14]	**Název dodávky**	**Příjemce**	**Typ dodávky[15]**	**Úroveň diskrétnosti[16]**	**Datum splatnosti (v měs.)[17]**
D8.1	Rámec monitorování, hodnocení a posuzování dopadů	8 - EURAC	Zpráva	Veřejné	12
D8.2	Datová architektura, včetně popisu monitorovacích systémů na ukázkách ARV	17 - Center Denmark	Zpráva	Veřejné	18
D8.3	Struktura a využití datového skladu	17 - Center Denmark	Zpráva	Veřejné	48
D8.4	Zprávy o výsledcích hodnocení (včetně doporučení a pokynů pro budoucí projekty)	1 - NTNU	Zpráva	Veřejné	48
D8.5	Zjednodušené LCA-LCCA porovnávající scénáře alternativních řešení	8 - EURAC	Report	Veřejné	24
D8.6	LCA a LCC implementovaných řešení a sociálních složek	8 - EURAC	Zpráva	Veřejné	48
D8.7	Zpráva o „multiple benefits analysis“	8 - EURAC	Zpráva	Veřejné	48

D8.8	Pokyny a doporučení pro replikaci a/nebo budoucí výzkum	8 - EURAC	Zpráva	Veřejné	48

Popis dodávek

D8.1 : Rámec monitorování, hodnocení a posuzování dopadů [12] obsahuje pokyny pro monitorovací systémy v šesti demonstracích ARV. Konkrétně bude stanoven společný rámec pro monitorování údajů a požadavky na kvalitu konkrétních monitorovacích systémů, které budou přizpůsobeny potřebám jednotlivých demonstrací. Výsledek by měl být vnímán v kontextu opf D2.1.

D8.2 : Datová architektura, včetně popisu monitorovacích systémů na ukázkách ARV [18]
Tento popis bude obsahovat seznam technologií, požadavků na data a jejich zdroje, zahrnující fyzickou architekturu monitorovacích systémů, jejich síťovou architekturu, instalované senzory, fungování procesů sběru dat (četnost měření, místní úložiště, záložní systémy) a protokoly související s daty. Monitorovací systém každé demonstrační akce bude vytvořen na míru a bude zohledňovat podněty od hlavních partnerů demonstrační akce. V každé demonstraci budou sledovány následující aspekty: (i) výroba energie (monitorování na místě), (ii) distribuce energie (monitorování na místě), (iii) spotřeba energie (monitorování na místě), (iv) komfort (vnitřní) (TH - CO2), (v) chování uživatelů (tj. otevírání oken, CMV atd.) a (vi) vnější mikroklimatické podmínky (v měřítku okresu).

D8.3 : Struktura a využití datového skladu [48] integruje data z demonstrací do centralizovaného datového skladu v ARV Cloud Hub, včetně procesů extrakce, transformace a načítání. Budeme zahrnovat údaje o stavebních činnostech a obsazenosti v nových budovách, činnostech při modernizaci, obsazenosti před a po zásahu v případě modernizovaných budov, aplikovaných průzkumech a simulacích.

D8.4 : Zprávy o výsledcích hodnocení (včetně doporučení a pokynů pro budoucí projekty) [48] kvality intervencí na základě klíčových ukazatelů výkonnosti, které poskytl WP2, spolu se sledovanými údaji, údaji o projektech a údaji z literatury. Bude se zabývat několika aspekty. Demonstrační projekty budou hodnoceny (prostřednictvím zapojení zúčastněných stran) z hlediska funkčnosti (uživatelského zážitku), kvality konstrukce a architektonického vzhledu.

D8.5 : Zjednodušené LCA-LCCA porovnávající scénáře alternativních řešení [24] bude vyvinut integrovaný zjednodušený model hodnocení LCA-LCC s perspektivou „od kolébky ke kolébce“, specificky zaměřený na informování a podporu návrhu řešení pro demoverze ARV.

D8.6 : L LCA a LCC implementovaných řešení a sociálních složek [48] komplexní posouzení potenciálních dopadů životního cyklu na životní prostředí a nákladů (LCA a LCC) konečných (implementovaných) řešení v každé demonstraci ARV, a to z pohledu „od kolébky ke kolébce“. Posouzení se bude týkat široké škály kategorií dopadů

D8.7 : Zpráva o „multiple benefits analysis“ [48] uplatňuje koncepci vícenásobných přínosů a její praktické využití při dosahování cílů udržitelného rozvoje OSN. Teoretické zázemí vytvoří POLITO a EURAC. Cílem je maximalizovat mezioborovou a mezisektorovou spolupráci (urbanismus, sociální vědy, ekonomie, stavební fyzika).

D8.8 : Pokyny a doporučení pro replikaci a/nebo budoucí výzkum [48]
„Souhrnná zpráva se zjištěními z činností v rámci WP8. Tento pracovní balíček má silnou vazbu na pracovní balíček WP2, neboť staví na jeho klíčových ukazatelích výkonnosti, metodách a nástrojích; na pracovní balíček WP3 o informování uživatelů (a jejich energetickém chování); na pracovní balíček WP4 o informování zúčastněných stran ve fázích integrovaného návrhu a zavádění; s WP5, který informuje o výrobním procesu, s WP6, který se zabývá monitorováním výroby energie, elektrické sítě a systémů skladování, a s WP7, který se zabývá propojením mezi chováním uživatelů, energetickým managementem budov (BEM) a řídicími systémy. Tato propojení zde budou hrát ústřední roli.“

Harmonogram relevantních milníků

Číslo milníku[18]	Název milníku	Příjemce	Datum splatnosti (v měs.)	Způsoby ověření
MS15	Předběžné hodnocení LCA-LCC	8 - EURAC	18	Předběžná zpráva o každé ukázce bude zaslána příslušným partnerům, aby ji posoudili a poskytli zpětnou vazbu.

Číslo pracovního balíčku [9]	WP9	**Příjemce** [10]	19 - GDFA
Název pracovního balíčku	Obchodní modely, finanční nástroje, politické mechanism a zužitkování		
Začátek měsíce	3	**Ukončení měsíce**	48

Cíle

Energetická účinnost budov není dostatečně rychlá, aby bylo možné splnit cíle Pařížské dohody. Naléhavě jsou zapotřebí inovativní obchodní modely a finanční nástroje. Přínosy chytrých energeticky pozitivních nemovitostí v demonstračních objektech přesahují snížení spotřeby energie/nákladů a přímé úspory CO2, ale umožňují také komoditizaci energetické flexibility a její obchodování občany jako prosumery. Současné prostředí nízkých úrokových sazeb omezuje možnost nabízet slevy na zelené úvěry a energeticky účinné hypotéky, což odrazuje od výrazného rozšíření financování energetické účinnosti. Integrace flexibilních energetických řešení do portfolií nemovitostí nabízí novou cestu k odstranění této překážky tím, že nabízí nástroje k posílení návratnosti financování energetické modernizace, čímž nabízí inovativní cestu k rozšíření. Stručně řečeno, cílem práce je využít inteligentní flexibilní energetická řešení k urychlení rozšíření stávajícího tržního financování, jako jsou energeticky účinné hypotéky (EEM), a také navrhnout zcela nové mechanismy financování založené na občanech jako spotřebitelích.
Cíl: Využít výhod energeticky příznivých čtvrtí k vytvoření nových pobídek pro občany a instituce finančních služeb k investicím do energetické účinnosti prostřednictvím inovace obchodních modelů a finančních nástrojů.

Popis práce a role partnerů

WP9 - Obchodní modely, finanční nástroje, politické mechanism a zužitkování [Měsíce: 3-48]
GDFA, NTNU, ACE, ČVUT, DTU, DANFOSS A/S, ENFOR, PROJECTZERO, EURAC, SINTEF, PALMA, IBAVI, IREC, MET, UAS Utrecht, HOUSING EUROPE, Buro de Haan, Center Denmark, SAB, BOEX, Rc Panels B.V., UU, CITY OF UTRECHT, BOSGROEP, iwell, MEX, Mitros, KARV, DOL, DTTN, UNITN, POLITO, OBF, NANO, AIGUASOL SAEST
Úkol 9.1 Inovační fórum pro cirkulární komunity s pozitivním vlivem na klima. M3-M48. Vedoucí úkolu: NTNU, GDFA;Přispěvatelé:
Všichni
V rámci tohoto úkolu se budou shromažďovat, analyzovat a šířit prokázané inovace v rámci pracovních skupin 2-8 (v rámci projektu a externě), které budou shrnuty do výroční zprávy ARV Innovation Intel for Impact (AI3). Kromě toho bude úkol T9.1 usnadňovat výměnu znalostí s Radou pro využívání ARV, aby se zajistila včasná identifikace a rozšiřování komerčně životaschopných inovací (D9.1, D9.2, D9.3 a D9.4). Jako „lídr demonstrační lokality klastru Utrecht“ zajistí propojení a spolupráci s WP9leader a klastry demonstrační lokality.

Úkol 9.2 Zmapovat škálovatelné obchodní modely a finanční nástroje přizpůsobitelné EU. M3-M9. Vedoucí úkolu: GDFA,
Přispěvatelé: Všechny
V rámci tohoto úkolu budou nejprve zmapovány stávající tržní, politické a regulační postupy v oblasti nemovitostí spojené s financováním EE pro různé třídy nemovitostí (sociální bydlení, nájemní bydlení a nemovitosti v soukromém vlastnictví) a flexibilní energetická řešení/postupy/koncepce v EU i mimo ni. Zaměříme se na postupy, které prokázaly schopnost rozšířit se v jiných regionech. Bude provedena analýza přenositelnosti těchto postupů do šesti jurisdikcí a také analýza toho, jak propojit příjmy z flexibilních energetických aktiv s modely financování nemovitostí, aby se posílil potenciál návratnosti. Mapování bude provedeno prostřednictvím rozhovorů a vyhledávání na internetu. Kromě toho budou do mapování zahrnuty regulační a politické nástroje na úrovni EU, včetně Blockchain Observatory, SET PLAN Action 3.2, Clean Energy for All Europeans a Renovation Wave (D9.5). Výsledky budou vydány jako katalog postupů, který bude sdílen s evropskými tvůrci politik a FI v šesti zemích demonstrační lokality.
Úkol 9.3 Navrhnout nové obchodní modely pro energeticky příznivé čtvrti, které by bylo možné financovat. M9-41. Vedoucí úkolu: GDFA. Přispěvatelé: Utrecht, DAN, PALMA, DTU, iWell, Bos Groep, UU, RCP, BOEX, HU, IREC, IBAVI, MET, AIGUA SINTEF, SAB, MEX, OBF ACE, NTNU
V návaznosti na úkol 9.2 vyvinout, zavést a vyhodnotit nové škálovatelné ziskové a neziskové obchodní a komunitní modely pro navrhování trhů s flexibilitou/RES prostřednictvím inteligentních obchodních platforem. Úspěšně fungující obchodní modely pro různé struktury vlastnictví nemovitostí (sociální bydlení, nájemní bydlení a bydlení v soukromém vlastnictví) budou navrženy společně s demo lokalitami ARV, které budou vyzkoušeny, vyhodnoceny a nakonec v úzké spolupráci s WP7 a šesti demo lokalitami navrženy nové trhy flexibility/RES a obchodní platformy (D9.6). Zaměřit se na škálovaný přístup, který zdůrazňuje zjednodušení, snadnost použití/aplikace prostřednictvím automatizace.
Podúkol 9.3.1-Navrh škálovatelné obchodní modely (GDFA, přispěvatelé všichni uvedení v T9.3)

V rámci této práce budou navrženy a otestovány snadno replikovatelné inovativní obchodní modely pro hodnotový řetězec modernizace a energetického provozu. Návrhy a testy budou prováděny na různých vlastnických strukturách, zde na sociálních a soukromých nemovitostech (např. v Nizozemsku v Utrechtu v demo klastru pro sociální bydlení a pro soukromé nemovitosti ve Španělsku). Focus will be on creating incentives for large scale retrofit including modes of demand aggregation. Mezi zkoumané obchodní modely patří: Kombinace produktu a služby (např. modely pronájmu) v oblasti energie, bezpečnosti, komfortu a renovace (WP4, WP5). Uzavírání smluv o energetické náročnosti na základě klíčových ukazatelů výkonnosti a systému monitorování energetického managementu budov (WP7), jakož i nové způsoby překonání problému rozdělených pobídek u pronajímaných nemovitostí. Pro soukromě vlastněné nemovitosti pro více rodin ve Španělsku. Výsledky práce na inovaci obchodních modelů budou zachyceny v plánech obchodních modelů jako moduly pro replikaci v jiných jurisdikcích v EU.

Podúkol 9.3.2 - Návrh obchodních modelů pro spotřebitele na bázi platformy (GDFA, přispěvatelé všichni uvedení v T9.3)

Stávající modely pro spotřebitele v EU často nejsou ziskové. Současné ceny a tarifní struktury nejsou vždy nastaveny tak, aby vytvářely dostatečně vysoké marže, které by zvýšily atraktivitu obchodování na místním trhu s energií. V rámci této práce se bude experimentovat s obchodním modelem založeným na platformě a tržním uspořádáním, které zvýší pobídky k posílení investic. Návrh a experimentování budou založeny na podmínkách demonstrační lokality v jurisdikcích s regulační připraveností, např. ve Španělsku, kde Královský Dekret umožňuje obyvatelům vícebytových domů a místním komunitám vytvářet modely „kolektivní autospotřeby“, které místní provozovatel sítě umožňuje díky úzké správě údajů z měřičů pro spotřebitele. Také v Nizozemsku, kde byly zajištěny zvláštní daňové výjimky pro družstevní spotřebitele. Práce určí bariéry (technologické, politické a regulační) i možnosti replikace na dalších trzích EU, pokud jde o politické a regulační prostředí a cesty od niky k hlavnímu proudu, přičemž bude zajištěna účast občanů a transparentnost digitálních obchodních platforem.

Podúkol 9.3.3 Ekonomická životaschopnost a podpora uplatnění na trhu (NTNU, přispěvatelé všichni uvedení v T9.3)

Vybrat nejvhodnější obchodní modely a připravit analýzu trhu pro vypracování strategií na podporu zavádění na trh. Pro pochopení možností uplatnění na trhu a replikovatelnosti provede tento dílčí úkol ekonomickou analýzu (vyčíslení příjmů, nákladů a přínosů, dlouhodobé životaschopnosti atd.) s cílem stanovit pokyny pro využívání a komercializaci obchodních modelů souvisejících s CPCC při zohlednění regulačních a politických aspektů přezkoumávaných v úkolu 9.2.

Úkol 9.4 Navrhnout inovativní finanční nástroje pro energeticky pozitivní nemovitosti a komunity. M15-M46. Vedoucí úkolu: GDFA. Přispěvatelé:Housing Europe, DTU, PALMA, IREC, MET, SINTEF, OBF, NTNU.

Podúkol 9.4.1: Navrhněte řešení financování spojeného s budovou (GDFA, přispěvatelé všichni uvedení v T9.4)

V rámci této práce budou navržena inovativní řešení financování, která nejlépe urychlí přechod na energeticky úsporné nemovitosti a zároveň budou cenově dostupná a efektivní pro vlastníky a uživatele budov. Práce bude spolupracovat s demonstračními objekty na návrhu finančního nástroje pro rozšíření energeticky pozitivních modernizací různých tříd majetku (sociální, nájemní a soukromé vlastnictví). Toho bude dosaženo experimentováním a testováním různých způsobů, jak využít přebytky obchodovatelné energie (např. místní trhy nebo rámce P2P) k inovaci financování prostřednictvím posílení zajištění, alokace zisků z energie do interních struktur fondů v sociálním bydlení vázaných na čisté pozitivní výsledky modernizace nebo využití příjmů z obchodované energie k obsluze kapitálových nákladů na EEM.

Podúkol 9.4.2 - Návrh digitálních dluhopisů pro rozšíření flexibilních trhů s energií pro spotřebitele (GDFA, přispěvatelé všichni uvedení v T9.4)

Tato práce bude využívat údaje z demonstrační lokality k výpočtu nákladů a nabídne celkový návrh standardního STO (zeleného digitálního dluhopisu) pro financování flexibilní energie.V současné době EU nemá standard STO (Green Token Offering Offering) ani zásady ekvivalentní zásadám zelených dluhopisů EU pro centralizované emise zelených dluhopisů. GDFA naváže na svou práci v oblasti digitalizace zelených dluhopisů, aby demonstrovala potenciál využití automatizace k umožnění nákladově efektivního vydávání STO pro flexibilní energii a modernizace. To bude provedeno na platformě pro vydávání malých dluhopisů "Do-It-Yourself" řízené bankou/bez banky. Výsledky budou zaznamenány v zelené příručce STO. Do této práce bude začleněn prvek budoucího prognózování, který bude spočívat v prozkoumání potenciálu využití budoucích uhlíkových kreditů jako zástavy pro financování energetické účinnosti a v diskusi s bankami o struktuře a požadavcích na budoucí uhlíkové kredity, které mají být zahrnuty do návrhu finančního nástroje (zelené úvěry, EEM nebo zelené STO). Načasování je správné, protože infrastruktura evropského a mezinárodního trhu pro obchodování s uhlíkovými kredity roste, takže je nevyhnutelné, že věřitelé budou stále častěji žádáni, aby zvážili přijetí uhlíkových kreditů jako zástavy. Proto může prosazení tohoto povědomí mezi evropskými finančními institucemi urychlit zájem o financování EE.

Úkol 9.5 Cesty CPCC k rozšíření prostřednictvím rady pro využívání. M27 - M46 Úkol Vedoucí GDFA, Přispěvatelé Všichni

Bude zřízena rada pro využívání zdrojů jako nástroj pro rozšiřování obchodních modelů a finančních nástrojů. Rada pro využití bude částečně složena ze silných inovačních uskupení a subjektů finančního sektoru, které budou šířit koncepce ekologických budov a renovací, aby dodaly impuls „vlně renovací“, která bude mít politickou podporu.

GDFA propojí tuto práci s evropskými bankami prostřednictvím UNEP FI a také prostřednictvím bankovních federací v šesti zemích, které jsou živými laboratořemi, za účelem přijetí nových nástrojů na trhu. Demonstrační klastry zřídí regionální poradní skupiny pro škálování složené ze zúčastněných stran a multiplikátorů z regionálních inovačních klastrů, jako jsou regionální bytová družstva, pobočky národních bytových družstev, stavební (oborové) organizace, další obce, aby připravily replikaci a škálování ARV CPCC.

Účast na jednoho partnera

Číslo a zkrácený název partnera	**Úsilí pracovního balíčku 9**
1 - NTNU	11.00
2 - ACE	0.50
3 - ČVUT	0.50
4 - DTU	8.00
5 - DANFOSS A/S	3.00
6 - ENFOR	1.00
7 - PROJECTZERO	0.50
8 - EURAC	1.00
9 - SINTEF	2.00
10 - PALMA	9.00
11 - IBAVI	1.50
12 - IREC	5.00
13 - MET	2.00
14 - UAS Utrecht	5.00
15 - HOUSING EUROPE	3.00
16 - Buro de Haan	1.50
17 - Center Denmark	1.00
18 - SAB	2.00
19 - GDFA	58.50
20 - BOEX	2.00
21 - Rc Panels B.V.	3.00
22 - UU	3.00
23 - CITY OF UTRECHT	4.00
24 - BOSGROEP	3.00
25 - iwell	3.00
26 - MEX	3.00
27 - Mitros	2.00
28 - KARV	0.50
29 - DOL	1.00
30 - DTTN	2.50
Armalam	2.50
31 - UNITN	0.50

Číslo a zkrácený název partnera	Úsilí pracovního balíčku 9
32 - POLITO	1.00
33 - OBF	6.00
34 - NANO	0.50
35 - AIGUASOL SAEST	1.50
Celkem	155.00

Seznam dodávek

Číslo dodávky[14]	Název dodávky	Příjemce	Typ dodávky[15]	Úroveň diskrétnosti[16]	Datum splatnosti (v měs.)[17]
D9.1	Vypracování výroční zprávy „ARV Innovation Intel for Impact“(A13).	19 - GDFA	Zpráva	Veřejné	12
D9.2	Vytvoření katalogu obchodních a finančních modelů osvědčených na jiných trzích za účelem přizpůsobení v EU, aby se urychlila renovační vlna.	19 - GDFA	Zpráva	Veřejné	6
D9.3	Návrh plánu obchodního modelu pro energeticky pozitivní obnovu různých sfér jako vzor pro replikaci v celé EU	19 - GDFA	Zpráva	Veřejné	36
D9.4	Návrh obchodního modelu pro „prozumenty“ založeného na platformě s jasnými zásadami a regulačními doporučeními	19 - GDFA	Předváděcí model	Veřejné	41
D9.5	Návrh finančních nástrojů souvisejících s budováním FI portfólia	19 - GDFA	Předváděcí model	Veřejné	36
D9.6	Rozvoj zelených digitálních technologií průvodce dluhopisy v měřítku flexibilní pro spotřebitele energetických trhů.	19 - GDFA	Jiné	Veřejné	45
D9.7	Umožnění rozšíření energeticky pozitivní renovace na trzích EU.	19 - GDFA	Jiné	Veřejné	46

Popis dodávek

D9.1 : Vypracování výroční zprávy „ARV Innovation Intel for Impact“ (A13). [12] shromažďuje, analyzuje a šíří prokázané inovace napříč WP 2-8 (v rámci projektu a externě) a zpracovává je do výroční zprávy ARV Innovation Intel for Impact (AI3). Kromě toho bude T9.1 usnadňovat výměnu znalostí s Radou pro využívání ARV, aby se zajistila včasná identifikace a rozšiřování komerčně životaschopných inovací. Revize: M12, M24, M36, M48

D9.2 : Vytvoření katalogu obchodních a finančních modelů osvědčených na jiných trzích za účelem přizpůsobení v EU, aby se urychlila renovační vlna. [6]

Stejně jako u D9.1: shromažďuje, analyzuje a šíří prokázané inovace napříč WP 2-8 (v rámci projektu a externě), které jsou shrnuty do výroční zprávy ARV Innovation Intel for Impact (AI3). Kromě toho bude T9.1 usnadňovat výměnu znalostí s výborem pro využívání ARV, aby se zajistila včasná identifikace a rozšiřování komerčně životaschopných inovací.

D9.3 : Návrh plánu obchodního modelu pro energeticky pozitivní obnovu různých sfér jako vzor pro replikaci v celé EU. [36]

Stejně jako u D9.1: shromažďuje, analyzuje a šíří prokázané inovace napříč WP 2-8 (v rámci projektu a externě), které jsou shrnuty do výroční zprávy ARV Innovation Intel for Impact (AI3). Kromě toho bude T9.1 usnadňovat výměnu znalostí s výborem pro využívání ARV, aby se zajistila včasná identifikace a rozšiřování komerčně životaschopných inovací.

D9.4 : D Návrh obchodního modelu pro „prozumenty“ založeného na platformě s jasnými zásadami a regulačními doporučeními. [41]

Stejně jako u D9.1: shromažďuje, analyzuje a šíří prokázané inovace napříč WP 2-8 (v rámci projektu a externě), které jsou shrnuty do výroční zprávy ARV Innovation Intel for Impact (AI3). Kromě toho bude T9.1 usnadňovat výměnu znalostí s výborem pro využívání ARV, aby se zajistila včasná identifikace a rozšiřování komerčně životaschopných inovací.

D9.5 : Návrh finančních nástrojů souvisejících s budováním FI portfólia [36]

Mapování provedené prostřednictvím rozhovorů a vyhledávání na webu. Kromě toho budou do mapování zahrnuty regulační a politické nástroje na úrovni EU, včetně Blockchain Observatory, SET PLAN Action 3.2, Clean Energy for All Europeans a Renovation Wave.

D9.6 : Rozvoj zelených digitálních technologií průvodce dluhopisy v měřítku flexibilní pro spotřebitele energetických trhů.. [45]

Vyvíjejí, zavádějí a vyhodnocují nové škálovatelné ziskové a neziskové obchodní a komunitní modely pro navrhování trhů flexibility/RES prostřednictvím vyvoje inteligentních obchodních platforem vSoftware

D9.7 : Umožnění rozšíření energeticky pozitivní renovace na trzích EU. [46]

Skládá se z několika dílčích témat: Navrhnout řešení financování spojená s budovami, - Navrhnout digitální dluhopisy pro rozšíření flexibilních trhů s energií pro spotřebitele. Cesty CPCC pro rozšiřování budou využity prostřednictvím rady pro využívání.

Harmonogram relevantních milníků

Číslo milníku [18]	**Název milníku**	**Příjemce**	**Datum splatnosti (v měs.)**	**Způsoby ověření**
MS16	Dokončení návrhu obchodního modelu	19 - GDFA	36	Dostupné plány
MS17	Osvědčené modely pro spotřebitele	19 - GDFA	41	Připravený a rozšířený návrh modelu
MS18	Digitální průvodce dluhopisy a připravená digitální struktura	19 - GDFA	45	Distribuovaný průvodce a připravené rozhraní pro digitální dluhopisy

Číslo pracovního balíčku [9]	WP10	**Příjemce** [10]	2 - ACE
Název pracovního balíčku	Komunikace, šíření a dosah zúčastněných stran		
Začátek měsíce	1	**Ukončení měsíce**	48

Cíle

Hlavním cílem WP10 je zajistit odbornou a veřejnou informovanost o výsledcích a úspěších projektu prostřednictvím široké škály distribučních kanálů. Za tímto účelem bude uplatňován dvojí přístup, který se bude prostřednictvím vhodných strategií zabývat a) projektem jako celkem a b) konkrétně každou demonstrací CPCC. Z tohoto pohledu budou pečlivě naplánované činnosti prováděny tak, aby úspěšně oslovily celý hodnotový řetězec zúčastněných stran potřebný k dosažení transformace na CPCC. ARV bude na výzvu CINEA přispívat ke společným informačním a diseminačním aktivitám s cílem zvýšit viditelnost a synergie mezi akcemi podporovanými v rámci H2020. Činnosti v oblasti komunikace a šíření informací (D&C) se zaměří zejména na:

- Vypracovat komplexní plán D&C a vytvořit účinnou strategii komunikace a šíření informací, která bude přizpůsobena konkrétním komunitám v každé laboratoři CPCC Živá laboratoř (LL).
- Umožnit na místní úrovni zapojení zúčastněných stran a osvětové činnosti, podpořit proces spoluvytváření (WP3) poskytnutím balíčků šitých na míru pro každou demonstraci.
- Identifikace zelených ambasadorů a zprostředkování jejich školení (WP3), aby mohli působit jako násobitelé.
- Zvýšení povědomí a podpora rozšiřitelnosti a využívání vyvinutých inovativních řešení na širší úrovni prostřednictvím oslovení průmyslu, akademické obce, tvůrců politik, správy a občanské společnosti.
- Podpora synergií na úrovni EU, které přispívají ke společným činnostem v rámci iniciativ Green Deal.
- Urychlit dopad inovativních řešení ARV a vytvořit optimální podmínky pro jejich využití, mimo jiné prostřednictvím platformy elektronického tržiště.

Popis práce a role partnerů

WP10 - Komunikace, šíření a dosah zúčastněných stran [Měsíce: 1-48]
ACE, NTNU, CVUT, DTU, DANFOSS A/S, ENFOR, PROJECTZERO, EURAC, SINTEF, PALMA, IBAVI, IREC, MET, UAS Utrecht, HOUSING EUROPE, Center Denmark, SAB, GDFA, UU, KARV, DOL, DTTN, UNITN, POLITO, OBF, NANO, AIGUASOL SAEST
Úkol 10.1 (T10.1) Vizuální návrh projektu ARV. M1-M3Vedoucí: NTNU, Účastníci: ACE
Aby byla zajištěna společná vizuální identita projektu, bude vytvořen balíček firemní vizuální identity, který bude obsahovat logo projektu, šablony pro prezentace a informační bulletiny a jako poutač na webové stránky. Vizuální prvky budou formulovány s ohledem na potřebu začlenit stávající grafické znázornění log souvisejících projektů a partnerů. Profesionálně koncipovaná a navržená vizuální identita nezklame ve zkoušce časem, a zajistí tak iniciativě konzistenci a dlouhou životnost. Logo, barvy, písmo, obrázky a fotografie budou v souladu a budou graficky reprezentovat všechny cíle na všech vytvořených materiálech a strategiích. Náležitě budou zohledněny grafické pokyny Evropské komise.
Úkol 10.2 (T10.2) Plán šíření a komunikace. M1-M48 Vedoucí: ACE, Účastníci: VŠICHNI
Podúkol 10.2.1 Základní strategie šíření a komunikace. Vedoucí: ACE, Účastníci: VŠICHNI
Podrobný plán D&C bude dodán v rámci M6. Tento plán bude představovat základní dokument, který nastíní cíle a postupy na základě činností šíření informací a komunikace v rámci projektu. Kromě toho tento dokument, který se zabývá oběma tematickými oblastmi (sociální inovace a energetická transformace), popíše strategii účinného oslovení klíčových zúčastněných stran (určených v WP3) na místní a evropské úrovni, aby se vytvořily optimální podmínky pro využití a tržní uplatnění vyvinutých řešení, přičemž bude vycházet z cílů WP9 a podporovat je. Bude podléhat každoroční revizi, a proto bude také informovat o provedených diseminačních/komunikačních aktivitách a o publiku, které všichni partneři oslovili.
Podúkol 10.2.2 Kontextualizované strategie šíření a komunikace podle ukázky CPCC Živá laboratoř. M1-M48 Vedoucí: SINTEF, Účastníci: VŠICHNI
Zástupci živých laboratoří CPCC s podporou SINTEF a s využitím základní strategie šíření informací a komunikace jako plánu vypracují pro každou ze šesti živých laboratoří CPCC na míru šité strategie šíření informací a komunikace zaměřené na konkrétní komunity na úrovni sousedství. První strategie D&C šité na míru budou vypracovány do M8 a budou revidovány v M20 a M38. Budou v nich specifikovány klíčové zúčastněné strany pro jednotlivé demo verze, na které se mají zaměřit, a také klíčová sdělení, osvětové činnosti a nástroje navržené k jejich oslovení. Na podporu strategie D&C šité na míru budou popsány marketingové nástroje a materiály na míru, jako jsou tiskové zprávy, vlogy, mini webové stránky v místním jazyce, videodeníky LL, podcasty atd. Počet a typ osloveného publika bude monitorován a vykazován při každé revizi dokumentu, přičemž se bude dbát na genderovou rovnost a etické aspekty

Úkol 10.3 (T10.3) Komunikační kanály a materiály pro šíření ARV. M1-M48 Vedoucí: Housing Europe, Účastníci: VŠICHNI

Podúkol 10.3.1 Webové stránky projektu. Vedoucí: ACE, Partneři: VŠICHNI

V rámci projektu budou vytvořeny webové stránky, které budou sloužit jako hlavní rozhraní pro zúčastněné strany, které se zajímají o možnosti vzdělávání a informace a výstupy projektu. Webové stránky budou sloužit jako komunikační a propagační kanál pro výsledky a pro zapojení a rozšíření komunity zúčastněných stran.

Podúkol 10.3.2 Oblast e-tržiště (e-marketplace). M1-M48 Vedoucí: Housing Europe, Účastníci: Všichni

Na webových stránkách bude zřízeno a vloženo elektronické tržiště, které bude sloužit jako „one stop shop". Zde budou sloučeny všechny výsledky projektu, budou zde uvedeny pokyny pro koncové uživatele, odkazy na různé zdroje, informace o dodavatelích výrobků, software, tabulky a datové soubory. Součástí budou také školicí materiály a technické pokyny. Informace bude možné snadno filtrovat podle typu, tématu, rozsahu, země, licence atd. Tato oblast bude také sloužit jako kontaktní místo pro všechny demonstrační projekty zaměřené na klimaticky pozitivní oběhové komunity, což umožní virtuální propojení a spolupráci.

Podúkol 10.3.3 Kanály sociálních médií. M1-M48 Vedoucí: ACE, Účastníci: Všichni

Kromě webových stránek a elektronického tržiště budou zřízeny kanály sociálních médií. Tyto sítě budou mít velký význam, protože pomohou překlenout rozdíly v mezinárodní a národní komunikaci. Sociální média: Twitter, Linkedin, komunita na Facebooku, kanál YouTube. Obsah těchto mediálních kanálů bude průběžně aktualizován o novinky zaměřené na demonstrační místa (mimo jiné videodeníky, občanská žurnalistika, vyprávění příběhů atd.).

Podúkol 10.3.3 Newslettery a propagační materiály. M1-M48 Vedoucí: Housing Europe, Účastníci: Všichni

- Půlroční elektronický newsletter poskytující informace o průběhu a výsledcích projektu, odkazy na tiskové a novinové zprávy, články a rozhovory. Newsletter bude postupně oslovovat různé skupiny zúčastněných stran, např.: a) zúčastněné strany v hodnotovém řetězci stavebnictví, b) poskytovatele bydlení, vlastníky a nájemce nemovitostí a c) místní orgány. To umožní diferencovat mezi skupinami přizpůsobení kanálů pro přenos znalostí.
- Informace o projektu budou rovněž poskytovány prostřednictvím letáku vydaného v angličtině a ve všech jazycích konsorcia, aby bylo zaručeno širší geografické pokrytí.
- Bude vytvořen 1 plakát formátu A0 a 1 rolovací plakát, které budou vystaveny na seminářích, veletrzích a konferencích. 1infografika (M36) shrne hlavní cíle a řešení realizovaná v 6 CPCC LL. Za překlady výše popsaných materiálů budou zodpovědní příslušní partneři projektu.
- Video s titulky pro 6 ukázek CPCC představí místní kontext a řešení vyvinutá v rámci projektu ARV, jakož i proveditelnost, spolehlivost a opakovatelnost navržených řešení. Video bude ukazovat interakce činností kolem demonstrací s místní komunitou. Bude široce sdíleno na webových stránkách a příslušných kanálech sociálních sítí, což podpoří udržitelnost výsledků projektu i po jeho skončení. Klíčové výsledky projektu budou stručně představeny v krátkých videozáznamech, které budou představovat příslušné partnery a shrnovat jejich zprávy. Tato videa budou umístěna na kanál YouTube a webové stránky projektu a budou široce propagována prostřednictvím sociálních médií projektu. Kromě toho budou pravidelně vytvářeny informační listy ilustrující průběh projektu a zveřejněné výsledky, které budou distribuovány příslušným cílovým skupinám. Na základě informačních listů bude s přispěním všech partnerů zapojených do 6 demonstrací CPCC vytvořena brožura výsledků projektu obsahující popis všech výsledků dosažených v ARV.

Úkol 10.4 (T10.4) Oslovení zúčastněných stran a budování kapacit. M1-M48 Vedoucí: Housing Europe, Účastníci: ACE, Všichni

Podúkol 10.4.1 Osvěta a zapojení občanů do seminářů, školení a společensko-kulturních akcí. Vedoucí: Housing Europe Partneři: Všichni

Aktivity v rámci WP3 potřebují podporu WP10, aby bylo možné úspěšně oslovit a zapojit občany. Strategie D&C vytvořené na míru v rámci T10.2 se budou zabývat tematickými oblastmi, na které se zaměřují živé laboratoře v demonstračních lokalitách. Budou obsahovat podpůrné balíčky s nástroji pro podporu rozhodování, popis procesů pro mentoring manažerů ŽL a školicí materiály (např. deskové hry), které budou navrženy v rámci aktivit WP3 zaměřených na zapojení občanů. Speciální pozornost bude věnována studentům středních škol a mladým výzkumným pracovníkům, na které budou zaměřeny místní semináře. Budou uspořádány dny otevřených dveří a interaktivní prohlídky s průvodcem, které podrobně představí demonstrační přístroje. Na místní úrovni se uskuteční řada programů, včetně přednášek, workshopů a festivalů, aby se zážitek z každé ukázky CPCC LL stal poutavějším a přístupnějším. Pokud nebude možné uspořádat fyzická setkání, budou alternativně využity online akce. Kromě toho bude každá ukázka CPCC LL vycházet z místních iniciativ a účastnit se místních společenských a kulturních akcí v rámci obecnějších osvětových a veřejných aktivit s cílem maximálně zviditelnit projekt. Občané budou vyzváni, aby sledovali sociální média, a obdrží

příslušné propagační materiály. Budou také vyzváni, aby se podělili o své zkušenosti a názory prostřednictvím videodeníků a podcastů. Tyto materiály budou široce šířeny prostřednictvím komunikačních kanálů projektu. Kromě toho bude v každé demonstraci CPCC LL zřízena regionální poradní skupina pro rozšiřování z regionálních inovačních klastrů, jako jsou regionální bytová družstva, pobočky národních bytových družstev, stavební (oborové) organizace, další obce. Skupina bude připravovat replikaci a rozšiřování demonstrace ARV testované v demonstracích CPCC LL. Tyto identifikované zúčastněné strany (čtyři z každé regionální poradní skupiny) budou tvořit „místní zelené ambasadory" a budou proškoleny, aby se zajistila rozšiřitelnost vyvinutých řešení a systémů (T3.3).
Podúkol 10.4.2 Oslovení a zapojení obcí a tvůrců politik M1-M48 Vedoucí: Housing Europe
Partneři: Všichni
Živé laboratoře CPCC zapojí místní rady a obce (WP2 a WP3), s nimiž budou úzce spolupracovat, aby lépe řešily jejich potřeby v rámci spojení s možnými modely řízení. Prostřednictvím účasti na mezinárodních akcích a dalších aktivitách budou osloveny obce mimo již zavedenou síť, aby se ukázal potenciál replikace. O výsledcích a technologiích živé laboratoře CPCC bude široce informováno s cílem znásobit implementaci řešení ARV a zároveň budou zdůrazněny politické informace a doporučení.

Podúkol 10.4.3 Oslovení a zapojení průmyslu a občanské společnosti. M1-M48 Vedoucí: Účastníci: ACE Housing Europe, DAN, MET, AIGUA, PALMA, OBF, město Utrecht, PZ, KARV, DTTN
- Ke konci projektu se uskuteční dvě konference - jedna technologická a druhá spíše politická - na nichž budou zdůrazněna inovativní řešení, CPCC a doporučení, která budou určena malým a středním podnikům/průmyslu, koncovým uživatelům, jakož i vývojářům a městům.
- Každá ze zúčastněných zastřešujících organizací (ACE a Housing Europe) uspořádá cílené akce, aby prostřednictvím osvětových seminářů propagovala přístup ARV a podpořila jeho další využívání. Workshopy mohou být v případě potřeby spojeny s návštěvou demonstrací na místě. ACE: Po celé Evropě budou uspořádány čtyři osvětové akce s workshopem a výstavou plakátů (demonstračních budov) s cílovou účastí 25-50 osob na akci. K účasti na těchto akcích budou přizvány národní členské organizace, aby se zvýšil jejich dosah. Hlavním cílem je zvýšit povědomí o zapojení občanů a procesu spoluvytváření a obhájit důležitost role architektů od počátečních fází každého procesu. Housing Europe: Pro členské asociace Housing Europe budou uspořádány čtyři workshopy zaměřené na zvyšování povědomí. Hlavním cílem je podpořit přijetí a uplatnění modelů CPCC na trhu, propagovat a zvýšit povědomí o zapojení občanů (2x) a uplatnění na trhu (2x) a získat zpětnou vazbu členů o užitečnosti těchto výstupů.

Podúkol 10.4.4 Oslovení a zapojení akademické obce. M1-M48 Vedoucí: ČVUT, partneři: NTNU, DTU, HU, UU, UNITN, POLITO, IREC
Výsledky projektu budou publikovány a prezentovány na nejméně 10 vědeckých konferencích. Akademičtí/výzkumní partneři zveřejní minimálně 14 článků s otevřeným přístupem ve vědeckých časopisech s vysokým dopadem, aby se výsledky ARV rozšířily mezi odbornou i širší vědeckou komunitu.

Úkol 10.5 (T10.5). Sdružování a přispívání ke společným činnostem H2020 a dalším akcím EU. M1-M48 Vedoucí: ACE, Partneři: Všichni
Tento úkol zahrnuje zdroje, které po vzájemné dohodě s EASME přispívají ke společným činnostem v oblasti šíření informací s cílem zvýšit synergie mezi akcemi podporovanými v rámci H2020 a jejich viditelnost. ARV se bude účastnit týdne udržitelné energie EU a dalších iniciativ nebo podporovaných aktivit EU (např. série konferencí o udržitelných místech). ARV se bude na pozvání EASME podílet na společných informačních a propagačních aktivitách s cílem zvýšit synergie a viditelnost akcí podporovaných EC. Kromě toho budeme shromažďovat zkušenosti získané z demo projektů ARV a inovace ve všech WP, abychom vytvořili příručku pro zúčastněné strany k implementaci úspěšných CPCC.

Účast na jednoho partnera

c	**Úsilí pracovního balíčku 10**
1 - NTNU	10.00
2 - ACE	12.00
3 - ČVUT	2.00
4 - DTU	2.50
5 - DANFOSS A/S	1.00

6 - ENFOR	0.50
Číslo a zkrácený název partnera	**Úsilí pracovního balíčku 9**
7 - PROJECTZERO	3.00
8 - EURAC	2.00
9 - SINTEF	5.00
10 - PALMA	7.00
11 - IBAVI	1.50
12 - IREC	4.00
13 - MET	1.00
14 - UAS Utrecht	2.00
15 - HOUSING EUROPE	22.00
17 - Center Denmark	1.00
18 - SAB	3.00
19 - GDFA	0.50
22 - UU	2.00
28 - KARV	1.00
29 - DOL	0.50
30 - DTTN	0.50
31 - UNITN	0.50
32 - POLITO	1.00
33 - OBF	0.50
34 - NANO	0.50
35 - AIGUASOL SAEST	0.50
Celkem	87.00

Seznam dodávek

Číslo dodávky[14]	**Název dodávky**	**Příjemce**	**Typ dodávky[15]**	**Úroveň diskrétnosti[16]**	**Datum splatnosti (v měs.)[17]**
D10.1	Korporátní identita ARV	1 - NTNU	Jiné	Veřejné	3
D10.2	i) Základní plán komunikace a šíření informací a ii) strategie šité na míru pro 6 demonstrací CPCC LL.	2 - ACE	Zpráva	Důvěrné, jen pro členy konsorcia (včetně Komise)	8

D10.3	Webové stránky projektu, e-tržiště a sociální média	15 - HOUSING EUROPE	Webové stránky, patenty atd.	Veřejné	6
D10.4	Newslettery a propagační materiály: Leták, plakáty, video, infografika	15 - HOUSING EUROPE	Webové stránky, patenty atd.	Veřejné	6
D10.5	Projektová brožura shrnující výsledky dosažené v oblasti ARV	15 - HOUSING EUROPE	Zpráva	Veřejné	42
D10.6	Závěrečná zpráva o šíření informací a komunikačních aktivitách	2 - ACE	Zpráva	Veřejné	48
D10.7	Zpráva o příspěvku ke společným H2020 aktivitám	2 - ACE	Zpráva	Veřejné	44
D10.8	Plán pro plánování, (re)design, (re)konstrukci, provoz a používání CPCC	1 - NTNU	Zpráva	Veřejné	12

Popis dodávek

D10.1 : Korporátní identita ARV [3]
Aby byla zajištěna společná vizuální identita projektu, bude vytvořen balíček firemní vizuální identity, který bude obsahovat logo projektu, šablony pro prezentace a informační bulletiny a jako poutač na webové stránky. Bude věnována náležitá pozornost grafickým pokynům Evropské komise.
D10.2 : i) Základní plán komunikace a šíření informací a ii) strategie šité na míru pro 6 demonstrací CPCC LL. [8]
Podrobný plán D&C bude dodán v rámci M6. Tento plán bude představovat základní dokument, který nastíní cíle a postupy na základě činností šíření informací a komunikace v rámci projektu. Druhou částí je vypracování na míru šitých strategií šíření a komunikace, které se budou týkat konkrétních komunit na úrovni sousedství pro každou ze 6 Živých laboratoří CPCC. První strategie šíření a komunikace na míru budou vypracovány do M8 a budou revidovány v M20 a M38.
D10.3 : Webové stránky projektu, e-tržiště a sociální média [6]
V rámci projektu budou vytvořeny webové stránky, které budou sloužit jako hlavní rozhraní pro zúčastněné strany, které se zajímají o možnosti vzdělávání a informace a výstupy projektu. Webové stránky budou sloužit jako komunikační a propagační kanál pro výsledky a pro zapojení a rozšíření komunity zúčastněných stran. Revize plánované pro M6, M12, M24, M436, M48.
D10.4 : Newslettery a propagační materiály: Leták, plakáty, video, infografika [6]
• Půlroční elektronický newsletter poskytující informace o průběhu a výsledcích projektu, odkazy na tiskové a mediální zprávy, články a rozhovory. Zpravodaj bude postupně oslovovat různé skupiny zúčastněných stran, např.: a) zúčastněné strany v hodnotovém řetězci stavebnictví, b) poskytovatele bydlení, vlastníky a nájemce nemovitostí a c) místní orgány. To umožní rozlišovat mezi skupinami, které přizpůsobují kanály přenosu znalostí. • Informace o projektu budou rovněž poskytovány prostřednictvím letáku projektu vydaného v angličtině a ve všech jazycích konsorcia, aby bylo zaručeno širší geografické pokrytí. •Bude vytvořen 1 plakát formátu A0 a 1 rolovací plakát, které budou vystaveny na seminářích, veletrzích a konferencích. 1 infografika (M36) bude shrnovat hlavní cíle a řešení realizovaná v rámci 6 CPCC LL. Za překlady výše popsaných materiálů budou zodpovědní příslušní partneři projektu. • Video s titulky pro 6 ukázkových CPCC představí místní kontext a řešení vyvinutá v rámci projektu ARV, jakož i proveditelnost, spolehlivost a opakovatelnost navržených řešení. Video bude ukazovat interakce činností kolem demosnímků s místní komunitou. Bude široce sdílena na webových stránkách a příslušných kanálech sociálních sítí, což podpoří udržitelnost výsledků projektu i po jeho skončení. • Klíčové výsledky projektu budou stručně představeny v krátkých videozáznamech, které budou představovat příslušné partnery a shrnovat jejich zprávy.
Tato videa budou umístěna na kanál YouTube a webové stránky projektu a budou široce propagována prostřednictvím sociálních médií projektu. Kromě toho budou pravidelně vytvářeny informační listy ilustrující průběh projektu a zveřejněné výsledky, které budou distribuovány příslušným cílovým skupinám. Na základě informačních listů bude za přispění všech partnerů zapojených do 6 demonstrací CPCC vytvořena brožura s výsledky projektu obsahující popis všech výsledků dosažených v ARV. Několik subdodávek. M6 a M30 (leták) M9 (plakáty) M18 (video) M36 (infografika).
D10.5: Projektová brožura shrnující výsledky dosažené v oblasti ARV [42]

Projektová brožura shrnující výsledky dosažené v oblasti ARV.
D10.6: Závěrečná zpráva o šíření informací a komunikačních aktivitách [48]
Závěrečná zpráva o šíření informací a komunikačních aktivitách.
D10.7: Zpráva o příspěvku ke společným H2020 aktivitám [44]
Zpráva o příspěvku ke společným činnostem H2020.
D10.8: Plán pro plánování, (re)design, (re)konstrukci, provoz a používání CPCC [12]
Plán pro plánování, (re)design, (re)konstrukci, provoz a používání CPCC. Revize M12, 24, 36, 48.

Harmonogram relevantních milníků

Číslo milníku [18]	**Název milníku**	**Příjemce**	**Datum splatnosti (v měs.)**	**Způsoby ověření**
MS19	Webové stránky ARV	2 - ACE	6	Zprovoznění webových stránek
MS20	Spuštění platformy elektronického tržiště	2 - ACE	6	E-tržiště zprovoznění platformy s definovanou úplnou strukturou a nahráním prvního obsahu, s plánem průběžné aktualizace.

1.3.4. WT4 Seznam milníků

Číslo milníku [18]	**Název milníku**	**Číslo pracov-ního balíčku**[9]	**Příjemce**	**Datum splatnosti (v měs.)**[17]	**Způsoby ověření**
MS1	Zahájení projektu	WP1	1 - NTNU	3	CA a zápis z KOM
MS2	Rámec pro hodnocení ARV	WP2	12 - IREC	9	Vymezení hodnotícího rámce
MS3	Implementace nástrojů	WP2	12 - IREC	15	Zahájení implementace nástrojů pro rozsáhlé modernizační akce
MS4	Virtuální realita prostředí	WP2	12 - IREC	36	Použitá a implementovaná prostředí virtuální reality
MS5	Celková metodika v T3.2	WP3	9 - SINTEF	9	Odpovídající metodika s dokončeným výstupem
MS6	Zprávy LL (Živé laboratoře)	WP3	9 - SINTEF	24	Dokončení prvních zpráv LL
MS7	Pokrok v integrovaném cirkulárním designu	WP4	1 - NTNU	20	Zprávy o návrhu budov s nulovými emisemi a pozitivní energií v CPCC D4.2-4.6
MS8	První iterace uznávaných typologií	WP5	14 - UAS Utrecht	12	Množství a kvalita uznaných typologií
MS9	Konečná iterace uznaných typologií a pracovního postupu před výrobou.	WP5	14 - UAS Utrecht	24	Ověření automatizovaně dodaných vstupů pro File2Factory
MS10	První iterace analýz výrobních pracovních postupů	WP5	14 - UAS Utrecht	30	Množství činností zaměřených na výrobu mimo lokalitu.
MS11	Realizované výrobní principy	WP5	14 - UAS Utrecht	36	Analýzy výstupní výroby. Dodané moduly na staveniště
MS12	Realizace demo projektů	WP5	14 - UAS Utrecht	36	Výstavba projektů dokončena
MS13	Pokrok v oblasti integrovaných systémů obnovitelných zdrojů energie a skladování	WP6	3 - ČVUT	20	Procesní zprávy o integrovaných systémech obnovitelných zdrojů energie a skladování v CPCC D6.2-6.6
MS14	Efektivní a flexibilní provoz	WP7	4 - DTU	34	Efektivní a flexibilní provoz na demonstračních místech

Číslo milníku [18]	Název milníku	Číslo pracov-ního balíčku[9]	Příjemce	Datum splatnosti (v měs.)[17]	Způsoby ověření
MS15	Předběžné posouzení LCA-LCC	WP8	8 - EURAC	18	Předběžná zpráva o každé demonstraci bude zaslána příslušným partnerům, aby ji posoudili a poskytli zpětnou vazbu.
MS16	Dokončení návrhu obchodního modelu	WP9	19 - GDFA	36	Dostupné plány
MS17	Osvědčené modely pro spotřebitele	WP9	19 - GDFA	41	Připravený a rozšířený návrh modelu
MS18	Digitální průvodce dluhopisy a připravená digitální struktura	WP9	19 - GDFA	45	Distribuovaný průvodce a připravené rozhraní pro digitální dluhopisy
MS19	Webové stránky ARV	WP10	2 - ACE	6	Zprovoznění webových stránek
MS20	Spuštění platformy e-tržiště	WP10	2 - ACE	6	E-tržiště zprovoznění platformy s definovanou úplnou strukturou a nahráním prvního obsahu, s plánem průběžné aktualizace.

1.3.5. WT5 Kritická rizika implementace a zmírňující akce

Číslo rizika	Popis rizika	Číslo pracovního balíčku	Navrhovaná opatření ke zmírnění rizik
1	Zpoždění technických výstupů (obecné riziko).	WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	WP1 bude zajišťovat harmonogram projektu a řešit případné překážky, jakmile se objeví. Vedoucí WP a partneři prokázali svou schopnost plnit úkoly včas i v jiných projektech.
2	Konstrukční chyby a překážky při integraci různých technologií a součástí (obecné riziko).	WP4, WP5, WP6, WP7	Aby bylo zajištěno, že technologie do sebe správně zapadají, bude pro návrh, hodnocení a optimalizaci použit integrovaný energetický návrh s modelováním.
3	Okresní modely digitálních dvojčat mohou být složité a těžké (obecné riziko).	WP2, WP4, WP5, WP6, WP7, WP8	Toto riziko bude zmírněno distribuovanou povahou digitálního cloudového centra ARV. Pokud se přesto vyskytnou problémy s výkonem, budou řešeny vypracováním dalších úrovní podrobnosti.
4	Nejasná formulace cílů nebo výsledků (obecné riziko).	WP1	WP1 zajistí jasně formulované cíle a milníky. Zapojení zúčastněných stran do jiných projektů ukazuje jejich schopnost formulovat cíle a navrhnout projekt v souladu s nimi.
5	Zpoždění v demonstračních případech (demonstrační případy).	WP4, WP5, WP6	Vlastníci budov a zúčastněné strany potvrdili svůj závazek v dopise o podpoře. Pokud projekt nemůže pokračovat z vnějších důvodů, konsorcium ARV navrhne opatření a zajistí náhradu ve stejné kvalitě.
6	Nedostatečné finanční prostředky na realizaci/rozšíření demo inovací (demonstrační případy).	WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Finanční pobídky v jednotlivých zemích a v celé EU budou mapovány a sledovány.
7	Nízký zájem/zapojení obyvatel (demonstrační případy).	WP3	Zjednodušte a zatraktivněte zapojení obyvatel, např. pořádáním soutěží, integrací živých laboratoří do stávajících arén, her, aplikací atd.
8	Nedosažení TRL 7-8 inovací (demonstrační případy).	WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Všechny inovace jsou relativně zralé (TRL 5-6).
9	Podceněné zdroje na demonstrační činnosti (demonstrační případy).	WP2, WP3, WP4, WP5, WP6	Zúčastněné strany se zavázaly k financování demonstrací. Vyhrazený rozpočet v ARV bude vyčleněn na podporu inovačních aktivit (např. zavádění Cloud Hubu).
10	Neschopnost shromažďovat údaje a zajistit jejich kvalitu pro hodnocení (demonstrační případy).	WP8	Úspěšný sběr dat v demonstracích zajistí speciální WP8.
11	Vnitrostátní/celostátní předpisy vedoucí k neoptimálnímu zavádění inovací (demonstrační případy).	WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Inovace budou přizpůsobeny potřebným předpisům - Fórum pro inovace ARV a specializované úkoly v WP9

Číslo rizika	Popis rizika	Číslo pracovního balíčku	Navrhovaná opatření ke zmírnění rizik
12	Zpoždění/chyby konzultanta nebo dodavatele (demonstrační případy).	WP4, WP5, WP6	Doba realizace bude zahrnuta do harmonogramu a sdělena co nejdříve.
13	Špatný výkon příjemce (vedení).	WP1, WP10, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Řídicí tým projektu bude sledovat, zda partneři dodržují předpisy. V případě provádění nevyhovující, budou formálně upozorněni a bude jim poskytnut měsíc na nápravu. Pokud se situace nezlepší, může valná hromada odhlasovat, že partner neplní své povinnosti.
14	Nejasné rozdělení úkolů a odpovědností partnerů a zemí (řízení).	WP1, WP10, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Všechny schůzky v rámci projektu ARV budou obsahovat povinný seznam úkolů spolu s návrhem, kdo bude jednotlivé úkoly sledovat.
15	Klíčoví pracovníci projektu by mohli změnit svou pozici v organizaci (management).	WP1	Všechny klíčové osoby jsou vysoce angažované ve společnosti ARV. Koordinátor a vedoucí PS jsou z vysoce kompetentních organizací, které jsou schopny nahradit klíčovou osobu.
16	Technické/administrativní neshody mezi partnery konsorcia (řízení).	WP1	Všichni partneři mají zkušenosti s výzkumnými projekty EU. Mnozí z nich spolupracovali již dříve. Všichni podepsali dohodu o spolupráci a podepíší dohodu o konsorciu (s doložkami o řešení konfliktů).
17	Nedostatečná komunikace, způsobuje nejasnosti (management).	WP1, WP10, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Bude sestaven komunikační plán, který bude obsahovat četnost, cíle a cílovou skupinu každé komunikace.
18	Neoprávněné rozhodování nebo zpoždění způsobující špatnou kvalitu výstupů (řízení).	WP1, WP10, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Speciální úkol v WP1 zajišťuje časté schůzky o stavu projektu mezi výzkumnými pracovníky, partnery a vedením, aby se minimalizovala nejistota ohledně překážek.
19	Nedostatečné urychlení zavádění na trh způsobené nejasným využitím a obchodními plány (ostatní).	WP9	Návrh obchodního modelu v rámci WP9 bude probíhat v dialogu s institucemi poskytujícími finanční služby a s radou pro využívání zdrojů, aby se zajistil soulad s požadavky finančníků a potřebami trhu napříč jurisdikcemi.
20	Omezené pokrytí komunikace s šíření inovace (ostatní).	WP10	PMT a odborníci na komunikaci v rámci WP10 budou aktivně využívat komunikační plán k zajištění šíření informací. Konsorcium ARV je dobře zastoupeno v EERA Smart Cities, ECTP, mnoha přílohách a klastrech IEA, čímž se maximalizuje dopad.
21	Nedostatečná kvalita výstupů a jejich šíření (ostatní).	WP1, WP10, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	QAP, odborníci na komunikaci a zúčastněné strany projektu mají cenné zkušenosti s šířením vysoce kvalitních výstupů mnoha projektů.

1.3.6. WT6 Přehled projektového úsilí v osoboměsících

	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	WP9	WP10	Celkový počet osob/měsíců na účastníka
1 - NTNU	77	9	12	25.50	3.50	15	14	15	11	10	192
2 - ACE	4	1	4	2	1	0	0	0.50	0.50	12	25
3 - ČVUT	7	6.50	18	18	19	37	23.50	19.50	0.50	2	151
4 - DTU	4	16	0	0	0	20	46	9	8	2.50	105.50
5 - DANFOSS A/S	1	0	0	0	0	1	9	3	3	1	18
6 - ENFOR	1	0	0	0	0	18	18	0	1	0.50	38.50
7 - PROJECTZERO	7	3	3	1	0	3.50	4	5	0.50	3	30
8 - EURAC	2	3	4	3	3.50	2	3	36	1	2	59.50
9 - SINTEF	4	12	37	14	7	4	7	6	2	5	98
10 - PALMA	7	47	50	22	16	1	5	25	9	7	189
11 - IBAVI	1	3	0	16	8.50	0	0	21	1.50	1.50	52.50
12 - IREC	4	67	16	23	10	1	20	15	5	4	165
13 - MET	1	0	8	0	0	0	4	8	2	1	24
14 - UAS Utrecht	10	3	1	19	35	2	1	3	5	2	81
15 - HOUSING EUROPE	1	1	6	0	0	0	2	0	3	22	35
16 - Buro de Haan	0.50	0	0	0	15	0	0	0	1.50	0	17
17 - Center Denmark	1	4	4	0	0	4	33	8	1	1	56
18 - SAB	1	0	3	0	0	2	3	3	2	3	17
19 - GDFA	4	0	1	0	0	0	0	2	58.50	0.50	66
20 - BOEX	1	0	5	1	5	2	3	1	2	0	20
21 - Rc Panels B.V.	0.50	0	0	13	6	2	0	1	3	0	25.50
22 - UU	1	0	0	5	2	14	19	2	3	2	48
23- CITY OF UTRECHT	1	0	11	0	2	0	2	1	4	0	21
24 - BOSGROEP	1	0	0	13	13	10	0	1	3	0	41
25 – iwell	1	0	0	0	0	0	17	1	3	0	22
26 - MEX	1	0	0	6	9	2	0	1	3	0	22

	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	WP9	WP10	Celkový počet osob/měsíců na účastníka
27 - Mitros	1	0	5	0	0	6	3	0	2	0	17
28 - KARV	1	2	7	4	5	6	5	9	0.50	1	40.50
29 - DOL	1	0	1	0	0	15	1	1	1	0.50	20.50
30 - DTTN	2.50	3.50	6	4	6	0	2	2	2.50	0.50	29
• Armalam	1.50	0	0	3	12	0	1	1	2.50	0	21
• X-LAM DOLOMITI	0	0	0	0.50	11.50	0	0	0	0	0	12
• FANTI LEGNAMI	0	0	0	0.50	7.50	0	0	0	0	0	8
31 - UNITN	1	0	0	22	22	0	2	8	0.50	0.50	56
32 - POLITO	1	0	0	20	8	11	0	10	1	1	52
33 - OBF	7	7	11	9	4	4	2	7	6	0.50	57.50
34 - NANO	1	0	0	0	0	10	4	3	0.50	0.50	19
35 – AIGUASOL SAEST	1	9.50	0	23	0	0	0	0	1.50	0.50	35.50
Celkem Osoba/Měsíce	162	197.50	213	267.50	231.50	192.50	253.50	228	155	87	1987.50

1.3.7. WT7 Předběžný harmonogram revizí projektu

Číslo recenze [19]	**Předběžný harmonogram**	**Plánované místo revize**	**Případné komentáře**
RV1	21	Brusel nebo online	
RV2	39	Brusel nebo online	
RV3	48	Brusel nebo online	

1. Číslo projektu

Číslo projektu bylo přiděleno Komisí jako jedinečný identifikátor vašeho projektu. Nelze jej měnit. Číslo projektu by **mělo být uvedeno** na **každé stránce dokumentů pro přípravu grantové dohody (část A a část B),** aby se předešlo chybám při jeho zpracování.

2. Zkratka projektu

Použijte zkratku projektu uvedenou v předloženém návrhu. Obecně ji nelze měnit. Stejná zkratka by **měla být uvedena** na **každé straně dokumentů pro přípravu grantové dohody (část A a část B),** aby se předešlo chybám při jejím zpracování.

3. Název projektu

U Použijte název (pokud možno ne delší než 200 znaků), který je uveden v předloženém návrhu. Drobné opravy jsou možné, pokud se na nich dohodnete během přípravy grantové dohody.

4. Datum zahájení

Není-li při přípravě grantové dohody řádně odůvodněno a dohodnuto konkrétní (pevné) datum zahájení, projekt bude zahájen první den měsíce následujícího po vstupu grantové dohody v platnost (pozn.: vstup v platnost = podpis agentury). Upozorňujeme, že v případě použití pevného data zahájení bude nutné předložit písemné zdůvodnění.

5. Doba trvání

Vložte dobu trvání projektu v celých měsících.

6. Identifikátor výzvy (části)

Identifikátor výzvy (části) je referenční číslo uvedené ve výzvě nebo části výzvy, na kterou jste se obraceli, jak je uvedeno ve zveřejnění výzvy v Úředním věstníku Evropské unie. Identifikátor uvedený Komisí musíte použít v dopise, kterým vyzýváte k přípravě grantové dohody.

7. Abstrakt

8. Měsíc vstupu do projektu

Měsíc, kdy se účastník připojil ke konsorciu, přičemž 1. měsíc je datem zahájení projektu a všechna ostatní data zahájení jsou vztažena k tomuto datu zahájení.

9. Číslo pracovního balíčku

Číslo pracovního balíčku (WP): WP1, WP2, WP3, ..., WPn

10. Příjemce

Musí se jednat o jednoho z příjemců grantu (nikoli o třetí stranu). Číslo příjemce, který vede práci v tomto pracovním balíčku.

11. Osoboměsíce na pracovní balíček

Celkový počet osoboměsíců přidělených na každý pracovní balíček.

12. Začátek měsíce

Relativní datum zahájení prací v konkrétních pracovních balíčcích, přičemž 1. měsíc je datem zahájení projektu a všechna ostatní data zahájení jsou vztažena k tomuto datu zahájení.

13. Ukončení měsíce

Relativní datum ukončení, kdy měsíc 1 označuje datum zahájení projektu a všechna data ukončení jsou vztažena k tomuto datu zahájení.

14. Číslo dodávky

Číslo dodávek: D1 – Dn.

15. Typ dodávky

Uveďte prosím typ dodávky pomocí jednoho z následujících kódů:

R	Dokument, zpráva
DEM	Demonstrátor, pilot, prototyp
DEC	Webové stránky, patentové náplně, videa atd
OTHER	

ETHICS Etické požadavky
ORDP Pilotní projekt otevřených výzkumných dat
DATA datové soubory, mikrodata atd

16. Úroveň diskrétnosti

Uveďte prosím úroveň diskrétnosti pomocí jednoho z následujících kódů:
PU Veřejné
CO Důvěrné, pouze pro členy konsorcia (včetně Komise)
EU-RES Utajované informace: RESTREINT UE (rozhodnutí Komise 2005/444/EC)
EU-CON Utajované informace: CONFIDENTIEL UE (rozhodnutí Komise 2005/444/EC)
EU-SEC Utajované informace: SECRET UE (rozhodnutí Komise 2005/444/EC)

17. Datum splatnosti dodávky

Měsíc, ve kterém budou dodávky k dispozici, přičemž 1. měsíc je datem zahájení projektu a všechna data dodávek se vztahují k tomuto datu zahájení.

18. Číslo milníku

Číslo milníku:MS1, MS2, ..., MSn.

19. Číslo recenze

Číslo recenze: RV1, RV2, ..., RVn.

20. Číslo instalace

Postupně číslujte instalace stejné infrastruktury. Instalace je část infrastruktury, kterou lze používat nezávisle na ostatních.

21. Země instalace

Kód země, ve které se instalace nachází, nebo IO, pokud je poskytovatel přístupu (příjemce nebo propojená třetí strana) mezinárodní organizací, ERIC nebo podobnou právnickou osobou.

22. Typ přístupu

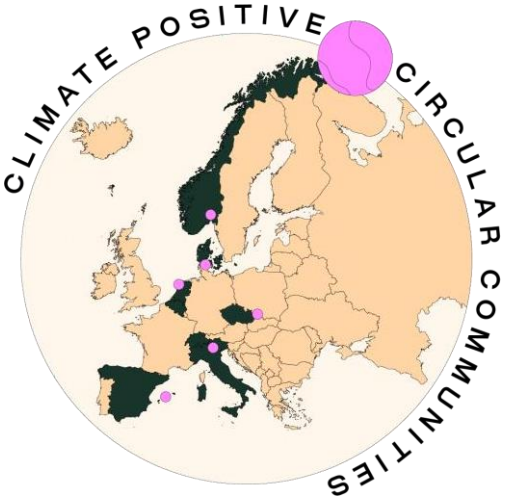
TA-uc v případě nadnárodního přístupu s náklady na přístup deklarovanými na základě jednotkových nákladů,
TA-ac v případě nadnárodního přístupu s náklady na přístup vykázanými jako skutečné náklady a
TA-cb v případě nadnárodního přístupu s náklady na přístup vykázanými jako kombinace skutečných nákladů a nákladů na základě jednotkových nákladů,
VA-uc v případě virtuálního přístupu s náklady na přístup deklarovanými na základě jednotkových nákladů,
VA-ac v případě virtuálního přístupu s náklady na přístup vykázanými jako skutečné náklady a
VA-cb v případě virtuálního přístupu s náklady na přístup vykázanými jako kombinace skutečných nákladů a nákladů na základě jednotkových nákladů.

23. Přístupové náklady

Náklady na přístup poskytnutý v rámci projektu. V případě virtuálního přístupu vyplňte pouze druhý sloupec. V případě nadnárodního přístupu vyplňte jeden z obou sloupců nebo oba podle způsobu vykazování nákladů na přístup. Náklady na nadnárodní přístup na základě jednotkových nákladů vyplynou z jednotkových nákladů podle množství přístupu, který má být poskytnut.

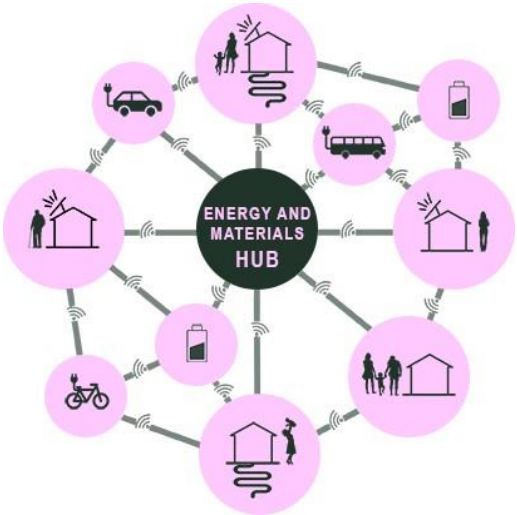
Popis obrázků

Str. 7



Obr 1.1

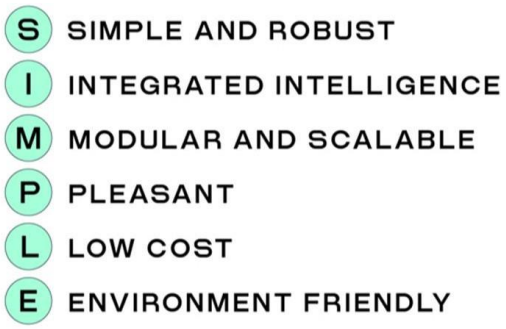
CLIMATE POSITIVE CIRCULAR COMMUNITIES = KLIMATICKY POZITIVNÍ KOMUNITY S OBĚHOVÝM HOSPODÁŘSTVÍM



Obr 1.2

ENERGY AND MATERIALS HUB = ENERGETICKÉ A MATERIÁLOVÉ CENTRUM

Str. 8:



Obr 1.3

SIMPLE AND ROBUST = JEDNODUCHÉ A STABILNÍ

INTEGRATED INTELLIGENCE = INTEGROVANÝ INFORMAČNÍ SYSTÉM

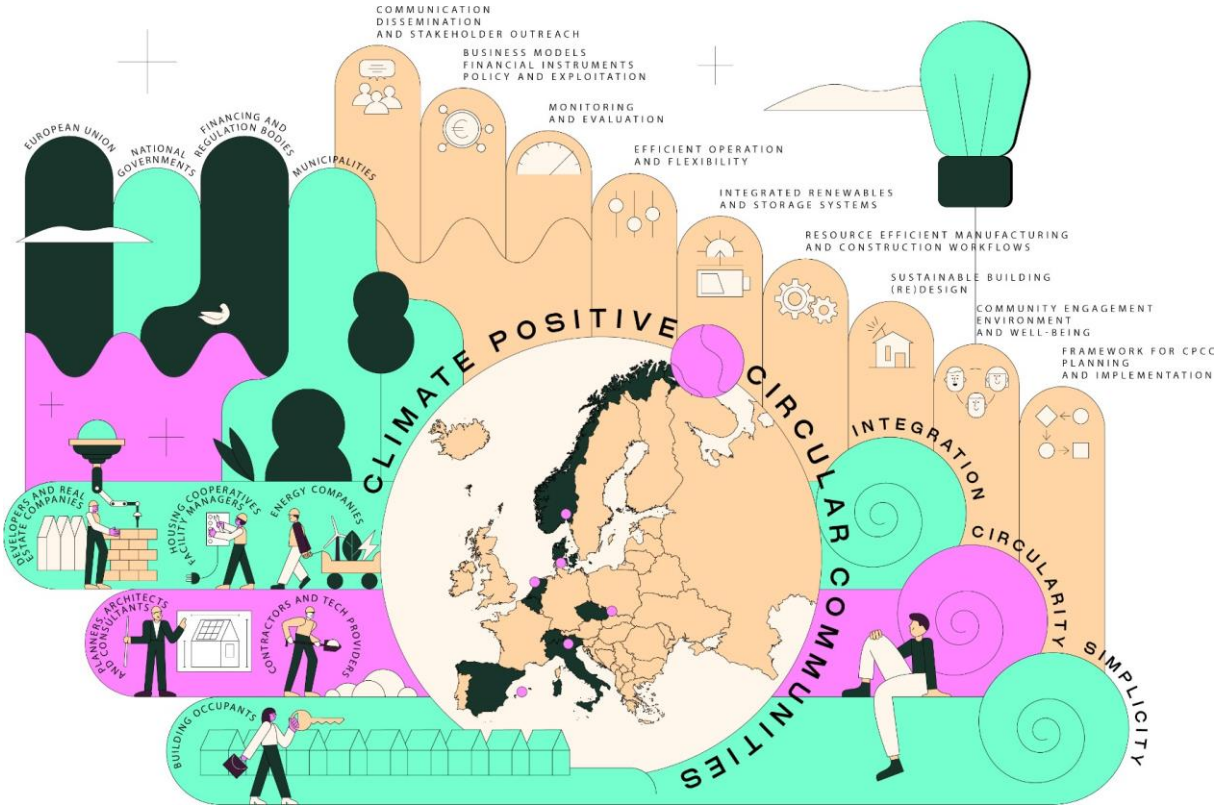
MODULAR AND SCALABLE = MODULÁRNÍ ŘEŠENÍ S MOŽNOSTÍ ŠKÁLOVÁNÍ

PLEASANT = UŽIVATELSKY PŘÍVĚTIVÉ

LOW COST = NÍZKONÁKLADOVÉ

ENVIRONMENTALLY FRIENDLY = EKOLOGICKÉ

Str.9



Obr. 1.4.

Hlavní popisek: CLIMATE POSITIVE CIRCULAR COMMUNITIES = KLIMATICKY POZITIVNÍ KOMUNITY S OBĚHOVÝM HOSPODÁŘSTVÍM

Vedlejší popisky vpravo:

INTEGRATION, CIRCULARITY, SIMPLICITY = INTEGRACE, PRINCIPY OBĚHOVÉHO HOSPODÁŘSTVÍ, JEDNODUCHOST

Popisky zleva doprava:

EUROPEAN UNION = EVROPSKÁ UNIE

NATIONAL GOVERNMENTS = VLÁDY JEDNOTLIVÝCH STÁTŮ

FINANCING AND REGULATION BODIES = FINANCUJÍCÍ A REGULAČNÍ SUBJEKTY

COMMUNICATION DISSEMINATION AND STAKEHOLDER OUTREACH = ŠÍŘENÍ KOMUNIKAČNÍCH SDĚLENÍ A OSVĚTOVÁ ČINNOST PRO ZÚČASTNĚNÉ SUBJEKTY

BUSINESS MODELS, FINANCIAL INSTRUMENTS, POLICY AND EXPLOITATION = OBCHODNÍ MODELY, FINANČNÍ NÁSTROJE, POLITIKY A VYUŽITÍ VÝSLEDKŮ PROJEKTU

MONITORING AND EVALUATION = MONITORING A VYHODNOCENÍ

EFFICIENT OPERATION AND FLEXIBILITY = EFEKTIVNÍ PROVOZ A FLEXIBILITA

INTEGRATED RENEWABLES AND STORAGE SYSTEMS = INTEGROVANÉ SYSTÉMY OBNOVITELNÝCH ZDROJŮ A SYSTÉMY SKLADOVÁNÍ ENERGIE

RESOURCE EFFICIENT MANUFACTURING AND CONSTRUCTION WORKFLOWS = VÝROBNÍ A STAVEBNÍ PRACOVNÍ TOKY S ÚČINNÝM VYUŽITÍM ZDROJŮ

SUSTAINABLE BUILDING (RE)DESIGN = UDRŽITELNÉ PROJEKTOVÁNÍ A PŘEPROJEKTOVÁNÍ BUDOV

COMMUNITY ENGAGEMENT, ENVIRONMENT AND WELLBEING = ZAPOJENÍ, PROSTŘEDÍ A KVALITA ŽIVOTA KOMUNIT

FRAMEWORK FOR CPCC PLANNING AND IMPLEMENTATION = RÁMEC PRO PLÁNOVÁNÍ A REALIZACI CPCC

Popisky zúčastněných stran:

DEVELOPERS AND REAL ESTATE COMPANIES = DEVELOPEŘI A REALITNÍ SPOLEČNOSTI

HOUSING COOPERATIVES FACILITY MANAGERS = FACILITY MANAŽEŘI BYTOVÝCH DRUŽSTEV

ENERGY COMPANIES = ENERGETICKÉ PODNIKY

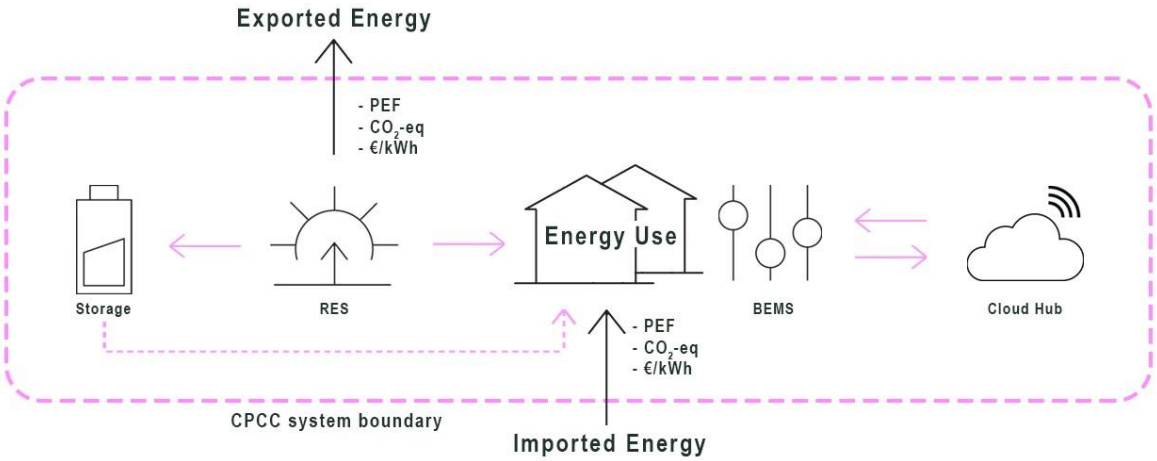
PLANNERS, ARCHITECTS AND CONSULTANTS = PROJEKTANTI, ARCHITEKTI A PORADCI

CONTRACTORS AND TECH PROVIDERS = SMLUVNÍ DODAVATELÉ A POSKYTOVATELÉ TECHNOLOGIÍ

BUILDING OCCUPANTS = OBYVATELÉ BUDOV

Str. 11:

Obr. 1.5



Storage = uskladnění/akumulace

RES = obnovitelné zdroje energie

Exported energy = exportovaná energie

PEF = faktor primární energie

Energy use = využití energie

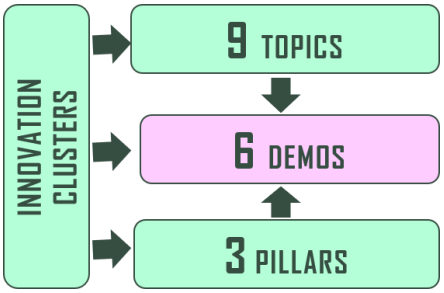
BEMS = systém energetického řízení budovy

Cloud hub = cloudový hub

CPCC systém boundary = hranice systému CPCC

Imported Energy = importovaná energie

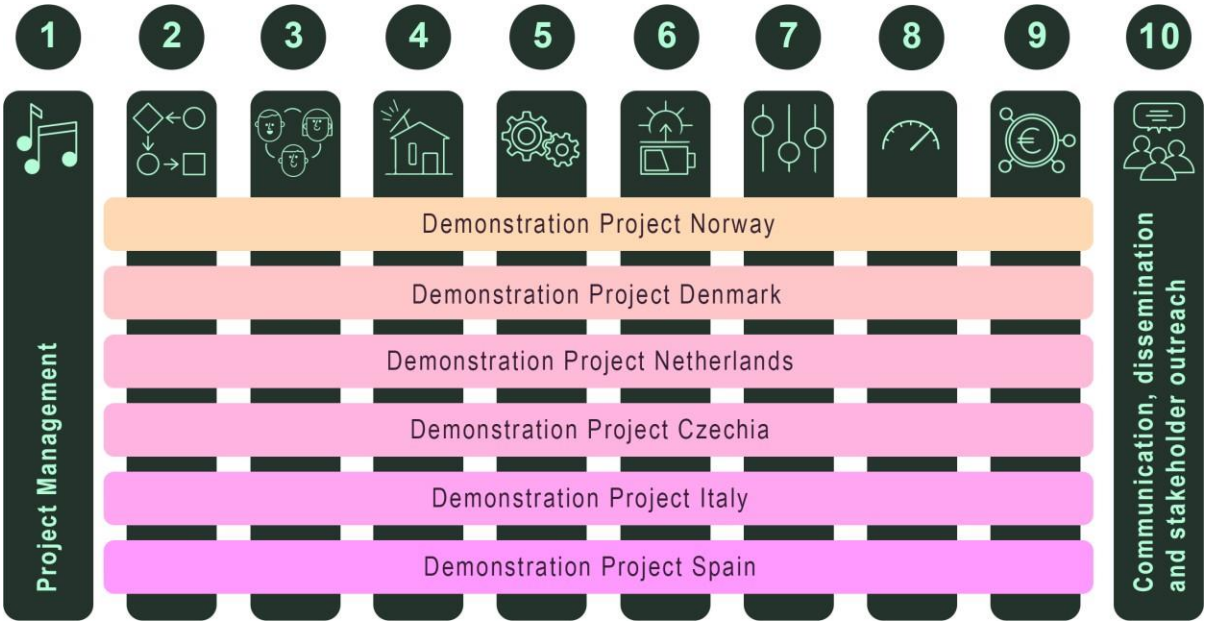
Str. 14:



INNOVATION CLUSTERS: 9 TOPICS, 6 DEMOS, 3 PILLARS

INOVAČNÍ KLASTRY: 9 TÉMATICKÝCH ZAMĚŘENÍ, 6 UKÁZKOVÝCH PROJEKTŮ, 3 PILÍŘE

Str. 17:



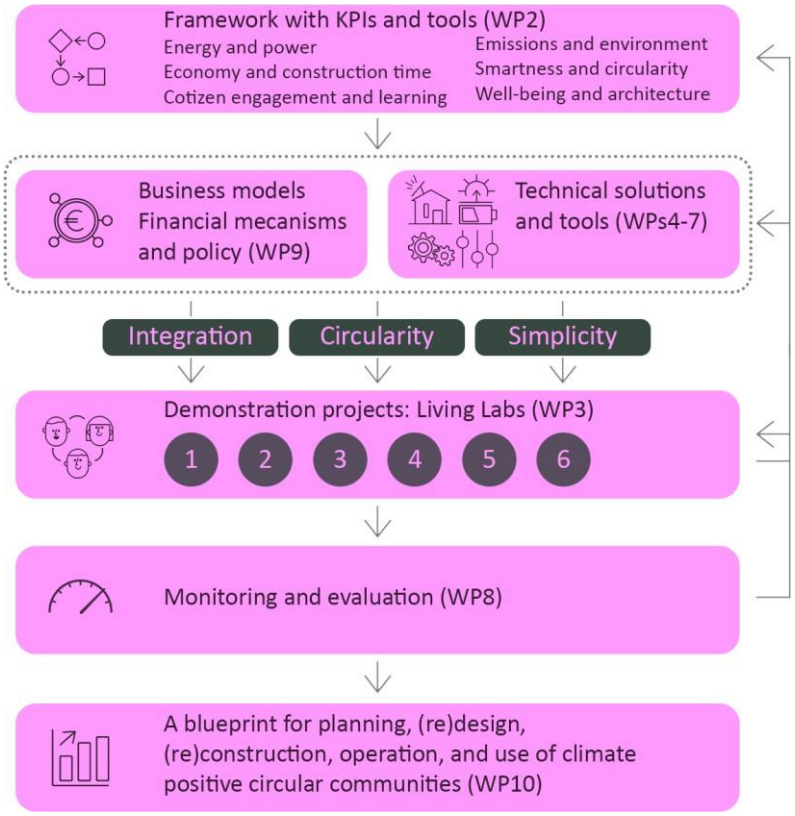
Obr. 1.6:

Project Management = projektový management

Demonstration Project Norway, Denmark, Netehrlands, Czechia, Italy, Spain = Ukázkové projekty Norska, Dánska, Nizozemska, Česka, Itálie a Španělska

Communication, dissemination and stakeholder outreach = komunikace, šíření výsledků a osvětová činnost pro zúčastněné subjekty

Str.19



Obr. 1.7

Popisky shora dolů:

Framework with KPIs and tools (WP2) = Rámes s klíčovými ukazateli výkonnosti a nástroji (WP2)

Energy and power = energie a elektřina, Economy and construction time = Hospodárnost a doba výstavby, Citizen engagement and learning = zapojení a vzdělávání občanů, emissions and environemnt = emise a životní prostředí, smartness and circularity = využití chytrých technologií a oběhovosti, well-being and architecture = kvalita života a architektura

Business models / Financial mechanisms and policy (WP9) – Obchodní modely / Finanční mechanismy a politika

Technical solutions and tools (WPs4-7) – Technická řešení a nástroje

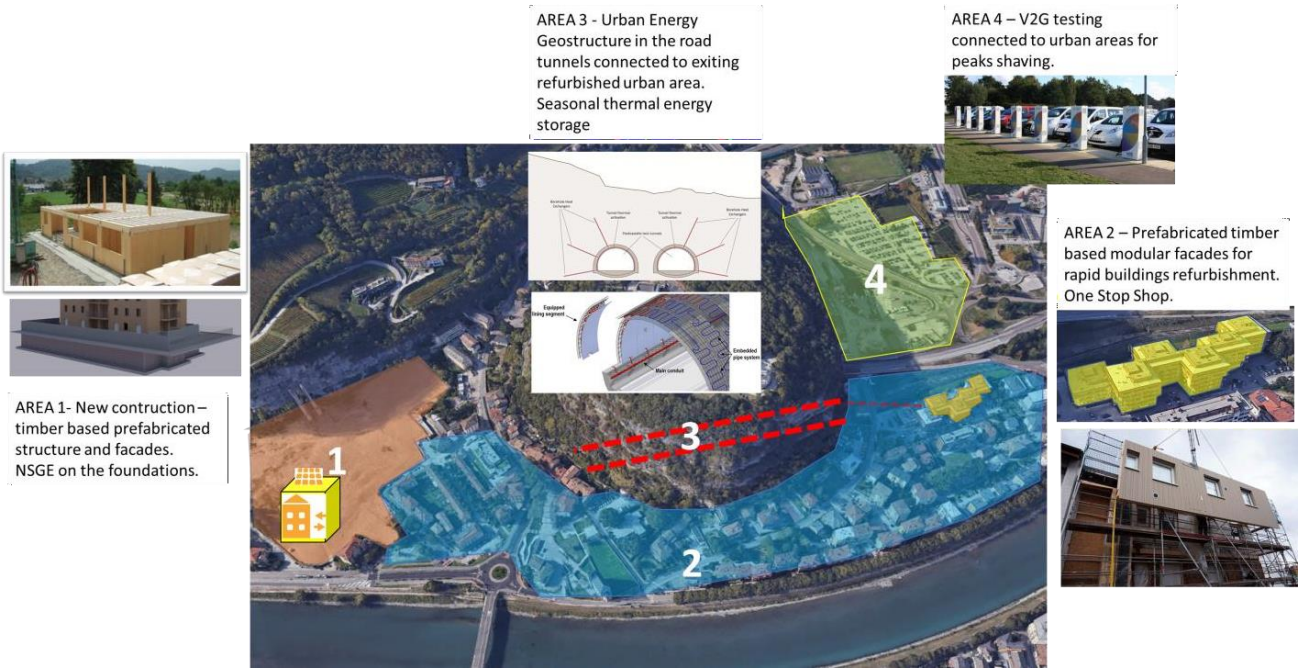
Integration/Circularity/Simplicity – Integrace, princip oběhového hospodářství/jednoduchost

Demonstration projects: Living Labs (WP3) – Ukázkové projekty: živé laboratoře (WP3)

Monitoring and evaluation – monitoring a vyhodnocení (WP8)

A blueprint for planning, (re)design, (re)construction, operation, and use of climate positive circular communities (WP10) – Vzorový plán pro projektování, přeprojektování, výstavbu, rekonstrukci, provoz a využití klimaticky pozitivních komunit s oběhovým hospodářstvím (WP8)

Str. 26



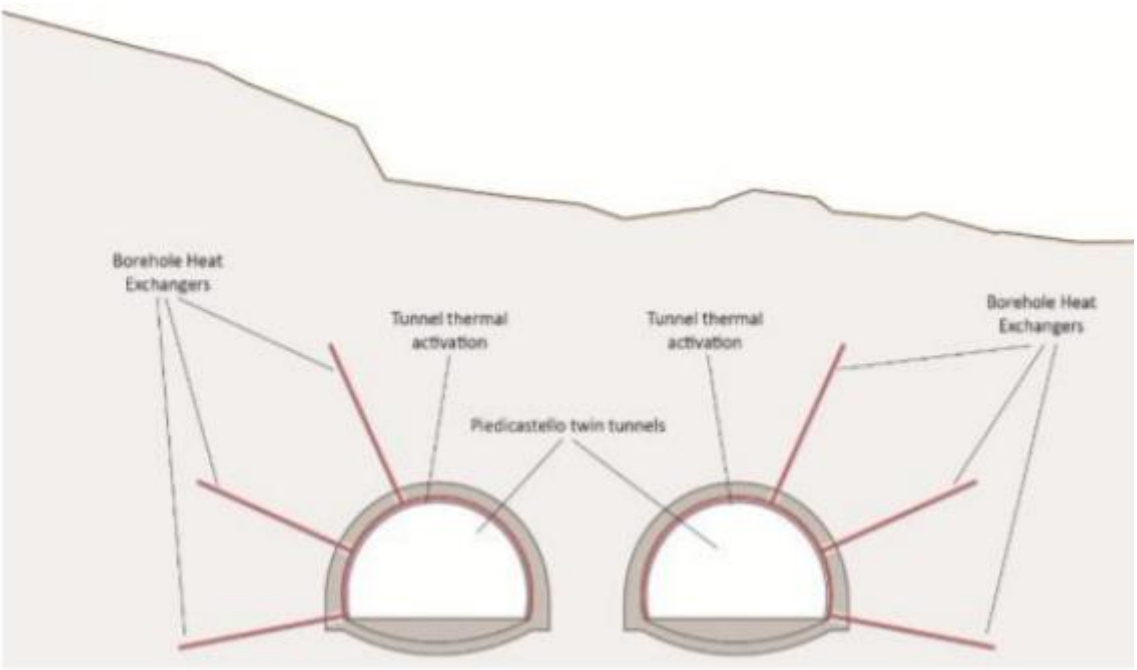
AREA 1 – Oblast 1 – Nová výstavba, dřevěná prefabrikovaná stavba a fasády. Využití geotermální energie blízko povrchu.

AREA 2 – Oblast 2 – modulární fasády z prefabrikovaného dřeva pro rychlou rekonstrukci budov systém One Stop Shop

AREA 3 – Oblast 3 – Městská energetická geostruktura v silničních tunelech napojených na výjezd z rekonstruované městské oblasti. Skladování sezónní termální energie

AREA 4 – Oblast 4 – zkoušení V2G pro městské oblasti – vyrovnání špiček

Str. 27



Borehole heat exchanger = tepelný výměník ve vrtu

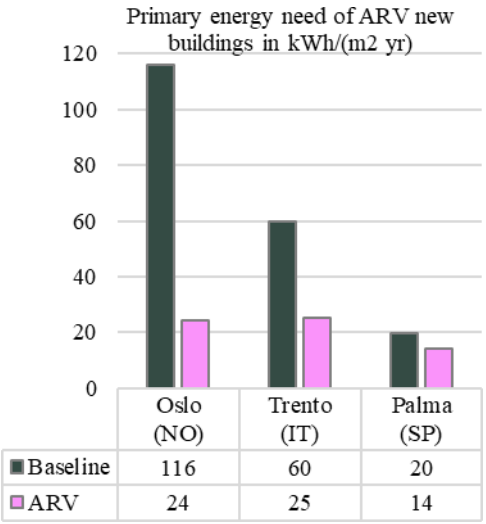
Tunnel Thermal activation = termální aktivace tunelu

Predicastello Twin Tunnels = dvojice tunelů v Predicastello

Str. 28

Vícepatrové budovy v distriktech Kanaleneiland-Zuid (4 patrová budova Bo-EX) a Overvecht (4 a 10 patrová budova Portaal, 10 patrová budova Mitros, 10patrová budova Bo-Ex)

Str. 36



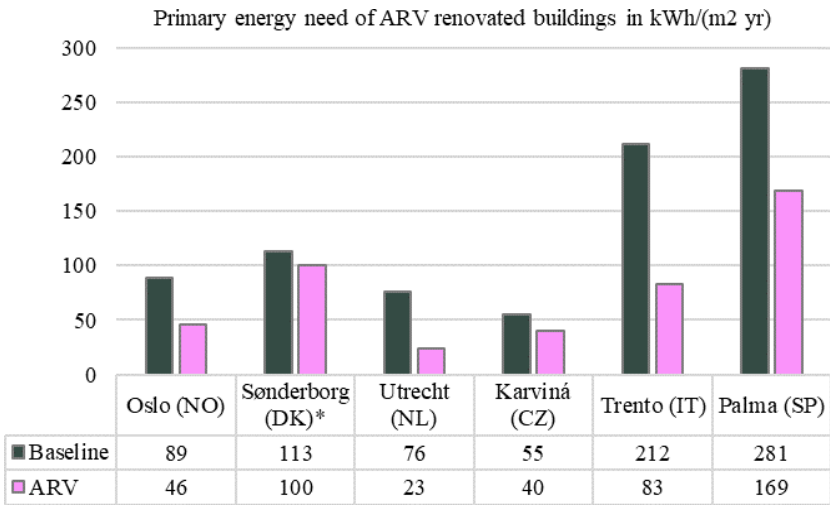
Obr. 2.1

Potřeba primární energie nových budov v kWh/(m2 za rok)

Základ

ARV

Str. 36

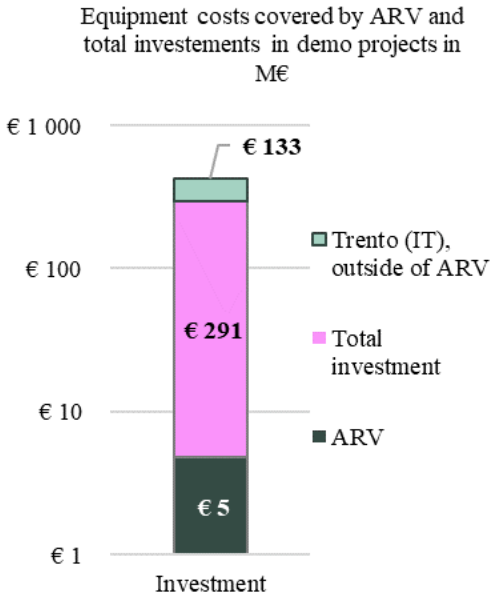


	Oslo (NO)	Sønderborg (DK)*	Utrecht (NL)	Karviná (CZ)	Trento (IT)	Palma (SP)
Baseline	89	113	76	55	212	281
ARV	46	100	23	40	83	169

Obr. 2.2

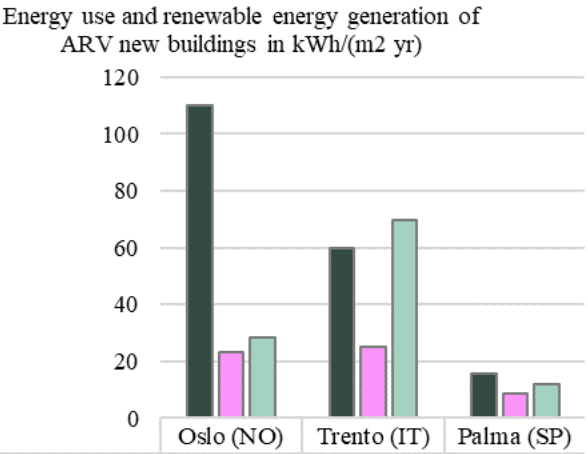
Potřeba primární energie renovovaných budov v kWh/(m2 za rok)
Základ
ARV

Str. 37



Obr. 2.3
Náklady na vybavení pokryté ARV a celkové investice v demo projektech v M Eur
Trento (IT) – mimo ARV
Celkové investice
ARV
Investice

Str. 37

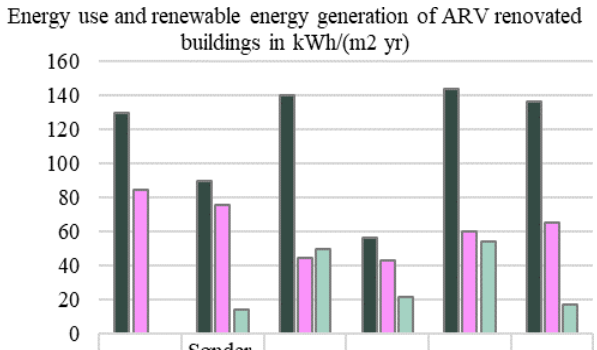


	Oslo (NO)	Trento (IT)	Palma (SP)
Baseline energy use	110	60	16
ARV energy use	23	25	8
ARV on-site generation	28	70	12

Obr. 2.4

Spotřeba energie a výroba obnovitelné energie nových budov ARV v kWh/(m2 za rok)
Základní spotřeba energie
Spotřeba energie ARV
Lokální výroba ARV

Str. 37



	Oslo (NO)*	Sønder-borg (DK)**	Utrecht (NL)	Karviná (CZ)	Trento (IT)	Palma (SP)
Baseline energy use	130	90	140	57	144	137
ARV energy use	84	76	45	43	60	66
ARV on-site generation	0	14	50	22	55	17

Obr. 2.5

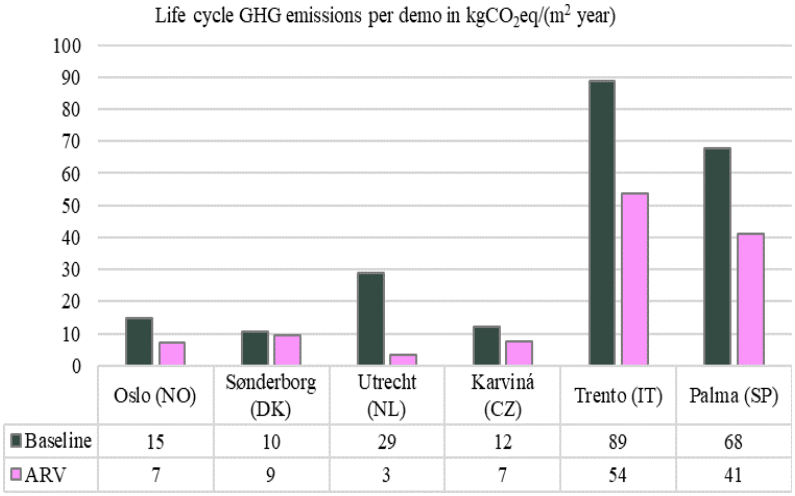
Spotřeba energie a výroba obnovitelné energie renovovaných budov ARV v kWh/(m2 za rok)

Základní spotřeba energie

Spotřeba energie ARV

Lokální výroba ARV

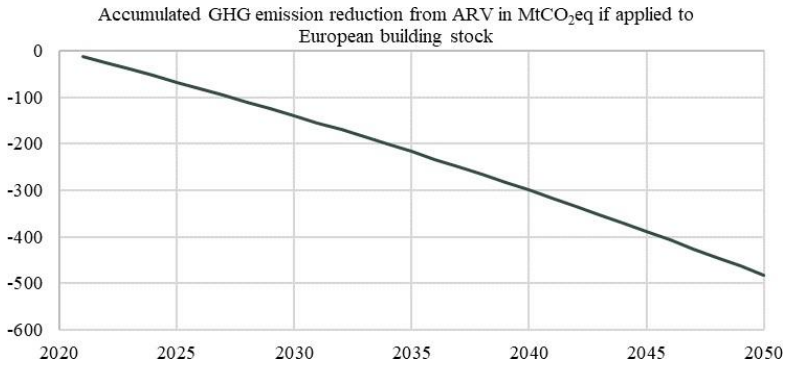
Str. 38



	Oslo (NO)	Sønderborg (DK)	Utrecht (NL)	Karviná (CZ)	Trento (IT)	Palma (SP)
Baseline	15	10	29	12	89	68
ARV	7	9	3	7	54	41

Obr. 2.6
Emise životního cyklu GHG na demo v kg CO2 ekv/(m2 na rok)
Základ
ARV

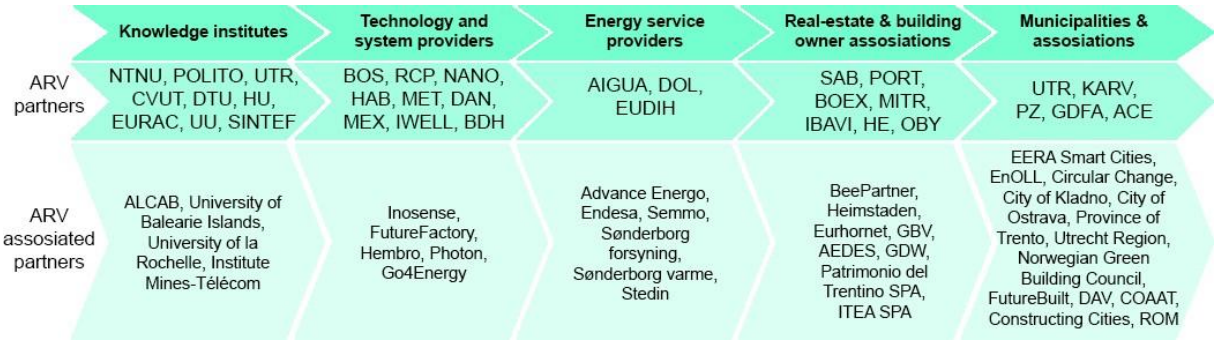
Str. 38



Obr. 2.7

Snížení akumulovaných emisí GHG z ARV v MtCO2 ekv pokud aplikováno na Evropský stavební fond

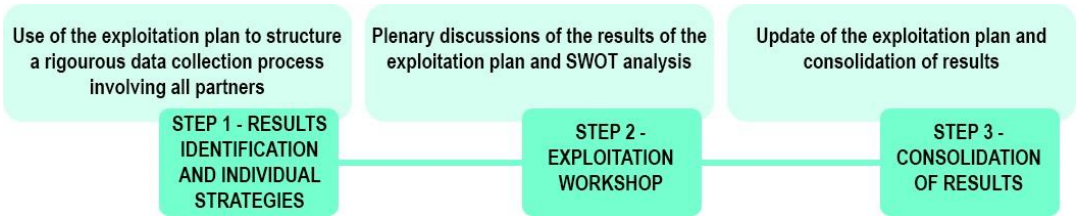
Str. 44



	Znalostní systémy	**Poskytovatelé technologií a systémů**	**Poskytovatelé energetických služeb**	**Sdružení vlastníků nemovitostí a budov**	**Obce a spolky**
Partneři ARV	NTNU, POLITO, UTR, CVUT, DTU, HU, EURAC, UU, SINTEF	BOS, RCP, NANO, HAB, MET, DAN, MEX, IWELL, BDH	AIGUA, DOL, EUDIH	SAB, PORT, BOEX, MITR, IBAVI, HE, OBY	UTR, KARV, PZ, GDFA, ACE
Přidružení partneři ARV	ALCAB, Univerzita Baleárských ostrovů, Univerzita La Rochelle, Institut Mines-Télécom	Inosense, FutureFactory, Hembro, Photon, Go4Energy	Advance Energo, Endesa, Semmo, Sonderborg forsyning, Sondenborg varme, Stedin	BeePartner, Heimstaden, Eurhornet, GBV, AEDES, GDW, Patrimonio del Trenito SPA, ITEA SPA	EERA Smart Cities, EnOLL, Circular Change, Město Kladno, Město Ostrava, Provincie Trento, Region Utrecht, Norwegian Green Building Council, FutureBuilt, DAV, COAAT, Constructing Cities, ROM

Obrázek 2.8 ARV hodnotový řetězec, zdůrazňující roli všech partnerů konsorcia a přidružených partnerů zdokumentovaných prostřednictvím dopisů vyjadřujících podporu.

Str. 50



Využití plánu ke strukturování přísného procesu sběru dat zahrnujícího všechny partnery	**plenární diskuse o výsledcích průzkumného plánu a SWOT analýze**	**aktualizace plánu využití a konsolidace výsledků**
KROK 1 - IDENTIFIKACE VÝSLEDKŮ A JEDNOTLIVÉ STRATEGIE	**KROK 2 – WORKSHOP VYUŽITÍ**	**KROK 3 - KONSOLIDACE VÝSLEDKŮ**

Obrázek 2.9 Metodika využití v ARV

Str. 51

Španělsko **IREC, MET, IBAVI, AIGUASOL**, Endesa, ALCAIB, UIB, COAAT		**Itálie** **EURAC, POLITO, UTR, HAB, DOL,** Trento, různí lokální developeři
Norsko **NTNU, SINTEF, OBY** Městský stavební klastr, Futurebuilt, Norwegian Green Building Council, Klima 2050, ZEN Centrum	**Evropské** **GDFA, HE, ACE, EUIDH,** Cirkulační změny, EERA Chytrá města, EnoLL*, FC4S*, Eneco, GdW, EurHornet, GBV, AEDES	**Nizozemí** **UTR, UU, HU, BOC, RCP, MEX, IWELL, BDH, PORT, BOEX, MITR**, FutureFactory, ROM, Hemubo, Stedin, BAM
Dánsko **DTU, PZ, DAN, SAB, ENFOR** Center Denmark, Sonderborg, Forsyning, Sonderborg Varme, DAV		**Česko** **ČVUT, NANO, KARV** Advance Energo, Ostrava, Kladno, Heimstaden, BeePartner, InoSense, Photon, SEMMO

Obrázek 2.10 Inovační klastry ARV: Klastry specifické pro jednotlivé země a společný evropský klastr fungující jako inkubátory na evropském trhu. Tučná jména znamenají partnery ARV, zatímco ostatní jména jsou přidruženými partnery potvrzenými prostřednictvím dopisů podpory ARV (v příloze) (*EnoLL: Evropská síť živých laboratoří, FC4S: Finanční centra pro udržitelnost (svolána OSN)).

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MARKET POTENTIAL		Year 1 (2025)	Year 2 (2026)	Year 3 (2027)	Year 4 (2028)	Year 5 (2029)	TOTAL in 5 years
	Construction Rate	**1.11 %**	**1.10 %**	**1.08 %**	**1.07 %**	**1.05 %**	
New	residential	2 443 165	2 409 880	2 376 594	2 343 308	2 310 023	**11 882 969**
	non-residential	435 227	429 297	423 368	417 438	411 509	**2 116 840**
	Renovation Rate	**1.26 %**	**1.26 %**	**1.27 %**	**1.27 %**	**1.28 %**	
Renovated	residential	2 762 707	2 773 359	2 784 010	2 794 661	2 805 313	**13 920 050**
	non-residential	492 150	494 048	495 945	497 843	499 740	**2 479 726**

ARV POTENTIAL		Year 1 (2025)	Year 2 (2026)	Year 3 (2027)	Year 4 (2028)	Year 5 (2029)	TOTAL in 5 years
New (#)	residential	122	241	594	820	1 155	2 932
	non-residential	44	64	127	188	247	670
Renovated (#)	residential	166	277	696	1 118	1 543	3 800
	non-residential	59	124	174	324	500	1 179
	TOTAL	391	706	1 591	2 449	3 445	**8 582**
% by Innovation Clusters		100 %	80 %	65 %	50 %	45 %	**4 764**
New (area, m2)	residential	11 219	22 132	54 565	75 322	106 074	269 312
	non-residential	277 697	410 870	810 390	1 198 560	1 575 379	4 272 895
Renovated (area, m2)	residential	15 223	25 470	63 919	102 662	141 699	348 974
	non-residential	376 820	788 068	1 107 533	2 064 716	3 188 592	7 525 728
	TOTAL	680 958	1 246 540	2 036 407	3 441 259	5 011 744	**12 416 909**

Tabulka 2.11 – Celkový tržní potenciál a potenciál ARV.

TRŽNÍ POTENCIÁL		Rok 1 (2025)	Rok 2 (2026)	Rok 3 (2027)	Rok 4 (2028)	Rok 5 (2029)	Celkem za 5 let
	Míra výstavby	1,11%	1,10%	1,08%	1,07%	1,05%	
Nové	Obytné	2 443 165	2 409 880	2 376 594	2 343 308	2 310 023	11 882 969
	Neobytné	435 227	429 297	423 368	417 438	411 509	2 116 840
	Míra renovace	1,26%	1,26%	1,27%	1,27%	1,28%	
Renovované	Obytné	2 762 707	2 773 359	2 784 010	2 794 661	2 805 313	13 920 050
	neobytné	492 150	494 048	495 945	497 843	499 740	2 479 726

POTENCIÁL ARV		**Rok 1 (2025)**	**Rok 2 (2026)**	**Rok 3 (2027)**	**Rok 4 (2028)**	**Rok 5 (2029)**	Celkem za 5 let
NOVÉ (#)	Obytné	122	241	594	820	1 155	2 932
	Neobytné	44	64	127	188	247	670
RENOVOVANÉ (#)	Obytné	166	277	696	1 118	1 534	3 800
	Neobytné	59	124	174	324	500	1 179
	CELKEM	391	706	1 591	2 449	3 445	8 582
% inovačních klastrů		100%	80%	65%	50%	45%	4 764
Nové (oblast, m2)	Obytné	11 219	22 132	54 565	75 322	106 074	269 312
	Neobytné	277 967	410 870	810 390	1 198 560	1 575 379	4 272 895
Renovované (oblast, m2)	Obytné	15 223	25 470	63 919	102 665	141 699	348 974
	neobytné	376 820	778 068	1 107 533	2 064 716	3 188 592	7 525 728
	CELKEM	680 958	1 246 540	2 036 407	3 441 259	5 011 744	12 416 909

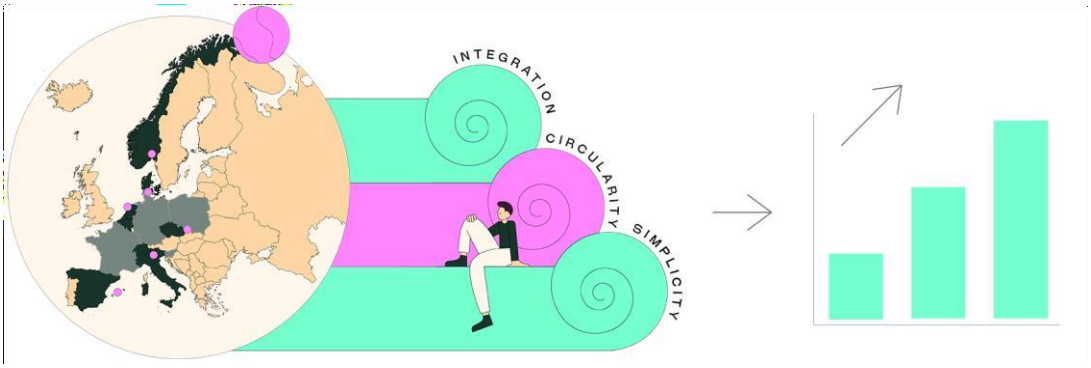
Str. 52

		Average cost per project (€)	Total investment in ARV based projects in 5 years (M€)	Total revenues per total ARV partners & *e-market* companies in 5 years (M€)
New	residential	142 900	520	390
	non-residential	5 232 010	3 390	2 542
Renovated	residential	21 582	139	104
	non-residential	790 181	905	679
TOTAL			**4 953**	**3 714**

		Průměrný náklady na projekt (EUR)	Celkové investice do ARV projektů za 5 let (EUR)	Celkové výnosy na celkový počet partner CRV a společností na elektronickém trhu za 5 let (EUR)
Nové	obytné	142 900	520	390
	Neobytné	5 323 010	3390	2542
Renovované	Obytné	21 582	139	104
	neobytné	790 181	905	679
CELKEM			4953	3714

Tabulka 2.12 Obchodní případ pro projekt ARV.

Str. 53

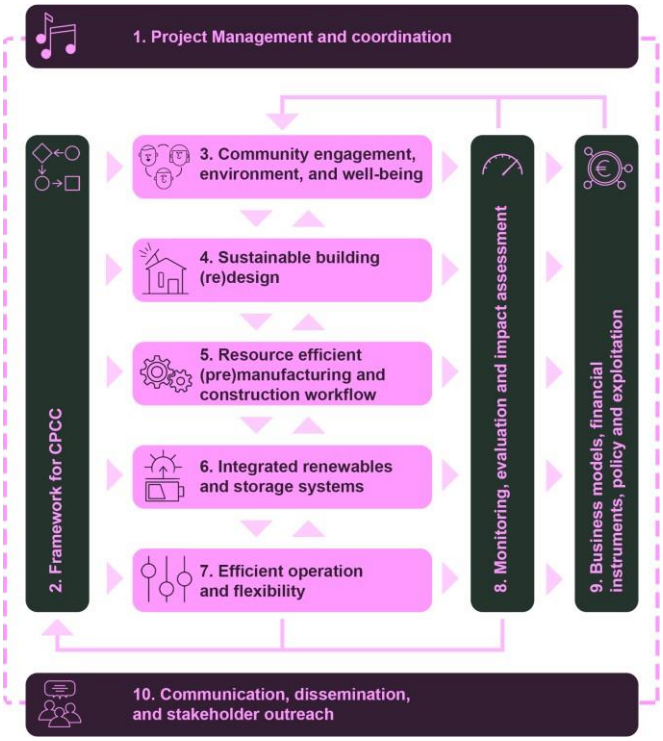


Integration – Integrace

Circularity – Kruhovitost

Simplicity – Jednoduchost

Str. 59



1. Řízení a koordinace projektu

2. Rámec pro CPCC

3. Angažovanost komunity, životní prostředí a pohoda

4. Udržitelný (re) návrh budovy

5. Pracovní postup (před) výroby a konstrukce efektivní z hlediska zdrojů

6. Integrované obnovitelné a úložné systémy

7. Efektivní provoz a flexibilita

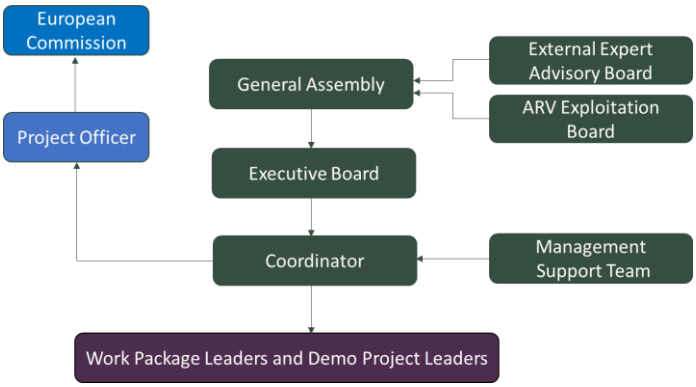
8. Monitorování, hodnocení a hodnocení dopadů

9. Obchodní modely, finanční nástroje, politika a využívání

10. Komunikace, šíření a dosah zúčastněných stran

Obrázek 3.1. Struktura a interakce pracovního balíčku PERT

Str. 62



European Commission - Evropská Komise

Project Officer – Projektový referent

General Assembly – Valné shromáždění

Executive Board – Výkonná rada

Coordinator - Koordinátor

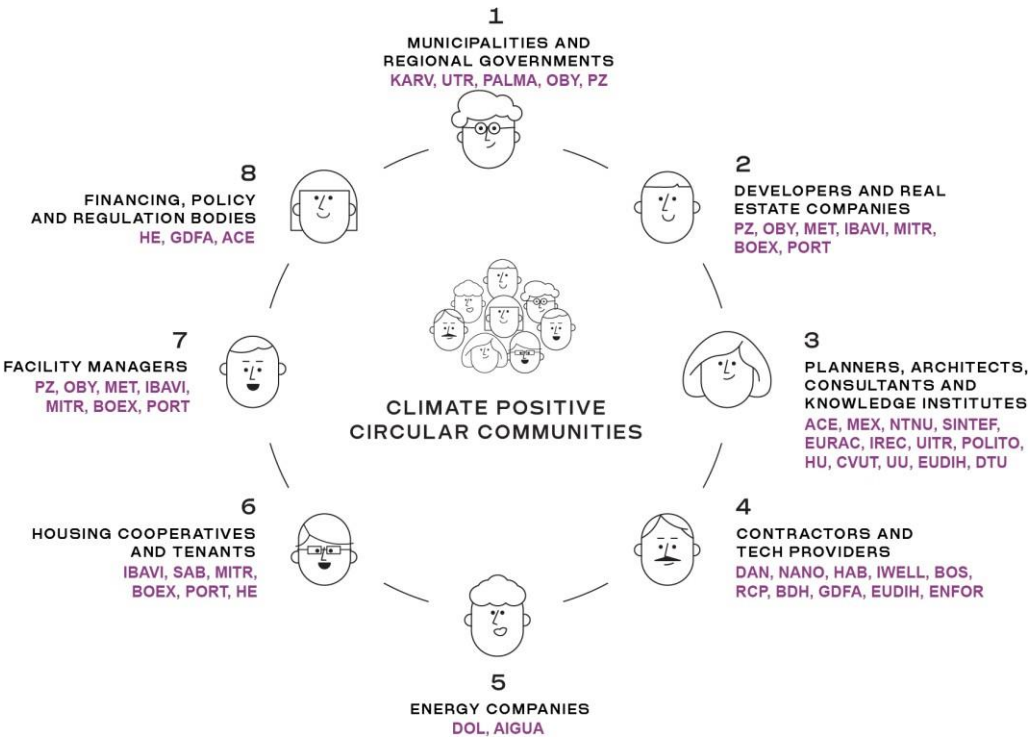
External Expert Advisory Board – Rada pro externí expertní poradenství

Management Support Team – Tým podpory managementu

Work Package Leaders and Demo Project Leaders – Vedoucí pracovních balíčků a vedoucí demo projektů

Obrázek 3.2. Hlavní struktura řízení projektu ARV

Str. 64



CLIMATE POSITIVE CIRCULAR COMMUNITIES – KLIMATICKY POZITIVNÍ CIRKULÁRNÍ KOMUNITY

1 MUNICILAPITIES AND REGIONAL GOVERNMENTS, KARV, UTR, PALMA, OBY, PZ – OBCE A REGIONÁLNÍ VLÁDY, KARV, UTR, PALMA, OBY, PZ

2 DEVELOPERS AND REAL ESTATE COMPANIES, PZ, OBY, MET, IBAVI, MITR, BOEX, PORT – VÝVOJÁŘI A SPOLEČNOSTI NEMOVITOSTÍ, PZ, OBY, MET, IBAVI, MITR, BOEX, PORT

3 PLANNERS, ARCHITECTS, CONSULTANTS AND KNOWLEDGE INSTITUTES, ACE, MEX, NTNU, SINTEF, EURAC, IREC, UITR, POLITO, HU, CVUT, UU, EUDIG, DTU – PROJEKTANTI, ARCHITEKTI, KONZULTANTI A ZNALOSTNÍ INSTITUTY, ACE, MEX, NTNU, SINTEF, EURAC, IREC, UITR, POLITO, HU, ČVUT, UU, EUDIG, DTU

4 CONTRACTORS AND TECH PROVIDERS, DAN, NANO, HAB, IWELL, BOS, RCP, BHD, GDFA, EUDIH, ENFOR – DODAVATELÉ A TECHNIKA, DAN, NANO, GAB, IWELL, BOS, RCP, BHD, GDFA, EUDIH, ENFOR

5 ENERGY COMPANIES, DOL, AIGUA – ENERGETICKÉ SPOLEČNOSTI, DOL, AIGUA

6 HOUSING COOPERATIVES AND TENANTS, IBAVI, SAB, MITR, BOEX, PORT, HE – SPOLUPRACOVNÍCI NA BYDLENÍ A NÁJEMCI, IBAVI, SAB, MITR, BOEX, PORT, HE

7 FACILITY MANAGERS, PZ, OBY, MET, IBAVI, MITR, BOEX, PORT – SPRÁVCI ZAŘÍZENÍ, PZ, OBY, MET, IBAVI, MITR, BOEX, PORT

8 FINANCING, POLICY AND REGULATION BODIES, HE, GDFA, ACE – FINANCOVÁNÍ, POLITIKA A REGULAČNÍ ORGÁNY, HE, GDFA, ACE

Obrázek 3.4 ARV partneři podél hodnotového řetězce CPCC

Str. 67

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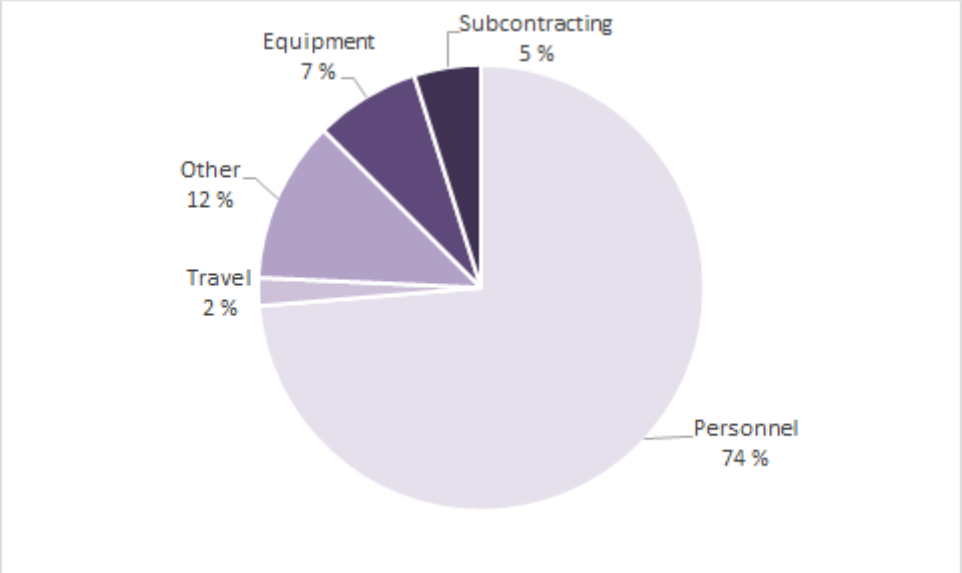


Travel – Cestování

Other – Další

Equipment – Vybavení

Subcontracting - Subdodávky

Personnel – Personál

Obrázek 3.6. Podíl přímých způsobilých nákladů

KLIMATICKY POZITIVNÍ KOMUNITY S OBĚHOVÝM HOSPODÁŘSTVÍM - ARV

Historie změn

Datum kontroly	Změna:	Odůvodnění změny
21.05.2021	Přidání obsahu. Tabulky a oddíly odstraněny.	Provedeno podle požadavku Agentury podle přípravného postupu GAP.
21.05.2021	Tabulka 2.10: Byly provedeny revize cílů	Změna spočívala v řešení následujícího komentáře ze souhrnné hodnotící zprávy: "Některé cíle v tabulce 2.10 nejsou dostatečně ambiciózní."
21.05.2021	Oddíl 2.2.5 – Komunikační aktivity byly aktualizovány o počet návštěv škol, seminářů atd.	Změna spočívala v řešení následujícího komentáře ze souhrnné hodnotící zprávy: "Komunikační opatření jsou velmi kvalitní, některé činnosti však nejsou jasně kvantifikovány. “
21.05.2021	Informace o fotovoltaickém systému byly přidány do oddílu o norském ukázkovém projektu.	Změna spočívala v řešení následujícího komentáře ze souhrnné hodnotící zprávy: "Není jasný rozsah některých akcí (např. plocha zastavěná nainstalovanou fotovoltaikou v Norsku). “
21.05.2021	Do sekce 3.4 byl přidán následující text: Všechny náklady na odpisy za zařízení, infrastrukturu nebo jiná aktiva v projektu jsou v souladu s článkem 6 a budou zaznamenány na účtech příslušných příjemců, zakoupené v souladu s článkem 10 grantové dohody a budou odepsány v souladu s mezinárodními účetními standardy a obvyklými účetními postupy příjemce.	Podle požadavků Agentury.
03.06.2021	Zvýšený počet PM pro P33 POLITO ve WP4 (z 12 na 20 PM), ve WP6 (z 9 na 11 PM), ve WP8 (z 8 na 10 PM). Rozpočet beze změny. Příslušné tabulky byly odpovídajícím způsobem aktualizovány.	Odůvodnění od partnera: „Při přípravě rozpočtu jsme s tímto mylně nepočítali, protože v době předložení návrhu byli v týmu pouze vedoucí pracovníci a nedalo se předvídat, že by se mohl hlásit i mladší vědec. Vládní opatření po pandemii nám nyní umožňují o tom uvažovat. “
03.06.2021	Náklady na CFS za P10 Palma byly přidány do tabulky 3.4b.	Podle požadavků Agentury.
09.06.2021	Zkrácené názvy příjemců byly změněny následovně: -Název HAB byl nahrazen názvem DTTN -Název HE byl nahrazen názvem Housing Europe -Název BdH byl nahrazen názvem Buro de Haan -Název EUDIH byl nahrazen názvem Center Denmark -Název UTR byl nahrazen názvem City of Utrecht	Podle požadavku Agentury s cílem zajistit soulad mezi částmi A a B.

	- Název BOS nahrazen názvem Bos Groep - Název MITR nahrazen názvem MITROS - Název PORT nahrazen názvem Portaal - Název OBY nahrazen názvem OBF - Název UITR nahrazen názvem UNITN	
09.06.2021	Ganttův diagram byl aktualizován: - D3.3 přesunut na M13 - D3.4 přesunut na M24 jako datum prvního dodání - D5.2 nově označen jako D5.1 - Výstupy D5.2 a 5.8-5.12 v M36	Podle požadavku Agentury s cílem zajistit soulad mezi částmi A a B.
11.06.2021	Pro třetí strany zapojené do projektu byly aktualizovány tabulky v části 4.2: - Tak, aby byl uveden daný WP (soubor pracovních úkolů – work package), úkol a/nebo dílčí úkol, který je zadáván subdodavateli - Tak, aby zahrnovaly částky za subdodávky - Tak, aby byla uvedena následující věta: "Subcontractor tbd." - „Provede subdodavatel“ Subdodávka bude zadána podle zásada nejlepšího poměru ceny a kvality a za podmínky neexistence střetu zájmů (podle článků 10 a 13 AMGA). “	Podle požadavků Agentury.
11.06.2021	Společnost DTTN začlenila dvě další propojené třetí strany: X-LAM Dolomiti a Fanti Legnami. Příslušné tabulky v oddílech 3.4 – Využití zdrojů a 4.2: – Třetí strany zapojené do projektu byly aktualizovány	Odůvodnění partnera: „Úvahou, která stála za zapojením 3 propojených třetích stran (LTP), byla logika snižování nákladů." […] Ve fázi podávání návrhu projektu ARV však nebylo možné stanovit správné vymezení fází projektování, vytváření prototypů, výstavby a instalace mezi potenciálními propojenými třetími stranami, a to v zásadě kvůli časové tísni a přísnému harmonogramu termínu pro podání návrhu. […] Skutečné rozložení nákladů a rozdělení úkolů odráží proces doladění a zdokonalení specifických odborných znalostí, které může každá propojená třetí strana nabídnout v rámci ukázkového projektu Trento. Demo “
11.06.2021	Aktualizovaná tabulka 3.4b: Položky „dalších přímých nákladů“ (cestovné, vybavení, další zboží a služby, velká výzkumná infrastruktura) pro následující partnery: - P1 NTNU: přesunutí 7 700 EUR na NTNU kvůli snížení celkových způsobilých nákladů na DANFOSS o 11 000 EUR, jak je vysvětleno níže. Tato částka se přidá do prostředků na náklady na publikační činnost a překlad pro konsorcium.	Podle požadavků Agentury.

	- P5 DANFOSS: rozdělení nákladů mezi kategorie Vybavení a Ostatní zboží a služby a odstranění nezpůsobilé části původně zahrnutých Nákladů na vybavení (11 000 EUR za spotřebu elektřiny, která je kryta nepřímými náklady). Díky 70% sazbě náhrad u DANFOSS se uvolnilo až 7 700 EUR z maximálního příspěvku EU, které byly přesunuty na NTNU. - P31 DTTN: přesunutí nákladů mezi nově začleněnými propojenými třetími stranami, jak je podrobně uvedeno níže. Všechny částky byly přesunuty od propojené třetí strany Armalam: o PM: 0,5 pro X-LAM Dolomiti a 0,5 pro Fanti Legnami (WP4), 11,5 pro X-LAM Dolomiti a 7,5 pro Fanti Legnami (WP5). o Přímé osobní náklady: 64 826 EUR pro X-LAM Dolomiti, 41 127 EUR pro Fanti Legnami o Ostatní zboží a služby: 454 000 EUR společnosti X-LAM Dolomiti, 285 000 EUR společnosti Fanti Legnami.	
24.06.2021	Vloženo: - Standardní text k úvodu oddílu 4.2. - Standardní text pro popis subdodávek pro partnery IBAVI, Mitros, Portaal v tabulce 4.2. - Přidání odkazu na příslušný úkol a soubor pracovních úkolů (WP) k popisu subdodávek pro partnerské RC panely v tabulce 4.2.	Podle požadavků Agentury.
24.06.2021	Z celého dokumentu byly odstraněny všechny zmínky o Portaal	z toho důvodu, že Portaal opustil konsorcium
24.06.2021	Oddíl 1.4.2 - Tabulka 1.7: úprava klíčových inovací pro WP4 v důsledku ukončení spolupráce s Portaal - Popisy nizozemského ukázkového projektu byly upraveny kvůli odchodu Portaal.	Kvůli tomu, že Portaal opustil konsorcium. Další podrobnosti jsou k dispozici ve formálním dopise Portaal
24.06.2021	Aktualizace Ganttova grafu	Pro zajištění vzájemného souladu mezi Sygma a tímto dokumentem
24.06.2021	Přidány odkazy na úkoly pro propojené třetí strany v popisu v oddíle 4.2.	Podle požadavků Agentury.
24.06.2021	Přerozdělení rozpočtu z důvodu odchodu Portaal z konsorcia, v důsledku toho byly upraveny také popisy v oddílech 3.4b a 4.2. Maximální příspěvky EU zůstávají stejné. Podrobný rozpis navýšení rozpočtu u příslušných partnerů: - NTNU: přidáno 4 PM ve WP1 a 4,5 PM ve WP4. Přidáno 2 541 EUR na Jiné zboží a	Navýšení PM ve WP4 pro pečlivé následné sledování ukázkových budov / společenství, Odůvodnění pro NTNU: zvýšení PM ve WP1 na projektový management a na implementaci platebních harmonogramů ke snížení rizika.

	služby, přiděleno na náklady na překlady a publikační činnost za konsorcium. - UAS Utrecht: přidány 2 PM ve WP4, 2 PM ve WP5, 1 PM ve WP9. - Buro de Haan: 1 PM ve WP9. - BOEX: 1 PM pro WP3, 25 000 EUR na subdodávky pro WP3, 15 000 EUR na subdodávky pro WP4, 75 000 EUR na náklady na vybavení pro WP5, 30 000 EUR na náklady na vybavení pro WP6, 77 000 EUR na náklady na vybavení pro WP7. - RC panely: 4 PM ve WP4, 1 PM ve WP5, 1 PM ve WP9. - UU: 2 PM ve WP4, 1 PM ve WP9. - Město Utrecht: 1 PM ve WP3, 1 PM ve WP9. - BOESGROEP: 4 PM ve WP4, 2 PM ve WP5, 1 PM ve WP9. - iWell: 1 PM ve WP9. - MEX: 1 PM ve WP9. - Mitros: 1 PM ve WP3, 25 000 EUR na subdodávky ve WP3, 15 000 EUR na subdodávky ve WP4, 75 000 EUR na náklady na vybavení ve WP5	za účelem průběžného sledování a řízení rizik a účinnosti. Odůvodnění od nizozemských partnerů: Na zvýšené úsilí personálu: „Zavedením nových dovybavených budov přinášíme do projektu také novou inovaci: pojetí renovací HeMuBo. To […] vede k hodnocení konceptů renovace Inside Out a Hemubo. Hodnocení vede k optimalizaci v obou pojetích, a to jak v oblasti energetické účinnosti, doby provozu i logistiky. Samotné vyhodnocení a implementace výsledků hodnocení ve fázích projektování a výstavby vyžaduje další úsilí zaměstnanců […] “
28.06.2021	Výsečové grafy a popis na začátku sekce 3.4 aktualizováno poté, co Portaal odešel z konsorcia.	
28.06.2021	Celkový počet partnerů v konsorciu opraven na 35 po odchodu Portaals	
28.06.2021	Drobné úpravy rozvržení a velikostí ilustrací	Malé redakční změny, aby se kapitoly a odstavce vešly na stránky
30.06.2021	Číslování příjemců aktualizováno tak, aby odpovídalo číslování v příloze č.2	Znovu zkontrolováno a aktualizováno podle návrhu Agentury
30.06.2021	Zkrácení tabulky v části 4.2 o subdodávkách pro společnosti IBAVI a BOEX, aby byl na konci viditelný standardní text	Podle požadavků Agentury.
30.06.2021	Tabulka 3.4b aktualizována o rozpočet na CFS náklady pro Mitros	Podle požadavků Agentury.

Obsah

1. Špičková kvalita – Excelence

Sektory energetiky a stavebnictví jsou pro evropskou politiku v oblasti životního prostředí a evropskou energetickou politiku zásadní, protože budovy zaujímají 40% celkové spotřeby energie v EU a 36% emisí skleníkových plynů v EU [1]. Je však obtížné v této oblasti dosáhnout rychlých a průlomových změn vzhledem ke konzervativní povaze tohoto odvětví a množství zúčastněných stran a koncových uživatelů, jimž je třeba se věnovat. Hlavním úkolem tedy zůstává zejména požadovaná rozsáhlá energetická renovace stávajícího fondu budov[2]. Investiční náklady jsou významnou bariérou, protože ochota i schopnost financovat opatření v oblasti energetiky a klimatu jsou obecně nízké, a také kvůli strukturálnímu nesouladu mezi riziky a ekonomickými přínosy. Navíc se stává naléhavým problémem i energetická chudoba, protože více než 30 milionů Evropanů nemá možnost přiměřeně vytápět své domovy[3]. Na závěr je nutné říct, že obnově sektorů stavebnictví a energetiky brání silná závislost těchto odvětví na zavedených postupech, s vysokými utopenými náklady a rozsáhlými síťovými/koordinačními účinky.

Stojíme tedy před výzvou najít **atraktivní, odolná a dostupná řešení,** která **významně urychlí** rozsáhlé energetické renovace a zavedení energetických a klimatických opatření v sektorech stavebnictví a energetiky.

Technologie a znalosti, které tyto změny umožňují, jsou však k dispozici. Konsorcium ARV má zkušenosti z několika desetiletí projektů výzkumu a vývoje v oblasti nízkoenergetických budov, budov s nulovými emisemi (zero-emission buildings – ZEB), budov s pozitivní energetickou bilancí a obytných oblastí s nulovými emisemi (zero-emission neighbourhoods – ZEN), viz Tabulka 1.5. Partneři se již účastnili vývoje a zkoušek široké škály slibných řešení pro takové budovy a obytné oblasti a dohlíželi na pilotní ukázkové projekty ZEB a ZEN v praxi. Víme tedy, že je možné toho dosáhnout, a je pro nás výzvou zajistit, aby tato řešení byla využitelná a škálovatelná.

Projekt ARV bude reagovat na tyto výzvy tím, že uplatní nové pojetí, které spočívá v kombinaci 3 koncepčních pilířů, 6 ukázkových projektů a 9 tematických oblastech zaměření projektu.

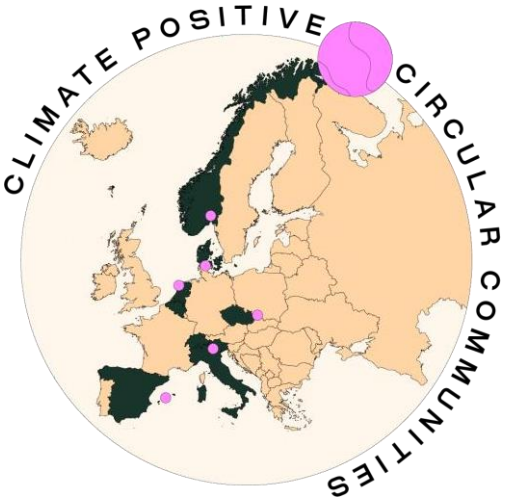
Díky práci s inovačními klastry ARV poskytne průkopnické inovace, které pomohou naplňovat ambice EU v oblasti klimatu a iniciativy Renovační vlny a naplní **vizi ARV** o rychlé a rozsáhlé realizaci klimaticky pozitivních komunit s oběhovým hospodářstvím **Climate Positive Circular Community (CPCC),** kde může společnost vzkvétat a prosperovat po mnoho generací.

Pilíře, ukázkové projekty a oblasti tematického zaměření jsou uvedeny v následujících oddílech textu.

6 ukázkových projektů klimaticky pozitivních společenství s oběhovým hospodářstvím (CPCC) [4] v celé Evropě

[1] COM (2020): Posílení evropských ambicí v oblasti klimatu do roku 2030. Investing in a climate-neutral future for the benefit of our people (Investice do klimaticky neutrální budoucnosti ve prospěch našich obyvatel). 562 final, Brusel, 17.9.2020.
[2] COM (2020): A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives (Renovační vlna pro Evropu – ekologizace našich budov, vytváření pracovních míst, zlepšování životní úrovně). 662 final, Brusel 14.10.2020
[3] Údaje z roku 2018, zdroj: Eurostat SILC. Doporučení Komise ze dne 14.10.2020 o energetické chudobě.
[4] Definice CPCC je uvedena na straně 6

Základem projektů v ARV programu je **6 ukázkových projektů velkého rozsahu, do nichž se zapojí 35 ARV partnerů, kteří budou představiteli celého hodnotového řetězce v sektorech stavebnictví a energetiky, spolu s rozsáhlou sítí inovačních klastrů.** Aby se docílilo opakovatelnosti a škálovatelnosti těchto ukázkových ARV projektů, byly pečlivě vybrány tak, aby mezi nimi byly zastoupeny různé druhy klimatu a společenských kontextů v Evropě a také s cílem přispět k vynikajícím inovacím ve všech potřebných tematických oblastech CPCC (Klimaticky pozitivních komunit s cirkulární ekonomikou). **Jde o projekty přeměny a regenerace měst zaměřené na různé druhy budov** (obytné, veřejné, vzdělávací i zdravotnické), které zahrnují **renovace na ploše 133 400 m^2** a **novou výstavbu na ploše 25 700 m^2**. Tyto projekty jsou pečlivě vybrány tak, aby řešily všechny oblasti tematického zaměření výzvy. Vybrané projekty se také navzájem doplňují, tzn. každý z nich přináší zvlášť výjimečné inovace ve zvolených oblastech zaměření projektu a může tak být pozitivním příkladem, který mohou následovat jiné projekty. Například nizozemský ukázkový projekt má zvlášť výjimečné inovace v oblasti tematického zaměření č. 5 – Pracovní toky při rekonstrukci, výstavbě a renovaci s účinným využitím zdrojů.



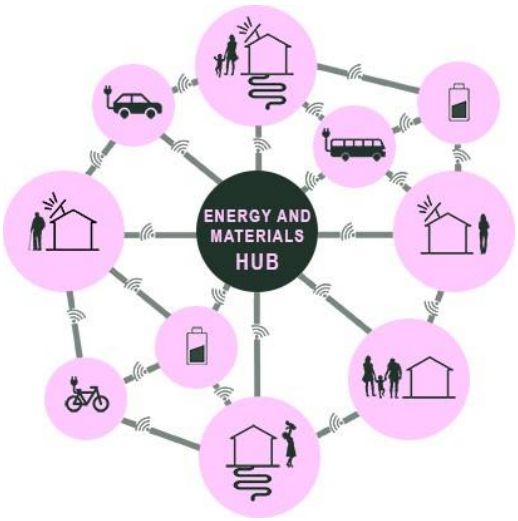
Obrázek 1.1 Mapa ukázkových projektů a zemí v ARV.

Všechny ukázkové projekty však řeší veškeré oblasti tematického zaměření. Ukázkové projekty a související inovace a klastry jsou podrobněji popsány v oddílech 1.4.2 a 2.1.1.

Toto jsou 3 koncepční pilíře: Integrace, princip oběhového hospodářství a jednoduchost

Úspěšné inovace CPCC, klimaticky pozitivních komunit s oběhovým hospodářstvím, se budou opírat o následující uplatnění 3 koncepčních pilířů:

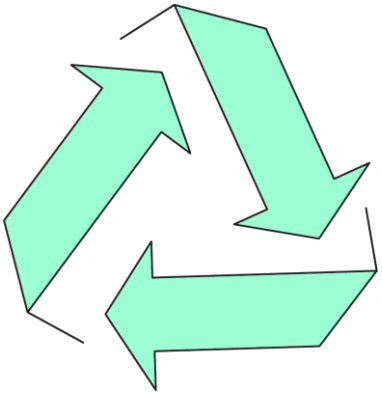
1) Integrace znamená, že se musíme zabývat několika vzájemně provázanými aspekty. Nestačí postavit velmi energeticky účinnou budovu, pokud si ji nikdo nebude moci dovolit nebo pokud nebude mít příznivé vnitřní prostředí. **Kvalita architektury, cenová dostupnost a kvalita života lidí** jsou proto zásadní aspekty, kterými je třeba se zabývat. V projektu ARV tento problém řešíme zaměřením na 3 různé vzájemně provázané úrovně: **1) lidé, 2) budovy a 3) komunitní energetické systémy** (viz obrázek 1.2). Když se soustředíme na lidi, bereme v úvahu širokou škálu hodnot různých zúčastněných stran v hodnotovém řetězci, od koncových uživatelů až po výrobce a finanční instituce. Do projektu ARV se zapojí **komunitní platformy, které zvýší povědomí veřejnosti o tématu, zapojí obyvatele a naváží vzájemnou spolupráci na spoluvytváření celého systému**. Když prezentujeme projekty energeticky efektivních budov, zároveň ukazujeme, jak jsou budovy ARV integrovány do svého kulturního a sociálního prostředí v souladu s **vizí Nového Bauhausu** [5]. Nakonec chytře napojíme uživatele i budovy **na energetické systémy komunity a materiálové uzly,** aby se zajistilo efektivní hospodaření s energií a zdroji v dané obytné oblasti i mimo ni. Koncept integrace zahrnuje integraci různých zúčastněných stran a odborných znalostí v celém hodnotovém řetězci CPCC a **využití nebývalých ICT řešení** za účelem usnadnění integrace různých systémů, zúčastněných stran i členů dané komunity. V oddíle 3. je podrobnější popis tohoto aspektu.



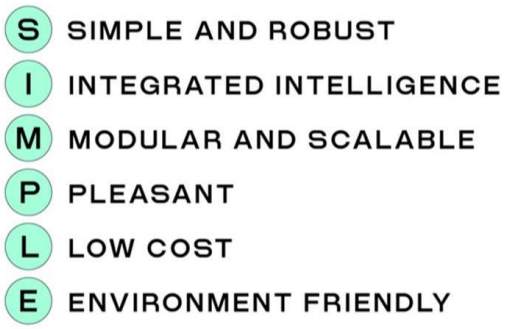
Obrázek 1.2 Integrace lidí, budova a energetických systémů v CPCC.

[5] https://ec.europa.eu/commission/presscorner/detail/en/AC_20_1916

2) Princip oběhového hospodářství se ve stavebnictví začal podstatněji rozvíjet teprve nedávno. Je však nezbytný pro udržitelný rozvoj, protože se očekává zdvojnásobení globální spotřeby materiálů v příštích čtyřiceti letech[6]. Jak zdůrazňuje nový Akční plán EU pro oběhové hospodářství[7], sektor stavebnictví spotřebovává obrovské množství zdrojů a pro jeho účely se těží asi 50 % všech materiálů. Toto odvětví je rovněž odpovědné za více než 35% celkové produkce odpadu v EU. V ARV budeme této výzvě čelit hledáním praktických řešení, **zaměřením na efektivní renovaci a výstavbu budov** a systematickým uplatňováním **Zásad EU pro oběhové hospodářství při navrhování budov**[8]. To znamená, že se v programu ARV budou uplatňovat klíčové principy oběhového hospodářství, tj. *zapojení všech účastníků hodnotového řetězce* do oběhového hospodářství, *využití finančních pobídek a celkových nákladů životního cyklu*, vytváření životaschopných o*bchodních modelů* s rozložením zátěže a nákladů, zlepšovat a využívat *vhodné nástroje a dovednosti* a zaměřovat se na *dlouhou životnost, flexibilitu, adaptabilitu, možnost opětovného použití a recyklaci*. Zaměřuje se zejména na **rozsáhlé renovace** stávajících budov (WP5). K dosažení cílů v oblasti nákladů, časové náročnosti a jednoduchosti (WP2-9) je nezbytné využití **digitálních nástrojů**. Program ARV rovněž nastartuje vývoj a zavedení **digitálních úložišť / evidencí materiálů** (WP4, WP8), které budou sledovat využití materiálu ve stávajících i nových budovách a možnosti jeho opětovného použití spolu s ukazateli nákladů a environmentálními ukazateli svázané energie a emisí.



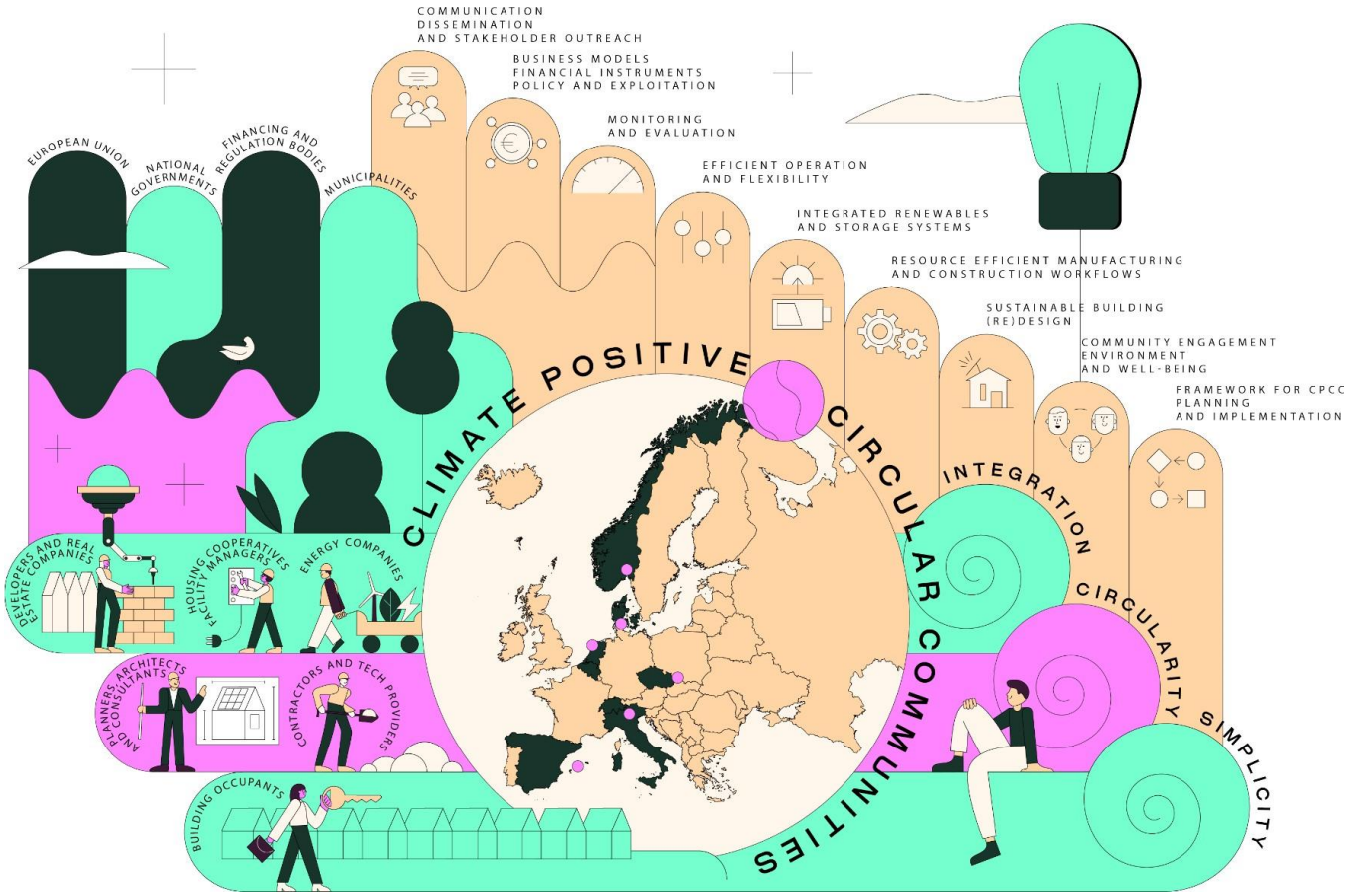
3) Jednoduchost. Držet se zásady jednoduchosti při plánování, projektování, výstavbě i používání CPPC umožňuje i přes všechny překážky zavést jejich rychlé a rozšířené používání. Je to proto, že jednoduchá řešení přinášejí několik podstatných výhod: 1) jsou odolnější a déle vydrží, 2) snadněji se realizují, 3) mají nižší náklady kvůli menší spotřebě materiálu a jednodušším výrobním procesům, 4) snáze se chápou, používají a fungují, 5) mají nižší spotřebu energie na životní cyklus i nižší emise (pokud jsou navržena chytře) a 6) mají nižší rizika. Aby bylo možné zajistit jednoduchá řešení, bude program ARV řešit
několik problémů, kterým čelí různé zúčastněné strany, od investorů, veřejných orgánů, stavebních společností až po koncové uživatele. **Jednoduchá řešení lze přinášet** pouze díky řízení složitosti. V programu ARV toto bude řešeno **využíváním zpravodajského systému (digitalizace)** v integrovaném plánování, projektování, výstavbě a provozu / využívání, stejně jako prezentací těch nejlepších integrovaných pracovních postupů výstavby a renovace s účinným využitím zdrojů pomocí **inteligentní industrializace a prefabrikace**.



Obrázek 1.3 Koncept jednoduchosti v programu ARV.

K řešení konkrétních výzev v rámci výzvy je vybráno **9 tematických oblastí zaměření.** Tyto oblasti jsou promítnuty do 9 souborů pracovních úkolů (pracovních balíčků) popsaných v oddíle 2 a odpovídají cílům popsaným v části 1.1 níže. Mezi oblasti tematického zaměření patří 1) Rámec pro plánování a realizaci CPCC, 2) Zapojení komunity, její životní prostředí a kvalita života, 3) Udržitelné projektování a nové projektování budovy, 4) Výrobní a stavební pracovní postupy s účinným využitím zdrojů, 5) Integrované systémy obnovitelných zdrojů a skladování, 6) Efektivní hospodaření s energií a energetická flexibilita, 7) Validace sledováním, vyhodnocením a hodnocením vlivů na životní prostředí, 8) Obchodní modely, finanční nástroje, zásady a využívání a 9) Komunikace, šíření informací a vztahy se zúčastněnými stranami. Těchto 9 tematických oblastí je dále popsáno v oddíle 1.3 písm. b) a v plánu prací (oddíl č.3).

[6] OECD (2018), Global Material Resources Outlook to 2060 (Globální výhled materiálních zdrojů do roku 2060).
[7] KOM (2020), A New Circular Economy Action Plan. For a cleaner and more competitive Europe. (Nový akční plán pro oběhové hospodářství. Pro čistší a konkurenceschopnější Evropu.)
[8] COM (2020), Circular Economy Principles of Buildings (Zásady oběhového hospodářství u budov).



Obrázek 1.4 Koncept ARV s **6** ukázkovými projekty Klimaticky pozitivních komunit zapojených do oběhového hospodářství a renovační vlny (**3** vlny sestávající z pilířů integrace, oběhového hospodářství a jednoduchosti), na nichž se podílí různé zúčastněné strany spolupracující na vytváření inovací v **9** oblastech tematického zaměření.

1.1 Cíle

Zastřešujícím cílem projektu ARV je **zrychlit tempo renovace budov a umožnit rychlé a rozsáhlé zavádění komunit CPCC** po celé Evropě. ARV usnadní **rychlé zavedení na trh a nákladově efektivní napodobování** koncepce CPCC, a tak významně přispěje k úplné dekarbonizaci Evropy do roku 2050. Specifické cíle ARV jsou v souladu se zastřešujícími cíli výzvy a jsou pojaty tak, aby dosáhly cílových hodnot uvedených v tabulce 1.1:

Cíl č.1: Vytvořit plán pro efektivní plánování, projektování, výstavbu, provoz a využívání komunit CPCC (zahrnuje všechny soubory pracovních úkolů (WP) a ukázkové projekty řízené a realizované prostřednictvím WP10).

Cíl č.2: Názorně předvést napodobitelný rámec plánování pro účinné projektování a úspěšnou realizaci komunit CPCC (WP2).

Cíl č.3: Názorně předvést platformy pro zapojení komunit zaměřené na zvyšování povědomí, chápání celého systému jeho obyvateli, životní úroveň obyvatel a spoluvytváření systému (WP3).

Cíl č. 4: Vyprojektovat a názorně předvést integrované budovy s oběhovým hospodářstvím zajišťující vysokou energetickou účinnost, nízké emise, nízké náklady, dobré vnitřní klima a vysokou architektonickou kvalitu (WP4).

Cíl č. 5: Názorně předvést bezproblémové procesy výstavby/renovace umožňující rychlé, jednoduché a účinné pracovní postupy (WP5).

Cíl č.6: Názorně předvést příklad výroby a skladování energie na místě k zajištění dodávky obnovitelné, místní a čisté energie (WP6).

Cíl č.7: Názorně ukázat inteligentní a flexibilní provoz budov a energetických systémů zajišťujících bezpečnou, uživatelsky orientovanou a nákladově efektivní energetickou účinnost (WP7).

Cíl č. 8: Sledovat a ověřovat platnost řešení ARV bezpečným a nepřetržitým měřením a hodnocením ukázkových aktivit (WP8).

Cíl č. 9: Usnadnit rychlé rozšiřování rozsahu inovací ARV zaměřením na klíčové politické pobídky a právní předpisy a vytvořit inovativní a účinné mechanismy financování a obchodní modely (WP9).

Cíl č. 10: Komunikovat o aktivitách prováděných v ARV a šířit jejich výsledky, zapojovat zúčastněné strany a urychlit využívání řešení vytvořených v ARV (WP9, WP10).

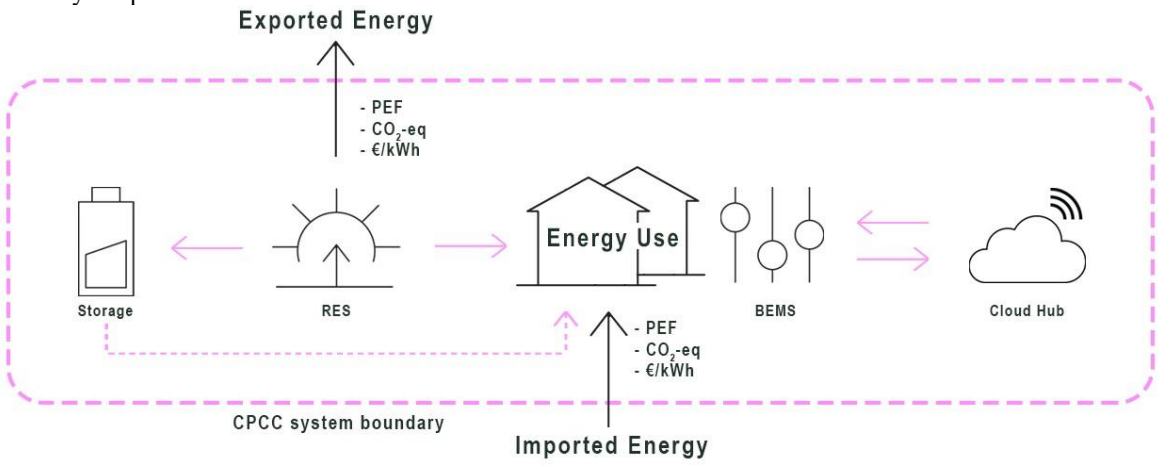
Tabulka č.1.1 Přehled cílových hodnot pro nové a renovované budovy v komunitách CPCC v programu ARV.

Kritéria hodnocení	Nová výstavba	Renovované budovy
Energie	**Snížení energetické náročnosti nejméně o 50%** ve srovnání se současnými požadavky stavebních předpisů dané země. **Pozitivní** úroveň energie podle spotřeby primární energie	**Snížení energetické potřeby nejméně o 50 %** ve srovnání s hodnotami před renovací. Alespoň podle normy **nZEB.**
IEQ	Vysoká kvalita vnitřního prostředí podle norem EU.	**Zlepšení nejméně o 30 %** ve srovnání s úrovněmi před dovybavením podle norem EN 16798-1: 2019
Hlučnost a prašnost	Podle norem EU v oblasti zdraví, bezpečnosti a životního prostředí.	**Snížení úrovně rušení života obyvatel nejméně o 30 %** ve srovnání s místními běžnými postupy
Svázané emise	**Snížení nejméně o 50 %** ve srovnání s místními běžnými postupy	
Trvání výstavby/dovybavení	**Snížení nejméně o 30 %** ve srovnání s místními běžnými postupy	
Náklady na celý životní cyklus	**Snížení nejméně o 20 %** v dané komunitě ve srovnání s místními běžnými postupy	
Náklady na výstavbu/dovybavení	**Snížení nejméně o 30 %** ve srovnání s místními běžnými postupy	

Definice klimaticky pozitivních komunit zapojených do oběhového hospodářství (CPCC)

Pracovní definice komunit CPCC je následující, ale bude dále upřesněna na základě poznatků získaných z projektu ARV a interakcí s dalšími projekty H2020 a iniciativami společných politik EU.

Koncept komunit CPCC je v souladu s koncepcemi *PED – Positive Energy District (Oblasti s pozitivní energetickou bilancí),* jak je popsáno v akční pracovní skupině plánu SET (Evropský strategický plán pro energetické technologie).
3.2 [9] a pracovní skupiny v rámci IEA [10], definice *Sustainable Plus Energy Neighborhoods (SPEN), tedy Udržitelných oblastí s pozitivní energetickou bilancí, podle definice* v projektu synikia.eu [11], definice *Zero Emission Neighborhoods (ZEN), tedy Oblastí s nulovými emisemi* [12,] podle definice výzkumného střediska pro Zero Emission Neighborhoods in Smart Cities (www.fmezen.no) a zásad oběhového hospodářství EU. Stejně jako u PED **se koncepce CPCC silně zaměřuje na interakci a integraci mezi různými budovami, uživateli a regionálními energetickými systémy, systémy zajišťování mobility a ICT systémy**. CPCC se však nezaměřují pouze na výše uvedené, ale zahrnují také **sociálně-environmentální aspekty a vyzdvihují principy oběhového hospodářství jako klíčový aspekt.** Společenstvím CPCC může být městská oblast, městská část a musí sestávat z několika propojených budov s přidruženou infrastrukturou, jako jsou sítě a technologie pro výrobu, skladování a výměnu elektřiny a tepla.



Obrázek 1.5 Ilustrace hlavních prvků CPCC (skladování, výroba energie, spotřeba energie, hospodaření s energií) a energetické toky do CPCC a z CPCC, spravované digitálním cloudovým uzlem programu ARV.

CPCC se zaměřuje na tři hlavní témata: (1) **Energie a emise**, (2) **Principy oběhového hospodářství** a (3) **Sociálně-environmentální** problémy, viz tabulka 1.2.

Tabulka 1.2 Pracovní definice komunit CPCC s hlavními tématy a souvisejícími cíli a KPI. Témata a KPI spolu s cílovými hodnotami jsou dále popsány v části 2.1

Téma	č..	Popis	Klíčové ukazatele výkonnosti – KPI
Energie a emise	1.1	Každá komunita CPCC má **nulovou čistou roční energetickou bilanci a nulovou čistou bilanci emisí skleníkových plynů,** a měla by se postupně posouvat k místnímu ročnímu přebytku výroby obnovitelné energie.	Dovážená, vyvážená a vyrobená energie v kWh/a a kWh/ m²/a. Emise skleníkových plynů z dovážené energie a zamezení emisím skleníkových plynů výrobou a vývozem obnovitelné energie v kg CO_{2e}/m²/a a tCO_{2e}/a
	1.2	Hranice **systému** pro výpočet obchodní bilance importu/exportu energie v CPCC se určuje podle budov a energetické infrastruktury, které jsou propojeny společným uzlem, který hospodaří a řídí celkovou energetickou účinnost.	Celková podlahová plocha a plocha areálu v m²
	1.3	Při výpočtu energetické a emisní bilance se zohledňují všechna **provozní energetická využití budovy podle směrnice o energetické náročnosti budov (EPBD)**, jakož i **integrace s přidruženou elektromobilitou.**	Spotřeba energie podle druhu a zdroje energie (EC) v kWh/a a kWh/m²/a. Emise skleníkových plynů v t$CO_{2e/a}$ a kgCO_{2e} /m²/a. Faktory primární energie (PEF) podle zdroje energie
	1.4	Každá komunita CPCC je **součástí městské a regionální sítě,** čímž se zajistí optimální využití lokálně vyráběné obnovitelné energie, **flexibilita, řízení spotřeby, kapacity pro skladování energie** a zároveň se zaručí bezpečnost dodávek energie.	Čistý zátěžový profil, křivka trvání vytížení, špičkové zatížení, export a import při špičce a denní profil čistého zatížení v kW; Faktor využití v %. Podíl vlastní spotřeby a vlastní výroby v %.

[9] Pracovní skupina pro plán SET: Realizační plán AKCE č. 3.2 v rámci plánu SET, červen 2018.
[10] IEA EBC, příloha 83 o oblastech s pozitivní energetickou bilancí (PED) – https://annex83.iea-ebc.org/about Pracovní skupina pro PED v JPI Urban Europe https://jpi-urbaneurope.eu/ped/ a COST Action 19126 o PED.
[11] Salom a Tamm (2020): výstup syn.ikia výstup: 3.1 Metodický rámec pro energeticky pozitivní budovy a obytné oblasti, 30. 9. 2020, synikia.eu.
[12] Wiik et al. (2018): Obytné oblasti s nulovými emisemi (ZEN) v chytrých městech. Definice, klíčové ukazatele výkonnosti a kritéria hodnocení: Verze 1.0. Dvojjazyčná verze, zpráva ZEN č. 7, NTNU/SINTEF, Norsko.

	1.5	CPCC je **vysoce energeticky účinná** a bude využívat **chytré** domácí služby a ovládací prvky, chytré stavební komponenty a jednoduché smart systémy pro interakci/zapojení uživatelů.	Snížení celkové spotřeby energie a energetického výkonu (kWh/m ^{2} a W/m^2). Ukazatel připravenosti budov pro chytrá řešení (SRI) [13]
Principy oběhové	2.1	CPCC **podporuje transformaci na oběhové hospodářství** zavedením regeneračních systémů, s minimálními vstupy zdrojů, emisemi a energetickými ztrátami díky zpomalení, uzavření a zeštíhlení materiálových a energetických cyklů.	Referenční úrovně [14] ukazatelů (vše)
	2.2	Stavební komponenty jsou navrženy tak, aby **měly dlouhou životnost, snadno se opravovaly, daly se znovu využít, repasovat, rekonstruovat a recyklovat.** Používají se pokud možno **místní a použité materiály.**	Referenční úrovně ukazatelů 2.1, 2.2, 2.3 a 2.4
Společensko-environmentální aspekt	3.1	Komunity CPCC **se soustředí na lidi**, tj. na jejich specifické potřeby, interakce a kvalitu života, a zajišťují vynikající podmínky vnitřního prostředí, prostorové vlastnosti a rovnoprávnou dostupnost pro osoby se zdravotním postižením a seniory.	Hodnocení spokojenosti uživatelů před a po realizaci. Společná definice multi-kriteriálního rámce.
	3.2	V CPCC **se minimalizuje rušení života obyvatel** během procesu výstavby/renovace, tj. doba výstavby/renovace, hlučnost, prašnost atd.	Doba výstavby/renovace ve srovnání s místními postupy v %
	3.3	V rámci CPCC se často organizují **aktivity zaměřené na zvyšování povědomí** spojené s udržitelným chováním, které podporují sociální inovace a vzdělávání i praktická školení o ekologickém a šetrném využívání energie.	Počet a rozsah činností za rok
	3.4	Vzhledem ke klimatickým změnám se v rámci CPCC usiluje **o komfortní venkovní podmínky,** které umožňují pobyt obyvatel venku a propagaci outdoorových aktivit.	Oslunění; sdílený prostor v % plochy areálu; plocha dětských hřišť a dalších míst pro aktivity v m² a v % plochy areálu

1.2 Vztah k pracovnímu programu

Návrh projektu ARV se zabývá konkrétními problémy a rozsahem Výzvy, jak je popsáno v tabulkách 1.3 a 1.4 níže.

Tabulka 1.3 Vztah k problémům řešeným ve Výzvě.

Řešené problémy (znění podle Výzvy)	Způsob řešení v programu ARV
Zaprvé, přeměna projektování a výstavby budov za účelem *snížení jejich svázaných emisí a zvýšení energetické účinnosti* jejich provozu; totéž platí pro dovybavení stávajících budov pro zvýšení jejich energetické účinnosti.	ARV bude využívat metody **integrovaného projektování a výstavby** s využitím **digitálních nástrojů** a **analýzy životního cyklu** za účelem minimalizace svázané energie a emisí. Budeme uplatňovat principy **oběhového hospodářství** při postupech projektování, přeprojektování, výstavby a rekonstrukce budov s důrazem na místní biologické materiály, opětovné využití, recyklaci, trvanlivost a odolnost, abychom dosáhli **alespoň 50% snížení svázaných emisí** ve srovnání se současnými stavebními předpisy platnými v dané zemi (**WP4-5**).
Zadruhé, dojde k transformaci budov na *energeticky pozitivní budovy* (s vlastní výrobou elektřiny pokrývající vytápění a chlazení a přispívající ke stabilitě energetické sítě) pomocí technologií využívajících udržitelné a obnovitelné zdroje energie.	Všechny ukázkové projekty ARV budou přispívat k cíli **pozitivní čisté energetické bilance** pomocí optimalizovaných systémů OZE a skladování energie v areálu (**WP6**). Projektování a hospodaření s OZE bude optimalizována (**WP7**), pokud jde o energetickou náročnost, emise skleníkových plynů a náklady na životní cyklus.

Tabulka 1.4 Vztah k oblasti působnosti Výzvy

Oblast působnosti (podle znění Výzvy)	Jak ARV řeší oblast působnosti Výzvy
Očekává se, že v rámci návrhů se budou realizovat *alespoň dva rozsáhlé, v praxi zrealizované ukázkové projekty (projekty obytných budov i neobytné projekty, nové /nebo dovybavené budovy)* slibných technologií, procesů a sociálních inovací v různých regionech Evropy.	Díky **šesti ukázkovým projektům velkého rozsahu v celé Evropě, které** zahrnují nové i dovybavené obytné, komerční i institucionální budovy, bude v rámci programu ARV realizována a vyhodnocena řada inovací v oblasti výstavby budov a energetických systémů i sociálních inovací, jejichž cílem je radikálně snížit potřebné náklady i trvání transformace na komunity CPCC (**WP 2-9**).
Škálovatelné projektování energeticky pozitivních zelených obytných oblastí kvalitně zapojených do prostorového, ekonomického, technického, environmentálního, regulačního a sociálního kontextu ukázkových areálů.	ARV vytvoří **rámec** pro efektivní plánování a realizaci CPCC a **vzorový plán** projektování, výstavby, provozu a používání CPCC v různých kontextech, kulturách, podnebích a na různých trzích v Evropě (**WP 2-9**).
Energeticky a zdrojově efektivní, plynulé pracovní postupy průmyslové výstavby/renovace od projektu až po případnou výrobu mimo areál, instalaci a sledování po dokončení stavby	Pomocí speciálně určeného souboru pracovních úkolů (pracovního balíčku) **WP5** zajistí ukázkové projekty ARV efektivní pracovní postupy, které **sníží potřebný čas a náklady na výstavbu/renovaci nejméně o 30 %**. Práce zahrnuje energeticky neutrální projektování již během výstavby nebo renovace s cloudovým 3D skenováním bodů a určení typologie budov pomocí AI .

[13] Generální ředitelství Evropské komise pro energetiku. Závěrečná zpráva o technické podpoře pro vývoj ukazatele připravenosti budov pro chytrá řešení. Lucembursko: Úřad pro úřední tisky Evropských společenství; 2019.
[14] Evropská komise: Level(s) – The European Framework for Sustainable Buildings (Evropský rámec pro udržitelné budovy)

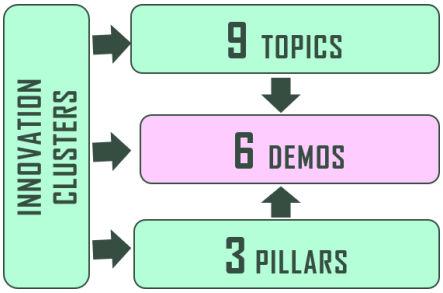
Recyklace / opětovné použití stavebních materiálů (nebo průmyslových vedlejších produktů) nebo snížení množství použitých materiálů a komponent ke snížení svázané energie budov	Program ARV sníží množství odpadu využitím projektování „Just in Time“ (JiT) (**WP4**) a umožní výrobu v budoucnu demontovatelných součásti pomocí modulárních renovačních a stavebních materiálů a oběhového designu u všech ukázkových projektů (**WP5**). **To povede ke snížení svázané energie a emisí skleníkových plynů během životního cyklu nejméně o 50 %** ve srovnání s běžnými postupy.
Prokázání vysoké míry napodobitelnosti, snížení nákladů na údržbu, dlouhodobé výkonnosti i socio-environmentálního profilu (např. kvalita ovzduší / přírodní ventilace, přirozené osvětlení atd.) a možností budoucí adaptace, opětovného použití nebo demontáže	Všechny ukázkové projekty ARV budou systematicky sledovány a vyhodnocovány (**WP8**) po dobu nejméně 1 roku a budou zaznamenávány údaje o nákladech a výkonnosti před i po realizaci řadou indikátorů. Společensko-environmentální účinnost bude zajištěna **uplatněním přístupu mnohonásobných přínosů** projektu **(WP2, WP3 a WP8)**
Zajistit, aby navrhovaná řešení neměla negativní vliv na požární bezpečnost budov a jejich zabezpečení proti zemětřesením	Všechna inovativní řešení realizovaná v rámci ARV budou předem prověřena a schválena místními úřady zajišťujícími shodu s požárními předpisy a předpisy pro bezpečnost při zemětřesení ještě před instalací (**WP5**)
Minimalizace rušení života obyvatel budovy a čas strávený na staveništi	Jedním z ústředních pilířů projekčního rámce programu ARV jsou i protokoly a standardy pro minimalizaci rušení obyvatel budovy v souladu s partnerským cílem Build4People (**WP4, WP5**).
Součástí programu je i monitorování provozní energetické náročnosti (minimalizace mezery skutečné výkonnosti ve srovnání s projektem) a odolnosti komponent použitých při výstavbě/renovaci po dokončení procesu výstavby/renovace.	Důkladné monitorování a vyhodnocování všech ukázkových projektů v ARV zajistí robustní soubory údajů, které budou srovnatelné pro celý projekt (**WP8**). Tyto údaje budou poskytnuty partnerům programu ARV a komunitám v EU prostřednictvím Cloud Hub (**WP7**) a Data Warehouse (WP8). Získané poznatky budou zapracovány do vzorového plánu pro CPPC (**WP10**)
Digitální metody a metody založené na použití evropského globálního navigačního družicového systému (EGNSS) při projektování a výstavbě, chytré monitorování a sledování postupu stavebních a renovačních prací (např. Building Information Modeling, digitální dvojčata a rozšířená realita, robotika atd.)	Při plánování, projektování a realizaci ARV řešení se bude používat řada špičkových digitálních nástrojů (**WP2-7**). Projekt ARV se posouvá kupředu **integrací různých nástrojů včetně různých zúčastněných stran:** počítačové simulace, EGNSS, GIS, BIM, VR, digitální evidence, digitální dvojčata, cloudové 3D skenování bodů, modely šedé skříňky, umělá inteligence atd.
Inovativní a energeticky účinnější integrované fotovoltaické prvky (BIPV), které přemění obyčejný plášť budovy v povrch vyrábějící elektřinu s estetickým vzhledem.	V programu ARV budou integrovány fotovoltaické prvky (BIPV) (**WP6**) přímo do pláště budovy architektonicky vhodným způsobem (nový Bauhaus) a tak, aby se to vše dalo snadno realizovat (**WP4-5**), například nová metoda renovace „Inside-Out“.
Systémy pro výrobu obnovitelné energie a systémy H&C (např. Dobíjecí zařízení) a řešení pro vytápění, ventilaci a klimatizaci (HVAC).	V programu ARV budou v praxi předvedeny inovativní OZE na místě stavby, včetně BIPV a účinného HVAC systému integrovaného do pláště budovy, které budou účinně integrovány s lokálními denními (EV baterie druhého využití + stacionární baterie) a sezónními systémy skladování tepla a okolní energie (**WP4-7**).
Řešení pro vytápění, větrání a klimatizaci (např. vratná tepelná čerpadla s chladivy, která nejsou skleníkovými plyny, nebo méně rozvinuté možnosti čistého vytápění, např. vodík).	Řešení HVAC v projektu ARV budou navržena pomocí analýzy životního cyklu , aby se minimalizovaly emise skleníkových plynů (**WP4-6**). Nebudou používána žádná chladiva, která by mohla přispívat ke globálnímu oteplování.
Systémy skladování energie s funkcemi obousměrného nabíjení, které neomezují využití obytného prostoru (např. skladování energie optimalizované pro danou oblast včetně systémů pro hospodaření s energií pro optimální integraci, flexibilitu a interoperabilitu se sítí).	V ukázkových projektech ARV se bude využívat i řada systémů pro skladování energie variabilní OZE (**WP6**), včetně V2G/V2B a. stacionárních baterií (1. a 2. generace), systémů skladování s nízkou exergií v areálu a sezónních tepelných úložišť s využitím městské tunelové infrastruktury.
Vysoce energeticky efektivní provoz budov se sníženými náklady na údržbu a dlouhodobou výkonností zajištěnou pomocí digitálních technologií pro optimalizaci výroby, spotřeby a skladování energie a energetické flexibility v oblasti, stejně jako digitální řešení pro zvýšení využitelnosti, energetické účinnosti a bezpečného provozu stavebních systémů a zařízení, zajišťující optimální uživatelský komfort a zdravější životní prostředí. Optimální dynamické přizpůsobení výroby obnovitelné energie na místě spotřebě dané budovy nebo oblasti; integrovaná reakce na poptávku, s přihlédnutím k neenergetickým výhodám (např. zabezpečení obyvatel; kvalita vnitřního / venkovního ovzduší atd.)	Ukázkové projekty ARV budou uplatňovat a vyhodnocovat integraci energetických systémů, včetně dynamických výkupních cen energie, hedonických cenových modelů a vyvažování zátěže pomocí umělé inteligence mezi energetickými nosiči (elektřina, topení, chlazení, kapalná paliva, plyn). ARV spustí centralizovaný evropský digitalizační hub (úroveň cloud) připojený k sub-hubům (úroveň fog) v jednotlivých místech ukázkových projektů, které budou zase připojeny k systémům a aplikacím pro budovy a obyvatele (úroveň edge). Díky využití nejmodernějšího principu datového jezera poskytne cloudové centrum ARV úložiště pro údaje z monitoringu a umožní efektivní využití údajů v různých měřítcích. Rovněž budou k dispozici uživatelská rozhraní pro obyvatele, provozovatele, vlastníky budov a další zúčastněné strany. To umožní výměnu údajů mezi lidmi, budovami a energetickými systémy, využít tak potenciální flexibility, zajistit uživatelský komfort a bezpečnost a minimalizovalo se znečištění. Modely budou přizpůsobeny různým podnebím a kontextům v celé Evropě pomocí příručky pro chytré komunity (Handbook for Smart Communities (**WP7**).
Chytré domácí služby, pokročilé automatizované ovládání, tj. Inteligentní měřiče, inteligentní ovládání vody, inteligentní nabíjení EV, inteligentní výtahy, inteligentní zabezpečení atd. na základě inkluzivního projektování, porozumění uživatelským preferencím obyvatel a harmonizace interakce budovy a obyvatel	V ukázkových projektech ARV se budou používat chytré ovládací prvky domácího systému pro zvýšení energetické účinnosti a pohodlí a interakcí obyvatel, včetně vytápění, ventilace, osvětlení, elektrických spotřebičů, kontroly přístupu a poplašných systémů (**WP7**). Systémy budou navrženy **spoluvytvářením** mezi koncovými uživateli a odborníky, čímž se zajistí naplnění potřeb obyvatel (**WP3, 4, 5**) a budou hodnoceny průzkumy realizovanými po obsazení budov (**WP8**), čímž by se mělo ověřit 30% zlepšení spokojenosti uživatelů se zrekonstruovanými budovami.
Integrace mezi systémy hospodaření s energií v budovách/systémy řízení a automatizace budov, výrobou obnovitelné elektřiny/energie, skladování energie, zařízeními městských dodávek služeb a sítí.	Integrace všech funkcí budov je řešena integrovaným přístupem ARV (**WP 3, 4, 5, 6, 7, 8**)
Potenciál pro místní flexibilitu agregováním a seskupováním zdrojů; možnost obchodovat s energií jako s komoditou	Ukázkové projekty ARV navrhnou a využijí nové škálovatelné místní trhy s energií a flexibilitou (LEFM) k obchodování s OZE a flexibilitou napříč energetickými systémy (elektřina a dálkové vytápění) spolu s novými obchodními modely,

flexibilitou vytváření nových služeb a příjmových toků pro majitele/nájemce budov a jejich	finanční mechanismy, jako jsou zelené digitální dluhopisy, a hedonické cenové mechanismy pro CPCC, a jejich zpřístupnění různým zúčastněným stranám po celé Evropě (nemovitosti, energetické společnosti, finanční instituce, zákonodárci) (**WP7, WP9, WP10**).
Činnosti zaměřené na zvyšování povědomí občanů ohledně živých laboratoří v zelených sousedstvích (vedené „zelenými školami“) s cílem podporovat sociální inovace, vzdělávání a odbornou přípravu zaměřenou na udržitelnost, která bude rozvíjet kompetence a pozitivní chování / dobré návyky v oblasti účinného využívání zdrojů a ekologicky šetrného využívání energie.	Ukázkové projekty ARV budou vytvářet prostor pro živé laboratoře (**WP3**), kde budou občané a obyvatelé zapojeni do procesu transformace komunit ARV. Mezi nejdůležitější aktivity zde bude patřit vytváření a poskytování prostoru pro výstavy tematicky zaměřené na energetické vzdělávání, koučování nájemců ve využívání energie prostřednictvím domácích systémů pro hospodaření s energiemi a jmenování „zelených velvyslanců“ mezi nájemci.
Koordinace norem a právních aspektů zajištění provozní účinností budov a technologií HVAC včetně mezery skutečné výkonnosti ve srovnání s projektem.	Řešení ARV budou řešit mezeru skutečné výkonnosti ve srovnání s projektem systematickým sledováním a hodnocením plánování, projektování, výstavby, provozu a používání CPCC a vytvářením systémů pro zpětnou vazbu v celém hodnotovém řetězci. Výsledkem budou doporučení zdokonalení nástrojů a procesů a nové podklady pro nová opatření a upravené právní a správní předpisy (**WP2, WP8, WP9, WP10**).

1.3 Pojetí a metodika

(a) Pojetí programu

Jak je uvedeno v oddíle 1.1 (a znázorněno na obrázku 1.4), koncepce ARV se opírá o kombinaci **3 koncepčních pilířů** (integrace, principy oběhového hospodářství a jednoduchost), **6 ukázkových projektů velkého rozsahu** a **9 oblastí tematického zaměření** (viz obrázek níže) a je podporován **inovačními klastry** z celého hodnotového řetězce CPCC (viz oddíl 2.10 v části 2.2)



Tímto způsobem projekt ARV **zvýší míru renovace budov (z hlediska rozsahu u intenzity) a celkově zvýší celkovou energetickou účinnost, energetickou flexibilitu, sociální udržitelnost a odolnost vůči klimatickým změnám v obytných oblastech**.

Zkušenosti partnerů ARV z jiných projektů (viz tabulka 1.5) ukázaly, že ukázkové projekty realizované v praxi poskytují efektivní prostor pro úspěšnou integraci řešení. Interdisciplinární inovace se mohou realizovat, když koncoví uživatelé, výzkumní pracovníci a subjekty z daného odvětví spolupracují jako aktivní účastníci celého procesu, od jeho vymezení, projektování a výstavby až po konečné hodnocení [15,16]. Úzká spolupráce a výměna znalostí mezi zúčastněnými stranami projektu vytvoří inovační uzly umožňující spoluvytváření ukázkových projektů, které budou sloužit jako vzory k napodobování v příslušných městech, zemích i zbytku Evropy. To je zajištěno tím, že jsou ukázkové projekty realizovány v různých klimatických a geografických kontextech, jakož i aktivním zapojením **celoevropských inovačních klastrů**, jak je popsáno v oddíle 2.2.

Stručně řečeno, program ARV usiluje o zjednodušení přijetí zvýšené energetické náročnosti budov, aby se zajistila jejich realizace ve velkém rozsahu s vynikajícím socioekonomickou výkonností. Cílem projektu ARV je zlepšit využívání již proveditelných a slibných řešení (od TRL 5/6) a postoupit k jejich zjednodušené integraci do projektů výstavby a renovace (dosažení TRL 7/8**). Ukázkové projekty se tak stanou živými příklady toho, jak jsou řešení programu ARV bezproblémově, cenově dostupně a úspěšně zaváděna v klimaticky pozitivních komunitách zapojených do oběhového hospodářství (CPCC).**

V tomto ohledu projekt ARV zohledňuje a řídí se řadou směrnic a politik EU požadujících dekarbonizaci, udržitelnost, cenovou dostupnost, účinné využívání zdrojů a odolnost v zastavěném prostředí i mimo něj, včetně: 1) Revidovaná směrnice o energetické náročnosti budov EPBD [17]; 2) Renovační vlna [18]; 3) Realizace Akce 3.2 SET-PLAN

[15] Meistad, T. (2015). Udržitelná výstavba: Od vzorových projektů k průmyslové transformaci, doktorská disertační práce, Norská vědeckotechnická univerzita, Trondheim, Norsko.
[16] Berker a Bahrati (2012). Výzkum energetika a budov: Výzvy plynoucí z vytváření nových znalostí, *výzkum a informace o výstavbě*, sv. 40, s. 473-80.
[17] Směrnice Evropského parlamentu a Rady 2010/31/EU ze dne 19. května 2010 o energetické náročnosti budov (2010)
[18] Evropská komise (2020): A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives (Renovační vlna pro Evropu – ekologizace našich budov, vytváření pracovních míst, zlepšování životní úrovně). Brusel, Belgie.

Plán [19]; 4) Čistá energie pro všechny Evropany [20]; 5) Pařížská dohoda [21]; 6) Přechod na čistou energii – technologie a inovace [22]; a cíle udržitelného rozvoje OSN [23] SDG7, 8, 9, 11, 12, 13 a 17. ARV navíc podporuje občanskou angažovanost a podporuje obyvatele CPCC, aby se aktivně podíleli na utváření svých komunit (WP3). Ukázkové projekty ARV budou organizovány tak, aby umožňovaly efektivní výměnu mezi obyvateli/nájemci a různými zúčastněnými stranami projektu. Pomocí digitálních platforem a častých workshopů bude ARV usilovat o aktivní zapojení občanů v CPCC a o získávání jejich nápadů a zpětné vazby. Podle digitální strategie Evropské komise [24,25] bude ARV propojovat inteligentní městskou infrastrukturu a snadno použitelná digitální řešení, aby se docílilo zlepšení a zjednodušení každodenního života lidí, vše za podmínek respektu k soukromí a vynikající kybernetické bezpečnosti (WP 6-7).

Relevantní probíhající výzkumné projekty

Projekt ARV zahrnuje akce umožňující spolupráci s jinými projekty a také bude navazovat na mnoho projektů, jichž se partneři ARV účastní, a bude s nimi interagovat, včetně národních, evropských a mezinárodních projektů. Přehled těchto projektů a jejich význam pro ARV je uveden v následující tabulce.

Tabulka 1.5 Přehled příslušných národních, evropských a mezinárodních projektů, na nichž se podílejí partneři ARV.

ARV partner	Relevantní projekty na národní, evropské a mezinárodní úrovni	Relevance pro program ARV a společné aktivity / synergie
NTNU (LEAD) *SINTEF, DTU, IREC, HE, ENFOR*	**syn.ikia:** SPEN (Energeticky pozitivní udržitelné oblasti) (H2020)	Ukázkový projekt čtyř udržitelných energeticky pozitivních obytných oblastí, energetická účinnost, flexibilita, využití OZE, řízení inovací, obchodní modely, sociální udržitelnost, komunikace a vstřícnost k zúčastněným stranám.
NTNU (lead) *SINTEF*	**FME ZEN:** Centrum pro výzkum obytných oblastí s nulovými emisemi v inteligentních městech (Norská rada pro výzkum a průmysl)	Ukázka 9 pilotních projektů velkého rozsahu v různých lokalitách v Norsku, flexibilní komponenty, OZE, šíření informací, řízení inovací, obchodní modely
NTNU (lead)	**+ CityxChange:** Inteligentní města a komunity H2020	Inovace, ukázkové projekty, IT, OZE, výměna znalostí
NTNU (lead)	**ECHOES:** Rozhodnutí v oblasti energetiky podporující Energetickou unii a plán SET (H2020)	Synergie energetického chování spotřebitelů / prozumentů a SET-plán
NTNU	**INVADE:** Integrované EV a baterie k posílení mobilní, distribuované a centralizované akumulace energie v distribuční síti (H2020)	Vývoj technologií Cloudový systém řízení flexibility pro zvýšení podílu OZE
NTNU, DTU	**openENTRANCE:** open ENergy TRansition Analýzy pro nízkouhlíkovou ekonomiku (H2020)	Analýza dopadu několika budoucích cest vývoje a politik, a rozvoj dialogu se zúčastněnými stranami
NTNU (lead)	**SMARTEES:** Sociálně-ekonomické perspektivy realizace energetické unie (H2020)	Sociální inovace a socioekonomické perspektivy
NTNU (lead)	**FME NTRANS:** Norské studie energetické transformace (Norská rada pro výzkum a průmysl)	Šíření informací a budování povědomí občanů
NTNU (lead)	**BEYOND:** Blockchainové obchodování s elektřinou pro integraci národních a decentralizovaných místních trhů (H2020)	Platformy a koncepty obchodování s energií
NTNU	**Solární energie v plánování městského rozvoje:** Ukol č. 51 IEA SHC	Solární technologie; Strategie plánování
NTNU	**Příloha IEA č.63:** Implementace energetických strategií v komunitách	Strategie plánování; Zapojení zúčastněných stran
NTNU (lead)	**EIP SCC :** „Od plánování až k realizaci“, včetně balíčku Smart City Guidance Package	Řešení inteligentního města, šíření výsledků
NTNU (lead) *SINTEF, DTU, CTU, IREC, EURAC*	**EERA JP Smart Cities:** Vypracování akčních plánů pro inteligentní města	Přispění k cíli plánu SET spočívajícím v realizaci 100 inteligentních oblastí s pozitivní energetickou bilancí.
NTNU SINTEF, EURAC	**Příloha IEA EBC č.83:** Oblasti s pozitivní energetickou bilancí.	Rámec a definice, ukázkové projekty
NTNU (lead)	**Projekt ChiNoZEN :** Projekt spolupráce mezi Norskem a Čínou zaměřený na nízkouhlíkové budovy a čtvrti	Vývoj technologií. Ukázka kombinovaného chlazení, vytápění a výroby čisté energie pro nízkouhlíkové čtvrti / budovy. Flexibilita energie.
NTNU	**Iclima:** Testovací prostředí pro materiály a stavební pláště s otevřenými inovacemi (H2020)	Inovativní materiály a stavební pláště. Zkoušky a Praktické ukázky.
SINTEF (lead)	**FlexBuild :** Hodnota flexibility koncového uživatele v budoucím norském energetickém systému.	Energetická flexibilita v budovách

[19] Společné výzkumné středisko Evropské komise (2018): AKCE Plánu SET – Plán realizace č. 3.2. Evropa se stane globálním vzorem integrovaných inovativních řešení pro plánování, zavádění a replikaci oblastí s pozitivní energetickou bilancí (PED). Evropská komise. Brusel, Belgie.
[20] Generální ředitelství Evropské komise pro energetiku (2019): Čistá energie pro všechny Evropany. Lucembursko: Úřad pro úřední tisky Evropských společenství.
[21] Rámcová úmluva OSN o změně klimatu (2015): Přijetí Pařížské dohody. Návrh předsedy. Paříž, Francie.
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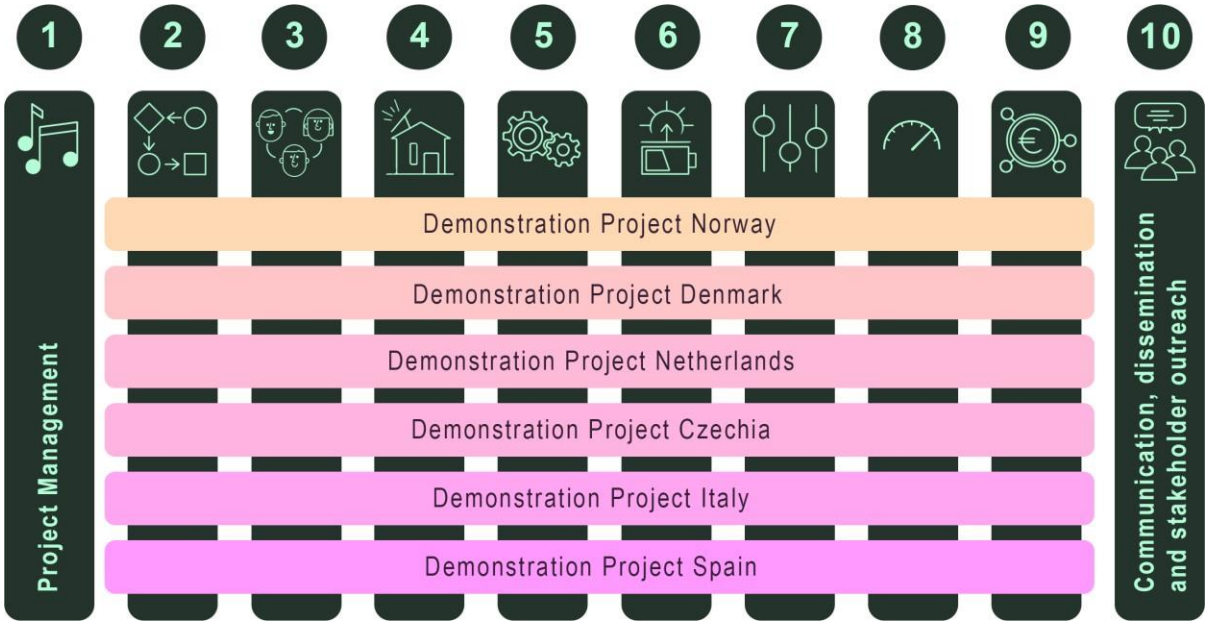
NTNU, DTU		
DTU (lead)	**SmartNet** : Inteligentní schémata interakce TSO-DSO, tržní architektury a ICT řešení (H2020)	Synergie v řízení na straně poptávky a decentralizované výroby energie.
DTU (lead)	**FLEXCoop:** Řízení podle poptávky pro energetická družstva demokratizující energetiku (H2020)	Nástroje řízení podle poptávky a nové obchodní modely.
DTU (lead) *ENFOR, PZ, DAN*	**CITIES** : Centrum pro IT - Inteligentní energetický systém ve městech (Dánská rada pro strategický výzkum)	Prognostické techniky a techniky optimalizace pro větrnou, solární energii a dálkové vytápění
IREC (lead)	**INCITE:** Inovativní řízení pro integraci obnovitelných zdrojů do inteligentních energetických systémů (H2020)	Energetická flexibilita v budovách
IREC (lead)	**SABINA** : SmArt BI-directional multi eNergy gAteway (H2020)	Energetická flexibilita v budovách a obytných oblastech
IREC	**GrowSmarter :** transformace měst pro chytrou, udržitelnou Evropu (H2020)	Chytrá řešení pro města
IREC	**EFFICIENT BUILDINGS:** Horizontální projekt Interreg MEDFull .	MED uzel pro inovativní sdílená řešení s účinným využitím energie v budovách
IREC	**TRI-HP**: Třígenerační systémy tepelných čerpadel s přírodními chladivy a obnovitelnými zdroji (H2020)	Synergie při vytváření pokročilých ovládacích prvků řízení vývoje a využívání tepelných čerpadel s přírodními chladivy v bytových domech
IREC	**WEDISTRICT:** Chytrá a lokálně vyráběná obnovitelná energie DISTRICT Řešení vytápění a chlazení pro udržitelný život (H2020)	Integrace obnovitelných zdrojů a řízení energie v sítích dálkového vytápění a chlazení
SINTEF (lead)	**DATABYGG:** Inteligentní prognostika spotřeby energie v budovách (Norská rada pro výzkum)	Spotřeba energie podle reakce na poptávku Inteligentní predikční modely
SINTEF (lead)	**OPPTRE:** Energetická modernizace dřevěných obydlí na úroveň nZEB **(**Norská rada pro výzkum)	Koncepce energetické modernizace rodinných domů, obvodových plášťů budov a architektonické atraktivity
SINTEF	**REZBUILD:** Inovativní ekosystém rekonstrukcí pro budovy s téměř nulovou spotřebou energie (NZEB) (H2020)	Rozhodovací platforma pro rekonstrukce pokročilými technologiemi pro renovaci budov s téměř nulovou spotřebou energie
SINTEF (lead)	**KLIMA 2050:** Snižování rizik prostřednictvím adaptací budov a infrastruktury na klimatické změny (Norská výzkumná rada & partneři)	Snížení společenských rizik spojených se změnou klimatu: zvýšení expozice srážkám a povodňovým oblastem v zastavěném prostředí.
ACE	**ABRACADABRA:** Přispění Assistant Building k rekonstrukci, uplatnění, sanaci a výstavbě skutečných Budov s nulovou spotřebou energie, aktivace trhu pro hloubkové renovace (H2020)	Integrace systémů obnovitelných zdrojů energie u přístaveb budov nebo u nové výstavby za účelem překročení standardu minimální energetické výkonnosti s cílem dosáhnout budov s téměř nulovou spotřebou energie (nZEB)
ACE	**RenoZEB :** Urychlení renovací k dosažení téměř nulové spotřeby energie u budov a obytných oblastí (H2020)	Fasády s technologií Plug and play fasády pro hlubokou renovaci s dosažením nZEB
ACE, Housing Europe	**Triple A-Reno :** Atraktivní, přijatelná a cenově dostupná hloubková renovace s uplatněním přístupu zaměřeného na spotřebitele a prokazatelné zlepšení výkonnosti (H2020)	Zaměření na obyvatele pomocí nových obchodních modelů pro spotřebitele a koncové uživatele a nástrojů podpory rozhodování s využitím prokazatelných zlepšení výkonnosti k usnadnění rozhodování
ACE	**Cultural-E :** Projektování zohledňující klima a kulturu a tržně zajímavá technologická řešení pro PEB (H2020)	Nástroje k projektování, inteligentní technologie, metodiky a doporučení pro budovy s pozitivní energetickou bilancí
ACE,Housing Europe	**Drive0: D**ekarbonizace stavebního fondu EU posílením renovací zaměřených na spotřebitele (H2020)	Renovace budov podle zásad oběhového hospodářství se zaměřením na koncové uživatele.
ACE	**DigiPLACE :** Směrem k evropské digitální platformě pro stavebnictví (H2020)	Společný evropský digitální stavební ekosystém digitálních služeb pro podporu inovací, obchodu atd.
PZ (lead) *SAB*	**SmartEnCity :** Opatření k energetickému dovybavení ve třech bytových družstvech v Sønderborgu (H2020)	Projektování, realizace a monitorování integrovaných systémů pro využití obnovitelné energie v budovách.
DTU (lead)	**FED:** Flexible Energy Denmark (Inovační fond Dánsko)	Flexibilita budov a čtvrtí a napojení na systém místní energetické komunity.
DTU	**ebalanceplus :** Inteligentní energetická flexibilita pro distribuční sítě (H2020)	Integrace obnovitelné energie do místní distribuční sítě; tržní a obchodní modely, ekonomické a sociální aspekty.
DTU	**SCA:** Smart City Accelerator (EU Interreg)	Optimalizace energetické účinnosti a uplatnění chytrých řešení v oblasti energetiky v inteligentních městech
DTU, *DAN*	**HEAT 4.0** (Inovační fond Dánsko)	Digitální řešení pro dálkové vytápění a místní tepelné sítě
DTU	**REBUS:** Udržitelné renovace budov (Inovační fond a investiční fond vlastníků půdy)	Partnerská spolupráce pro udržitelnou renovaci. Posílení inovačního potenciálu při renovaci.
EURAC	**STARDUST:** Holistický a integrovaný model městské obnovy pro Smart Cities (H2020)	Efektivní, inteligentní a občansky orientovaná města s nízkou uhlíkovou stopou se ekologickými řešeními a inovativními obchodními modely.
EURAC	**VARCITIES:** Přelomová přírodní opatření pro zdraví, kvalitu života a odolnost ve městech (H2020)	Města zaměřená na komunitní život: inovativní nápady, udržitelné modely a sdílené veřejné prostory napomáhající zlepšení zdraví a kvality života v různých klimatických podmínkách.
EURAC	**SINFONIA:** Chytrá iniciativa měst, která se zavázala investovat do pokročilých energetických řešení velkého rozsahu (FP7)	Rozsáhlá, integrovaná a škálovatelná energetická řešení ve středně velkých evropských městech: úspory energie, využití OZE, zpětné dovybavení budov, optimalizace elektrické sítě a dálkové vytápění a chlazení dané oblasti
EURAC	**CA19126:** Evropská síť oblastí s pozitivní energetickou bilancí (PED) (COST Action)	Harmonizace, sdílení a šíření znalostí/průlomových objevů ohledně PED
EURAC, NTNU	**Úkol č. 63 IEA SHC** Plánování oblastí se solární energií	Projektování komunit založených na využití solární energie

BOEX, HU, UU, BOS GROEP	**IRIS:** Spoluvytváření inteligentních a udržitelných měst (H2020)	Uplatňování inovací, plánování rozvoje za účasti občanů, energetická účinnost, inteligentní ICT, obchodní modely.
BOEX, HU, UU, BOS GROEP	**TKI:** Henriëttedreef District of Overvecht in Utrecht (Národní inovační projekt)	Modulární renovační systém
HU	**Opatření k minimalizaci** energetické chudoby v sektoru soukromého nájemního bydlení (H2020)	Řešení energetické chudoby v sektoru soukromého nájemního bydlení
HU, UU	**Inteligentní solární nabíjení** (Přes EFRO)	Lokálně vyráběná solární energie akumulovaná ve sdílených automobilech pomocí inteligentního a dynamického systému (V2G)
HU	**Transformace energetiky** ve stávajícím stavebním fondu	Cenově dostupná a uživatelsky přívětivá řešení renovace
HU	**Future Factory** (MMIP3 a 4)	Moduly, díky nimž je bydlení v řadových domech udržitelné ve velkém rozsahu.
UU	**PVP4Grid** PV-Prosumers4Grid (H2020)	Lepší integrace fotovoltaiky a prozumentů na trhu s elektřinou
UU	**PARENT** Participativní platforma pro udržitelné hospodaření s energií (ERA-NET)	Úspora energie díky softwarovému řešení, které lze rozšířit, je opakovaně použitelné, společensky přijatelné a obchodovatelné.
UU	**CESEPS:** Společný vývoj inteligentních energetických produktů a služeb (ERA-NET)	Spotřební chování při využívání energie, místní obchodování s energií, poptávkově orientované řízení, místní OZE, e-mobilita a prognostika
SAB	**HAPPI** Energetická účinnost bytového družstva Procesní plánování a investice (H2020)	Energetická rekonstrukce obydlí: Výběr nejlepších technologií a metod pro inteligentní financování renovací velkého rozsahu.
PALMA (lead)	**EDUSI:** Litoral de Ponent – Strategie pro integrovaný udržitelný městský rozvoj (FEDER)	Trvalé a dlouhodobé zlepšování sociálních, ekonomických, a environmentálních podmínek městské oblasti.
PALMA	**INCIRCLE** Evropský fond pro regionální rozvoj	Nakládání s odpady
PALMA	**REGENERATE:** Uvolnění trhu pro ekologicky udržitelné renovace na Baleárských ostrovech (H2020)	Obchodní modely a financování renovace
DAN	**REWARDHeat:** Inteligentní sítě, integrace obnovitelných a odpadních zdrojů energie (H2020)	Vývoj a praktická ukázka rozvodny okruhu dálkového vytápění pro bytový dům.
DAN	**RE-INVEST:** Strategie investice do obnovitelné energie (Innovation Fund Denmark)	Inovativní výzkumný projekt zaměřený na vývoj systému 100% obnovitelné energie v Evropě
HE	**HEART:** Sada nástrojů pro holistickou energii a architektonické dovybavení budov (H2020)	Multifunkční sada nástrojů s integrovanými komponentami k transformaci stávajících budov na energeticky účinné inteligentní budovy.
HE	**HOUSEFUL:** Inovativní řešení a služby podle principů oběhového hospodářství pro sektor bydlení (H2020)	11 řešení podle principů oběhového hospodářství spoluvytvářených se zúčastněnými stranami ve stávajícím hodnotovém řetězci bytové výstavby.
CENTER DENMARK (lead), *DTU, DAN*	**Center Denmark:** Inteligentní energie (Evropská komise a Inovační fond Dánsko)	Sjednocení a zaznamenání výsledků digitalizace energetických systémů, poskytnutí informací odvozených z dat pro komerční využití
DTTN	**Build-in-wood** (H2020)	Podstatné zvýšení podílu výstavby ze dřeva

(b) Metodologie

Hlavní metodikou projektu ARV bude **spoluvytvářet, realizovat, provozovat a hodnotit 6 projektů obnovy měst,** a ukázat tak, jak se mohou rozšiřovat slibné inovace umožňující vznik klimaticky pozitivních komunit zapojených do oběhového hospodářství (CPCC).



Obrázek 1.6 Integrace tematických souborů pracovních úkolů 1-10 a ukázkových projektů ARV.

Ukázkové projekty byly pečlivě vybrány, aby řešily hlavní tematické oblasti výzvy, a budou realizovány v maticové struktuře, která propojí tematické oblasti (WP – pracovní balíčky) s implementací regeneračních projektů (ukázkové projekty), viz obrázek 1.6. Tato maticová struktura podporuje výměnu poznatků a spolupráci na programu jak v rámci tematických odborností (ve WP), tak při praktické realizaci (v ukázkových projektech). Jak bylo zmíněno v úvodu, každý z ukázkových projektů je vybrán jako zdroj inspirace pro jednu nebo více tematických oblastí zaměření. **Maticová struktura zajišťuje napodobení projektů a jejich škálování tím, že s podobné ukázkové prvky využijí v různých plánovacích, socioekonomických, finančních a sociálních kontextech.** Tím se docílí toho, aby se ukázkové projekty a tematické pracovní oblasti nestaly jenizolovanými projekty, ale zajistí se, aby se relativní silné a slabé stránky různých partnerů systematicky navzájem doplňovaly. Regionální, kulturní a lingvistická sounáležitost je významnou hnací silou přenosu znalostí a byla výslovně zohledněna výběru ukázkových projektů, aby byla zajištěna vyšší míra škálovatelnosti a replikace.

Následuje shrnutí složení a mimořádných výsledků ukázkových projektů ARV:

- Jsou součástí **projektů transformace a regenerace městských částí,** mezi nimiž jsou zastoupena různá **podnebí a kontexty** v Evropě ve všech jejích geografických oblastech.
- Jejich součástí jsou **inovační klastry** a zúčastněné strany z **celého hodnotového řetězce potřebného k dosažení transformace na CPCC**, včetně obcí, developerů, vlastníků, urbanistů, architektů, inženýrů, smluvních dodavatelů, dodavatelů materiálů, komponentů a služeb, energetických společností, správců zařízení, obyvatel , Nevládních organizací a výzkumných/vzdělávacích institucí.
- Kladou velký důraz na **efektivní procesy renovace**, včetně značného **podílu sociálního bydlení, které má být upgradováno nejméně na standard NZEB**. Součástí ukázkových projektů je navíc výstavba nových budov, což ukazuje vůli dosáhnout **pozitivní energetické účinnosti.**
- Mají **vysoké cíle,** pokud jde o energetickou účinnost, flexibility v oblasti energetiky a elektrického proudu, využívání OZE, minimalizaci emisí skleníkových plynů, nízké investiční a provozní náklady, oběhové hospodářství, vysokou architektonickou kvalitu a dosažení vysoké úrovně bezpečnosti, zabezpečení a kvality života obyvatel a uživatelů.
- Zahrnují **významné inovace,** které se týkají všech oblastí zaměření výzvy (viz tabulka 1.7). Každý z ukázkových projektů navíc přináší obzvláště vynikající inovace alespoň v jedné z 9 oblastí tematického zaměření: Španělský ukázkový projekt má vynikající inovace v oblastech zaměření č. 2) Rámec a nástroje pro účinnou realizaci CPCC a č.3) Zapojení komunity. Norský ukázkový projekt má vynikající inovace v oblasti zaměření č.4) Udržitelné projektování a rekonstrukce budov. Nizozemský ukázkový projekt nabízí vynikající inovace v oblasti tematického zaměření č. 5) Pracovní postupy výstavby, rekonstrukce a renovace s účinným využitím zdrojů. Italský a český projekt nabízejí vynikající inovace v oblasti zaměření č. 6) Integrace obnovitelných a akumulačních systémů. Dánský ukázkový projekt má vynikající inovace v oblasti zaměření č.7) Efektivní provoz a flexibilita. Všechny projekty přispívají k integrovaným přístupům v oblastech zaměření č.8) Měření a hodnocení a č.9) Obchodní modely, finanční nástroje, politika a využití poznatků.
- Poskytují prostor pro **Living Labs,** kde jsou občané a obyvatelé zapojeni do procesu transformace komunit ARV. Účelem je vytvoření inteligentněji spravovaných komunit tím, že budou osloveni občané, podniky, pracovníci / dojíždějící, podnikatelé, akademická obec, veřejné orgány a neziskové organizace, kteří se aktivně zapojí do zdola iniciovaného spoluvytváření identifikace, vytváření a realizace vhodných řešení.

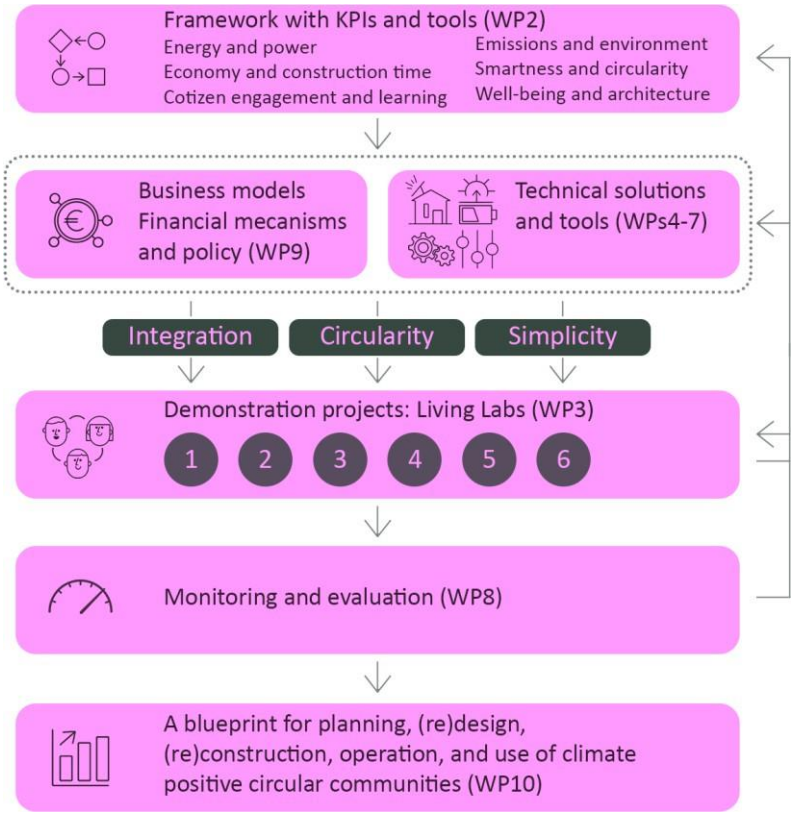
Stručně řečeno, ukázkové projekty ARV přinesou inovace s **velkým potenciálem pro replikaci a rozšířené uplatnění v** celé Evropě.

V projektech budou využity následující hlavní metody a nástroje a pracovní postupy:

Využije se **řada různých metod a nástrojů**, včetně následujících:
Řízení inovací (WP1), interdisciplinární workshopy a spoluvytváření (všechny WP), návštěvy ukázkových projektů (všechny WP), živé laboratoře (WP3,10), integrovaný design (WP4-7), AR / VR (WP2,3), EGNSS / GIS / BIM / digitální dvojčata (WP2, 4-6), digitální evidence a databáze materiálů (WP4,5,8), parametrický design (WP4,5), LCA (WP4,5,8), průmysl 4.0 / Zero engineering / file-to-factory a štíhlá nízkouhlíková výstavba (WP5), vícenásobná analýza přínosů (WP2,8), počítačové simulace energie a vnitřního/vnějšího prostředí (WP2, 4, 5, 6), modely šedé skříňky (WP7), predikce (WP7), digitální cloudový hub (WP7), API (WP8), observatoř Blockchain (WP9), STO (WP9), sociální média (WP10), hry

(WP10), webové platformy (WP10) atd. Používané metody a nástroje jsou podrobněji popsány v plánu prací (část 3).

Pracovní postup: Všech deset pracovních balíčků bude u ukázkových projektů fungovat ve vzájemné provázanosti za účelem vytvoření integrovaných a jednoduchých řešení na základě principů oběhového hospodářství pro CPCC. WP1 se zaměřuje na řízení a koordinaci projektů a inovací. WP2 se bude věnovat vytvoření snadno použitelného plánovacího rámce pro realizaci CPCC. Pracovní balíček WP3 bude spočívat ve spolupráci a interakci s obyvateli a bude souviset zejména s plánováním (WP2), projektováním (WP4), realizací (WP5) a inteligentním energetickým provozem (WP7) CPCC. V ARV projektu půjde o ukázku efektivního projektování budov a pracovních postupů výstavby a program tedy bude mít vyhrazené WP pro udržitelné projektování a rekonstrukce budov (WP4) a pro výrobní a stavební procesy s účinným využitím zdrojů (WP5). WP 6 se zaměřuje na integraci lokální výroby a skladování energie z obnovitelných zdrojů spolu s dobíjením elektromobilů. Jakmile komunita začne fungovat, inteligentní monitorování (WP8) propojí lidi, budovy a energetické systémy, čímž umožní inteligentní a nákladově efektivní provoz a použití se zvláštním zaměřením na



Obrázek 1.7 Ilustrace pracovního postupu v ARV.

flexibilitu a výměnu energie (WP7). Aby se dosáhlo rychlé a efektivní replikace řešení CPCC se WP9 zaměří na finanční mechanismy, obchodní modely, politiku a využití výsledků. WP10 se zaměřuje na komunikaci se zúčastněnými stranami a šíření informací spolu s vybudováním e-tržiště pro řešení ARV a vytvořením vzorového plánu pro plánování, projektování a opětovné projektování, rekonstrukci a výstavbu, provoz a využití CPCC.

Genderová analýza

Integrace aspektů rovnosti pohlaví a rozmanitosti se realizuje pomocí rámce pro **zapojení zúčastněných stran** (např. zahrnutím osvědčených postupů uplatnění inkluzivního přístupu) a pokynů pro otevřenou správu údajů (např. zahrnutím údajů rozdělených podle pohlaví, kdykoli je to možné, a identifikací genderové předpojatosti v dostupných údajích). Integrace aspektů rovnosti žen a mužů ve všech fázích projektu je proto důležitá pro dosažení optimálního výkonu i pro úspěšné uplatnění na trhu a replikaci.

Zavádění klimaticky pozitivních komunit zapojených do oběhového hospodářství (CPCC) nám významně pomůže vytvářet řešení, která mají být v budoucnosti realizována, a lépe chápat jejich dopad. Jejich úspěch závisí na schopnosti místních partnerů zapojit do projektu občany a eliminovat tak vnímání projektu jako relevantního pouze pro technické odborníky a inženýry. Proto budou do všech fází implementace zahrnuty aspekty rovnosti pohlaví a rozmanitosti, od vytváření inovací až po monitorování účinku ukázkových projektů. Zvláštní důraz bude kladen na zajištění **spravedlivého a různorodého zastoupení** ve všech participativních procesech v rámci projektu ARV.

Se zaměřením na rozvoj strategií pro uplatnění na trhu a replikaci budou do aktivit na podporu start-upů zahrnuty i aspekty rovnosti pohlaví. Meziprojektová interakce, komunikace a šíření informací budou v co největší možné míře využívat **genderově nestranný jazyk a prostředí** k podpoře gender mainstreamingu, tj. prostředí, kdy se všechna pohlaví mohou zapojit do aktivit ARV, těžit z nich a ovlivňovat je. Řešení ARV budou přizpůsobena různým geografickým a kulturním kontextům také pomocí zvyšování povědomí s důrazem na význam **inkluzivní integrované energie a udržitelného plánování**.

ARV bude věnovat pozornost **jazykové a vizuální reprezentaci** použité ve všech materiálech projektu, aby pomohla odstranit nevědomé genderové předsudky a vytvořila přitažlivou a posilující vizi inkluzivní obytné oblasti usilující o genderovou rovnováhu na akcích souvisejících s projektem a v dalších reprezentativních funkcích. V případě potřeby budou využity další odborné znalosti, např. Prostřednictvím Evropského střediska pro ženy a technologie a dalších zdrojů.

Projekt ARV bude mít ženskou koordinátorku projektu, 5 z 10 vedoucích pracovních balíčků WP jsou ženy a 50 % zaměstnanců registrovaných na portálu účastníků jsou ženy. Valná hromada a výkonná rada budou mít rovněž vyvážené zastoupení pohlaví. Kromě toho se koordinátor projektu zavazuje zajistit rovnováhu pohlaví na projektových a administrativních pozicích nabídkou specializovaných podpůrných programů (http://www.ntnu.edu/genderbalance).

1.4 Čeho chceme dosáhnout

1.4.1 Stávající úroveň rozvoje technologií a čeho chce program ARV dosáhnout nad rámec této úrovně

Tabulka 1.6 podává přehled současného stavu rozvoje a technologií v porovnání s ambicemi ARVs nad rámec tohoto stavu, se zaměřením na řešení témat výzvy a souvisejících inovací v ARV. Další popis inovací ARV je uveden v části č.3, pokud jde o pracovní plán, a v části 1.4.2, pokud jde o ukázkové projekty ARV.

Tabulka 1.6 Přehled současného stavu rozvoje a technologií a ambice programu ARV nad rámec tohoto stavu.

Téma	Stávající stupeň rozvoje technologií	Ambice ARV nad rámec současného stavu rozvoje technologií
Budovy s nulovou spotřebou energie a s pozitivní energeticko u bilancí	Byly realizovány některé budovy s nulovou čistou energií a dokonce i budovy s pozitivní energetickou bilancí. Realizovány byly také některé budovy s nulovými emisemi. Zatím však takové budovy nejsou stavěny běžně, a navíc mají vysoké investiční náklady a komplikovaný provoz a používání, což má za následek vyšší spotřebu energie a / nebo nižší kvalitu životního prostředí, než se ředpokládalo.	ARV se posouvá dál tím, že zohledňuje energii a emise během celého životního cyklu, stejně jako životní úroveň a povědomí lidí, efektivitu nákladů a architektonické kvality. Komunita CPCC v programu ARV je navržena tak, aby nedocházelo k dílčí optimalizaci a aby došlo k překlenutí mezery ve výkonu.
Téma	**Stávající stupeň rozvoje technologií**	**Ambice ARV nad rámec současného stavu rozvoje technologií**
Plánování a projektování	K dispozici je široká škála nástrojů pro predikci energetické výkonnosti a vnitřního prostředí. K modelování čtvrtí a obytných oblastí je navrženo několik nástrojů. Používání těchto nástrojů je však složité a časově náročné a neřeší všechny ukazatele výkonu CPPC integrovaně. Zároveň chybí nástroje, které by poskytly spolehlivé předpovědi emisí během životního cyklu v počáteční fázi plánování, a nástroje, které by mohly modelovat flexibilitu v průběhu životního cyklu.	ARV vyvine a předvede rámec nástrojů pro efektivní plánování a hodnocení CPCC. Bude vycházet ze stávajících nástrojů pro ZEB a PED, ale rozšíří se tak, aby se zohlednily **principy oběhového hospodářství a flexibility a lidskou perspektivu**. Budou řešeny náklady na životní cyklus a substituční vztahy mezi různými opatřeními (např. mezi investicemi do renovace budov vs. novými energetickými systémy). Bude navržen tak, aby byl integrován s digitálními nástroji, jako jsou EGNSS, GIS, BIM, a aby bylo možné lépe posoudit všechny vlastnosti dané oblasti a byl srozumitelný pro všechny zúčastněné strany včetně obyvatel.
Téma	**Stávající stupeň rozvoje technologií**	**Ambice ARV nad rámec současného stavu rozvoje technologií**
Pracovní postupy pro výstavbu / renovaci	Evropský fond staveb je jedinečný a heterogenní, ale je z velké části starý a neúčinný a vyvíjí se pomalu. V celé EU probíhají důkladné renovace, které významně snižují spotřebu energie, pouze u 0,2 % budov ročně. Mezi důvody tohoto stavu patří vysoké investiční náklady, nedostatek specializované pracovní síly, rušení a obtěžování obyvatel atd. Již bylo realizováno několik projektů rozsáhlých energetických renovací, ale většina z nich nesplňuje všechny požadavky k tomu, aby je bylo možné dále rozšířit (náklady, rušení života obyvatel, architektonická kvalita).	Program ARV vytvoří, bude prezentovat a ověřovat nové pracovní toky podle Industry **4.0** pro výrobu a konstrukci účinně využívající zdroje pro rozsáhlé energetické renovace. Aplikuje pokročilé nástroje, jako je **digitální sběr údajů, automatizace a techniky projektování budov s nulovou zátěží**. Výsledkem budou **prefabrikované prvky,** které budou zahrnovat energeticky účinné služby a nízkouhlíkové stavební materiály, které lze bezproblémově instalovat bez rušení a obtěžování obyvatel. Prvky ARV budou nákladově efektivní, omezí odpad a dopravu, a zajistí vysokou architektonickou kvalitu. Tento proces bude možné replikovat u široké škály budov v celé Evropě.
Téma	**Stávající stupeň rozvoje technologií**	**Ambice ARV nad rámec současného stavu rozvoje technologií**
Provoz a použití	Efektivní provoz a využívání budov vyžaduje technická řešení, která jsou hladce integrována a která řeší chování a potřeby obyvatel. Několik studií ukazuje, že pokud se nevezmou v úvahu přání obyvatel, vede to ke vzniku mezery skutečné výkonnosti ve srovnání s projektem. Nové digitální technologie, jako jsou inteligentní domácí systémy a nabíjení elektromobilů s využitím umělé inteligence, zároveň nabízejí příležitosti pro přizpůsobené ovládání a optimalizaci energie, nákladů a environmentální výkonnosti a zároveň poskytují pohodlí obyvatelům. Potenciál obytné oblasti s pozitivní energetickou bilancí přináší i výhody získané předpovědí zatížení/potřeby energie, vyvažováním a řízením energetické flexibility. Tyto problémy je třeba řešit multidisciplinárním a integrovaným přístupem k projektování a provozu budov a čtvrtí. Mnoho výhod a strategií pro plné rozvinutí potenciálu se ukáže teprve v praxi.	ARV se do programu začlení a bude prezentovat řešení pro **aktivní zapojení občanů** do projektování, provozu a používání CPCC. Na ukázkových projektech budou vytvářeny a zkoušeny **Živé laboratoře,** aby se zvýšilo zapojení, povědomí a vědomostí obyvatel a **překlenul se rozdíl mezi technickým a sociálním kontextem**. Nástroje, jako jsou workshopy pro spoluvytváření projektů, AR / VR, zelení ambasadoři a iniciátoři změn, koučování v oblasti energetiky a oběhového hospodářství a seriózní hry zahrnující širokou škálu zúčastněných stran. Zvláštní důraz bude kladen na mladé občany (studenty) jako budoucí občany a ambasadory CPCC. Zpětná vazba a poznatky získané z ukázkových projektů ARV budou použity k vytvoření napodobitelných přístupů. ARV vyvine a předvede **digitální řešení a infrastrukturu** založenou na datech, aby rozvinula potenciál flexibility CPCC a optimalizovala výrobu pro vlastní spotřebu, minimalizovala emise CO_2 a náklady, aniž by slevila z bezpečnosti nebo kvality života občanů. Sem patří na míru přizpůsobené ukazatele připravenosti budov pro chytrá řešení a flexibilní funkce různých typů budov v CPCC po celé Evropě. ARV také poskytne centralizovaný datový sklad zajišťující společný datový rámec CPCC.
Téma	**Stávající stupeň rozvoje technologií**	**Ambice ARV nad rámec současného stavu rozvoje technologií**
Pasivní a bioklimatický design budov	Pasivní stavební design / bioklimatický design mají v Evropě dlouhou tradici. Potenciál tohoto zajímavého přístupu však stále není plně využíván v praxi, a to navzdory skutečnosti, že moderní pasivní design má ještě vyšší potenciál díky novým poznatkům o životním prostředí, např. ohledně	ARV vytvoří a bude prezentovat nové paradigma „**integrovaného projektového řešení CPCC podle principů oběhového hospodářství**, a to **multidisciplinárním** přístupem k navrhování a přeprojektování budov s maximalizací energetické účinnosti, minimalizací emisí skleníkových plynů a nákladů během životního cyklu, optimalizací kvality života obyvatel a zajištění vysokéarchitektonické kvality. Toho bude dosaženo využitím

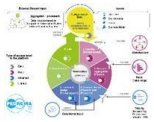
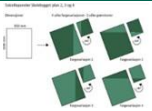
	emisí skleníkových plynů a nízkouhlíkových materiálů, jakož i využíváním moderních digitálních nástrojů. Důvodem je především časové a zdrojové omezení v raných fázích projektování a nedostatek interdisciplinárních dovedností. Již v rané fázi projektování je tedy zapotřebí efektivní a integrovaný přístup s moderními digitálními nástroji a systematickým holistickým procesem projektování.	moderních **digitálních nástrojů** (BIM, Digital Twins) ve spolupráci s mnoha zúčastněnými stranami při navrhování pro: • Integrace aktivních/pasivních řešení (solární, přirozené/hybridní větrání, akumulace tepla, efektivní distribuce vytápění / chlazení) • Industrializace, modularita a standardizace • Technologie Plug-and-play • Ukládání údajů o materiálu (digitální evidence a pasporty) • Architektonická rozmanitost (projektování v širším kontextu) • Flexibilita, dlouhá životnost a nízké náklady na údržbu • Snížení, opětovné použití a recyklace odpadu • Požární bezpečnost a zabezpečení proti zemětřesením
Téma	**Stávající stupeň rozvoje technologií**	**Ambice ARV nad rámec současného stavu rozvoje technologií**
OZE a skladová ní energie	Na trhu existuje řada obnovitelných a akumulačních systémů s různým použitím. Jejich náklady stále klesají, což spolu s rostoucí digitalizací a používáním elektromobilů vytváří příležitost k urychlení hluboké transformace našeho energetického systému a jeho struktury v následujících dvaceti letech. Hlavní inovační potenciál spočívá v účinné integraci různých energetických systémů a také v integraci s budovami a uživateli. Tím vzniká potenciál minimalizovat náklady na přechod ke klimatické neutralitě a otevírá nové příležitosti pro snižování útrat spotřebitelů energie a jejich aktivní účast na nových trzích.	*Inovace ARV spočívají v **inteligentní** **integraci* nejúčinnějších systémů OZE a akumulačních systémů pro různé typy budov, použití, podnebí a kontexty, se zaměřením na **flexibilitu a obchodovatelnost**. ARV se zaměří na nejslibnější technologie, jako jsou zemní tepelná čerpadla, budování integrované fotovoltaiky, elektrické baterie (stacionární i v EV), sezónní akumulace tepla (s využitím přírodních zásobníků) a efektivní využití dálkového vytápění. Integrace technologií bude v CPCC realizována optimalizací nákladů, emisí a kvality života cestujících. Optimalizace bude prováděna pomocí nejmodernějších metod a **digitálních nástrojů** včetně prognostiky, skyimagingu, modelů šedé skříňky a parametrického designu.
Téma	**Stávající stupeň rozvoje technologií**	**Ambice ARV nad rámec současného stavu rozvoje technologií**
Finanční nástroje a obchodní modely	Financování udržitelného rozvoje je jednou z největších výzev naší doby. Tuto výzvu lze zvládnout jedině mobilizací a přesunem značných zdrojů. Navzdory transformaci globálního finančního systému po finanční krizi však tento systém není pro tento účel vhodný. V současné době je k naplnění finančních potřeb cílů udržitelného rozvoje věnováno příliš málo kapitálových toků, a naopak financování neudržitelného rozvoje je věnováno příliš mnoho kapitálových zdrojů. Kvůli současným nízkým limitům úrokových sazeb jsou omezeny možnosti slev na zelené půjčky a energeticky účinné hypotéky (EEM), což působí demotivačně na tržní financování energetické účinnosti. Integrace flexibilních energetických řešení do portfolií nemovitostí nabízí novou cestu k překlenutí této bariéry nabídkou nástrojů k posílení návratnosti financování energetického dovybavení budov, což nabízí inovativní cestu ke škálování projektů. Digitální finance, které zahrnují širokou škálu technologií, jako jsou velká data, umělá inteligence, blockchain a internet věcí (IoT), nabízejí inovativní způsoby podpory udržitelného financování a vyhlídky na efektivnější, dostupnější a méně zranitelný finanční systém.	Cílem ARV je plně využít výhod čtvrtí s pozitivní energetickou bilancí k vytvoření nových pobídek pro občany i finanční instituce k podpoře investic do energetické účinnosti. Přínosy však nespočívají jen v snižování energie / nákladů a přímých úspor emisí CO2, ale také **umožňují komoditizovat energetickou flexibilitu a její obchodovatelnost pro** občany v roli zákazníků. V programu ARV se bude používat inteligentní flexibilní energetická řešení k urychlení škálování stávajícího tržního financování, jako jsou **energeticky účinné hypotéky (EEM)**, a také za účelem vytvoření zcela nových mechanismů financování založených na občany jako prozumenty. Důraz bude kladen na vytváření **pobídek pro dovybavení velkého rozsahu,** včetně způsobů agregace poptávky. Mezi inovace ARV patří: **Kombinace produktů a služeb** (např. Modely pronájmu) v oblasti energetiky, bezpečnosti, pohodlí a renovací. **Smluvní zajištění energetické účinnosti** na základě KPI a monitorovacím systému Building Energy Management, jakož i nové způsoby, jak překonat problém nejednotných motivací v pronajatých nemovitostech. Zahrnuje také uplatnění **konceptu „one-stop-shop** " spojeného s inovativními finančními pobídkami **motivujícími k dostatečnému zapojení a urychlení hloubkových energetických rekonstrukcí v oblastním měřítku**. Výsledky budou zachyceny ve vzorových plánech obchodních modelů jako moduly určené k replikaci v celé EU.
Téma	**Stávající stupeň rozvoje technologií**	**Ambice ARV nad rámec současného stavu rozvoje technologií**
Politiky, právní a správní předpisy	Stavební předpisy se v současné době zaměřují pouze na energetickou náročnost, ačkoli několik zemí plánuje v příštích letech zapracovat požadavky týkající se emisí skleníkových plynů. Metody, jak tyto aspekty dokumentovat a posoudit, jsou však stále ve vývoji. Evropské nařízení a směrnice o elektrické energii jsou základem ambiciózní Zelené dohody pro Evropu a Zelené obnovy (Green Recovery)[26] . Mnoho ustanovení v nařízení i směrnici o elektřině má zásadní význam při odstraňování stávajících regulačních překážek flexibility na straně poptávky a pro umožnění aktivní účasti spotřebitelů energie za účelem zvýšení účinnosti a při přechodu na čistou energii.	ARV použije přístup LCA a materiálových evidencí a úložišť k vyhodnocení a dokumentaci emisí životního cyklu ukázkových projektů. Tento přístup poskytne základ pro referenční hodnoty a cílové hodnoty pro politiky a předpisy. Cílem ARV je uvolnění překážek efektivity a flexibility na straně poptávky prostřednictvím udržitelného designu, renovace založené na datech a hierarchie nastavení digitalizace, aby zákazníci a místní komunity mohli jednat jako aktivní zákazníci, aniž by museli řešit nepřiměřené technické požadavky, administrativní požadavky, postupy a poplatky. Cílem ARV je ukázat možnosti odstranění stávající regulační překážky flexibility na straně poptávky, umožnit aktivní účast všech spotřebitelů energie na přechodu na čistou energii a zvýšit účinnost na všech úrovních.

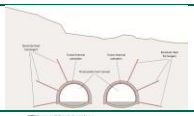
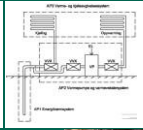
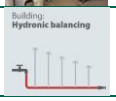
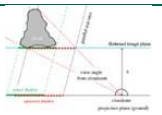
[26] SmartEn - Smart Energy Europe, listopad 2020: Realizace návrhu uspořádání trhu s elektřinou s cílem podpořit flexibilitu na straně poptávky.

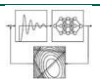
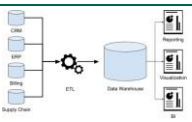
1.4.2 Inovace v programu ARV

Přehled klíčových inovací ARV je uveden v tabulce 1.7 i s krátkým popisem každé inovace, aktuální úrovně technologické připravenosti (TRL) a cílové hodnoty TRL, spolu s klíčovými zúčastněnými stranami a očekávanými dopady. Podrobnější popisy (a další inovace) jsou uvedeny v oddílech 1.4.2 a 3.

Tabulka 1.7 Přehled inovací programu ARV (podrobný popis je uveden v části 1.4.2)

	Klíčová inovace	TRL	Hlavní dopady / cíle	Ilustrace
WP2: Rámec a nástroje pro	Nástroj pro modelování a hodnocení při plánování CPCC	5/6→ 8/9	Připojte a integrace řešení do CPCC, což umožňuje zjednodušený a škálovatelný design. Propojení zúčastněných stran do procesu výstavby/renovace k usnadnění spoluvytváření CPCC. Rámec bude snadno použitelný a vysoce replikovatelný v různých ukázkových areálech.	
	Prostředí s podporou VR / AR	5→7	Posílení role občanů; Lepší chápání a pozitivnější vnímání řešení pro energetické dovybavení budov; Hladší dialog mezi obyvateli a profesionálními zúčastněnými stranami.	
WP3: Zapojení komunity, životní prostředí a kvalita života	CPCC Living Labs (Živé laboratoře CPCC) a nástroje pro zapojení občanů.	6→ 8	Zapojení komunity do sociální obnovy, transformace energie a oběhových systémů, se zapojením velvyslanců pro zelenou energii a koučinku v oblasti využití energie.	
	Jednotná platforma pro rekonstrukce v CPCC	6→ 8	Spolupráce na vytváření projektů umožňujících difúzní šíření projektové technologie a napodobitelnosti řešení; související výhody odolnosti proti požáru a seismické aktivitě při výstavbě / rekonstrukci dřevostaveb.	
	Centrum pro transformaci energetiky TE21	5/6→ 7/8	Zvýšení povědomí, zapojení a znalostí občanů v oblasti energetické náročnosti a transformace energetiky v městském prostředí.	
	Občanská energetická společenství (CEC)	5/6→ 7/8	Mechanismus hromadného financování za účelem zvýšení výroby energie z obnovitelných zdrojů fotovoltaikou v okrese a pokyny zajišťující napodobitelnost	
	Program lidského kapitálu BouwisWouw	7→8	Pracovní místa a stáže vytvořené v místním sektoru stavebnictví a renovací.	
	Renovace sociálního bydlení s uživateli nájemního bydlení	7→8	Posílení postavení občanů a zlepšení sociálního a hmotného životního prostředí	
	Koučování obyvatel ohledně využití energií ke snížení energetické chudoby	4/5→7	Posílení role občanů a jejich spokojenost, nižší spotřeba energie a nižší náklady na energii pro nájemce	 
WP4: Projektování a přeprojektování budov podle principů udržitelnosti	Sociální bydlení v energeticky pozitivních budovách s využitím místních materiálů	6/7→ 8/9	Zvýšení využití místních materiálů s nízkou svázanou energií a emisemi. Napodobitelná konstrukční řešení pro PEB ve středomořském podnebí	
	Použití recyklovaných materiálů na zelených střechách	6→7	Snížení množství svázané energie a tepelných ostrovů, lepší hospodaření s dešťovou vodou.	
	Architektonická a estetická řešení BIPV / BAPV pomocí technologie plug-and-play	6→8	Spokojenost občanů s projektováním budov; Zvýšení produkce OZE (BI / BAPV) na úrovni budovy.	
	Hloubkové dovybavení historických budov	6/7→ 8/9	Proces hlubokého dovybavení pro úspory energetiky při zachování hodnot kulturního dědictví a zlepšení pohodlí uvnitř budov. Architektonická integrace fotovoltaiky.	
	Digitální evidence pro CPCC a Material Hub	6→8	Dokumentace integrovaného projektového řešení s principy oběhového hospodářství (Integrated Circular Design) pro renovaci budov s 50% snížením energetické náročnosti a výstavbu energeticky pozitivních nových staveb, informace pomocí Industry 4.0 prostřednictvím digitálních průzkumů, zlepšení uživatelského pohodlí.	
	Retrofit HeMuBo (NZEB) s konstrukčními komponenty systému Inside-Out pro výškovou modernizaci sociálního bydlení na PEB	6→8	Zkrácení trvání dovybavení a nákladů na něj; Vyšší ambice v oblasti energetiky z přístupu NZEB HeMuBo pokud jde o ZEB a PEB z programu Inside-Out. Cílem je vytvořit koncept, který přetrvá i v budoucnosti a bude nabízet vyšší úroveň pohodlí pro nájemce.	

WP5: Předvýrobní, výrobní a stavební pracovní postupy s účinným využitím zdrojů	Vyměnitelná energetická fasáda	4/5→6	Umožňuje snadné použití fotovoltaických a fotovoltaicko-termických fasádních tepelných výměníků pro možné propojení s tepelnými čerpadly	
	Dřevěné/biologické plug-and-play moduly	6→8	Snížení emisí CO2při používání materiálů a na staveništi, delší životnost, kratší doba výstavby a snížení hluku a znečištění na staveništi.	
	Návrh systému Inside-Out pro výškovou rekonstrukci sociálního bydlení na PEB.	6→8	Zkrácení doby a nákladů na dodatečné vybavení; Úsilí dosáhnout nulové nebo pozitivní energetické bilance.	
	Předběžné rozpoznávání typologie fasád	4/5→7	Zkrácení doby a nákladů na dodatečné dovybavení; Vylepšená flexibilita pro systém dovybavení na míru; Vysoký potenciál replikace ve stávajícím stavebním fondu.	
	Technické řešení výrobního procesu pro energetickou neutralitu	4/5→7	Zkrácení doby a nákladů na dodatečné vybavení; Vylepšená flexibilita pro dovybavení systémů; Vyšší potenciál replikace u stávajícího stavebního fondu	
	Centrum oběhového hospodářství pro optimalizovanou výstavbu	4/5→7/8	Upcyklace materiálů z demolic snižuje celkové množství CO2 a vázanou energii dovybavené budovy; Snížení znečištění ovzduší a nákladů na dovybavení díky optimalizaci logistiky.	
	Jednotlivý pracovní postup optimalizovaný pro stavební práce	4/5→7/8	Snížení obtíží (prašnost, hlučnost, emise) pro obyvatele při dovybavování; Snížení znečištění ovzduší a nákladů na dovybavení díky optimalizované logistice.	
WP6: Inovativní RES + akumulace	Integrace bateriového akumulačního systému druhého využití a V2G	5→8	Opětovné použití autobaterií šetří materiály; flexibilita budov, rozložení zátěže a vyrovnání špiček, snížení nákladů.	
	Geostruktura městské energie v dálničních tunelech	6→8	Zajištění sezónní tepelné akumulace CPCC pomocí stávající (opuštěné) infrastruktury. Snižování energetické spotřeby, nákladů a emisí.	
	Systém LowEx	6/7→ 8/9	Extrémně nízkoteplotní vytápění a vysokoteplotní distribuce chlazení pomocí tepelné hmoty a optimalizované zemní tepelné čerpadlo s SCOP topením 6-7 a SCOP chlazením >30. Zvýšený tepelný komfort, vyšší architektonická kvalita, nižší spotřeba energie / elektřiny.	
	Posilovač oběhu pro teplou užitkovou vodu v dálkovém vytápění (DH)	4/5→7	Snížení teploty dálkového vytápění ze 45 na 25 °C, což má za následek vyšší využití energie pro účely konečného vytápění a lepší komfort	
	Optimalizace vratné teploty	6/7→ 8/9	Snížení teploty dálkového vytápění ze 45 na 30 °C, což způsobuje vyšší využití energie pro účely konečného vytápění a lepší komfort	
WP7: Efektivní provoz a flexibilita	CPCC Cloud HUB	6/7→ 8/9	Digitální hub pro ukládání dat a řízení energetické výkonnosti, uvolnění potenciálu flexibility na úrovni obytných čtvrtí. Bude zde také prostor pro datový sklad – Data Warehouse (viz WP8).	
	CPCC SRI	5/6→ 7/8	Ukazatele připravenosti budov pro chytrá řešení přizpůsobené pro budovy v CPCC v různých klimatických podmínkách a kontextech pro lepší hospodaření s energií	
	Funkce flexibility pro CPCC	5→7	Funkce flexibility umožňují využití potenciálu flexibility CPCC v různých klimatických podmínkách a kontextech, což snižuje potřebu energie, emise CO 2 a náklady.	
	Centralizované systémy vícegeneračních nZEB budov	5/6→ 7/8	Optimální provoz a monitorování pro zvýšení výkonu centralizovaných systémů v nZEB budovách prostřednictvím energetické flexibility.	
	Automatizované analýzy energetické náročnosti pro dovybavení PEB	4/5→7	Vylepšení vlastní spotřeba OZE v budově díky snížení úspor primární energie a zvýšení produkce OZE (BI / BAPV) na úrovni budovy	
	Zavedení řešení pro předpovědi (počasí ve městě, solární energie, zatížení)	4/5→7	Zvýšení míry vlastní spotřeby optimalizací výroby, skladování a používání OZE	

	Inteligentní optimalizace ovládání budovy	4/5→7	Zvýšení míry vlastní spotřeba; Vylepšení kvality vnitřního prostředí; Zvýšení povědomí a angažovanosti občanů prostřednictvím uživatelského rozhraní	
	Inteligentní optimalizace komunity a propojení trhu	4/5→7	Úspory primární energie výměnou energie na úrovni okresů a měst; Realizace dalších investic do udržitelné energie v důsledku výnosů z obchodování na trhu.	
WP8: Monitorování,	Vyhodnocení CPCC po začátku využívání budov	6/7→ 8/9	Ucelenější a dlouhodobější řešení zajišťující udržení kvality života obyvatel bez ohledu na energetickou výkonnost	CPCC-POE 
	CPCC Data Warehouse	6→8	Systematizovaná datová architektura a úložiště pro sledování, ověřování a šíření energie, emisí, materiálů, uživatelského pohodlí, znečištění, chování uživatelů a mikroklimatu. Přispění k překonání mezer skutečné výkonnosti ve srovnání s projektem.	
	Rámec mnohonásobných výhod	6→8	Rámec pro integrované hodnocení CPCC za účelem postupného dosažení cílů udržitelného rozvoje OSN.	
WP9: Modely financování a obchodní modely	Obchodní modely pro CPCC s možnostmi financování bankami	6/7→ 8/9	Úspěšné fungující obchodní modely pro různé struktury vlastnictví nemovitostí: sociální bydlení, pronájmy i soukromé vlastnictví. Škálovatelné a vhodné pro ziskový i neziskový sektor.	
	Škálovatelné finanční nástroje pro zelené nemovitosti	6/7→ 8/9	Inovativní řešení financování, která urychlují přechod na budovy s pozitivní energetickou bilancí a zároveň jsou cenově dostupná a účinná pro vlastníky i uživatele budov.	
	Nabídka ekologických bezpečnostních tokenů (STO)	6/7→ 8/9	Využití zelených digitálních dluhopisů k využití potenciálu STO pro flexibilní energii a dovybavení budov. Zvyšování povědomí mezi Evropským finančním institutem za účelem urychlení zájmu o financování EE.	
	Jednotné kontaktní místo pro rozsáhlou renovaci městských oblastí	6/7→ 8/9	Snížení překážek pro renovační projekty, zvýšení zapojení koncových uživatelů na dlouhodobých řešeních	

1.4.2 Ukázkové projekty ARV v oblasti CPCC

Španělský ukázkový projekt je *Llevant Innovation District* v Palma de Mallorca ve čtvrti s cca. 2500 obyvateli. Zahrnuje oblast smíšené zástavby včetně obytných, terciárních a vzdělávacích budov s novou výstavbou i renovacemi. Soubor opatření, které se budou v projektu ARV realizovat, bude zahrnovat postupy renovace s účinným využitím zdrojů a energetickou analýzu a provoz v okresech, s důrazem na sociální, vzdělávací a digitální aspekty s cílem zvýšit zapojení občanů. V oblasti budou realizovány následující hlavní aktivity:

1) Rozsáhlá modernizace v La Soledat Sud ve 250 soukromých bytech (26 800 m^2) pomocí nového typu partnerství veřejného a soukromého sektoru. Celková zastavěná plocha je 191 000 m^2;
2) IBAVI podpoří novou budovu sociálního bydlení s pozitivní energetickou bilancí: 36 bytů; 1750 m^2;
3) Nové vysoce energeticky účinné obytné budovy pro více rodin. Ukázkový projekt zahrnuje 2 budovy; 114 + 88 bytů o 14 400 m^2;
4) Reprezentativní částí projektu bude energetická renovace památkově chráněné modernistické budovy ze 70. let: 16 600 m^2;
5) Vytvoření občanského energetického společenství (CEC), což je soukromý hromadně financovaný inovativní mechanismus usnadňující zavádění obnovitelné energie s využitím dostupných veřejných a soukromých střech v této oblasti.

Klíčové údaje:

Velikost (podlahová plocha): 936 935 m^2	**Časová osa výstavby/renovace:** 2021-2025
Investiční náklady: 104 milionů EUR	**Developeři projektu:** Městská rada (Ajuntament de Palma de Mallorca) ve spolupráci s krajskou správou a univerzitou

Klíčové inovace:

WP	Inovace
WP2	Přizpůsobení, odzkoušení a použití nástroje **District Energy Simulation Tool** k analýze, návrhu a zkoumání energetických toků v oblasti. Takto bude optimalizována interakce s okolní energetickou infrastrukturou, budou definovány cesty energetické transformace v oblasti a bude posouzen dopad opatření. Následně bude tento nástroj propojen se 3D digitálními dvojčaty okresů pomocí virtuální reality připojením k Digitalizačnímu centru v oblasti.
WP3	**Centrum pro energetickou transformaci TE21** bude fungovat jako ukázkové a výstavní prostory a jako centrum pro zapojení občanů do energetické transformace měst a nových udržitelných technologií. V souvislosti s místními energetickými komunitami ve školách TE21 zrealizuje soubor vzdělávacích akcí a informačních kampaní se zvláštním důrazem na vzdělávání mladších generací. Při aktivitách se budou využívat digitální nástroje, vizualizace VR, testování prototypových řešení a dny otevřených dveří. **Adaptace a hodnocení budov po jejich uvedení do provozu k vyhodnocení spokojenosti obyvatel. Vytvoření platformy pro občanská energetická společenství – Citizen Energy Community (CEC)**: soukromý hromadně financovaný inovativní mechanismus výroby obnovitelné energie na veřejných a soukromých střechách v této oblasti. Při vytvoření platformy CEC se zaměříme na její vzdělávací aspekt a napodobitelnost.
WP4	Návrh, výstavba a monitorování 36 bytových domů pro více rodin postupně se přeměňujících na budovy s pozitivní energetickou bilancí v roce 2023 od propagátora veřejného sociálního bydlení. Silné zaměření na používání **inovativních místních materiálů a odolnost proti klimatickým změnám. Nákladově optimální řešení pro dovybavení** budov při renovacích velkého rozsahu (200-300 bytů) s cílem dosáhnout 50% snížení energetické náročnosti a významného zlepšení podmínek tepelného komfortu **Energetická rekonstrukce vlajkové lodi v podobě památkově chráněné kancelářské budovy** (Antic Edifici GESA) spolu s testováním a monitorováním několika řešení BIPV z hlediska estetiky a výroby energie.
WP5	Praktická ukázka **zkrácení doby realizace** a snížení nákladů při renovaci velkého rozsahu (200–300 bytů; několik budov) v integrovaném procesu s jedním projektovým manažerem ve srovnání s procesem, který probíhá po jednotlivých budovách. Zkoušení řešení založených na **obnově ekologicky šetrných místních řemeslných činností,** kterým hrozí zánik s použitím a zdokonalením Katalogu udržitelných místních materiálů.
WP7	**Pokročilá kontrola a monitorování** sdílených aktiv systémů vytápění, ventilace a klimatizace HVAC v obytných domech pro více rodin, Agregace dat v hierarchickém nastavení pomocí cloud, fog a edge výpočtů. **Evropské centrum pro digitalizaci** (CENTER DENMARK) bylo založeno, aby zajistilo nízkonákladový provoz v různých klimatických pásmech. **Flexibilní provoz občanského energetického společenství (CEC)** k výrobě obnovitelné energie s využitím dostupných veřejných a soukromých střech v okolí.
WP9	**Mechanismus jednorázového partnerství veřejného a soukromého sektoru** pro rozsáhlou renovaci městských oblastí poskytne nástroj usnadňující iniciativy renovace velkého rozsahu **Vznik občanského energetického společenství (CEC)** prostřednictvím **soukromého crowd-fundingového inovativního mechanismu** za účelem výroby obnovitelné energie s využitím dostupných veřejných i soukromých střech v dané oblasti. Model CEC se zaměří obzvlášť na vzdělávací aspekt a napodobitelnost -

Italský ukázkový projekt se jmenuje *Piedicastello Destra Adige* a nachází se v severoitalském městě Trento. Ukázkový projekt sestává ze čtyř oblastí:

V **Oblasti č.1**, bývalém průmyslovém areálu Italcementi, bude vybudována zcela nová víceúčelová čtvrť Trento, kde se budou nacházet obytné a terciární budovy. Cílem je rozvoj celého okresu jako soběstačné oblasti s využitím jeho výjimečného geotermálního potenciálu a jeho vynikající orientace na jihovýchod k napájení geotermálních tepelných čerpadel fotovoltaickou energií.

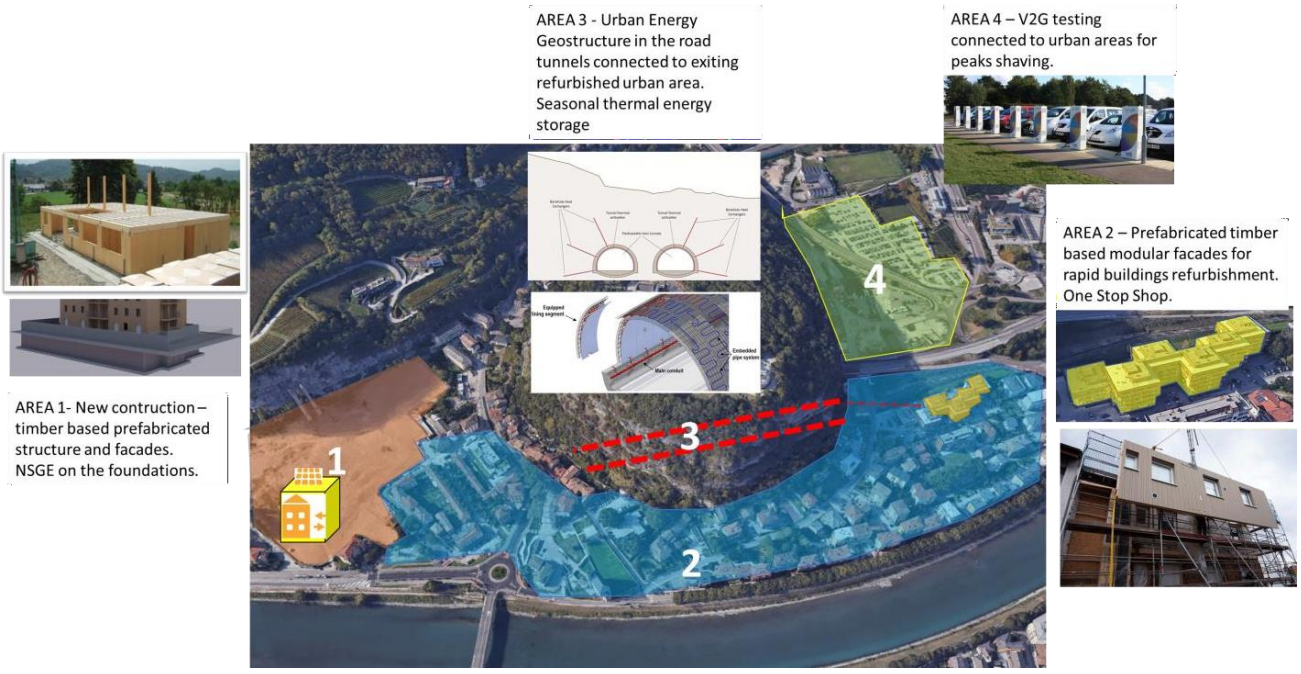
Oblast č.2 byla urbanizována v 50. – 70. letech. Většina budov je na konci nebo téměř na konci svého životního cyklu. Výstavba v oblasti se silně zaměřila na sociální bydlení a je z velké části stále ve vlastnictví Trentino Institute for Social Housing. Tyto obytné budovy mají být renovovány pomocí standardizovaných prefabrikovaných dřevěných fasádních prvků, realizací takzvaného „One-Stop-Shop“ systému, který poskytuje technickou podporu ve všech fázích projektování a realizace, přičemž soukromí vlastníci v oblasti jsou také vyzýváni, aby se zapojili do procesu přestavby, což zaručuje vysokou míru napodobitelnosti i pro ostatní oblasti Trenta.

V **Oblasti č.3** se nacházejí bývalé dálniční tunely Piedicastello zahrnující dvě 250 m díry v hoře Dos Trento, které jsou v současné době využívány jako výstavní prostory. Záměrem je využít tuto geostrukturu k dodávce a skladování energie pro novou městskou část v oblastech č.1 a 2.

Oblast č.4, která je v současné době využívána jako parkoviště, bude přestavěna na servisní centrum pro okres a město. Dojde zde k propojení dojíždějících pracovníků s komerčními službami a bude zde umístěn systém skladování energie podle přístupu V2G a současně bude podporováno pronikání elektrické mobility na trh.

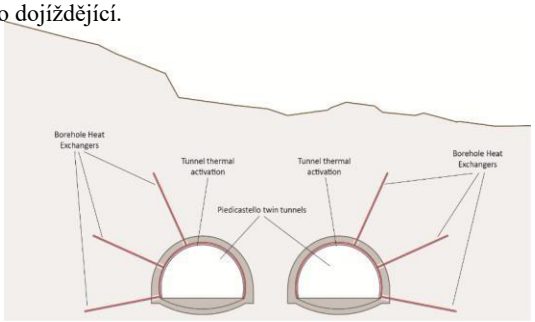
Klíčové údaje:

Rozsah: Celková zastavěná plocha v Oblasti č.2 k renovaci - 40 000 m^2, financováno v rámci ARV: 6000 m^2Nově zastavěné plochy v oblasti č.1, která má být postavena - 10 000 m^2, financováno ARV: 550 m^2	**Časová osa výstavby/renovace:** 2021-2025
Investiční náklady: Potenciální investiční náklady v oblasti č.2: 16 mil. EUR – přímé investiční náklady během projektu ARV 2,7 mil. EUR Potenciální investiční náklady v oblasti č.1: 10 mil. EUR. Přímé investiční náklady během ARV 1,1 mil. EUR Potenciální investiční náklady v oblasti č.3: 2,5 milionu EUR Přímé investiční náklady během ARV: 350 tis. €	**Developeři projektu:** Provincie Trentino, soukromí vlastníci půdy, Obec Trento, ITEA, Dolomiti Energia



Klíčové inovace:

WP	Inovace
WP3	• One-stop-shop platforma s jednotným kontaktním místem pro rekonstrukce, motivující soukromé vlastníky v dané oblasti, aby se zapojili do renovačních činností poskytnutím technické podpory ve všech fázích projektu a realizace. Spolupráce na vytváření projektů umožňujících difúzní šíření projektové technologie a napodobitelnosti řešení; související výhody odolnosti proti požáru a seismické aktivitě při výstavbě / rekonstrukci dřevostaveb. • Rozvoj lokální energetické komunity spojený s NSGE a službami dálkového vytápění, místní výrobou a sdílením OZE. • Zapojení místních zúčastněných stran do fáze společného projektování s ohledem na mnohonásobný dopad vytvářené komunity CPCC.
WP4	Jak u nové výstavby, tak u rekonstrukce urbanizačních projektů z 60. a 70. let (sociální bydlení a soukromá sféra) se předpokládá využití výhod přístupu Industry 4.0, kde integrace mezi těmito 2 sektory vytvoří nové příležitosti pro společnosti a úspory z rozsahu daných řešení. Hlavním cílem je zajistit energetickou soběstačnost rozšiřovaných městských oblastí. Navrhované inovace jsou následující: • Katalog řešení **integrovaného projektového řešení s principy oběhového hospodářství (Integrated Circular Design)** pro renovace budov s 50% snížením energetické náročnosti a výstavbu energeticky pozitivních nových staveb s důrazem na plášť budov s aktivními (BAPV / BIPV) a pasivními prvky, integrace přírodních řešení, informace na úrovni Industry 4.0 prostřednictvím digitálních průzkumů, zlepšení uživatelského pohodlí (psychologického i fyziologického). • **Scénáře nové výstavby, rekonstrukce a vyvýšení dřevostaveb** (místní a oběhový hodnotový řetězec); zjednodušená inventarizace životního cyklu; proces projektování založený na oběhovém hospodářství, snižování využití půdy vyvýšením staveb (vývoj scénářů) u nové výstavby; renovace stávajících budov; další (nové) objemy vytvořené na stávajících budovách. • **Koncepce přirozeného a mechanického větrání** u budov přizpůsobených klimatickým změnám. • Integrace tepelných čerpadel pro H&C (připojení k NSGE – tunely, základy budov, silnice); pasivní systémy vytápění integrované do obvodových plášťů budov; aktivní tepelná hmota, skladování tepla; aktivní / pasivní integrace systémů prostřednictvím automatizačních systémů Building Automation Systems.

	• Analýza stávajících modelů pro zpracování scénářů [27] za účelem informování **o hybridních řešeních založených** na energii / přírodě na površích budov a plochách ve městě; inovativní materiály (nové i vedlejší odpadní produkty). • Architektonická a estetická integrace řešení **BIPV / BAPV / PVT**: výběr materiálů; integrace mezi fotovoltaickými, solárně termálními a CMV systémy.
WP5	• Výstavba/renovace v areálu ze dřeva a přírodních materiálů (modulární – systém plug & play) během provozu budovy bude poprvé vyzkoušena v Trentu při realizaci adaptačních opatření na změnu klimatu, která zahrnují letní chlazení pomocí tepelných čerpadel a vzorek zelené střechy ochlazující tepelné ostrovy a program hospodaření s místní dešťovou vodou (deštné zahrady, zeleň). Instalace vyměnitelné fasády – integrované řešení pomocí obnovitelných zdrojů řízené BAS (flexibilní řešení umožňující snadné použití tepelných výměníků PV / PV-T / solárně termické / fasádní tepelné výměníky propojitelné s tepelnými čerpadly). Pasivní / aktivní řešení pro větší psychologické i fyziologické pohodlí. Systém uhlíkových kreditů spojený s uhlíkovou zásobou ve dřevostavbách. • Identifikace výrobních metod mimo areál pro moderní způsoby výstavby (Modern Methods of Construction) v suché technice na základě hlavního systému používaného pro výrobu panelů: Křížem lepené dřevo a/nebo rámovaná zeď • Definice standardních modulů (tvar a rozměr) s určitou flexibilitou (rozměr, materiály, vrstvy) pro snadné přizpůsobení stávajícím budovám (stavební struktura a systémy) • Identifikace postupů BIM pro návrh panelů tak, aby byly plně kompatibilní s výrobním a ovládacím softwarem, přímo spojená s vyřizováním objednávek klienta, řízením zásob atd. • Definice možných vrstev a materiálů (biologických nebo recyklovaných): vnější povrchová úprava (včetně zelených řešení, nano materiály, reflexní povrchové úpravy, FV panely), odvětrávaná fasáda, izolace, průchod systému / zařízení (uvnitř modulu nebo mezi moduly), vnitřní povrchová úprava (včetně PCM a masivních řešení) • Systémová integrace: průchod pro potrubí a elektrické rozvody (plug and play: korelace se stávajícími systémy), BAPV a BIPV, mini MV stroj poblíž oken • Upevňovací systém panelu ke stávající zdi musí být jednoduchý, rychlý, bezpečný, reverzibilní (spoje dřevo/dřevo, dřevo/ocel, ocel/ocel) s ohledem na instalaci a nastavení: zvláštní pozornost bude věnována atypickým stěnám a nestandardním prvkům (rohové, zemní a střešní spoje, balkony atd.)
WP6	• Používání **baterií druhého využití a technologií V2G** na parkovišti pro dojíždějící. • **Městská energetická geostruktura v bývalých dálničních tunelech o rozměrech dvakrát 250 m jako sezónní akumulace** pro zásobování nové městské části energií pro vytápění a chlazení. Nový prototyp energetického tunelu ve stávajícím tunelu Piedicastello, který se v současné době používá jako výstavní síň poté, co se přestal používat k přepravě. Budou realizovány následující inovace: 1) Instalace výměníků tepla s radiálními vrty v délce 30 m s korunovým obrysem. 2) Instalace potrubí u klenby korunového krytu tunelu, 3) Potrubí pro připojení k systému tepelného čerpadla umístěného na portálu. 4) Sekundární systém pro vytápění a chlazení ve výstavní hale. 5) Plán měření včetně teplotních čidel zabudovaných v zemi, v tunelu, tepelném toku atd.  • **Energetické geostruktury pro novou budovu v oblasti č.1,** díky nimž se zrealizují budovy s téměř nulovou energetickou bilancí v oblasti č.1 (bývalá oblast Ex-Italcementi), budou vytvořeny energetické geostruktury. Plánována jsou následující řešení: 1) tepelná aktivace základů instalací oběhového potrubí do základové desky, 2) tepelná aktivace opěrných zdí pomocí prvků GeothermSkin (patentová priorita č. 102016000020821).
WP7	• Zavedení řízení Energetických společenství a jeho standardizace pro procesy rekonstrukce.
WP8	• Obchodní model platformy jednotného kontaktního místa (one-stop-shop) ve spojení s italskými vnitrostátními pobídkami pro rekonstrukce motivující soukromé vlastníky v dané oblasti, aby se zapojili do renovace poskytováním technické podpory ve všech fázích projektování a realizace.

Nizozemský ukázkový projekt se skládá ze dvou klastrů obytných budov ve čtvrti *Overvecht-Noord* a ve *čtvrti Kanaleneiland-Zuid* ve městě Utrecht. Oba okresy byly postaveny v 60. a 70. letech kvůli rychlému nárůstu městského obyvatelstva a jejich výstavba je obecně nekvalitní. Oba okresy jsou živými multikulturními okresy s vysokým podílem sociálního bydlení, škol a obchodů. Obytné oblasti jsou v hustě obydlené čtvrti, která je domovem většiny nízkopříjmových domácností. Oba okresy mají trojitou energetickou infrastrukturu: síť dálkového vytápění, plynovou infrastrukturu pro domácí kotle a elektrickou síť.

[27] CUSP.UO Observatory

Zúčastněné strany v oblasti Overvecht-Noord mají ambice stát se do roku 2030 energeticky nezávislými na fosilních palivech, což podporuje vnitrostátní vláda. Dvě družstva sociálního bydlení Mitros a Bo- Ex společně se svými partnery a dalšími bytovými družstvy potřebují v nadcházejících letech renovovat přibližně 5 000 jednotek sociálního bydlení a zároveň rozšířit veřejné prostory, zlepšit kvalitu života, bezpečnost, mobilitu a kulturu v této oblasti. Podobné výzvy jsou naléhavé i v okrese Kanaleneiland Zuid v Utrechtu. Většinu domů tvoří byty ve výškových budovách ze 60. a 70. let, z nichž se přibližně 15 000 až 20 000 nachází v severozápadní Evropě s obrovským tržním potenciálem pro systematický přístup. Je velkou výzvou renovovat tyto bytové domy na budovy s téměř nulovou hodnotou nebo budovy s pozitivní energií nákladově efektivním způsobem. Mezi hlavní překážky patří nedostatek integrovaných, obecně použitelných, cenově dostupných řešení, omezené možnosti výroby energie z obnovitelných zdrojů ve výškových bytech a v jejich okolí, nedostatek prostoru v domácnostech a ve veřejném prostoru, organizace inovací a spolupráce s partnery v hodnotovém řetězci stavebnictví, doba potřebná pro renovace, nepohodlí pro obyvatele a omezená důvěra obyvatel v dlouhodobou (energetickou) výkonnost.

V rámci projektu ARV se zrealizují ukázková opatření spočívající v systematickém a energeticky účinném dovybavení: a) 6 bytových domů na budovy s téměř nulovou spotřebou energie (s ambicí zlepšit energetickou výkonnost budovy na pozitivní energetickou bilanci přizpůsobením inovací projektu ARV na míru); b) 4 bytových domů z 60. let na budovy s pozitivní energetickou bilancí v oblasti se zelení. Budovy s pozitivní energetickou bilancí jsou cílem v delším horizontu, ale v případě, že nebude možné dosáhnout tohoto cíle z důvodu vnějšího vývoje (například 100% udržitelnost sítě dálkového vytápění provozované externími organizacemi), budou budovy dovybaveny tak, aby byly technicky připraveny na tento standard. To znamená, že z dovybavené budovy se stanou budovy s pozitivní energetickou bilancí, jakmile budou externí zdroje vytápění 100% obnovitelné. V obou okresech bude zrealizována propojená inteligentní síť s (BI) PV, v bateriích a v jednotkách V2G v návaznosti na rozvodnou síť DSO, včetně 8 středně vysokých obytných budov a 2 výškových obytných budov Intervam-10.

Obrázek 1.8 První dovybavená výšková budova s pozitivní energetickou bilancí v Evropě byla dokončena v Overvecht-Noord Utrecht v roce 2020.

Klíčové údaje:

Celková velikost (podlahová plocha):	63 600 m^2	**Časová osa výstavby/renovace:**	2021-2024
Investiční náklady:	85 milionů EUR	**Developeři projektu:**	Bo-Ex & Mitros (partneři ARV)

Majitel	Okres	Typ	Čeho chceme dosáhnout	Plánování	Dodatečné dovybavení	Obydlí	M2
Bo-Ex	Kanaleneiland	Bredero-4	PEB	2022	2023	65	5500
Bo-Ex	Kanaleneiland	Bredero-4	PEB	2022	2023	65	5500
Bo-Ex	Kanaleneiland	Bredero-4	PEB	2023	2024	65	5500
Bo-Ex	Kanaleneiland	Bredero-4	PEB	2023	2024	65	5500
Bo-Ex	Kanaleneiland	Intervam-4	změna NZEB na PEB	2022	2023	48	4900
Bo-Ex	Kanaleneiland	Intervam-4	změna NZEB na PEB	2022	2022	48	4900
Bo-Ex	Kanaleneiland	Intervam-4	změna NZEB na PEB	2022	2023	48	4900
Bo-Ex	Kanaleneiland	Intervam-4	změna NZEB na PEB	2022	2024	48	4900

Mitros	Overvecht	Intervam-10	změna NZEB na PEB	2023	2024	125	11000
Mitros	Overvecht	Intervam-10	změna NZEB na PEB	2023	2024	125	11000

Klíčové inovace:

WP	Inovace
WP3	**Sociální renovace s nájemci bydlení:** před vlastní rekonstrukcí bude bytové družstvo s nájemci jednat o sociálních problémech a příležitostech nájemců, a podpoří nájemce při řešení těchto sociálních témat. Mezi klíčové inovace programu ARV patří také koučování po renovaci, které má zlepšit dlouhodobou odolnost nájemců vůči sociálním výzvám a příležitostem. Kromě toho bude také analyzován a přezkoumán uplatněný systém technických a sociálních voucherů pro flexibilitu úprav nájemních bytů. **Program lidského kapitálu Bouw=Wouw!:** klíčová inovace spojuje inovativní příklady v programu ARV se školením mladých lidí v dané oblasti, pokud jde o instalaci a údržbu chytrých řešení. Nový přístup nabízí jak sociální příležitosti pro obyvatele okresů, tak nové kapacity potřebné pro rozšíření a replikaci energetických renovací v utrechtském regionu. **Energetické koučování obyvatel ke snížení energetické chudoby**: Součástí této inovace jsou digitální i sociální inovace. Pomocí inteligentních technologií se připraví vizualizace monitorovacích dat z monitorovacích systémů instalovaných v budovách (viz také inovace WP7) prostřednictvím domácího systému pro hospodaření s energií (HEMS) nebo webových stránek s personalizovanými osobními údaji. Koučování nájemců budou realizovat místní odborníci na energetickou transformaci, aby nájemci lépe porozuměli energetické náročnosti a upravili své zvyklosti a / nebo lépe používali technologie reakce na poptávku. **Fyzický hub v oblasti:** v roce 2021 se očekává výstavba pavilonu podle oběhových principů v okrese. Tento pavilon postavený podle oběhových principů bude podporovat zapojení a rozvoj komunity prostřednictvím školení, propagace a šíření informací o programech energetické transformace a renovace v dané oblasti. Součástí tohoto dílčího úkolu ARV je využití tohoto centra jako lokality v okrese, kde budou spoluvytvářeny činnosti související se sociální obnovou, Bouw=Wouw! a energetickým koučingem.
WP4	**Návrh systému Inside-Out pro dovybavení sociálního bydlení ve středně vysokých nebo výškových budovách na budovy s pozitivní energetickou bilancí,** inovativní designové prvky integrovaných a modulárních stavebních prvků jsou: • Střešní: integrace kolektivních tepelných čerpadel, vyrovnávací nádoby, (BA/BI) FV panely, izolační systém. • Fasády: integrace rekuperace tepla pro LT vytápění a větrání, kabeláž připravenou pro DC a (BA/ BI) FV panely • Modulární panely přizpůsobitelné různým typologiím budov se budou připojovat k různým částem fasády a balkonu. • Identifikace potřebné rozmanitosti konceptu renovace, aby se výsledný architektonický vzhled mohl přizpůsobit a aplikovat v kontextu. • Standardizace a flexibilita rozhraní spojujícího výše uvedené moduly s vyšším adaptačním potenciálem v celém životním cyklu a vytvářejí méně odpadu díky síťové montáži. **Architektonické a estetické řešení BIPV/BAPV typu plug-and-play:** inovativní prvky jsou zahrnuty v integraci FV komponentů do fasádní střechy, balkonu, zábradlí a balustrádových stavebních prvků jako řešení pro připojení kabeláže FV panelů a sledovacího zařízení a optimalizace výnosu elektřiny. • Dodatečné vybavení HeMuBo NZEB: následující inovativní prvky: • Dodatečné vybavení NZEB včetně přechodu energetického systému z vytápění plynovými kotli na dálkové vytápění (nízká/střední teplota) • Univerzální systém dovybavení fasády: výstavba dřevěného rámu a inovativní řešení tepelných mostů; • Přechod z NZEB na PEB použitím modulárních komponent Inside-Out. Průzkum možné integrace modulárních fasádních řešení (Inside Out 2.0: energetické a vzduchotechnické instalace fasád sendvičovými panely) vytvořených mimo stavbu a nainstalovaných technologií plug-and-play na místě a využití dalších BIPV/BAPV *.
WP5	**Předběžné rozpoznávání typologie fasád**: mezi inovativní prvky patří předběžné rozpoznávání typologií fasád cloudovým 3D skenováním bodů (drony, Lidar atd.) a automatickou identifikaci typologie budov pomocí algoritmů umělé inteligence. **Automatizované analýzy energetické náročnosti pro dovybavení budovy s pozitivní energetickou bilancí:** Predikce množství OZE (FV, tepelné zdroje) k dosažení čisté nulové nebo kladné energetické bilance pomocí umělé inteligence. **Energeticky neutrální inženýrství procesu výstavby**: Parametrické konstrukční nástroje, kterými lze navrhnout renovační komponenty, které mohou být uplatněny v průmyslové výrobě, což šetří náklady a čas. **Hub postavený podle principů oběhového hospodářství pro optimalizovanou výstavbu:** Optimalizace stavebních, materiálových a pracovních toků všech dodavatelů a subdodavatelů integrovanými BIM a uzly pro výstavbu podle principů oběhového hospodářství. Integrace místních výrobních zařízení do center umožňujících zpracovat nové (udržitelné) a sklizené materiály zpracované na nové (integrální) stavební prvky. **Pracovní postup** výstavby optimalizovaný na plynulý tok: přístup založený na přesném plánování času a množství provozní a logistické pracovní postupy snižující plýtvání, potřebný prostor, náklady a narušení okolí na staveništi.
WP6	**Návrh a realizace OZE a řešení skladování energie pro tepelné potřeby budov/čtvrtí** : Implementace a ukázka nákladově efektivní, univerzální modulární infrastruktury pro větrání a chlazení pro výškové budovy, kompatibilní s více zdroji vytápění. **Návrh a realizace OZE a řešení skladování energie pro zásobování elektřinou v budovách/čtvrtích** : BIPV/BAPV pro maximalizaci získávání sluneční energie v kombinaci s místním a okresním systémem skladováním elektřiny s podporou sítě i EV-V2G. Přímé použití výpadku stejnosměrného proudu BIPV / BAPVI
WP7 a WP8	**Nasazení řešení pro prognostiku (počasí ve městě, sluneční záření, zatížení):** Prognostika výroby FV energie pomocí kamer s detekcí mraků a meteorologické stanice spolu s rychlou sítí senzorů, které měří ozáření a teplotu panelů BAPV / BIPV a spotřebu energie **Inteligentní optimalizace ovládání budovy**: Použití MPC regulátorů (MPC) s prediktivním řízením podle modelu k zohlednění prognóz počasí a zatížení a řadičů pro okresní systémy a systémy BEMS, BIPV a BAPV podle zpětné vazby od uživatelů z aplikací a webu. **Optimalizace inteligentních komunit a propojení trhu** : Integrace řešení pro modelování, prognostiku a řízení budov s inteligentním zásobováním energií a inteligentních komunit. Hierarchický a distribuovaný rámec řízení umožní místním komunitám a energetickým sítím optimálně využívat místní výrobu obnovitelné energie včetně algoritmů nabíjení EV/V2G. Propojení konvenčních

	trhů s agregovanou flexibilitou pro budovy a obytné oblasti. Rozhraní pro trhy pro zajišťování výkonové rovnováhy a flexibility Pokyny pro nové obchodní modely energetických komunit. Inovace spočívá v distribuovaném ovládání decentralizovaných aktiv koordinovaných agregátorem, aniž by došlo k narušení soukromí.
WP9	**Inovativní obchodní modely**: Kombinace produktů a služeb (např. Modely pronájmu) v oblasti energetiky, bezpečnosti, pohodlí a renovací (WP4, WP5). Smluvní zajištění energetické náročnosti podle KPI a monitorovacím systému energetické správy budov (WP7). Obchodní modely a FI související s optimalizovanou vlastní spotřebou a/nebo obchodováním s energií z obnovitelných zdrojů na úrovni budovy a/nebo okresu a/nebo státu (WP6 a WP7)

* Majitelé budov (Bo-Ex a Mitros) mají v úmyslu zvýšit výkon HeMuBo (používaného externími členy konsorcia ARV) z NZEB na PEB. O změnách bude rozhodnuto podle výsledků WP4/WP6 a externích faktorů, jako jsou stávající smluvní dohody mezi Bo-Ex, Mitros a jejich dodavateli (nejsou součástí konsorcia ARV) a požadované investice k dosažení vyšší energetické výkonnosti.

Český ukázkový projekt zahrnuje *zdravotní středisko Karviná Mizerov* ve městě Karviná. Jedná se o pětipodlažní budovu postavenou na konci 80. let. Je ve vlastnictví magistrátu města Karviná a částečně je pronajímána soukromým ordinacím s různými lékařskými specializacemi, tj. imunologie, stomatologie, dermatologie, radio diagnostika atd. Použitím OZE a dovybavením obvodového pláště budovy se po renovaci dosáhne standardu ZEB. Bude použita kombinace tepelných čerpadel, FV i hybridních PVT solárních panelů a zásobníků odpadního tepla a energie. Účinnost opatření zajistí vyspělý systém monitorování energie v budovách (BEMS) a monitorování IAEQ. Dobíjecí zařízení EV pro osobní i firemní automobily i vozy záchranné služby podporují pronikání elektromobility na trh v oblasti projektu.

Klíčové údaje:

Velikost (podlahová plocha): 11 130 m^2	**Časová osa výstavby/renovace:** 2022–2024
Investiční náklady: 2,06 milionu EUR	**Developer projektu:** Město Karviná

Klíčové inovace:

WP	Inovace
WP3	**Transformace energetiky** Zdravotní středisko Karviná Mizerov jako živá laboratoř pro město Karviná a další obce v České republice. LL bude efektivně vzdělávat občany, např. studenty, čímž přispěje k vytvoření obytných oblastí s účinným využitím energie a zdrojů, kde budou mít občané a zúčastněné strany lepší povědomí a míru zapojení do dění. Cílem je podpořit uživatelsky přívětivé, inovativní a udržitelné řešení budov vzděláváním a dalšími komunikačními kanály a realizovat tak projektování budov zaměřené na uživatele. Projekt podporuje vytváření dlouhodobých ekosystémů zúčastněných stran zabývajících se energetickou transformací a úlohou jednotlivých projektů jako hnací síly širších organizačních a procedurálních změn. **Akce pro zvýšení zapojení komunit** s mladými studenty (14–19 let), seznámení s metodami spoluvytváření systémů.. Ze studentů se stanou iniciátoři změn, kteří budou prosazovat udržitelnost u svých vrstevníků, rodičů a komunity.
WP4	Český ukázkový projekt zahrnuje rekonstrukci zdravotního střediska Karviná Mizerov ve městě Karviná. Zaměření ukázkového projektu v Karviné: • Dosáhnout pozitivní energetické bilance budovy díky standardu pasivního domu a výrobě obnovitelné energie. • Digitální design a 3D simulace (digitální dvojčata) pro potenciál slunečního osvitu a navržení optimálního stínění. • Pilotní projekty malého rozsahu na řešení odolná proti klimatickým změnám – použití tepelných čerpadel pro letní chlazení. • Hodnocení uhlíkové stopy životního cyklu systémů HVAC • BIPV BAPV PV-T, solárně termální, tepelná čerpadla, aktivní stínicí systémy s předpovědí počasí, inovativní řešení chlazení. BIPV zabudované do odvětrávané fasády. • Ukázka zelené střechy pro snížení tepelných ostrovů, hospodaření s dešťovou vodou (dešťové zahrady, zeleň).
WP5	V Karviné proběhne pilotní stavba přímo na místě během provozu budovy při instalaci **opatření k adaptaci na změnu klimatu,** která zahrnují letní chlazení tepelnými čerpadly a ukázku zelené střechy pro chlazení tepelných ostrovů a místní hospodaření s dešťovou vodou (dešťové zahrady, zeleň). Instalace **vyměnitelných OZE integrovaných do fasády** (flexibilní řešení se snadnou aplikací tepelných výměníků FV/PV-T/solárně termální /fasádních výměníků tepla propojitelných s tepelnými čerpadly).
WP6	**Elektřina**: V ukázkovém projektu Karviná bude zvažována realizace inovativního FV systému s kombinací BIPV a BAPV. FV systém s vysokým výkonem přispěje ke zlepšení vnitřního prostředí tím, že poskytne energii k pohonu vnějších stínících prvků odstiňujících přebytek slunečního světla do interiéru při zachování nejvyšší úrovně architektonické estetiky BIPV. Centrální skladování energie druhého využití bude adekvátně navrženo tak, aby fungovalo jako místní mikrosíť podporující různé funkce pro budování energetické flexibility, přesouvání zátěže a vyrovnání špiček. Také se počítá s dobíjecími stanicemi EV a implementací služeb V2G/V2H. Nakonec budou instalovány lokální senzory slunečního záření a teploty, také bude nainstalováno řešení skyimager pro přesné předpovědi FV a provozu celého systému.

	Teplo: Implementace inovativního systému tepelných čerpadel pro rekonstrukci budov zajišťující energii pro vytápění a chlazení. Systém bude kombinace tepelného čerpadla s PVT a využití odpadního tepla. Dále bude zvážen návrh tepelného zásobníku pro vyvážení tepelných čerpadel, poskytující potenciál pro flexibilní vytápění podle poptávky v budově a potřebnou topnou energii v zimě a chlazení v létě podle požadavků na pozitivní energetickou bilanci v okresu. Bude realizována místní meteorologická stanice s měřením vnitřní teploty pro efektivní provoz systémů HVAC.
WP7	• Systém BEMS spolupracující s prognostikou a inteligentním měřením zajistí efektivní provoz a hospodaření s OZE, skladovací systémy a přizpůsobení skutečné poptávce po energii. • Predikce PV pro modelování provozu BAPV/BIPV a akumulace baterií v budově • Prognostika lokální výroby FV energie a Sky-imaging pro velmi krátkodobou předpověď slunečního ozáření pro provoz energetického systému budovy • Prognózy profilů zatížení u elektrické energie a tepla • Prognózy výroby energie pro BIPV a BAPV • Řízení bateriových systémů • Optimální provoz propojeného úložiště baterií a elektromobilů • Propojení různých platforem BEMS pro agregaci flexibility a umožnění flexibility v dané oblasti
WP8	Monitorovací platforma IAQ: Senzory informují uživatele, přímo řídí technologii (AHU, HVAC) nebo poskytují potřebná data nadřazenému systému
WP9	Zkušenosti načerpané u zdravotního střediska Karviná Mizerov poslouží jako živá laboratoř pro Karvinou a vzor pro ostatní obce v České republice.

Dánský ukázkový projekt se jmenuje *SAB Department 22: Kløvermarken / Hvedemarken* a nachází se v centru města Sønderborg. Zahrnuje 19 bytových domů o 3 podlažích, celkem 432 bytů s podlahovou plochou 32 000 m ^{2}. Bytové domy byly postaveny v letech 1970-1973. V roce 2010 byla renovována izolace budov s novými nízkoenergetickými okny, novými radiátorovými systémy a novými rozvodnami dálkového vytápění s ovládáním přes portál Danfoss. 19 bytových domů pokrývá 9 rozvoden. V roce 2017 bylo do střech všech 19 bytových domů zabudováno přes 3 000 m ^{2} solárních FV panelů. Solární FV systém má výrobní kapacitu 460 kW solární elektřiny, což odpovídá 408 000 kWh ročně, tj. 37% celkové spotřeby elektřiny ve 432 bytech. Současně byly v oblasti kolem 19 bytových domů, na chodbách a v suterénu nainstalovány nové LED venkovní lampy.

Klíčové údaje:

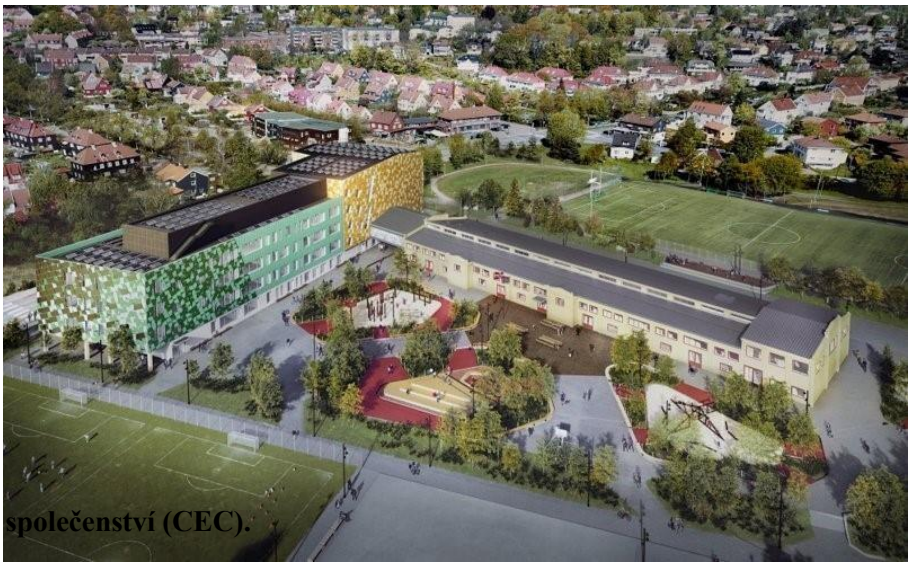
Velikost (podlahová plocha): 35 600 m^2	**Časová osa výstavby/renovace:** 2021-2022
Investiční náklady: 0,4 milionu EUR	**Developer projektu:** Sønderborg Andelsboligforening (Sonderborg Housing Association)

Klíčové inovace:

WP	Inovace
WP3	Zapojení nájemců a občanů: Výsledné úspory energie díky plánovaným inovativním energetickým technologiím významně závisí na denní energetické náročnosti nájemců v ukázkových budovách. Proto je plánována řada informačních a vzdělávacích aktivit, díky nimž se nájemci a pracovníci údržby naučí ovládat nové inteligentní řídicí systémy a naučí se obsluhovat nové energeticky úsporné spotřebiče. Z řad nájemců budou jmenováni Zelení velvyslanci (Green Ambassadors), jeden velvyslanec na každou z 19 budov, kteří budou vyškoleni, aby pomáhali svým sousedům a kolegům šetřit energii.
WP4	Inovativní design automatických systémů vytápění snižujících návratovou teplotu dálkového vytápění z radiátorů v bytech. Inovativní výstavba systémů tepelných čerpadel v místních vnitřních okruzích teplé užitkové vody za účelem snížení návratové teploty systému dálkového vytápění. Zaměření na použití materiálů s nízkou uhlíkovou náročností v budovách. Zaměření na řešení problémů vnitřního klimatu v kombinaci s novým automatickým vytápěním snižujícím návratovou teplotu. Praktická ukázka a monitorování stávajících integrovaných FV panelů na budovách v kombinaci s bateriemi.

WP6	Inteligentní bateriový systém na úrovni místních oblastí: Stávající solární FV systém v projektu DEMO si za poslední 3 roky vedl velmi dobře a v každém bloku je v plánu instalovati bateriové systémy se solárními FV panely. Na začátku roku 2021 budou do každého z 19 bloků zabudovány baterie o kapacitě 15 kWh/4 kW. Instalace 19 baterií znamená, že se v budovách může využít dalších 60 000 kWh solární elektřiny ročně navíc místo exportu této solární elektřiny do sítě. Součástí tohoto projektu bude monitorování a hodnocení integrovaného systému FV s bateriemi.
WP7	Inteligentní systém ovládání vytápění Leanheat: Díky senzorům instalovaným v bytech může umělá inteligence Leanheat zaznamenávat termodynamické chování budovy a optimálně řídit topný systém v budovách. Leanheat také snižuje potřebnou maximální spotřebu energie. Umělá inteligence se naučí, jaký je profil spotřeby teplé užitkové vody v bytech a podle toho upravuje vytápění tak, aby nabíjela a vydávala energii podle potřeby. Systém přesouvání zátěže je navržen tak, aby přesunul spotřebu energie do období, kdy je její použití nejhospodárnější. Výkonnost inteligentního řídicího systému Leanheat v SAB Department 22 bude monitorován a hlášen do projektu ARV. Snížení vratné teploty dálkového vytápění z budov: Zaměření na systém topných těles a systém teplé užitkové vody. Nižší vratné teploty dálkového vytápění vedou k vyšší účinnosti teplárny. Kromě toho bude k dispozici vyšší podíl obnovitelných zdrojů nižší kvality. Systém Danfoss Solo bude zaveden ve 2 budovách s 50 byty v SAB 22 jako ukázkový projekt. Systém Solo může řídit teplotní rozdíl na radiátoru pro optimalizaci systému. Současně zlepšuje hydronickou rovnováhu radiátoru, protože se tok řídí skutečnou poptávkou po teple. Teplá užitková voda posílená tepelným čerpadlem: Obvykle je vratná teplota dálkového vytápění příliš vysoká kvůli nezbytnosti vysoké teploty v cirkulačním systému teplé vody. Vratnou teplotu dálkového vytápění lze snížit instalací malého tepelného čerpadla (3–5 kW) do systému. Tepelné čerpadlo odebírá teplo z okruhu potrubí a tím snižuje vratnou teplotu. Ekonomická výhodnost tohoto systému spočívá v kompromisu mezi ekonomickými přínosy v důsledku snížené vratné teploty dálkového vytápění a spotřeby elektřiny u tepelného čerpadla. V závislosti na skutečných nákladech na elektřinu a hodnotě návratového bonusu dálkového vytápění lze optimalizovat (zapnout/vypnout) provoz tepelného čerpadla, což má za následek možnost přesunu paliva mezi dálkovým vytápěním a elektřinou. Výkon tohoto nového systému bude v projektu monitorován, vyhodnocován a vykazován. Inteligentní a flexibilní správa elektrické sítě / dálkového vytápění (návaznost na projekt CITIES): Teplota v síti místního dálkového vytápění je často zbytečně vysoká, což vede k vysokým tepelným ztrátám, protože provozovatel nemá spolehlivou prognostiku skutečné potřeby tepla v budovách, a proto musí distribuovat dálkové teplo s relativně vysokou teplotou, což opět vede k vysoké návratové teplotě. Pro snížení průtokové a návratové teploty v síti bude zavedena metoda inteligentní predikce místní potřeby tepla v budovách a predikce tepelných ztrát v síti. Metoda je založena na inteligentních datech z digitalizovaných měřičů tepla v bytech v kombinaci s předpovědí počasí, předpokládanou poptávkou, teplotami v kritických polohách v síti atd. Díky tomu může síť dálkového vytápění sloužit k akumulaci tepla. Dále mohou být metody použity pro provoz teplotních zón ve městě a k optimalizaci místních tepelných čerpadel a k využití tepla např. z chlazení supermarketu. Digitalizace systému je také velmi důležitá pro budoucí elektrifikaci dálkového vytápění. Flexibilní konfigurace a provoz tepelných čerpadel (návaznost na CITIES): V současnosti je kladen důraz na integraci tepelného čerpadla na uživatelské úrovni. Z výše uvedeného digitálního provozu systémů dálkového vytápění však vyplývá, že by měly být analyzovány metody integrace tepelných čerpadel na různých úrovních systému. Integrace větších tepelných čerpadel na úrovni okresů zvýší flexibilitu integrovaného systému power2heat a následně rozšíří možnosti řešení orientovaných podle poptávky. Zonální provoz systémů dálkového vytápění usnadněný digitalizací připraví půdu pro využití stávajícího systému jako součásti místního energetického družstva, kde lze využít přebytečné teplo z průmyslu a/nebo chlazení supermarketů. Místní trh s energií / flexibilitou: Regulátory na vysoké úrovni projektu ARV budou schopny předvídat dostupnou flexibilitu na agregované úrovni. Tato flexibilita se používá přímo k poskytování služeb distribuční soustavy, ale navíc tuto flexibilitu mohou nabízet na příslušných trzích i subjekty odpovědné za energetickou bilanci (BRP). V ARV budou vyvinuty specializované agregátory inteligentních domů k obchodování s energetickou flexibilitu komodit na úrovni budov nebo oblastí. Inteligentní ovládání elektřiny a osvětlení v domácnostech: V budovách a bytech bude předveden nově vyvinutý systém ovládání inteligentních domů. Inteligentní domácí systém ovládá vytápění, ventilaci, osvětlení, elektrické spotřebiče, kontrolu přístupu, alarmy atd.
WP9	Návrh inovativních modelů financování pro realizaci opatření pro dovybavení energií v sociálních bytových družstvech.

Norským ukázkový projekt je *škola a kulturní oblast Voldsløkka*. Součástí projektu je výstavba střední školy pro 810 studentů, nový kulturní sál, taneční sál a zkušebna. Součástí projektu je výstavba nových budov a **renovace stávající památkově chráněné budovy** o celkové ploše přibližně 14 000 m $^{2.}$ Oblast má vysoké environmentální ambice a stane se první školou s pozitivní energetickou bilancí v Oslu pokrývající veškerou spotřebu energie včetně zařízení / zásuvek. Celková plocha FV zařízení je 1556 m ^{2} a roční odhadovaná výroba energie je 192 MWh. Nové školské zařízení bude **integrováno do svého okolí**, čímž oblast získá nové funkce a aktivity a posílí se zelená infrastruktura oblasti. Soubor opatření projektu ARV bude zahrnovat **procesy renovace s účinným využitím zdrojů a energetickou analýzou a provozem dané oblasti**, s důrazem na **sociální, vzdělávací a digitální aspekty** ke **zlepšení zapojení občanů** a vytváření **občanských energetických společenství (CEC).**



Klíčové údaje:

Velikost (podlahová plocha):	14 000 m^2	**Časová osa výstavby/renovace**	2021-2024
Investiční náklady	88,2 milionu EUR	**Developer projektu**	OsloBygg KF

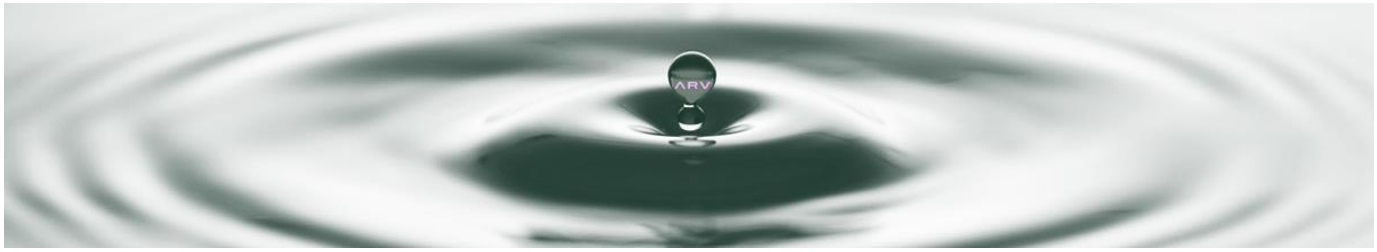
Klíčové inovace:

WP	Inovace
WP3	**Využití nástrojů a platformy AR/VR v rozhodovacím procesu**. Při renovaci a ukázkové čtvrti se použijí různé 3D a/nebo vizualizační techniky virtuální reality (VR) a/nebo rozšířené reality (AR), aby se lépe vysvětlily analýzy různých scénářů různým typům zúčastněných stran, čímž se usnadní zapojení občanů, podpoří vzdělávání a odborná příprava pro udržitelnost. Vývoj aplikací VR a AR se zaměřuje na několik zúčastněných stran (urbanisté a tvůrci politik) a různé skupiny občanů (žáci, veřejnost, obyvatelé a uživatelé infrastruktury, servisní pracovníci). **Zvyšování povědomí o klimatu prostřednictvím vzdělávání** a **zapojení místních komunit.** Využití tělovýchovných zařízení pro výuku udržitelnosti. **Sociální renovace** se zaměří na zapojení komunity před rekonstrukcí, zatímco Energetická transformace vytvoří fyzický prostor a zaměří se na nová řešení energetické transformace a cirkulace energie, testování inovativních a prototypových řešení a energetické koučování obyvatel. Bude vytvořen ukázkový prostor **pro vzdělávání občanů a dětí** se zaměřením na nové technologie, jako je skladování energie, elektrická vozidla, obnovitelné zdroje atd. V projektu se zrealizují víceúčelové shromažďovací prostory podporující využívání budov místní komunitou.
WP4	**Návrh přizpůsobený klimatickým změnám** pomocí inovativních otevřených vodních ploch. To je výchozím bodem školního projektu. Záměrem je vytvořit originální ekologický školní dvůr, kde se vegetace a hospodaření s povrchovou vodou používají k vytváření kvalitních a rozmanitých venkovních prostor. **Účinné použití nízkouhlíkového betonu** s o 40 % nižšími svázanými emisemi, než je obvyklé. **Digitální design pro optimální výkonnost během životního cyklu**. K optimalizaci výkonnosti výstavby budovy z ekologického a ekonomického hlediska bude využito BIM a digitálních dvojčat. Budovy budou komplexně vyhodnoceny, pokud jde o životní cyklus, dopad na životní prostředí, náklady a spotřebu energie, zapojení místní komunity, využití vnitřního a venkovního prostoru, vodohospodářství, hlučnost a znečištění a estetiku. **Design přizpůsobený klimatickým změnám** díky otevřeným vodním plochám Pojetí venkovní zelené plochy zajistí využití vegetace k optimalizaci hospodářství s vodou a zároveň vytvoří rozmanité a atraktivní prostředí. Plánuje se využití rostlin absorbujících znečišťující látky. **Strategie renovace podle principů oběhového hospodářství** budou vytvořeny mapováním místně dostupných stavebních materiálů a komponent ze stržených budov. Konkrétně se opět využije většina stěn a oken ze staré továrny, která budou vylepšena tak, aby vyhovovala novým normám energetické náročnosti, čímž se sníží svázané emise skleníkových plynů z používání stavebních materiálů. Jedná se o součást návrhu energetické obnovy budovy kulturního dědictví s využitím strategií renovace podle principů oběhového hospodářství. Projektování podle postupů umožňujících (opětovné) použití stavebních materiálů a komponent podle technických, funkčních a estetických omezení.
WP5	Implementace **uhlíkově neutrálního stavebního procesu.** Při výstavbě se ke snížení emisí skleníkových plynů, látek znečišťujících ovzduší a hlučnosti budou používat stavební stroje s elektrickým pohonem a pohonem na biologická paliva. Ty budou napojeny na systémy elektrického vytápění staveniště. K optimalizaci řízení staveniště z hlediska životního prostředí a maximalizaci využití elektrických vozidel budou mimo staveniště zřízeny materiálové huby, kde mohou velká vozidla vykládat zboží, které bude na místo přepravováno menšími elektrickými vozidly.
WP6	Místní výroba obnovitelné energie pomocí inovativních **BIPV a BAPV**

	Místní skladování energie: V předběžném projektu byl vyhrazen prostor pro samostatnou bateriovou místnost. ARV se bude snažit navrhnout a vystavět inovativní systém využívající recyklované baterie. **Místní výroba obnovitelné energie integrovanou fotovoltaikou budov (BIPV) a aplikovanou fotovoltaikou budov (BAPV).** Barevné FV panely budou instalovány na střechu a fasádu budov, což umožní vyšší stupeň flexibility, pokud jde o architektonický výraz a integraci. Hlavním úkolem je vyvážit optimální produkci energie s estetickými požadavky. Vyzkouší se i konstrukční řešení s úhlovými moduly. Bude vyzkoušen i montážní systém umožňující snadnou instalaci a výměnu komponent (panel-panel a panel-budova). **Místní skladování energie.** V procesu renovace je plánován prostor pro uskladnění baterií. Aby se podpořilo opětovné použití stavebních materiálů a komponent, budou použity recyklované autobaterie. Očekává se snížení emisí skleníkových plynů v celém procesu výroby baterií o 50 % a snížení dopadu na životní prostředí o 20 %, a to při nižších nákladech. **Nízkoteplotní tepelné vytápění a vysokoteplotní tepelné chlazení (LowEx) HVAC.** Nový systém vytápění/chlazení s nízkoteplotním tepelným vytápěním a vysokoteplotním tepelným chlazením pomocí stejné infrastruktury ve spojení se zemním tepelným čerpadlem. Nízká potřeba energie, řádově 3 až 10 kWh / m ^{2} rok a výrazné snížení špičky. Snížením energetické potřeby pro vytápění/chlazení lze místní výrobu energie z obnovitelných zdrojů využít k dalším funkcím budov pro koncové uživatele (osvětlení, ventilace, spotřebiče), která jsou méně závislá na sezónní potřebě, čímž se sníží roční nesoulad mezi výrobou FV energie a energetickou spotřebou budov. Systém LowEx je integrován se stávající infrastrukturou, čímž šetří náklady a svázanou energii použitého materiálu.
WP7	WP7 se zaměřuje na optimální provozní výkonnost ukázkových budov. V rámci WP7 jsou testovány modely pro prognostiku výroby energie a řízení systému LowEx.
WP8	**Povědomí o klimatických změnách a zapojení občanů:** Hodnocení intervence z hlediska více přínosů **Uhlíkově neutrální proces výstavby:** Hmotnostní toky energie a materiálů během výstavby a monitorování, Plán užívání a spotřeby energie elektrických strojů a zařízení během výstavby, Čas výstavby (monitorování na místě zařízeními a / nebo hodnocení na základě návštěv / zpráv) a prašnost a hlučnost, kvalita prostředí na staveništi (PM10, PM2,5, hladina hluku) **Klimaticky přizpůsobený design:** Kvalita vnějšího a vnitřního prostředí (teplota, relativní vlhkost, koncentrace CO2, PM10, PM2,5, hladina hluku). **Strategie renovace podle principů oběhového hospodářství:** Toky energie a materiálů během fáze výstavby a fáze monitorování. **Místní výroba obnovitelné energie a systém LowEx:** Výroba energie (monitorování na místě), např. Energie z FV, HP (geotermální – elektrická kWh absorbovaná HP a vyrobená tepelná kWh), spotřeba energie (monitorování na místě). Konečná spotřeba energie v důsledku vytápění, chlazení a užitkové teplé vody. Konečná spotřeba elektřiny u budov.
WP9	Zavedení řízení Energetických společenství a jeho standardizace pro procesy rekonstrukce.

[39] https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

2. Dopad



Klíčovým výsledkem projektu je zřízení a systematizace efektivních procesů a služeb pro jednoduchý a integrativní přístup k udržitelnějším budovám v Evropě. V části 2 demonstrujeme, jak budou činnosti a očekávaný výsledek projektu ARV přímo řešit všechny očekávané dopady výzvy – **EIC** a další relevantní dopady, které nejsou uvedeny v textu výzvy (viz Sekce 2.1.2). V oddíle 2.1.3 identifikujeme potenciální překážky, které by mohly zabránit dosažení takových dopadů, a předkládáme opatření k překonání těchto překážek. V sekci 2.2. poskytujeme návrh plánu pro strategie šíření, využívání a komunikace (viz Sekce 2.2.1, 2.2.2 a 2.2.5), jež budou realizovat očekávané dopady projektu. Zvláště zdůrazňujeme zapojení klíčových zúčastněných stran napříč hodnotovým řetězcem na místní úrovni a účast příslušných komunit na rozvoji aktivních a živých čtvrtí.

2.1 Očekávané dopady

2.1.1 Očekávané dopady výzvy

Tabulka 2.1 uvádí přehled očekávaných dopadů ARV. Níže uvedené podsekce poskytují komplexní a podrobné vysvětlení toho, jak byly vypočteny jednotlivé dopady, a to včetně základních linií, metod, výpočtů a cílových hodnot.

Tabulka 2.1 – Sladění projektu s očekávanými dopady určených v textu výzvy LC-GD-4-1-2020.

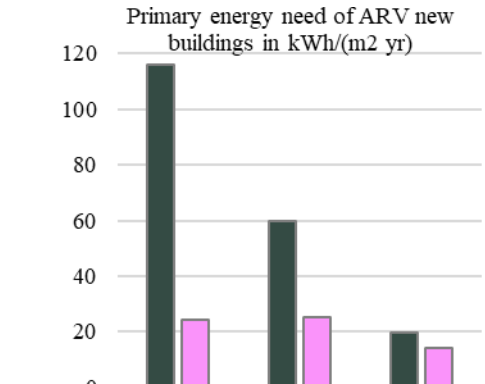
OČEKÁVANÝ DOPAD VÝZVY	SOUHRN DOPADŮ PROJEKTU ARV
EIC1 – Primární úspory energie vyvolané projektem	Celkové akumulované úspory 846 GWh za 5 let po projektu (rok 2029).
EIC2 – Investice do udržitelné energie vyvolané projektem	Kumulované investice 1080 mil. EUR 5 let po projektu (rok 20209)
EIC3 – Demonstrační místa, která jdou nad rámec téměř nulové energetické náročnosti budovy, a **EIC4** – Vysoká energetická náročnost (téměř nulová energetická úroveň ve smyslu směrnice 2010/31/EU pro zdokonalené/pozitivně laděné budovy pro nové výstavby);	Všechny demonstrace v rámci projektu ARV jsou definovány jako „vysoká energetická náročnost“, která je buď „téměř nulovou energetickou úrovní“ (renovace), nebo „pozitivní energetickou úrovní“ (nová výstavba).
EIC5 – Snížení emisí skleníkových plynů směrem k nule (v tCO2 ekv/rok) pro celý životní cyklus ve srovnání se současnou situací zobrazenou prostřednictvím LCA postupem "z kolébky do kolébky"	Celkové akumulované úspory přibližně 235 000 tCO2 ekv za 5 let po projektu (rok 2029).
EIC6 – Snížení energie v budovách o 50 % bez ústupků s ohledem na spotřebu energie a pohodlí;	Snížení o 50–55 % ve srovnání s výchozími hodnotami, viz tabulka 2.2 a související vysvětlení.
EIC7 – Snížení látek znečišťujících ovzduší k nule (v kg/rok) pro celý životní cyklus ve srovnání se současnou situací zobrazenou pomocí LCA z kolébky do kolébky	Celkové akumulované snížení znečišťujících látek o 4544500 kg za 5 let po projektu (rok 2029)
EIC8 – Demonstrace vysokého potenciálu replikovatelnosti pomocí nových nebo stávajících inovačních klastrů zahrnujících celý hodnotový řetězec	Z předpokládaných 8580 projektů ARV odhadujeme, že Inovační klastry budou přímo odpovědné za provizi 4760 projektů (55 %).
EIC9 – Zkrácení doby stavby a dodatečných úprav a nákladů nejméně o 30 %, aby bylo umožněno zavedení na trh a sociální dostupnost	Budou použity klíčové strategie, které umožní dosáhnout snížení času o 34 % a snížení nákladů o 32 %.
EIC10 – Vylepšená konečná kvalita vnitřního prostředí nejméně o 30 % a snížení prachu a hluku při dodatečných úpravách nejméně o 30 %, což vede k vyšší míře spokojenosti uživatelů, jak prokázal příslušný Standard CEN (nebo jeho ekvivalent).	Budou použity klíčové strategie, které umožní dosáhnout 30% snížení prachu a hluku během dodatečných úprav.

V následujícím textu podrobně popisujeme, jak bude projekt ARV řešit očekávané dopady výzvy (EIC). Kromě toho pro každé EIC odhadujeme globální dopady nad rámec tohoto projektu do 5 let na základě předpokladu, že koncept a výsledky ARV budou přijaty v 8580 projektech a budou pokrývat celkovou plochu 12 417 000 m^2 (srov. Tabulka 2.12 v Sekci 2.2.2.1). Odůvodnění a údaje pro tento předpoklad jsou podrobněji popsány v Sekci 2.2.2.

EIC1) Úspora primární energie vyvolaná projektem

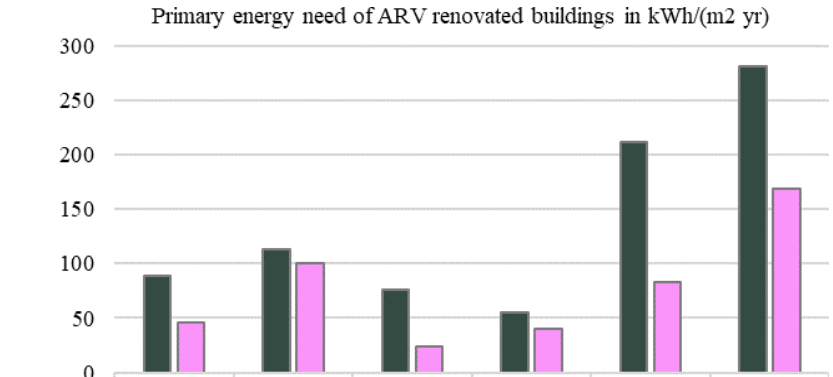
ARV dodá vysoce účinné budovy (WP4-5), které výrazně převyšují stavební předpisy příslušných zemí (v nové výstavbě) a hodnoty před rekonstrukcí (v renovovaných budovách). Obrázek 2.1 ukazuje vypočítanou potřebu primární energie nových budov v ARV ve srovnání se stavebními předpisy příslušných zemí (výchozí hodnota). Výsledky ukazují, že v průměru nově postavené demo budovy ARV využívají o 67 % méně primární energie, než je požadováno ve stavebních předpisech.

Obrázek 2.2 ukazuje vypočítanou primární potřebu energie renovovaných budov v rámci ARV. I zde lze dosáhnout významného zlepšení ve srovnání se stavem před renovací (v průměru 44 %). Poměrně malého vylepšení dánského dema v Sønderborgu, kde se nepočítá s upgradem obvodového pláště budovy, je dosaženo opatřeními účinnosti jen v energetickém systému a řízení budov. Taková opatření mají vysoký potenciál replikovatelnosti a lze je realizovat velmi rychle a nákladově efektivně.



	Oslo (NO)	Trento (IT)	Palma (SP)
Baseline	116	60	20
ARV	24	25	14

Obrázek 2.1 Potřeba primární energie u nových budov v ARV ve srovnání s referenčními hodnotami z podobných budov podle stavebních předpisů konkrétních zemí a místních faktorů primární energie.



	Oslo (NO)	Sønderborg (DK)*	Utrecht (NL)	Karviná (CZ)	Trento (IT)	Palma (SP)
Baseline	89	113	76	55	212	281
ARV	46	100	23	40	83	169

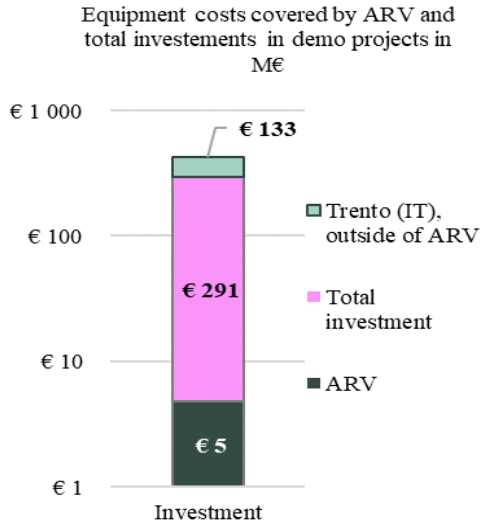
Obrázek 2.2 Potřeba primární energie renovovaných budov v ARV ve srovnání se situací před renovací podle místních faktorů primární energie. *Pouze z opatření pro zlepšení účinnosti.

Přímým důsledkem demonstračních projektů ARV je tedy vyloučení 9,2 GWh primární energie za rok. Z důvodu zvětšení dopadu ARV s ohledem na míru renovace budov, výstavby a demolice jako průměru zemí uvedených v pracích Sandberga a kol. na téma dynamického modelování budov v Evropě[28] lze zabránit celkovému využití 402 TWh primární energie do roku 2030 a 1326 TWh do roku 2050.

Projekt ARV poskytne velmi významný příspěvek k dosažení cíle EU, kterým je snížení roční spotřeby primární energie o 30 % do roku 2030. Očekává se, že 6 ukázek v projektu přispěje celkovými úsporami přibližně ***9,2 GWh/rok****. S ohledem na pronikání/přijetí trhu podrobně popsané v sekci 2.2.2 se očekává, že koncept ARV přispěje* ***celkovými akumulovanými úsporami energie 846 GWh v prvních 5 letech po projektu****.*

[28] Zjednodušená projekce za předpokladu, že se fond budov EU vyvíjí jako průměr zemí v Sandberg, Nina Holck; Sartori, Igor; Heidrich, Oliver; Dawson, Richard; Dascalaki, Elena; Dimitriou, Stella a kol. (2016): Dynamické modelování budov: Dynamic building stock modelling: Application to 11 European countries to support the energy efficiency and retrofit ambitions of the EU. V Energy and Buildings 132, s. 26–38. DOI: 10.1016/j.enbuild.2016.05.100.

EIC2) Investice do udržitelné energie vyvolané projektem (v milionech EUR)



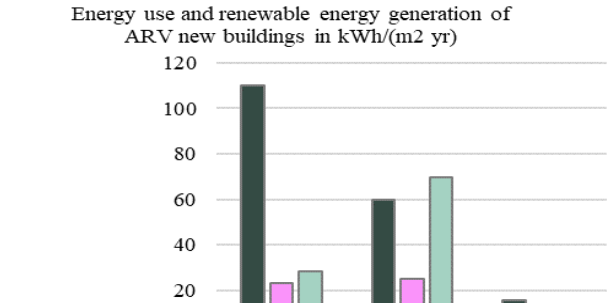
ARV významně přispěje ke zvýšení investic do udržitelné energie (s ohledem na účinnost energetického systému a novou výrobu obnovitelné energie) s investicemi 1,9 mil. EUR (NE), 0,1 mil. EUR (DK), 5,8 mil. EUR (NL), 0,2 mil. EUR (CZ), 1,2 mil. EUR (IT) a 4,6 mil. EUR (SP), celkem tedy 13,8 mil. EUR. Vzhledem k tomu, že naše ukázky pokrývají plochu 159 000 m^2, rovná se to investici 87 EUR/ m^2. Celková instalační kapacita v demo oblastech ARV bude 3,3 MW. Celkové investice do demo projektů spuštěných ARV však budou mnohem vyšší. Při investování přibližně 5 milionů EUR do nákladů na vybavení prostřednictvím ARV budou partneři investovat celkem 291 milionů EUR do ukázek ARV – včetně části ukázky Trento (IT), která není přímo součástí ARV, ale bude z ní stále těžit, bude investováno dalších 133 milionů EUR (viz obrázek 2.3).

Obrázek 2.3 Stanovené náklady na vybavení kryté ARV a celkové investice partnerů do všech demo projektů.

Prostřednictvím aktivit šíření, komunikace a využívání (během projektu i po něm) bude konsorcium ARV demonstrovat socioekonomické a environmentální přínosy používání různých udržitelných energetických technologií v obytných a nebytových budovách. Na základě různých použitých technologií, aktuální vyspělosti trhu, úrovně penetrace, kterou očekáváme u konceptu ARV, a s odhadovanou cílovou plochou asi 12 417 000 m2 do 5 let je ***očekávaný dopad ARV na investice do udržitelného rozvoje energie spuštěný projektem 1080 mil. EUR****. Koncept ARV není založen na jediném udržitelném zdroji energie, který maximalizuje potenciál investic do udržitelných energií.*

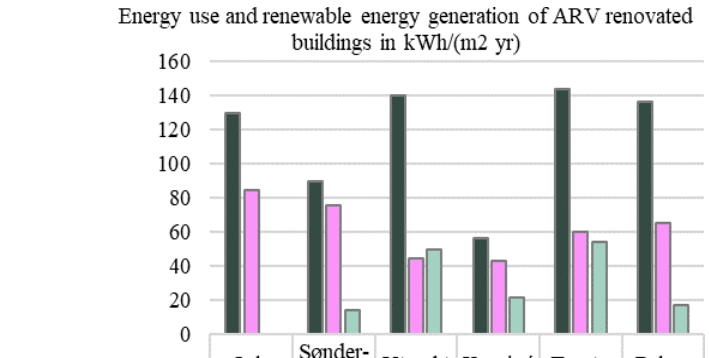
EIC3) Demo místa, která přesahují výkon budovy s téměř nulovou spotřebou energie a

EIC4) Vysoká energetická náročnost - téměř nulová energetická hladina ve smyslu směrnice 2010/31/EU pro zdokonalené a pozitivně laděné budovy pro nové stavby.



	Oslo (NO)	Trento (IT)	Palma (SP)
Baseline energy use	110	60	16
ARV energy use	23	25	8
ARV on-site generation	28	70	12

Obrázek 2.4 Vypočítaná roční spotřeba energie a výroba energie z obnovitelných zdrojů u nových budov v ARV ve srovnání se základní spotřebou energie považovanou za minimální požadavek z příslušných národních stavebních předpisů



	Oslo (NO)*	Sønder-borg (DK)**	Utrecht (NL)	Karviná (CZ)	Trento (IT)	Palma (SP)
Baseline energy use	130	90	140	57	144	137
ARV energy use	84	76	45	43	60	66
ARV on-site generation	0	14	50	22	55	17

Obrázek 2.5 Vypočítaná roční spotřeba energie a výroba obnovitelné energie renovovaných budov v ARV ve srovnání se základní spotřebou energie před obnovou. *Chráněno jako historická památka, FP nejsou možné. ** Instalací systému skladování baterií se roční vlastní spotřeba zvýší o 60 000 kWh/rok

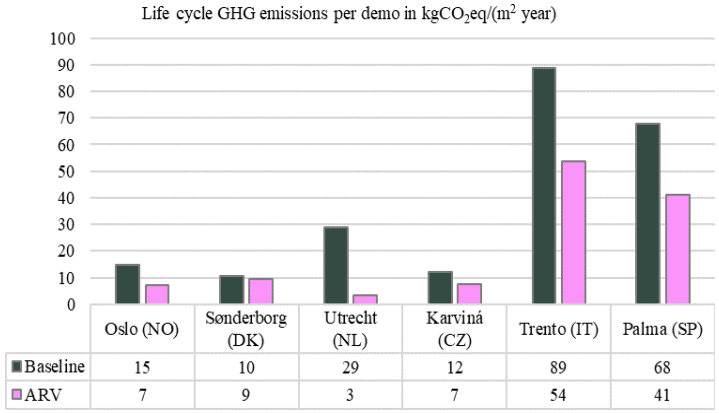
ARV předvede vysoce výkonné budovy, nově postavené i renovované. Vysoká úroveň energetické účinnosti a zavádění inteligentních systémů řízení energie, obnovitelných zdrojů energie a opatření pasivního designu umožňuje, aby se tři nové stavby v Oslu (NO), Trento (IT) a Palma (SP) staly budovami s plusovou energií (viz obrázek 2.4).

Očekává se nejen snížení minimálních požadavků stavebních předpisů na spotřebu energie (základní spotřeba energie) v průměru o 61 %, ale výroba energie z obnovitelných zdrojů na místě převýší využití získané energie v ARV v průměru o 80 % ročně, což odpovídá ročnímu přebytku výroby energie z obnovitelných zdrojů 53 kWh/m^2 nebo celkem 1,4 MWh.

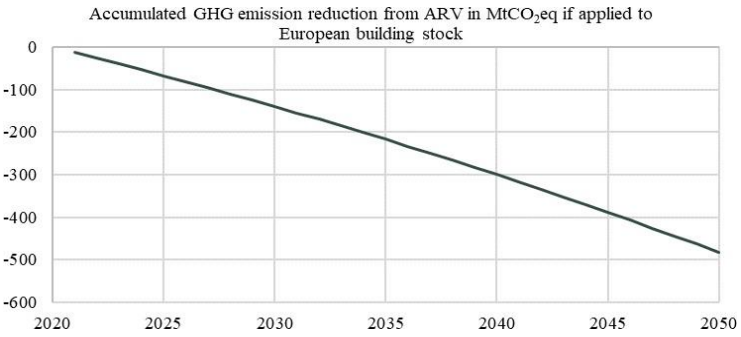
Budovy, které mají být renovovány v rámci ARV, navíc vykazují vynikající energetickou náročnost, snižují základní spotřebu energie (úroveň před renovací) v průměru o 42 % a generují 49 % získané spotřeby energie na místě z obnovitelných zdrojů energie (viz obrázek 2.5).

Zvýšení potenciálního dopadu ARV na evropskou úroveň s ohledem na renovaci, výstavbu a demolici budov jako průměr zemí uvedených v práci Sandberga a spol. o dynamickém modelování budov v Evropě[28] lze do roku 2030 ušetřit celkem 389 TWh dodané energie a do roku 2050 dalších 1281 TWh. Kromě toho by se výroba energie z obnovitelných zdrojů v celé Evropě zvýšila do roku 2030 o 177, respektive o 580 TWh do roku 2050. Jen v šesti zemích ARV dosahují úspory 130 a 433 TWh a výroba energie z obnovitelných zdrojů na místě 60 až 196 TWh do roku 2030 a 2050.

EIC5) Snížení emisí skleníkových plynů (v tCO2 ekv/rok) pro celý životní cyklus ve srovnání se současnou situací zobrazenou prostřednictvím posouzení životního cyklu z kolébky do kolébky



Obrázek 2.6 Vypočtené roční emise skleníkových plynů v životním cyklu v kgCO2 ekv/(m^2 rok) pro šest ukázek ARV. Pro základní linii jsou provozní emise skleníkových plynů pro nové budovy vypočteny z minimálních požadavků na spotřebu energie podle národních stavebních předpisů pro nové budovy a dle typických národních průměrných hodnot. U renovovaných budov byla jako výchozí hodnota použita situace před renovací.



Obrázek 2.7 Akumulované snížení emisí skleníkových plynů z ARV v MtCO2eq, s použitím míry renovace budov, výstavby a demolice jako průměru zemí uvedených v práci Sandberga a kol.

Následující data byla získána prostřednictvím předběžných analýz LCA založených na zjednodušeném přístupu, protože k vytvoření úplného životního cyklu postupem "z kolébky do kolébky" je zapotřebí komplexní soubor podrobných údajů. V projektu ARV budou provedeny podrobnější LCA, aby bylo možné plně posoudit a porovnat výkony ex-ante a ex-post (WP 4-8).

Obrázek 2.6 ukazuje projektově zprůměrované úspory v kgCO2eq/ (m2 za rok) pro novou výstavbu a rekonstrukci. V případě ARV se očekává, že celkové emise skleníkových plynů během životního cyklu ve srovnání se základními hodnotami se sníží o 48% nebo o 2979 CO2 ekv/(m^2 za rok). Snížením těchto čísel a považováním renovace, výstavby a demolice budov za průměr zemí uvedených v práci Sandberga a kol. o dynamickém modelování budov v Evropě[28] lze do roku 2030 zabránit celkovým emisím 153 MtCO2eq a do roku 2050 496 MtCO2eq (viz obrázek 2.7).

S ohledem na průměr všech energetických renovací v celé EU28, které proběhly v letech 2012 až 2016, se relativní roční snížení emisí skleníkových plynů na renovaci bytů odhaduje zhruba na 9 %, což představuje průměrně snížené emise zhruba 11 MtCO2 ekv za rok během tohoto období[29]. ARV umožní roční snížení emisí skleníkových plynů v demonstračních lokalitách o přibližně 2979 tCO2 ekv za rok, což odpovídá průměrně asi 50 % ve srovnání se základními emisemi.

S ohledem na průměr úspor normalizovaných na oblast každé demonstrace a s ohledem na progresivní implementaci konceptu ARV v rámci celkem asi 12 417 000 m2 za 5 let odhadujeme ***celkovou akumulovanou úsporu asi 235 400 tCO2 ekv za 5 let****. Jsme tedy pozitivním směrem k dosažení cílů EU v oblasti budování souvisejících emisí skleníkových plynů do roku 2050.*

[29] Comprehensive study of building energy renovation activities and the uptake of nearly zero-energy buildings in the EU. Final Report. EC. Listopad 2019

EIC6) Snížení vtělené energie v budovách o 50 % bez ústupků s ohledem na spotřebu energie a pohodlí

Tabulka 2.2 uvádí několik strategií ARV ke snížení energie (GJ/m2) a emisí (kg CO2 klimatická změna. Pro Oslo (NO), Sønderborg (DK) a Trento (IT) byly ztělesněné emise použity jako výchozí hodnota, protože dostupnost dat umožnila určit reprezentativní základní hodnotu pro vtělenou energii v těchto zemích. Výchozí hodnota použitá pro demo z Osla (NO) je v průměru 39 školních budov v Norsku[30]. Pro Sønderborg (DK) a Trento (IT) byly použity průměrné emise z 34 obytných budov v Dánsku[31] a 28 obytných budov v Itálii[32] s padesátiletou životností. Pro Českou republiku a Španělsko nebylo možné získat reprezentativní hodnoty pro energii ani emise specifické pro danou zemi, takže byly použity průměrné evropské hodnoty energie z přílohy IEA č. 57[33] pro renovace (v případě České republiky) a průměrná renovace a nová výstavba (v případě Španělska). Pro nizozemskou základní linii byla použita hodnota Koezjakov et al. 4,7 GJ/ m^2 v jejich publikaci o energii v nizozemském fondu budov[34]. Očekávané snížení těchto výchozích hodnot je mezi 50 a 55 % v ukázkách ARV.

Skutečnost, že je tak obtížné získat spolehlivé a reprezentativní údaje o energii a emisích přítomných ve stávajících nebo dokonce nových budovách zdůrazňuje mimořádný význam společnosti ARV při přispívání k lepšímu porozumění fondu budov v Evropě. V průběhu projektu bude ARV zkoumat metody a hlásit spolehlivá data o této energii a emisích.

Tabulka 2.2 Očekávaný dopad ARV na snížení vtělené energie (*) a/nebo ztělesněných emisí (**).

Demonstrace	Základní linie	Snížení	Příklady strategií vyvolávajících snížení vtělené energie
Oslo (NO)**	4.5	50 %	Aplikace nízkouhlíkového betonu s o 40 % nižšími emisemi než standard. Uhlíkově neutrální stavební postup. Fasádní konstrukce na bázi dřeva. Opětovné použití stavebních dílů a recyklovaných materiálů
Sønderborg (DK)**	7.2	50 %	Renovace stávající budovy – opětovné použití stavebních dílů a snížení odpadu
Utrecht (NL)*	4.7	50 %	Omezte plýtvání díky strategii návrhu Just Enough & JiT Plug and Play: demontovatelné díly. Kruhový rozbočovač pro sběr materiálů z demoličního odpadu a zpracování pro opětovné použití v (integrálních) stavebních dílech
Karviná (CZ)*	4.4	50 %	Komponenty navržené pro snadnou montáž, demontáž a recyklaci. Prefabrikované prvky na bázi dřeva.
Trento (IT)**	4.6	50 %	Prefabrikované prvky na bázi dřeva. Opětovné použití městské geostruktury. Renovace s opětovným použitím stavebních dílů.
P. de Mallorca (SP)*	5.3	55 %	Integrovaný proces návrhu a katalog řešení pro rekonstrukce budov s 50% úsporou energie. Místní biologické materiály. Renovace s opětovným použitím stavebních dílů.

Projekt ARV významně přispěje k cíli EU snížit vtělenou energii v budovách o 50-55 % bez ústupků, pokud jde o spotřebu energie a pohodlí.

[30] Wiik MK, Selvig E, Fuglseth M a kol. Klimagasskrav til materialbruk i bygninger: ZEN Report No. 24, 2020

[31] Zimmermann, R. K., Andersen, C. M. E., Kanafani, K., & Birgisdottir, H. (2020). Klimapåvirkning fra 60 bygninger: Muligheder for udformning af referenceværdier til LCA for bygninger. Polyteknisk Boghandel og Forlag. Forskning i det byggede miljø, SBi Bind 2020:04 https://sbi.dk/Pages/Klimapaavirkning-fra-60- bygninger.aspx

[32] Freja Nygaard Rasmussen, Sara Ganassali, Regitze Kjær Zimmermann, Monica Lavagna, Andrea Campioli & Harpa Birgisdóttir (2019) LCA benchmarks for residential buildings in Northern Italy and Denmark – learnings from comparing two different contexts, Building Research & Information, 47:7, 833-849, DOI: 10.1080/09613218.2019.1613883

[33] Birgisdóttir, H.; Houlihan-Wiberg, A.; Malmqvist, T.; Moncaster, A.; Rasmussen, F. N. (2016): Evaluation of Embodied Energy and CO2eq for Building Construction (Annex 57). Dostupné na: http://www.iea-ebc.org/Data/publications/EBC_Annex_57_ST4_Case_Studies_Recommendations.pdf

[34] Koezjakov, A.; Urge-Vorsatz, D.; Crijns-Graus, W.; van den Broek, M. (2018): The relationship between operational energy demand and embodied energy in Dutch residential buildings. V Energy Build. 165, s. 233–245. DOI: 10.1016/j.enbuild.2018.01.036.

EIC7) Snížení látek znečišťujících ovzduší na nulu (v kg/rok) pro celý životní cyklus ve srovnání se současnou situací zobrazenou prostřednictvím posouzení životního cyklu z kolébky do kolébky

Údaje uvedené v tabulce 2.3 byly získány od Eurostatu ze zdrojového sektoru „Rezidenční: stacionární“[35], pokud není uvedeno jinak. Stejně jako v EIC6 je nalezení spolehlivých a reprezentativních údajů o všech znečišťujících látkách ve všech demonstracích náročným úkolem a bude prováděno během projektu.

Tabulka 2.3 Očekávaný dopad ARV na snížení látek znečišťujících ovzduší pro celý životní cyklus. * Výchozí hodnota hlášená partnery.

	PM2.5					
	NO	DK	NL	CZ	IT	SP
Základní látky znečišťující ovzduší (v kg/rok)	12.2	811.6	66.9	15.8	201.9	1258.2
Odhadované látky znečišťující ovzduší (v kg/rok)	6.1	730.5	13.4	11.1	121.1	622.8
Snížení látek znečišťujících ovzduší (v kg/rok)	6.1	81.2	53.5	4.8	80.8	635.4
Šetření znečišťujících látek normalizovaných na ukázkovou plochu (kg/m²)	0.001	0.002	0.001	0.0004	0.0154	0.011
Úsporný potenciál za 5 let	11 500	60 175	35 925	11 272	387 758	284 717
Celkové akumulované úspory za 5 let (kg)	**791 183**					
	PM10					
	NO	DK	NL	CZ	IT	SP
Základní látky znečišťující ovzduší (v kg/rok)	14.0	826.5	69.9	20.6	204.5	452.4
Odhadované látky znečišťující ovzduší (v kg/rok)	7.0	743.8	14.0	14.4	122.7	223.9
Snížení látek znečišťujících ovzduší (v kg/rok)	7.0	82.6	55.9	6.2	81.8	228.5
Šetření znečišťujících látek normalizovaných na ukázkovou plochu (kg/m²)	0.001	0.002	0.001	0.0006	0.015	0.004
Úsporný potenciál za 5 let	13 197	61 277	37 574	14 653	392 557	102 370
Celkové akumulované úspory za 5 let (kg)	**621 705**					
	NOx					
	NO	DK	NL	CZ	IT	SP
Základní látky znečišťující ovzduší (v kg/rok)	25.8	777.5*	275.4	903.7	510.2	1556.2*
Odhadované látky znečišťující ovzduší (v kg/rok)	12.9	701.4	55.1	632.6	306.1	770.3
Snížení látek znečišťujících ovzduší (v kg/rok)	12.9	76.1	220.3	271.1	204.1	785.9
Šetření znečišťujících látek normalizovaných na ukázkovou plochu (kg/m²)	0.001	0.002	0.006	0.024	0.037	0.013
Úsporný potenciál za 5 let	24 321	56 409	147 969	642 953	979 474	352 156
Celkové akumulované úspory za 5 let (kg)	**2 203 233**					
	Sox					
	NO	DK	NL	CZ	IT	SP
Základní látky znečišťující ovzduší (v kg/rok)	12.1	67.2*	14.8	390.7	63.9	1888.8*
Odhadované látky znečišťující ovzduší (v kg/rok)	6.1	60.5	3.0	273.5	38.4	934.9
Snížení látek znečišťujících ovzduší (v kg/rok)	6.1	6.7	11.9	117.2	25.5	953.9
Šetření znečišťujících látek normalizovaných na ukázkovou plochu (kg/m²)	0.001	0.0002	0.0003	0.011	0.005	0.016
Úsporný potenciál za 5 let	11 406	4 980	277 940	267158.5	122 374	427 435
Celkové akumulované úspory za 5 let (kg)	**851 950**					
	CO					
	NO	DK	NL	CZ	IT	SP
Základní látky znečišťující ovzduší (v kg/rok)	0.5	14.8	52.8	27.2	9.1	43.5
Odhadované látky znečišťující ovzduší (v kg/rok)	0.3	13.3	10.6	19.0	5.5	21.5
Snížení látek znečišťujících ovzduší (v kg/rok)	0.3	1.5	42.2	8.2	3.6	22.0
Šetření znečišťujících látek normalizovaných na ukázkovou plochu (kg/m²)	2.1E-05	4.2E-05	0.001	0.0007	0.001	3.7E-04
Úsporný potenciál za 5 let	471	1096	28 360	19 348	17 276	9 840
Celkové akumulované úspory za 5 let (kg)	**76 412**					
CELKEM NAKUMULOVANÉ ÚSPORY za 5 let po projektu (kg)				**4 544 483**		

*S přihlédnutím k průměru úspor normalizovaných na plochu každé distribuce a s ohledem na implementaci konceptu ARV v celkové výši 12 417 000 m² za 5 let se očekává, že koncept ARV přispěje **celkovými akumulovanými úsporami znečišťujících látek ve výši 4 544 483 kg** do 5 let po projektu. Očekává se, že 6 demonstrací v projektu přispěje celkovou úsporou ve výši **4093 kg/rok**.*

[35] https://ec.europa.eu/eurostat/databrowser/view/ENV_AIR_EMIS__custom_355943/default/table?lang=en

EIC8) Demonstrace vysokého potenciálu replikovatelnosti pomocí nových nebo stávajících inovačních klastrů zahrnující celý hodnotový řetězec

Přestože se aktivity a demonstrace v rámci tohoto projektu zaměřují na konkrétní budovy a lokality, jsou reprezentativní pro podnebí, regiony a architektonické styly, jež se nacházejí v celé Evropě. ARV předvede jednoduché a integrační strategie, které lze použít s minimálním omezením i v jiných regionech. Zajištění skutečné replikovatelnosti vyžaduje závazek zavedených **inovačních klastrů jako součást strategie využívání** (viz oddíl 2.2.2), kde budou znalosti a strategie soustředěny a šířeny v rámci místního hodnotového řetězce a budou hrát významnou roli při využívání a šíření a v oblasti komunikaci. Konkrétně bude každé demo místo spolupracovat s odpovídajícími obcemi, bytovými asociacemi a vědeckými a technologickými partnery, což vytvoří bod konvergence pro snadnější výměnu nejen mezi místními partnery, ale také mezi partnery na vyšší evropské úrovni, např. na úrovni společností distribuujících technologie, které umožní křížové vazby mezi Inovačními klastry. Usnadní sdílení řešení, například pro distribuci prefabrikátů nebo šíření nových inovativních řešení pro správu energií.

Zavedením vysoce replikovatelných a jednoduchých/integrujících přístupů, s přímými vazbami na místní inovační klastry a agregovanými s oblastí elektronického trhu zajistíme, že budou zachovány znalosti a zkušenosti a dále bude posílena síť a zdroje mezi příslušnými zúčastněnými stranami. Toto je klíčový krok k zajištění toho, aby nové projekty vznikaly mimo časový rámec tohoto projektu. Předpokládáme, že v prvním roce komercializace bude 100 % projektů zadáno přímo Inovačním klastrům (469 projektů), toto procento se bude postupně snižovat v průběhu let, kdy se elektronický trh zvýší. ***Celkově z předpokládaných 8580 projektů ARV odhadujeme, že 4760 bude uvedeno do provozu prostřednictvím inovačních klastrů****. Podrobný přehled projektů zadaných prostřednictvím Inovačních klastrů je dále podrobně popsán v části 2.2.2.*

EIC9) Zkrácení doby výstavby / zdokonalování a nákladů o nejméně 30 %, aby se umožnilo zavádění na trh a sociální dostupnost

Majitelé budov zdůraznili dobu výstavby a náklady jako důležité rozhodovací faktory při zvažování výstavby nebo zdokonalování budov. Konzultace se zúčastněnými stranami ohledně iniciativy vlny renovace ukázala, že **92 %** respondentů uvádí **nedostatek nebo omezené zdroje** na financování rekonstrukcí budov jako překážku pro renovace budov, jakož i **složité a zdlouhavé** procesy a kapacitu dodavatelů. Očekává se proto, že zkrácení času a nákladů na strategie udržitelné výstavby by mělo obrovský dopad na posílení rychlosti a hloubky renovace budov, čímž by se zvýšila poptávka, z níž by měly prospěch všechny relevantní zúčastněné strany včetně stavebníků, nájemců a vlastníků budov.

Snížení nákladů ARV je výsledkem několika opatření souvisejících s různými ukázkami ARV: NE: implementace strategie kruhové renovace, optimalizace staveniště (kruhový rozbočovač a rozbočovač materiálu), používání elektrických stavebních strojů; DK: snížení nákladů na návrh, výrobu a konstrukci zařízení na podporu oběhu. NL: včasné zapojení nájemníků na začátku renovace (sociální renovace) a použití prefabrikovaných a modulárních stavebních prvků *Inside-Out*; CZ: používání digitálních stavebních řešení během hodnotového řetězce stavby, prefabrikace mimo staveniště, využití včasného konceptu, maximalizace využití kvalifikovaných pracovních sil, které dokážou provádět více úkolů, a minimalizace přepracování stavby; IT: prefabrikace standardizovaná mimo staveniště, přesnější průzkumné techniky, jež snižují chyby a informují o prefabrikátech mimo staveniště a zkracují dobu stavby na místě; SP: prefabrikace mimo staveniště a integrovaný design od začátku projektu.

Zkrácení času ARV je výsledkem: NE: včasného zapojení a lepší komunikace plánování (využití prostředí AR/VR) s místní komunitou v procesu plánování, implementace integrované kruhové strategie návrhu v rané fázi návrhu s využitím dříve vyrobených modulárních řešení a optimalizace správy staveniště; DK: efektivnější instalace automatických zařízení a efektivnější využívání simulace/softwaru; NL: použití nulového inženýrství a prefabrikovaných a modulárních stavebních prvků *Inside-Out*; CZ: používání digitálních stavebních řešení během hodnotového řetězce stavby, úzká spolupráce ve fázi návrhu projektu a zapojení všech zúčastněných stran zapojených do procesů, vzdělávání pracovních sil, které mohou provádět více úkolů, a minimalizace stavební úpravy; IT: použití konstrukce pro štíhlou výrobu; SP: implementace partnerství veřejného a soukromého sektoru mezi městskou radou a hlavní společností za účelem úplného řízení procesu a současně implementace participativní strategie, která do projektu zapojuje koncové uživatele (tj. obyvatele okresu).

[37] https://ec.europa.eu/environment/topics/circular-economy/levels_en

Současná odhadovaná doba stavby se pohybuje v rozmezí 12–72 měsíců v závislosti na rozsahu stavby/renovace a náročnosti projektu. Průměrná snížení času i nákladů pro všech šest demonstračních míst v ARV jsou uvedena v tabulce 2.5. Čísla jsou získána porovnáním odhadů času a nákladů pro procesy a řešení ARV s průměrnými dobami výstavby/zdokonalení a náklady pro tradiční stavební postupy a řešení dosahující stejné energetické náročnosti. Další snížení se očekává, až budou postupy a řešení implementovány i v jiných projektech po ARV, a to kvůli větším zkušenostem a objemům. U některých ukázek jsou tato snížení uvedena v tabulce.

Tabulka 2.5 Očekávané dopady ARV na zkrácení doby a nákladů na výstavbu/zdokonalení. Tabulka ukazuje očekávané snížení v období projektu ARV a po dokončení projektu ARV (v závorkách), kde to bylo odhadnuto, tj. když byla řešení zvýšena a plně integrována na trhu.

Demonstrace	Snížení času	Snížení nákladů
Oslo (NO)	33 %	30 %
Sønderborg (DK)	38 %	35 % (up to 40 %)
Utrecht (NL)	40 %	35 %
Karviná (CZ)	33 % (38 %)	31 % (34 %)
Trento (IT)	35 % (up to 50 %)	30 % (35-40 %)
Palma (SP)	25 %* (35-38 %)	32 % (40 %)
PRŮMĚRNÉ SNÍŽENÍ ČASU A NÁKLADŮ (%)	**34 & 32**	

Základem konceptu ARV je nákladově efektivní a časově efektivní výstavba a renovace, které povedou k sociální dostupnosti a přijetí na trhu. V průměru se očekává, že přijetí konceptu ARV ***sníží čas a náklady o 34 % a 32 %*** *(v průměru v rámci projektu ARV).* *U dema ve Španělsku je doba renovace zkrácená o 35 % a doba nové výstavby zkrácená o 15 % (tj. v průměru o 25 %). Nové zkrácení doby výroby o 15 % se zvýší na 30 %, když jsou inovativní řešení standardizována na trhu.

EIC10) Vylepšená konečná kvalita vnitřního prostředí nejméně o 30 % a snížení prašnosti a hluku při dodatečných úpravách alespoň o 30 %, což vede k vyšší spokojenosti uživatelů, jak je prokázáno podle příslušné normy CEN (nebo ekvivalentu).

Kvalita vnitřního prostředí (IEQ) je základní součástí procesu výstavby a renovace a vede ke zdravému a příjemnému prostředí. Pro vybudování dobrého IEQ jsou velmi důležité návrhy budov, které pojmou vhodné ventilační systémy s materiály šetrnými k životnímu prostředí a které zohledňují znečištění ovzduší (viz EIC 7). Šest předváděcích míst použilo různé strategie k **dosažení alespoň 30 % snížení prachu a hluku při dodatečných úpravách, což vedlo ke zlepšení IEQ alespoň o 30 %**. Mezi takové strategie patří chytře navržená připojení, která pomohou snížit hladinu hluku a prachu na kratší dobu, optimalizovaný vzduchotechnický systém, průmyslové komponenty montované na vnější fasádu, aby se zabránilo vnitřním stavebním činnostem, a architektonicky integrované hlukově redukční fasádní prvky pro přirozené větrání. Nové budovy dosáhnou alespoň IEQI, renovované budovy alespoň IEQII podle ISO 17772-1: 2017. Hodnocení demo a obsazenosti bude provedeno ve všech ukázkách renovace ARV, aby bylo zajištěno alespoň **30 % zlepšení v IEQ**, kde bylo IEQ před obsazením hodnoceno jako IEQII nebo hůře.

2.1.2 Další očekávané dopady nad rámec 10 EIC uvedených ve výzvě

Tabulka 2.6. Souhrn klíčových dopadů ARV, které přesahují 10 EIC uvedených v textu výzvy.

Kategorie dopadu	Jak ARV přispěje k dosažení dopadů	Cíle	KPI
1) Cirkulární ekonomika a odolnost	Maximalizace opětovného použití budov pomocí štíhlé renovace pomocí analýz životního cyklu (WP5, 8), minimalizace odpadu a znečištění prefabrikací a industrializací (WP5), návrh pro dlouhodobou, snadnou opravu, opětovné použití a recyklaci stavebních dílů (WP4, 5). Použití místních biologických materiálů (WP4, 5). Design pro flexibilitu využití budovy (WP4) a flexibilní a zabezpečené energetické systémy a úložiště (WP6,7).	50% snížení emisí skleníkových plynů v životním cyklu ve srovnání se stavem ex-ante nebo současnou praxí. Použijte všechny příslušné úrovně[37] *CEI.*	kg CO2-ekv/m2 po dobu životnosti 60-100 let. Počet použitých CEI úrovní.
2) Sociálně-environmentální vlastnosti	Design pro pohodu a dobré vlastnosti vnitřního prostředí včetně dobrých denních a vizuálních vlastností, kvality vzduchu v místnosti, tepelného komfortu, akustiky a přístupnosti pro osoby se zdravotním postižením a seniory (WP4-5). Zahrnuto v analýze výhod (WP3 a WP8)	Zlepšení alespoň o 30 % ve srovnání se stavem ex-ante	% uživatelů, kteří se pohybují po stupnici spokojenosti

[37] https://ec.europa.eu/environment/topics/circular-economy/levels_en

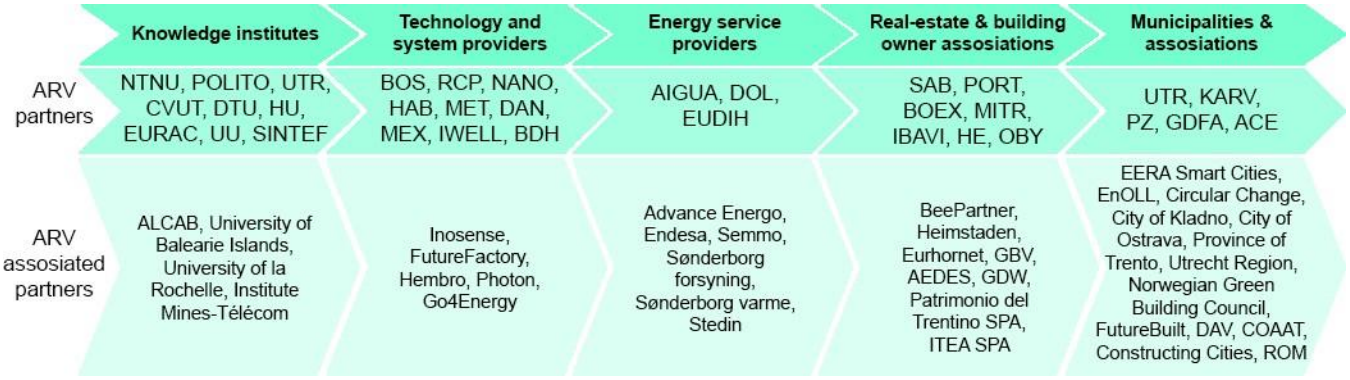
	Design pro pohodlné venkovní podmínky, tj. sluneční a denní světlo, vizuální vlastnosti a stínění před větrem a hlukem (WP4-5).	Nejméně 30% zlepšení oproti stavu ex-ante	% uživatelů, kteří se pohybují po stupnici spokojenosti.
	Minimalizujte rušení cestujících během renovace prefabrikací mimo staveniště a minimalizujte čas strávený na místě (WP5).	30% zkrácení doby stavby. Přerušení téměř nulové	Čas stavby a zásah
	Zvyšování povědomí, zapojení a vzdělávání zajištěním živých laboratoří se spoluvytvářením (WP3), vytváření občanských energetických společenství (WP2)	Nejméně 12 aktivit ročně zahrnujících 1000 lidí.	Počet a rozsah činností za rok
3) Elegance	Navrhujte vysokou energetickou účinnost a využívejte služby a ovládací prvky inteligentní domácnosti, komponenty inteligentní budovy a chytré, ale jednoduché systémy pro interakci/zapojení uživatelů (WP4-7).	Průměrné skóre dopadu více než 70 %.	Chytrý indikátor připravenosti (SRI)
4) Energetická flexibilita a zabezpečení dodávek	Navrhujte vysokou energetickou účinnost a využívejte služeb a ovládání inteligentní domácnosti, inteligentních stavebních komponent a chytrých, ale jednoduchých systémů pro interakci/zapojení uživatelů. Výměna dat mezi budovami, energetickými systémy a lidmi prostřednictvím komunitního digitálního centra. Automatizované algoritmy pro počasí a predikce výkonu. (WP4-7)	Zlepšení alespoň o 30 % ve srovnání s výkonem ex-ante	Denní čistý profil zatížení v kW; faktor využití v %, podíl vlastní spotřeby / vlastní výroby v %.
5) Dostupnost a zmírnění energetické chudoby	ARV předvede škálovatelná řešení pro obnovu sociálního bydlení a veřejných budov, která významně sníží náklady na výstavbu a provoz a zároveň zajistí dobré vnitřní klima a architektonické vlastnosti (WP 2–9).	30% snížení stavebních nákladů a nejméně 50% snížení účtů za energii.	Snížení v eurech ve srovnání se současnými standardy.
6) Vytváření pracovních míst, inovační kapacita a konkurencescho pnost průmyslu	Všechny zúčastněné strany: posilte nebo navažte novou spolupráci v hodnotovém řetězci CPCC, PPP, lepší porozumění potřebám zákazníků (všechny WP). Lepší zdraví a blahobyt občanů (WP2-8), tvorba hodnoty díky nižší spotřebě energie a energie (WP3,4,5), využívání OZE a úložiště na místě + EV (WP6) a větší flexibilita (WP7, 9), program lidského kapitálu pro vytváření pracovních míst (WP3), standardizace a procesy 4.0 (WP5),	Minimálně 20% nárůst tvorby hodnoty partnerů ARV a vytvoření přibližně 12–20 000 nových pracovních míst ročně[38] (na základě investic vývojářů ARV 2022-2024).	Tržby v eurech, počet vytvořených pracovních míst
7) Standardy a předpisy	ARV bude přispívat k revidovaným stavebním a energetickým předpisům, zejména pokud jde o měřítka a dokumentační potřeby pro účetnictví skleníkových plynů a pro revidované kódy energetické náročnosti a pro SRI. Pro financování bude ARV přispívat k novému standardu pro zelené digitální dluhopisy (zelené STO).	Poskytněte příspěvky na vnitrostátní úrovni a na úrovni EU prostřednictvím nejméně 20 setkání a publikací	Počet publikací a setkání s regulačními orgány
8) Vytváření znalostí	ARV přispěje k vytváření znalostí mezi všemi zúčastněnými stranami v konsorciu, ve skupině přidružených inovačních klastrů, obyvatelům demo projektů prostřednictvím živých laboratoří (WP3), energetických společenství (WP2) a k širšímu publiku prostřednictvím komunikace a šíření činnosti (WP10)	Plán šíření informací a komunikace (část 2.2.1)	Počet a rozsah událostí (oddíl 2.2.2)
9) Příspěvek ke klíčovým cílům politiky EU	Vlna renovace[39]: ARV předvede efektivní a replikovatelný pracovní postup pro renovaci sociálního bydlení a kulturního dědictví, které účinně využívá zdroje budovy (WP5).	133 400 m^2 budov zrekonstruovaných na standard nZEB nebo ještě lépe	# m^2 budov a energie
	Cíle v oblasti klimatu: ARV přispěje k dosažení cílů 50–55% snížení emisí skleníkových plynů do roku 2030 a 90–95% snížení do roku 2050 předvedením a uznáním škálovatelných CPCC.	50% snížení emisí skleníkových plynů v životním cyklu ve srovnání s předběžnými podmínkami/současnou praxí.	kg CO_2-ekv/m^2 po dobu 60 let životnosti.

Specifické dopady pro zúčastněné partnery

Projekt ARV posune inovace v odvětví stavebnictví a renovace prostřednictvím komplexního portfolia strategií vhodných pro různé klimatické podmínky v různých kulturních souvislostech zaměřených na sociální bydlení a veřejné budovy. Na obr. 2.8 je uvedeno umístění průmyslových partnerů a jejich příslušný příspěvek k využití výsledků projektu z hlediska hodnotového řetězce. Jak je znázorněno na obrázku, partneři konsorcia pokrývají celý hodnotový řetězec od poskytovatelů materiálu až po konečné zákazníky a uživatele budov. Průmysloví partneři budou mít klíčovou úlohu po projektu pro úspěšné zavádění vyvinutých řešení na trh, a to nejen vytvářením nových tržních příležitostí, ale také posilováním konkurenceschopnosti a růstu společností (podrobnosti o strategii exploatace viz sekce 2.2.2)). V následujícím textu stručně popisujeme očekávané dopady projektu pro každého ze zapojených průmyslových partnerů.

[38] 8 12–18 místních pracovních míst na milion EUR investovaných do energetické účinnosti, IEA, Sustainable Recovery, červen 2020

[39] https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en



Obrázek 2.8 ARV hodnotový řetězec, zdůrazňující roli všech partnerů konsorcia a přidružených partnerů zdokumentovaných prostřednictvím dopisů vyjadřujících podporu.

Tabulka 2.7 Očekávané výhody pro **průmyslové** partnery ARV

Partner	Očekávané dopady
ENFOR	*Přímé výhody*: Vylepšený model prognóz by měl společnosti ENFOR pomoci do 3 let zdvojnásobit prodej. ENFOR odhaduje, že během projektu najme 1 nového vývojového inženýra a zvýšení příjmů by mělo přinést 3–6 nových zaměstnanců za 5 let. Nástroje vyvinuté v rámci tohoto projektu budou celosvětově prodávány prostřednictvím současných dohod o distribuci prodeje a předpokládané strategie využívání. *Nepřímé výhody*: Úspěšné dosažení projektu umožní ENFOR upevnit vztahy se zákazníky a neustále posilovat svou pozici vedoucího poskytovatele řešení pro energetický sektor. Umožní také prozkoumat několik nových metod pro lepší předpověď energie s DTU.
Danfoss	*Přímé výhody*: Jako součást partnerství v oblasti využití bude společnost Danfoss dodávat řešení - koncept oběhu Booster - pro inteligentní efektivní provoz založený na externích signálech z výroby elektřiny a dálkového vytápění. Danfoss odhaduje 1–5 nových pracovních míst v oblasti produktového managementu, výroby a služeb do 5 let po projektu, což se může zvýšit v závislosti na přidané hodnotě trendu řešení. *Nepřímé výhody*: Úspěšné dosažení projektu a zahrnutí řešení Danfoss do demonstrací posílí pozici č. 1 v inteligentním a efektivním řešení pro systémy dálkového vytápění a bude v popředí kombinace technologie rozvodny dálkového vytápění s tepelným čerpadlem.
Mex Architects	*Přímé výhody:* Projekt umožní Mex Architects přímo se podílet na stavbě současných stavebních komponent a typologií budov, těžit ze zvýšených efektivních procesů ARV, které umožní nástup dalších projektů bez navýšení interních zdrojů. *Nepřímé výhody:* Zahrnutí efektivních, udržitelných a atraktivních renovací v rámci tohoto projektu do jejich portfolia posílí pozici architektů Mex Architects v této oblasti a vytvoří další tržní poptávku.
iWell	*Přímé výhody:* Společnost iWell bude těžit z předvedení baterií iWell Cube, které v případě úspěchu lze rychle rozšířit na použití ve více bytech a čtvrtích jako flexibilní službu pro provozovatele sítí a bytové korporace v modelu FaaS (Flexibilita jako služba). Společnost iWell odhaduje zdvojnásobení své současné zaměstnanosti prostřednictvím náboru zaměstnanců údržby a instalačních techniků a softwarových inženýrů. *Nepřímé výhody:* Úspěšné výsledky projektu přispějí k jedné ze základních cest výzkumu a vývoje iWell, a proto mají potenciál výrazně urychlit vývoj v této oblasti. Rovněž zvýší viditelnost a nová strategická partnerství, například s provozovateli sítí, bytovými korporacemi, provinciemi a obcemi.
BOS GROEP	*Přímé výhody:* Účast na tomto projektu umožní BOS dále zlepšovat inteligentní řešení renovace výškových budov, jako jsou fasády a integrované střešní moduly se společnou infrastrukturou pro více topenářských služeb. Zlepšením designu produktů, materiálů a industrializačních funkcí společnost BOS očekává snížení výrobních nákladů a jejich finanční atraktivitu, čímž se zvýší výnosy. Nárůst projektů umožní BOS spustit off-site výrobní zařízení pro prefabrikované instalační moduly a vytvářet nová pracovní místa. *Nepřímé výhody:* Úspěšné výsledky projektu budou mít dopad na celkovou strategii inovací společnosti a budou pohánět nové cesty inovací v oblasti výzkumu a vývoje.
RC Panels	*Přímé výhody:* Panely RC budou těžit z účasti na ARV zvýšením ročních renovací z 1 000 domů na 4 000 domů během 4 let, podporované zvýšenou industrializací a prefabrikací. Projekt ARV také umožní společný rozvoj bytových družstev (zástupce budoucích klientů) a dalších inovativních společností pro výšková řešení. *Nepřímé výhody*: Účast na tomto projektu přispěje ke generování nových technických řešení a souvisejících znalostí pro integraci instalací do stavebních částí. Rovněž se výrazně zvýší viditelnost a portfolio klientů RC panelů, které přispěje k budoucím projektům a růstu.
Metro-vacesa	*Přímé výhody:* Vývoj předpokládaný v tomto projektu Integrované služby pro monitorování a řízení centralizovaných systémů ve vícegeneračních budovách bude implementován v budoucích MV obytných zástavbách na základě míry spokojenosti zákazníků s ohledem na výsledky tohoto projektu, který zlepší spokojenost klientů a podnikání MV . Výsledkem projektu bude přímý kontrakt na 2 zaměstnance během projektu a další podnikání povede k vytvoření 3 nových pracovních míst. *Nepřímé výhody:* Získá exkluzivní přístup ke strategiím a partnerství, které budou relevantní pro budoucí aplikace v oblasti nemovitostí a budou integrovány do hodnocení post-prodeje pro budoucí vývoj.
Aiguasol	*Přímé výhody:* Účast na projektu ARV umožní zlepšení automatizace návrhu systémů HVAC, vývoje digitálních dvojčat a zlepšení integrace BIM simulačních nástrojů a výsledků vedoucích ke zdvojnásobení kapacity Aiguasolu na 800 000 EUR ročně. To bude mít přímý účinek na nasmlouvání 2 nových vývojových inženýrů během projektu a 6 nových inženýrů po skončení projektu.

	Nepřímé výhody: Tento projekt umožní nový výzkum a vývoj nástrojů pro sdílení fotovoltaických výstupů.
Dolomiti Energia	*Přímé výhody:* Účast na projektu ARV je klíčovým faktorem, který umožňuje pokračování jejich úsilí o podporu energeticky účinných služeb jako ESCO, které chrání životní prostředí. *Nepřímé výhody*: Dolomiti Energia bude výrazně těžit z partnerství a lepší viditelnosti získané díky účasti na tomto projektu, což může být velmi důležité pro rozhodovací proces zákazníka.
Nano-Power	*Přímé výhody:* Společnost NanoPower bude těžit z účasti v ARV přímou dodávkou systémů pro skladování energie z druhé životnosti baterií na předváděcí místa a získá zkušenosti s tím, jak je optimálně integrovat a provozovat v CPCC jako součást plánované strategie využívání. *Nepřímé výhody*: Účast na tomto projektu výrazně zvýší viditelnost a portfolio klientů NanoPower, což přispěje k budoucím projektům a růstu.
Buro de Haan IT	*Přímé výhody:* Účast v tomto projektu umožní další vývoj v různých algoritmech pro předběžné rozpoznávání geometrií fasád, umožní lepší a bezchybnou analýzu budovy a zefektivní proces výstavby automatizací nezbytných technických výpočtů. (včetně stavebních výpočtů, environmentálních výpočtů, legislativních testů. To by vedlo k několika průlomům s přímým dopadem na podnikání. *Nepřímé výhody*: Vzhledem k tomu, že se jedná o nový trh, očekáváme, že účast v tomto projektu výrazně zvýší viditelnost a povědomí trhu o naší práci a také o dalších společných projektech.

Zbývající partneři budou také přímo těžit ze spolupráce v tomto projektu. Tabulka 2.8 shrnuje dopady pro tyto partnery. Pro zjednodušení byly některé seskupeny podle jejich profilu.

Tabulka 2.8: Očekávané výhody od ARV pro **neprůmyslové** partnery

Profil partnera	Partner	Očekávané dopady
Univerzity a výzkumné ústavy	Norská univerzita vědy a technologie, České vysoké učení technické, Technická univerzita v Dánsku, EURAC Research, SINTEF, Catalonia Institute for Energy Research, University of Applied Sciences Utrecht, Univerzita v Utrechtu, Politechnická univerzita v Turíně, University of Trento	*Přímé výhody:* Účast v ARV výrazně posílí nejmodernější znalosti v inovativních metodách, řešeních a technologiích k vytvoření udržitelných vzorců chování a přispěje ke všem integračním aspektům pozitivních komunit s cirkulárním klimatem. *Nepřímé výhody:* Získané znalosti a zavedená strategická partnerství budou relevantní pro další výzkumné oblasti v rámci univerzit a budou dále prosazovat vědecké objevy. V dlouhodobém horizontu univerzity očekávají, že přispějí normalizace (vnitrostátní a unijní úroveň), odborná příprava a vzdělávání, jakož i tvorba politik při rozvoji udržitelných čtvrtí.
Obce	Město Utrecht Město Karviná Městská rada Palma	*Přímé výhody:* Účast v ARV představuje krok vpřed k vytváření více Klimaticky pozitivních cirkulárních komunit díky nimž jsou sousedství a města udržitelnější. Výsledky budou sloužit jako příklady a osvědčené postupy pro projekty obnovy sousedních okresů ve městech. *Nepřímé výhody:* Úspěšný výsledek projektu a strategická partnerství budou relevantní pro implementaci dalších řešení v budoucnosti.
Bytová družstva / Korporace	SAB Housing Association, Stichting Bo-Ex '91, Mitros, IBAVI, Housing Europe	*Přímé výhody:* Inovace ARV budou použity ve fondu budov spravovaném těmito asociacemi, čímž se zvýší jejich dosah na potenciální nové uživatele. *Nepřímé výhody:* Účast v ARV zvýší síť a budoucí partnerství těchto sdružení a položí základy pro budoucí úspěšné projekty.
OsloBygg	*Přímé výhody*: Účast v tomto projektu přinese nové znalosti a zkušenosti v celém životním cyklu nových udržitelných budov, jejich správních činností a jejich integrace v městských čtvrtích. *Nepřímé výhody:* Zahrnutí úspěšných ukázkových případů do portfolia OsloBygg přiláká další partnerství a podnikání, což z něj činí referenci pro rozšířené udržitelné veřejné budovy.	
Habitech	*Přímé výhody*: Rozšířená spolupráce a integrační přístup získaný z tohoto projektu umožní lepší implementaci projektů inteligentní účinnosti na jednotlivých budovách a v městském měřítku, od fáze plánování až po implementaci a správu a analýzu výkonu. *Nepřímé výhody:* Přístup k jedinečné obchodní síti ARV poskytne rámec, který členům Habitechu poskytne komplexnější přístup k novým řešením.	
Centrum pro digitální inovace EU	*Přímé výhody:* Účast na tomto projektu přímo přispěje k pokroku v oblasti nejmodernějších technologií a rozšíří digitální platformu/centrum o více partnerů a více služeb. *Nepřímé výhody:* Vytvořená partnerství budou relevantní pro obchodní partnery využívající digitální platformu provozující jejich služby, s více dostupnými možnostmi.	
Project Zero	*Přímé výhody*: Účast v ARV podpoří navazování partnerství a řešení sdílení s cílem vytvořit vedoucí pozici pro Sønderborg a Dánsko v oblasti neutrálního růstu CO2 a udržitelných měst, což je hlavním cílem projektu Zero. *Nepřímé výhody*: Vygenerovaná spolupráce umožní přechod do udržitelných měst po celém světě.	
The Green Digital Finance Alliance	*Přímé výhody:* Přijetí inovativních udržitelných obchodních modelů a finančních mechanismů vyvinutých během projektu by přímo ovlivnilo jejich standardní způsob provozu. *Nepřímé výhody:* Tento projekt umožní vytvoření sítě zúčastněných stran s vysokým potenciálem pro spolupráci a další propagaci udržitelných postupů digitálního financování na národní a mezinárodní úrovni.	
Evropská rada architektury (ACE)	*Přímé výhody:* Prostřednictvím účasti na projektu ARV bude mít ACE silný hlas a účast na rozhodovacím procesu v předpokládaných architektonických službách, čímž zajistí vyvážené a cenné dědictví pro budoucnost, které je v souladu s posláním ACE. Umožní také budoucí vedení architektů ohledně toho, jak poskytovat vysoce kvalitní architektonické služby klientům a zároveň zajistí, aby regulační prostředí pro architektonickou praxi usnadnilo dosažení tohoto cíle. *Nepřímé výhody:* Navázaná partnerství přispějí k podpoře přeshraniční spolupráce a usnadnění evropské praxe v kontextu příslušných směrnic a politik EU.	

2.1.3 Překážky a bariéry k dosažení očekávaných dopadů

Existuje několik potenciálních vnějších překážek, které mohou ovlivnit výsledek a dopad projektu. Níže popisujeme bariéry a představujeme způsoby, jak je překonat.

- **Nedůvěra v to, že renovace jsou ekonomicky atraktivní,** spolu s **vysokými náklady na intervence.** Existuje také myšlenka, že ani komplexní renovace nemusí snížit provozní náklady, nebo že mělké renovace již mohou pomoci snížit provozní náklady a stále zvýšit náklady na nákup a pronájem. Náš projekt poskytne důkaz o použitelnosti a výhodách probíhající hloubkové renovace a o výhodách, které přináší majitelům budov a uživatelům tím, že prokáže hodnotu navrhovaných řešení (rámec více výhod).
- **Vysoká (vnímaná) námaha,** která demotivuje majitele a obyvatele od provádění rekonstrukcí, spolu s obtížemi v rozhodovacích procesech v obytných budovách s více majiteli. Energetická účinnost navíc není vždy hlavním důvodem, proč do takového projektu investovat, a majitelé často upřednostňují vysokou úroveň komfortu, personalizaci a estetiku, kvůli čemuž je sladění s energetickými zásahy výzvou. Není také jasné, jak by energetická náročnost ovlivnila ceny nemovitostí, což může být pro majitele demotivující. ARV bude tuto bariéru řešit poskytováním ověřených, přesných a snadno přístupných a srozumitelných informací pro všechny zúčastněné strany (ověřené demo projekty v reálném světě, e-market, one-stop-shop, pokyny/plán pro plánování, design, konstrukci (provoz a používání CPCC).
- **Potíže s přístupem k finanční podpoře** nejen při získávání půjček na rekonstrukce obytných budov, ale také při dlouhé návratnosti, nepředvídatelnosti nákladů při renovaci a vysokých platbách předem před získáním financování. V současné době jsou v EU odstraňovány překážky pro vydávání zelených digitálních dluhopisů prostřednictvím zvyšující se regulační jasnosti kryptoměn. Neexistuje však žádný průvodce ani standard pro zelené digitální dluhopisy (zelené STO). Projekt ARV přispěje k nápravě této chyby (WP9). Díky ukázce úspěchu řešení v demo projektech to investorům a úvěrovým agenturám poskytuje jistotu, že se jim investice vrátí. Také vytvoření schopnosti obchodovat s energií spravedlivým a efektivním způsobem poskytne ekonomickou pobídku majitelům budov.
- **Nedostatečná technická odbornost** mezi místními a regionálními orgány a nedostatek kvalifikované pracovní síly, zejména pro rozsáhlé renovační projekty. To často omezuje použitelnost určitých technologií v konkrétních případech a klade odpor vůči instalaci nových technik nebo opatření energetické účinnosti kvůli obavám o jejich údržbu. Projekt ARV přinese elektronický trh s integrovanou technickou odborností a ověřenými dodavateli, aby si vlastník mohl koupit testované a zaručené služby a příslušná školení.
- **Komplexní a konzervativní povaha konstruktivního odvětví,** která často neakceptuje zásadní změny ve svém způsobu práce, zejména v případech, kdy jsou zapotřebí nové dovednosti a technické znalosti. Pomalé a dlouhé zahájení projektu je také vnímáno jako hlavní překážka zahájení stavebních a rekonstrukčních projektů. Snížení času a nákladů na stavební a renovační činnosti, jakož i integrované, zjednodušené a digitalizované výrobní procesy, které má ARV zajistit, tyto výzvy vyřeší.
- **Omezené zavádění inteligentních technologií a digitalizace** je potenciálně významnou překážkou, která je v rámci projektu zasažena kombinací vysoce zkušených projektových partnerů s dlouholetými zkušenostmi v zavádění inovací inteligentních budov/inteligentních energetických systémů, širokého spektra velkých podniků. a malých a středních podniků v celém hodnotovém řetězci a jasné digitální strategie, která má snížit náklady, zjednodušit proces renovace/stavby a využívat technologie systematičtěji.
- **Nejistota ohledně budoucího využití budovy,** jako jsou změny ve službách, demografie, vylidňování venkova, což zvyšuje neochotu renovovat. Kromě toho je překážkou běžná takzvaná dělená incentivní bariéra, kde majitel platí renovace, ale obyvatelé z toho mají prospěch. Strategie ARV pro zapojení obyvatel a integrovaný přístup energetické účinnosti/OZE/skladování v hodnotovém řetězci CPCC (od plánování po použití) přispěje ke zvýšení zavádění řešení ARV.
- **Široká využitelnost technologií** ve více řešeních může být narušena, například tam, kde existují konkrétní architektonická omezení nebo obavy ohledně údržby a spolehlivosti nových instalací. Projekt ARV tuto výzvu vyřeší předvedením a validací řešení v široké škále kontextů (kulturní, podnebí, typologie), které zvýší flexibilitu a škálovatelnost řešení.
- **Nedostatek atraktivních produktů financování** je uveden ve vlně renovace jako nejčastější překážky efektivní renovace budov. ARV bude spolupracovat s některými z předních světových finančních institucí (WP9) ve spolupráci s investory do nemovitostí, veřejnými orgány a partnery ve stavebnictví, aby nasadily a vyhodnotily nové finanční nástroje, které překlenou rozdíl mezi rizikem a odměnou pro veřejné i soukromé subjekty majitelé bytů, stavebnictví, developeri a veřejné orgány.
- V některých evropských jurisdikcích existují **překážky regulace a politiky**, jejichž cílem je rozšířit producentské obchodní modely založené na platformě. Toto riziko snižuje pobídky občanů k přechodu od

spotřebitelů k producentům energie. Evropské nařízení a směrnice o elektřině poskytují základ pro ambiciózní evropský ekologický obchod a zelené využití[40]. Mnoho článků v nařízení i směrnici o elektřině má zásadní význam pro odstranění stávajících regulačních překážek flexibility na straně poptávky a pro umožnění aktivní účasti spotřebitelů energie za účelem zvýšení účinnosti a přechodu na čistou energii. Zatímco některá ustanovení nařízení byla okamžitě použitelná s jeho zveřejněním v Úředním věstníku Evropské unie v červnu 2019, očekává se, že několik ustanovení bude do vnitrostátních právních předpisů provedeno do prosince 2020. Komplexní rámec agregace reakce na poptávku však stále ve většině zemí chybí. Cílem ARV je uvolnění bariér pro efektivitu a flexibilitu na straně poptávky udržitelným designem, renovací založenou na datech a hierarchií nastavení digitalizace s cílem umožnit zákazníkům a místním komunitám jednat jako aktivní zákazníci, aniž by na ně byly kladeny nepřiměřené technické požadavky a administrativní požadavky, postupy a poplatky. Cílem ARV je tedy ukázat, jak odstranit stávající regulační překážky flexibility na straně poptávky a umožnit aktivní účast všech spotřebitelů energie na přechodu na čistou energii.

2.2 Opatření k maximalizaci dopadu

Šíření a využívání činností jsou klíčovými faktory úspěchu projektu ARV, protože zapojí zúčastněné strany a přispějí k výměně znalostí mezi aktéry z různých odvětví a maximalizují jeho přínos pro evropské hospodářství a společnost. Strategie šíření se zaměří na podporu vědeckých a technických akcí a výsledků projektu, včetně školení; workshopů a akcí s cílem zapojit zúčastněné strany do aktivit vzájemného učení. Strategie využívání navíc zajistí efektivní využití výsledků ARV vědeckými, ekonomickými, politickými a společenskými cestami a zaručí, že dopad výsledků bude po dokončení aktivit projektu maximalizován. V následujících podsekcích podrobně popisujeme naše strategie pro efektivní šíření, využívání a komunikaci výsledků projektu pro úspěšné dodání očekávaných dopadů ARV.

2.2.1 Šíření aktivit

Specializovaný pracovní balíček (WP10) byl navržen tak, aby zajistil maximální dopad výzkumu na celou průmyslovou a výzkumnou komunitu, jakož i na budování/energetický hodnotový řetězec a občany, a to prostřednictvím vysoké transparentnosti a plného šíření výsledků výzkumu. Cílem strategie šíření je zapojit příslušné zúčastněné strany do všech činností prováděných během čtyřletého projektu a přispět k položení základů dlouhodobých vztahů pro podporu škálovatelnosti a aktualizace trhu vyvinutých řešení na širší úrovni, včetně průmyslu, tvůrci politik, správy a občanské společnosti. ARV bude také podporovat součinnost na úrovni EU a bude přispívat k činnostem a prioritám ES jako iniciativa Zelená dohoda pro Evropu. K dosažení těchto účelů bude projekt implementovat plán šíření výsledků ARV (WP10), který zohledňuje následující aspekty: ***(i)*** Cílové zúčastněné strany na projektu; ***(ii)*** Nástroje a kanály pro šíření; ***(iii)*** Zpráva; a ***(iv)*** Monitorování a hodnocení. Diseminační plán bude monitorován, přezkoumáván a pravidelně aktualizován v průběhu projektu ARV, aby bylo zajištěno dosažení maximálního dopadu.

Plán šíření čtyřletých aktivit nastiňuje cíle šíření, cílové publikum, klíčová sdělení, strategie a odpovědnosti, výhody konsorcia a komunikační kanály. Podrobnosti o tomto plánu jsou uvedeny níže a budou sloučeny do podrobné zprávy s plánováním a načasováním činností tak, aby odpovídaly datu zahájení projektu a nadcházejícím událostem. Pro každé demo živých laboratoří CPCC bude navíc připravena kontextualizovaná strategie šíření a komunikace, která se bude zabývat konkrétními komunitami na úrovni sousedství a okresu pro každou ze 6 kkCPCC LL v Norsku, Španělsku, Dánsku, České republice, Itálii a Nizozemsku.

Cílové zúčastněné strany ARV

Bylo identifikováno a seskupeno šest hlavních skupin zúčastněných stran: 1) stavba/budova; 2) občané/koncoví uživatelé; 3) tvůrci politik/regulační orgány; 4) výzkumná komunita; 5) investiční/podnikatelská komunita; a 6) média/občanská společnost. Tabulka 2.9 podrobně popisuje skupiny zúčastněných stran, které budou mít prospěch z aktivit / výsledků ARV a přispějí k jeho dlouhodobé vědecké a inovační kapacitě. Partneři projektu mají silné kontakty s řadou národních a mezinárodních zúčastněných stran v oblasti stavebnictví a energetiky, které budou využívány při realizaci projektu a po dosažení očekávaných výsledků. Každá z identifikovaných skupin zúčastněných stran bude mít z projektu prospěch různými způsoby a bude mít k dispozici různé nástroje a činnosti pro šíření a využívání, aby jich dosáhla.

Tabulka 2.9 Skupiny zúčastněných stran, na které se zaměřují činnosti šíření ARV.

[40] https://smarten.eu/wp-content/uploads/2020/11/FINAL_smartEn-EMD-implementation-monitoring-report.pdf

Skupiny zúčastněných stran	Typy organizací/jednotlivců	Jaký prospěch mají zúčastněné strany z ARV a jak jejich zapojení přispívá k maximalizaci dopadu ARV
Odvětví stavebnictví (potenciální členovi elektronického trhu)	Poskytovatelé materiálu a správci portfolia, konstruktéři, architekti, poskytovatelé služeb, zástupci realit	Kontakt z první ruky s technologií a navrhovanými strategiemi umožní přímé implementace řešení v rané fázi a současně zajistí replikace strategií ARV a tedy růst předpokládaných výsledků.
Občané (koncoví uživatelé)	Vlastníci budov, nájemníci, sdružení pronajímatelů (družstva), obce	Efektivní koncoví uživatelé udržitelných budov budou těžit z používání strategií, které přispívají k udržitelnému životnímu prostředí, s ekonomickými úsporami za jejich účet za elektřinu.
Tvůrci politik a regulační orgány/ úřady	Evropská komise, tvůrci politik, Světová rada pro zelené budovy	Být informováni o výhodách ARV pro budoucnost udržitelného růstu evropské ekonomiky. Nové předpisy a zásady pro efektivnější budovy. Standardizované procesy, služby a obchodní modely mezi různými zúčastněnými stranami.
Výzkumná komunita a vzdělávací instituce	Univerzity a výzkumné ústavy (neziskové a komerční) Sdružení/ sítě výzkumných pracovníků/ vědců	Zapojení se do akcí vzájemného učení s partnery ARV, přispívá k posílení výzkumných a inovačních kompetencí v této oblasti. Rozšíření znalostí.
Investiční společnosti a obchodní sdružení	Konfederace evropského podnikání, European SmallBusiness Alliance (ESBA), Evropský kapitál, Evropská investiční banka, Alternative Investment Management Association (AIMA), Asociace investičních společností (AIC)	Být si vědomi vývoje v špičkovém odvětví s velkým dopadem na evropský hospodářský rozvoj. Podporovat další rozvoj tohoto odvětví a rozšiřovat rozsáhlá udržitelná centra.
Mediální skupiny, novináři, komunikátory	Synergie s příslušnými sítěmi a projekty	Přispět k informování občanské společnosti o ekonomických a environmentálních výhodách ARV. Přispět uvědomělým občanům k udržitelným akcím.
Široká veřejnost / občané / neziskové organizace	Široká veřejnost	

Nástroje a kanály šíření (a komunikace)

Cílem akcí šíření a komunikace je informovat evropské zúčastněné strany o výhodách ARV, které jsou relevantní pro jejich vlastní hlavní zájmy (činitelé v oblasti energetiky a stavebnictví; vlastníci budov, nájemci atd .; akademici/vzdělávání; podpora technologie/průmyslu). Aby bylo možné oslovit velké množství zúčastněných stran, budou zavedeny vhodné nástroje a kanály. Mezi kanály pro šíření a komunikaci (např. BUILD UP41, ECTP42 atd.) bude patřit:

- Vytvoření identity vizuálního návrhu projektu ARV a šablon pro dokumenty a prezentace
- Výroba brožury a plakátu s úvodem do projektu ARV
- Vývoj webových stránek projektu spojených se sociálními sítěmi ARV (LinkedIn, Twitter)
- Pravidelně budou vyvíjeny digitální zpravodaje, které budou šířeny k relevantním zúčastněným stranám projektu a budou vkládány na webové stránky projektu, za účelem přenosu pokroku projektu a výsledků aktivit všem aktérům, kteří se mohou zajímat o výzkum a kteří mohou být případně zapojeni v budoucích výzkumných aktivitách
- Balíčky podpory s nástroji na podporu rozhodování, popis procesů mentoringu manažerů **živých laboratoří** (LLs) a školicí materiály pro občany (připravené v rámci WP3) budou dále šířeny v rámci na míru šitých strategií šíření a komunikace vyvinutých v r. WP10
- Řada programů, vč. Dnů otevřených dveří, interaktivní komentované prohlídky, besedy, workshopy a festivaly se budou konat na místní úrovni, aby byly zkušenosti každé živé laboratoře CPCC poutavější a přístupnější občanům
- Konference budou organizovány společně s cílenými akcemi za účelem spolupráce s průmyslem a občanskou společností
- Za přispění všech partnerů zapojených do 6 ukázkových stránek CPCC bude vytvořena brožura s výsledky projektu obsahující popis všech výsledků dosažených v ARV.
- Krátké videosérie a podcasty zaměřené na výsledky ARV a zkušenosti občanů s aktivitami CPCC LLs.
- K cílení na konkrétní typy zúčastněných stran budou použity další nástroje, jako jsou sociální média, technologie Web 2.0 včetně funkcí odborných publikací, ke kterým mají přístup různé typy zúčastněných stran, nebo projektové/externí akce

• Šíření vědeckých a technických úspěchů bude probíhat pomocí otevřených nástrojů, jako je Google Scholar & Research Gate, přičemž relevantní vědecká sdělení budou k dispozici na webových stránkách projektu;

[41] https://www.buildup.eu/en
[42] http://www.ectp.org/

Oblast elektronického trhu bude zřízena a vložena na web jako **„jednotné kontaktní místo“.** Tam budou sloučeny všechny výsledky projektu, které poskytnou pokyny koncovým uživatelům, odkazy na různé zdroje, informace o dodavatelích produktů, software, tabulky a datové sady. Součástí bude také školicí materiál a technické pokyny. Informace budou snadno filtrovány podle typu, tématu, měřítka, země, licence atd. Tato oblast bude také sloužit jako kontaktní místo pro všechny demo projekty zaměřené na Klimaticky pozitivní cirkulární komunity, umožňující virtuální konektivitu a spolupráci. Další kanál, který bude implementován, se týká účasti a přednášení prezentací o projektu a spolupráce v oblasti výzkumu a vývoje na národní i mezinárodní úrovni na příslušných vědeckých / technických akcích. Přímá komunikace s jednotlivci (osobní setkání, workshop, webináře a/nebo přímý e-mail), cílené zasílání e-mailů příslušným identifikovaným organizacím a zveřejňování novinek na webových stránkách/zpravodají/sociální sítě organizací sítí partnerů bude také podporována (viz WP10).

Klíčové zprávy

Budou řídit aktivity projektu v oblasti výzkumu a vývoje tím, že budou sdělovat, **jak ARV reaguje na klíčové společenské výzvy,** jako je změna klimatu, dostupnost bydlení, energetická chudoba, zdraví a blahobyt občanů, hospodářské oživení a **jak jsou výsledky projektu relevantní pro náš každodenní život**, vytvářením pracovních míst, zaváděním nových technologií a pozitivním dopadem na planetu a kvalitu života, Zprávy ARV budou přizpůsobeny **typu činnosti, ke které se vztahují** (komunikace nebo šíření), a budou aktualizovány v průběhu projektu. Konsorcium nicméně definovalo několik předběžných zpráv pro šíření a komunikaci projektu.

- Klimaticky pozitivní cirkulární komunity, kde lidé mohou pomáhat prospívat a prosperovat pro příští generace
- Krásná, udržitelná, společně v CPCC
- Renovace za účelem obnovy, odolnosti a sociálního začlenění
- Ekologická, bezpečná, zdravá a dostupná bydlení a komunity pro všechny
- CPCC učiní renovaci výhodnou z hlediska klimatické neutrality a obnovy
- Zelenější a odolnější komunity
- CPCC ke sladění klimatických a sociálních cílů.

Monitorování a hodnocení

Jakmile projekt začne, je třeba implementovat, monitorovat a rozpracovávat plány, plánuje se strategie monitorování (WP1, WP8). Hodnocení bude prováděno pravidelně, aby bylo zajištěno účinné hodnocení dopadů a aktualizace nebo předefinování činností šíření a využívání a zajištěna vysoká kvalita prováděného šíření a využívání. Hodnotící kritéria a monitorovací činnosti jsou znázorněny níže:

- Kritéria hodnocení: indikátory měření dopadu. Tabulka 2.10 ukazuje kvalitativní a kvantitativní ukazatele pro měření dopadu, a tedy pro co nejpřesnější posouzení činností šíření.
- Monitorovací postupy: podávání zpráv a zpětná vazba. Aby bylo zajištěno přesné monitorování a hodnocení aktivit šíření a pochopení dopadu provedených akcí, všichni partneři zaregistrují své činnosti ARV. Kromě toho budou všichni partneři připravovat své činnosti v oblasti šíření a využívání podle akčního plánu reportů, nejméně každých 6 měsíců pro AEB; všichni partneři zaregistrují aktivity v dokumentu o šíření a užívání; a všichni partneři budou uchovávat důkazy o prováděných činnostech. Strategie šíření bude prováděna s ohledem na ochranu všech příslušných práv duševního vlastnictví. Výsledky proto budou zveřejněny až po řádném zvážení otázek duševního vlastnictví a příslušné ochrany, pod dohledem správní rady pro inovace a rady pro využívání ARV.

Tabulka 2.10 Dopadová opatření a cílové hodnoty.

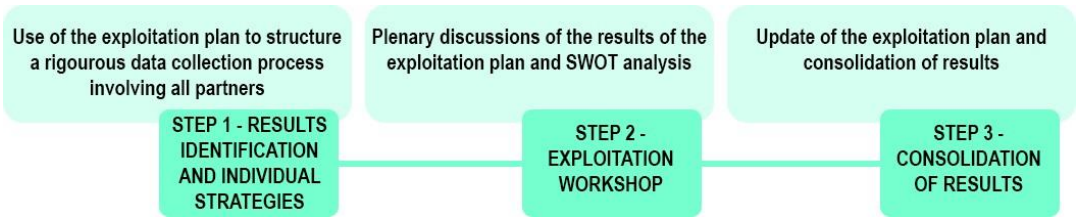
Indikátory pro měření dopadu	Měřicí technika/zdroj	Cílová hodnota
Vědecké a technické výsledky	Příspěvky publikované ve vědeckých časopisech s vysokým dopadem (např. Building Research & Information, Energy Build, Int. J. Life Cycle Assess, Renewable and Sustainable Energy Reviews, Architectural science review); Mezinárodní pozvaná/plenární/hlavní sdělení a posterové prezentace.	> 4/rok > 5/rok
Celkový počet návštěv webových stránek projektu	Web projektu je registrován ve službě Google Analytics, která nabízí bezplatnou službu, která generuje podrobné statistiky o návštěvnících webu.	1000 / rok
Počet distribuovaných brožur	Analýza individuálních plánů šíření a zpráv partnerů.	200 / rok
Počet zúčastněných vědeckých akcí, na kterých je projekt šířen	Vědecké akce.	8
Počet technických akcí, na kterých je projekt šířen	Technické akce.	8

Počet osobních schůzek/ komunikace	Osobní setkání a komunikace.	25
Počet cílených e -mailů	Cílené emaily.	200/ rok

Počet novinek zveřejněných na jiných webových stránkách sítě	Jiné webové stránky sítě	12
Počet LinkedIn a Twitter sledujících/členů	Registr LinkedIn a Twitter.	300

2.2.2 Využití výsledků

Zkušební rada ARV bude zřízena jako nástroj pro škálování obchodních modelů a finančních nástrojů. Výbor pro exploataci bude částečně složen ze silných inovačních klastrů a hráčů finančního sektoru, kteří budou šířit koncepty zelené budovy a renovace, aby poskytly impuls „vlně renovace“, která bude politicky podložena. Metodika využití ARV bude strukturována v T9.6 jako třístupňový proces, jak ukazuje obrázek 2.9.



Obrázek 2.9 Metodika využití v ARV

2.2.2.1 Osnovy využití a obchodního plánu

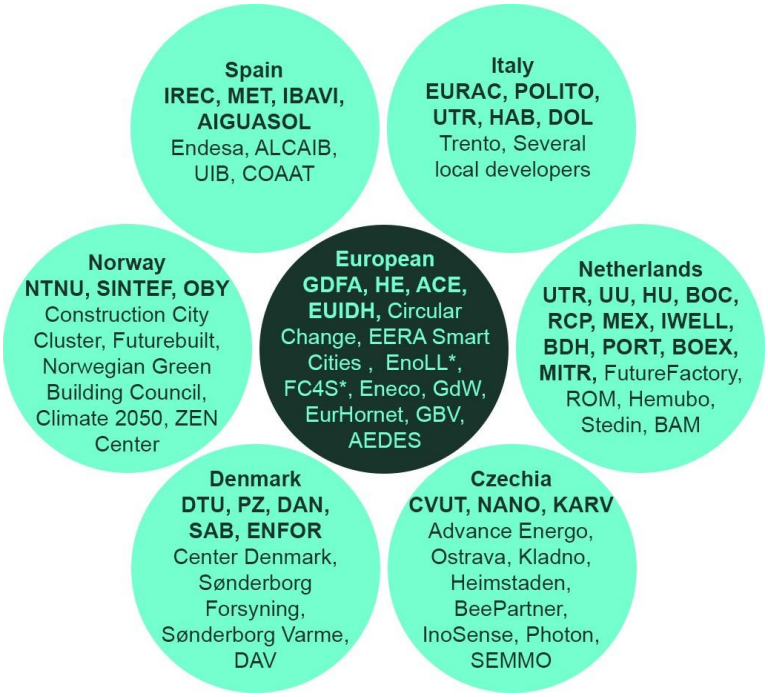
Plán využívání inovací projektu bude prováděn s ohledem na krátkodobé a dlouhodobé cíle. Krátkodobé cíle ve čtyřletém časovém rámci a úzce propojené s WP1, WP8, WP9 a WP10 budou:

1) Usnadnit výměnu znalostí s Exploatační radou ARV za účelem nepřetržité identifikace komerčně životaschopných inovací a ochrany jakékoli další IP vyplývající z projektu,
2) Vytvářet doporučení pro replikaci na základě analýz více výhod (úkol 8.5, D8.8),
3) Vytvářet obchodní a finanční modely osvědčené na jiných trzích pro přizpůsobení v EU, aby se urychlila vlna obnovy. (D9.2),
4) Navrhnout plány obchodního modelu pro energeticky pozitivní retrofity pro různé třídy aktiv jako moduly pro replikaci v celé EU (D9.3),
5) Navrhnout finanční nástroje vázané na budovy pro přijetí FI v portfoliích nemovitostí (D9.5),
6) Vypracovat průvodce zelenými digitálními dluhopisy pro škálování flexibilních trhů s energií pro zákazníka,
7) Umožnit škálování energeticky pozitivních renovací na trzích EU. (D9.7) a
8) Rozvíjet a rozšiřovat síť potenciálních zúčastněných stran v hodnotovém řetězci, včetně průmyslových partnerů, malých a středních podniků a investorů, aby dále podporovaly činnosti po ukončení projektu (prostřednictvím rady pro využívání ARV a souvisejících inovačních klastrů).
9) Zřízení e-tržiště pro sloučení výsledků projektu s odkazy na zdroje, dodavatele produktů atd. (D10.3)

Vytvoření elektronického tržiště umožní agregaci všech výsledků projektu, inovací, poskytovatelů technologií a poskytovatelů služeb. Elektronický trh bude zahrnovat nezbytné nástroje pro zefektivnění procesu a poskytování potřebných služeb a zařízení a zavedené finanční mechanismy usnadní jejich zavádění. Kromě toho budou vytvořeny **Inovační klastry** (viz obrázek 2.10), které zahrnují partnery ARV a další zúčastněné strany, od nichž jsme obdrželi dopisy podpory, s cílem sloužit jako místní nástroj usnadňující implementaci předpokládaných řešení. Budou zahrnovat nejen místní zúčastněné strany, ale také větší mezinárodní hráče, akademické i průmyslové, které nabízejí široké, ale stále vysoce škálovatelné řešení.

Inovační klastry ARV sdružují klíčové zúčastněné strany z celého hodnotového řetězce CPCC: znalostní instituty, poskytovatele technologií a systémů, poskytovatele energetických služeb, architekty, majitele nemovitostí a budov, obce a regionální úřady, finanční instituty a různé organizace pracující pro podporu udržitelných budov a komunit. V ARV existují klastry pro jednotlivé země organizované kolem ukázek ARV a společný klastr pro celou EU, který slouží jak místním klastrům, tak jako multiplikátory trhu v celé EU, viz obrázek 2.10.

Dlouhodobé cíle jsou úzce spojeny s potenciálním využíváním strategií ARV a budou založeny na růstu řešení, protože více koncových uživatelů poskytne příběhy o úspěchu. Tento růst je odhadován v naší tržní analýze, jak je znázorněno v následující části, a spoléhá na inovační klastry, inovativní finanční mechanismy (WP9) a úspěch oblasti ***elektronického trhu*** (tj. Zvýšení celkového povědomí o značce řešení ARV a inovace). Naším cílem je zřízení a systematizace zjednodušených procesů a služeb směřujících k vytváření udržitelnějších budov v Evropě. To přímo přispěje k uvedení **12 000 000 m2 renovovaných a nových budov** na trh využívajících koncept a strategie ARV do roku 2029, jak odhaduje naše analýza trhu níže.



Obrázek 2.10 Inovační klastry ARV: Klastry specifické pro jednotlivé země a společný evropský klastr fungující jako inkubátory na evropském trhu. Tučná jména znamenají partnery ARV, zatímco ostatní jména jsou přidruženými partnery potvrzenými prostřednictvím dopisů podpory ARV (v příloze) (*EnoLL: Evropská síť živých laboratoří, FC4S: Finanční centra pro udržitelnost (svolána OSN)).

Analýza trhu a obchodní případ pro ARV

Inovace ARV mají obrovský tržní potenciál. Evropský fond budov stárne a potřebuje výměnu nebo renovaci, což představuje značný tržní potenciál, a proto hraje významnou roli při stabilizaci stavebního odvětví, zejména v krizovém období. Roční **obrat** ve stavebním sektorů (všechny činnosti) se pohybuje kolem 1,400 miliard EUR a **obrat** věnovaný činnostem **renovace** a údržby se pohybuje v rozmezí 370 miliard EUR[43]. Trh s výrobky a službami pro energetickou účinnost, včetně technologií pro správu energií, ohřevu vody a vzduchotechniky, dosáhl v roce 2015 přibližně 41 miliard EUR a očekává se, že do roku 2023 vzroste na 80,8 miliardy EUR (CAGR 7,7%) 44. Využitelné inovace předpokládané v tomto projektu mají slibný potenciál příjmů.

S ohledem na známé a předpokládané míry výstavby a renovace jsme odhadli celkový tržní potenciál, který představuje celkový počet budov v EU, u nichž se očekává výstavba nebo renovace. Z nich jsme odhadli počet projektů ARV, které by bylo možné rozvíjet každý rok, a vypočítali příslušné
% podílu na trhu, počet projektů a oblast. V souladu s principy navrhované renovační vlny a s ohledem na distribuci demonstračních případů ARV předpokládáme jako největší trh více projektů renovace než nových staveb. **Předpoklady/vstup:** Tržní potenciál byl vypočítán pomocí údajů45,46 o počtu a rozložení budov, jakož i předpokládané rychlosti výstavby a renovace, což vedlo k následujícímu: Stav budov EU: 258 820 000; Bytové budovy EU: 219 685 150; Nebytové budovy EU: 39 134 850; průměrná plocha bytového domu: 91,8 m2; průměrná plocha nebytového domu: 6380,5m2. Potenciální pronikání ARV na trh bylo založeno na odhadech vyplývajících ze studie proveditelnosti založené na vstupech partnerů ARV se zkušenostmi se zaváděním nových konceptů a produktů na stavební trh. Potenciál ARV je segmentován podle typu budovy (tj. Bytové vs. nebytové) a typu intervence (renovace vs. nová výstavba).

[43] https://www.renovate-europe.eu/category/news/, zpřístupněno v lednu 2021.
[44] http://renovate-europe.eu/wp-content/uploads/2015/09/Final-pdf-version.pdf
[45] https://ec.europa.eu/energy/eu-buildings-factsheets_en
[46] Sandberg, Nina Holck; Sartori, Igor; Heidrich, et al. (2016): Dynamic building stock modelling: Application to 11 European countries to support the energy efficiency and retrofit ambitions of the EU. In Energy and Buildings 132, pp. 26–38. DOI: 10.1016/j.enbuild.2016.05.100

Tabulka 2.11 – Celkový tržní potenciál a potenciál ARV.

MARKET POTENTIAL		Year 1 (2025)	Year 2 (2026)	Year 3 (2027)	Year 4 (2028)	Year 5 (2029)	TOTAL in 5 years
	Construction Rate	**1.11 %**	**1.10 %**	**1.08 %**	**1.07 %**	**1.05 %**	
New	residential	2 443 165	2 409 880	2 376 594	2 343 308	2 310 023	**11 882 969**
	non-residential	435 227	429 297	423 368	417 438	411 509	**2 116 840**
	Renovation Rate	**1.26 %**	**1.26 %**	**1.27 %**	**1.27 %**	**1.28 %**	
Renovated	residential	2 762 707	2 773 359	2 784 010	2 794 661	2 805 313	**13 920 050**
	non-residential	492 150	494 048	495 945	497 843	499 740	**2 479 726**

ARV POTENTIAL		Year 1 (2025)	Year 2 (2026)	Year 3 (2027)	Year 4 (2028)	Year 5 (2029)	TOTAL in 5 years
New (#)	residential	122	241	594	820	1 155	2 932
	non-residential	44	64	127	188	247	670
Renovated (#)	residential	166	277	696	1 118	1 543	3 800
	non-residential	59	124	174	324	500	1 179
	TOTAL	391	706	1 591	2 449	3 445	**8 582**
% by Innovation Clusters		100 %	80 %	65 %	50 %	45 %	**4 764**
New (area, m2)	residential	11 219	22 132	54 565	75 322	106 074	269 312
	non-residential	277 697	410 870	810 390	1 198 560	1 575 379	4 272 895
Renovated (area, m2)	residential	15 223	25 470	63 919	102 662	141 699	348 974
	non-residential	376 820	788 068	1 107 533	2 064 716	3 188 592	7 525 728
	TOTAL	680 958	1 246 540	2 036 407	3 441 259	5 011 744	**12 416 909**

V souhrnu odhadujeme, že 5 let po projektu ARV bude realizován předpokládaný celkový počet asi 8580 projektů s inovacemi ARV, a to jak pro bytové, tak pro nebytové účely, což představuje celkovou plochu asi 12 417 000 m2 udržitelných budov, což má za následek celkové dopady popsané v EIC1-10.

Inovace ARV půjdou nad rámec snížení energií/nákladů a přímé úspory CO2. Rovněž umožní komoditizaci energetické flexibility a její obchodování s občany jako producenty. Integrace flexibilních energetických řešení do realitních portfolií nabízí novou cestu k posílení návratnosti financování modernizace energetiky. V rámci ARV využijeme výhod energeticky pozitivních čtvrtí k vytvoření nových pobídek pro občany a instituce finančních služeb, aby investovaly do energetické účinnosti prostřednictvím inovace obchodního modelu a finančních nástrojů, přičemž zohledníme regulační a politické aspekty.

Tok příjmů a cenový model pro využitelné výsledky budou založeny na cenách jednotlivých řešení dostupných na elektronickém trhu v kombinaci s nezbytnou technickou podporou, náklady na instalaci a poradenskou prací. Proto je předvídání těchto hodnot v této fázi obtížné, protože velmi závisí na: i) rozsahu požadovaných renovací, které se mohou pohybovat od menších až po rozsáhlé, ii) úrovni technické odbornosti a času potřebného k podpoře zákazníka, iii) specifické výzvy, které představují např. geografická a / nebo architektonická omezení, která by mohla ovlivnit konečnou cenu za projekt, iv) geografická poloha a následně náklady na metr čtvereční. Abychom provedli spravedlivé posouzení cen, řídili jsme se zprávou EP47 o odhadech cen renovace, kde náklady na drobné renovace jsou 60 EUR/m^2, mírné renovace 140 EUR/m^2, rozsáhlé renovace 330 EUR/m^2 a "téměř-nulové" renovace je 580 EUR/m^2. Za předpokladu, že uživatelé budou v průměru provádět mírně až rozsáhlé renovace(tj., **235 EUR/m^2** za bytové budovy a **124 EUR/m^2** za nebytové budovy), a že cena nových

Tabulka 2.12 Obchodní případ pro projekt ARV.

		Average cost per project (€)	Total investment in ARV based projects in 5 years (M€)	Total revenues per total ARV partners & *e-market* companies in 5 years (M€)
New	residential	142 900	520	390
	non-residential	5 232 010	3 390	2 542
Renovated	residential	21 582	139	104
	non-residential	790 181	905	679
	TOTAL		**4 953**	**3 714**

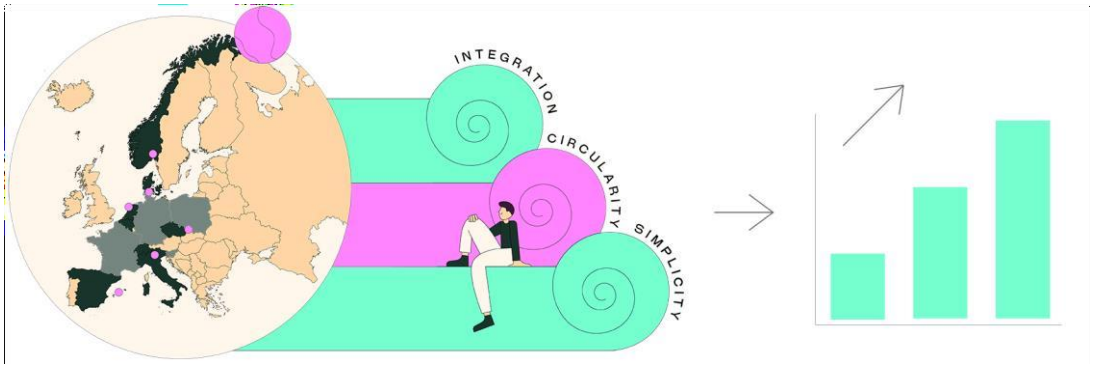
[47] https://www.europarl.europa.eu/RegData/etudes/STUD/2016/587326/IPOL_STU(2016)587326_EN.pdf

staveb by činila v průměru **1556 EUR/m²** (bytové[48]) a **820 EUR/m² (**nebytové[49]**)**. Na základě konzervativního přístupu820 se pro tuto prognózu konsorcium ARV domnívá, že konsorcium ARV bude schopno zachytit 75% nákladů spojených s renovací a novými stavebními činnostmi.

Na základě těchto odhadů můžeme odhadnout celkový agregovaný příjem za 5 let ve výši 3,7 miliardy EUR pro všechny partnery ARV a společnosti v rámci ARV.

2.2.2.2 Strategie komercializace a cesty na trh

Klíčové využitelné výsledky



Inovace ARV (viz. tabulka 1.7 v oddíle 1.4.2) **mají potenciál být komerčně využívány jako produkty nebo služby,** jako například „Fasádní moduly Inside-Out“, „Moduly plug-and-play na bázi dřeva / bio“, „Systém LowEx“, „Digitální deník pro CPCC“, „Posilovač cirkulace“, „Geostruktura městské energie ',' Nabídka zeleného bezpečnostního tokenu (STO) ',' Cirkulární hub pro optimalizovanou konstrukci ',' Jednotné kontaktní místo pro rozsáhlé renovace městských částí ',' 'iWell Cube', atd. Inovace budou komercializovány společně s poskytovateli technologií a systémů v konsorciu ARV. Trasy inovací služeb na trh budou vydlážděny v dialogu s poskytovateli energetických služeb, sdruženími vlastníků nemovitostí a budov a finančními orgány. Obce a sdružení, která jsou součástí nebo spojena s ARV, pomohou vytvořit ještě větší zátěž na trhu, což dále urychlí přechod k CPCC.

Šest klastrů demonstračních projektů bude společně s **Exploatační radou** ARV (AEB) klíčovým aktivátorem a určovačem tras pro implementaci trhu a přebudování inovací ARV. AEB zajistí včasnou identifikaci a škálovatelnost komerčně životaschopných inovací podporovaných správcem inovací (IM) a radou pro inovace (T1.3). Tyto skupiny budou spolupracovat a navazovat kontakty s možnými partnery a zúčastněnými stranami mimo konsorcium ARV s cílem identifikovat trh pro využitelné inovace. Jak bude ARV postupovat, bude AEB spolupracovat s partnery a poskytovat rady při vývoji obchodních plánů pro využití. Přidružení partneři ARV pomohou při dalším rozšiřování trhu s inovacemi. Prostřednictvím tohoto proaktivního přístupu bude konsorcium identifikovat a přistupovat ke zdrojům financování ze soukromého a veřejného sektoru pro následný vývoj po skončení ARV.

WP1 a WP9 zahrnují úkoly zvláště určené k dosažení úspěšného a měřitelného využití, kde bude posouzena hodnota pro další použití, jako např.:

- Hodnocení očekávaného socioekonomického dopadu generovaných znalosti, technologií a faktorů, které by mohly ovlivnit jejich využívání (standardizace, etické nebo regulační aspekty atd.)
- Podrobná studie trhu a potenciálů absorpce a plán internacionalizace a replikace
- Finanční příležitosti a obchodní modely a plán technologické implementace
- Metodika a strategie pro přizpůsobené řízení znalostí generovaných v projektu a ochranu práv duševního vlastnictví, podle zájmu příjemců (T1.6)
- Analýza potenciálu využití výsledků projektu, přezkoumání všech aspektů z pohledu potenciálních investorů, interních nebo externích, a lidí z marketingu

[48] Manganelli et al, Sustainability 2019, 11, 249; doi:10.3390/su11010249

[49] https://zebra-monitoring.enerdata.net/overall-building-activities/average-Náklad-of-renovation-in-non-residential-per-m2.html#average-Náklad-of-construction- for-new-tertiary-buildings.html

- Analýza přenositelnosti postupů do šesti jurisdikcí a také analýza toho, jak propojit příjmy z flexibilních energetických aktiv s modely financování nemovitostí za účelem posílení potenciálu návratnosti
- Rozšiřování, zvyšování úrovně, mainstreaming ARV prostřednictvím kooperativních inovací, včetně profilů replikace, studie proveditelnosti, práva duševního vlastnictví a přístupu na trh.

Elektronický trh (D10.3) bude agregovat, umocňovat a využívat inovace ARV. Bude spuštěn na webových stránkách ARV jako ***jednotné kontaktní místo***, které také slouží jako hlavní rozhraní a kontaktní místo pro všechny demonstrační projekty (současné i budoucí) zaměřené na CPCC, umožňující virtuální konektivitu a spolupráci a fungující jako komunikační a diseminační kanál. It will serve as a database for all technology and service providers, as well as materials & local resources. Elektronický trh ARV poskytne pokyny pro koncové uživatele, odkazy na různé zdroje, informace o dodavatelích produktů, softwaru a datových sadách, jakož i školicí materiály a technické pokyny. Elektronický trh zvyšuje potenciál pro replikovatelnost, ke které dojde prostřednictvím zapojení koncových uživatelů a členů elektronického trhu. To má výhody jak pro členy elektronického trhu, tak pro koncové uživatele navrhovaných řešení.

Tabulka 2.13 Výhody pro členy *elektronického trhu* a koncové uživatele

Výhody pro členy e-trhu	Výhody pro koncové uživatele navrhovaných řešení
• Jejich produkty a služby budou propagovány pod pečetí udržitelnosti • Zákazníci je najdou bez významného úsilí. • Budou těžit ze synergického přístupu, který agregovaný elektronický trh umožňuje. • Společnosti budou těžit ze zvýšené viditelnosti a povědomí o trhu. • Jednoduchý, integrativní a efektivní proces je pobídkou pro koncové uživatele k přijetí řešení. • Možnost pro společnosti prodávat své individuální produkty umožňuje zacílit na DIY (Vyrob si sám) trh, který má velkou tržní hodnotu a je zastoupen vlastníky domů, kteří provádějí vlastní postupné renovace. Tito uživatelé se pravděpodobně snadno zapojí do konceptu ARV a integrativního přístupu.	• Koncoví uživatelé mají přístup k centralizované prodejně, kde mohou najít všechna řešení pro celý proces výstavby a/nebo renovace. • Platforma elektronického trhu spojuje koncového uživatele se vzdělaným projektovým manažerem, který poradí s nejefektivnějším a nejvhodnějším řešením, nikoli pro konkrétní komponent, ale pro celý projekt. • Tento proces je vysoce efektivní a integrativní, na rozdíl od fragmentovaných samostatných řešení. To umožní lepší služby a rychlejší dobu instalace. • Budou zaměřeny na místní zúčastněné strany, které jsou schopny zaměřit se na konkrétní omezení související s podnebím, geografií a architektonickým dědictvím. • Koncoví uživatelé budou těžit z nejnovějších inovací v příslušných oblastech a zajistí tak nejlepší možné řešení konkrétního problému.

2.2.3 Správa výzkumných dat

ARV bude generovat mnoho různých typů a forem dat. To bude zahrnovat zprávy, specifikace, metodiky, procesy a energetická data, abychom zmínili alespoň některé. Veškerá data týkající se demo stránek, např. Účty za energie a měřená data, zůstanou výhradně ve vlastnictví demo stránek a budou sdílena pouze se svolením vlastníka předváděcího webu. Předběžné oznámení o jakémkoli plánovaném zveřejnění bude správní radě poskytnuto nejméně 45 dní před zveřejněním. Veškeré námitky proti plánovanému zveřejnění budou vzneseny v souladu s pravidly dohody o konsorciu (CA). Pokud není ve výše uvedené lhůtě vznesena námitka, je zveřejnění povoleno. Aby se předešlo pochybnostem, strana nesmí zveřejňovat nové znalosti nebo znalosti jiné strany, a to ani v případě, že jsou tyto znalosti nebo znalosti sloučeny s prioritami strany, bez předchozího písemného souhlasu druhé strany. Pokud jsou pro účely šíření nebo externí poradní radě (EAB) poskytnuty jakékoli důvěrné informace za účelem získání cenné zpětné vazby pro potenciální využití trhu, musí každý člen činnosti v oblasti šíření informací nebo EAB podepsat dohodu o nezveřejnění a zajistit, že nezveřejní informace jakékoli třetí straně. Příslušné zákony o ochraně údajů budou plně dodrženy a všechny osobní údaje budou anonymizovány, než budou použity pro akademický výzkum/komerční podnikání. V následujícím textu uvádíme stručnou analýzu hlavních prvků zásad správy dat ARV. Mezi hlavní prvky patří: (1) typ údajů, které budou shromažďovány, zpracovávány nebo generovány, (2) metodika a standardy, které budou použity, (3) jak budou tyto údaje využívány nebo sdíleny, a nakonec (4) jak bude vše ošetřeno a zachováno. Odkaz na datovou sadu a název, identifikátor vytvářené datové sady a popis datové sady

- Popis údajů, které budou generovány nebo shromažďovány, jejich původ (v případě, že jsou shromažďovány), povaha a rozsah a komu by mohly být užitečné a zda jsou základem vědecké publikace. Informace o existenci (či nikoli) podobných údajů a možnostech integrace a opětovného použití
- Standardy a metadata a sdílení dat
- Odkaz na stávající vhodné standardy disciplíny. Pokud tyto neexistují, přehled o tom, jak a jaká metadata budou vytvořena
- Popis způsobu sdílení údajů, včetně přístupových postupů, období embarga (pokud existují), osnovy technických mechanismů pro šíření a nezbytného softwaru a dalších nástrojů umožňujících opětovné použití a definice, zda bude přístup široce otevřený nebo omezený na konkrétní skupiny. Identifikace úložiště, kde budou uložena data, pokud již existují a jsou identifikována, s uvedením typu úložiště (institucionální, standardní úložiště pro disciplínu atd.).

- V případě, že soubor údajů nelze sdílet, je třeba uvést důvody (např. Etické zásady, pravidla pro osobní údaje, duševní vlastnictví, obchodní záležitosti, otázky související s ochranou osobních údajů a se zabezpečením).
- Archivace a uchovávání (včetně ukládání a zálohování)
- Popis postupů, které budou zavedeny pro dlouhodobé uchování údajů; údaj o tom, jak dlouho by měla být data uchovávána, jaký je jeho přibližný konečný objem, jaké jsou související náklady a jak je plánováno jejich pokrytí.

ARV řeší výše uvedené body v rámci aktivit šíření. Kromě toho Exploatační rada ARV (AEB) a Manažer inovací IM zváží další pokyny a případně je upraví.

2.2.4 IPR / Správa znalostí a ochrana

Pro úspěch projektu je nezbytné, aby se všichni partneři projektu dohodli na výslovných pravidlech týkajících se duševního vlastnictví, přístupových práv ke všem podkladům a výsledkům pro provádění projektu a ochrany práv duševního vlastnictví (IPR) a důvěrných informací před zahájením projektu. Proto budou tyto problémy podrobně řešeny v rámci CA mezi všemi partnery projektu. CA mezi všemi partnery konsorcia bude obsahovat popis role každého partnera v projektu a jejich očekávaný přínos. Kromě toho CA vytvoří pro projekt právní rámec, aby poskytl jasnou regulaci problémů v rámci konsorcia souvisejících s prací, vlastnictvím IP, přístupovými právy k pozadí a výsledkům a dalšími záležitostmi zájmu konsorcia. Všichni partneři souhlasili s podepsáním povinné CA v souladu s oficiálními pokyny Komise. EM bude odpovědný za dokončení části o právech duševního vlastnictví v CA. CA bude dokončena ve fázi GA.

Struktura a proces správy IPR

Proces správy práv duševního vlastnictví během projektu byl navržen tak, aby zaručoval zavedený strukturovaný proces k identifikaci, posuzování a ochraně práv duševního vlastnictví generovaných v celém projektu. V centru procesu řízení IPR je Valné shromáždění (GA), které bude dohlížet na formulování celkové strategie IPR a zajišťovat soulad s pokyny Komise. Jakmile budou strategie IPR formulována a odsouhlasena všemi zástupci partnerů v GA, implementaci strategie IPR bude zajišťovat EM.

Každý partner je výhradně zodpovědný za identifikaci výsledků, které generuje v projektu, a nahlásí to AEB. Partneři jsou po konzultaci s AEB rovněž odpovědní za provádění strukturovaného procesu hodnocení, včetně důkladného vyhledávání patentů, s cílem určit, zda lze nové znalosti nejlépe využívat ochranou nebo jinými prostředky. Konečně, je -li to nutné, mohou být provedeny formalizované licenční smlouvy s třetími stranami, pokud je to považováno za nezbytné k maximalizaci využití výsledků, tj. V geografických oblastech nebo tržních segmentech, které konsorcium není schopno poskytovat služby.

Zásady vlastnictví IPR a přístupových práv

Jak bude podrobně popsáno v CA, partneři se předběžně dohodli, že IP zabývající se každým z hlavních výsledků projektu budou ve společném vlastnictví partnerů zapojených do jejich vývoje. Pokud je jakýkoli výsledek vytvořen společně alespoň dvěma partnery projektu a není možné rozlišit mezi příspěvkem každého z partnerů projektu, bude taková práce ve společném vlastnictví přispívajících partnerů projektu. Všechny společné výsledky, včetně vynálezů a všech souvisejících patentových přihlášek a patentů, budou ve společném vlastnictví přispívajících stran. Podrobnosti týkající se spoluvlastnických výsledků, společných vynálezů a společných patentových přihlášek budou řešeny v CA.

Žádost o patenty bude podána v každém případě, kde se zdá, že jsou splněny požadavky na invenční krok a novost a existují průmyslové a komerční aplikace. Několik partnerů v konsorciu má předchozí zkušenosti s patentovými přihláškami v příslušných oblastech své odbornosti. AEB a koordinátor budou vycházet z těchto zkušeností, aby zajistili úplný soulad s pravidly a předpisy EU v oblasti práv duševního vlastnictví a mezinárodními předpisy. Aby bylo zajištěno bezproblémové provedení projektu, partneři projektu v dohodě o konsorciu udělí sobě navzájem a jejich přidruženým společnostem bezplatná přístupová práva k jejich pozadí a výsledkům pro provedení projektu. To umožní výzkumným pracovníkům provést projekt podle svých nejlepších schopností, aniž by jim bránily administrativní problémy. Dohoda o konsorciu definuje další podrobnosti týkající se přístupových práv k využívání pozadí a výsledků.

Opatření k zajištění otevřeného přístupu k recenzovaným vědeckým publikacím.

Ústředním cílem tohoto konsorcia je poskytnout prospěch evropskému společenství. Někteří partneři projektu mohou buď používat otevřeny zdrojový kód ve svých výstupech, nebo přispívat svými výstupy do komunit Open-Source. Podrobnosti týkající se používání open-source kódu budou řešeny v CA. Rozpočet projektu zahrnuje poplatky za

publikaci za otevřený přístup, aby bylo zajištěno, že výzkumné publikace budou mít otevřený přístup bez ohledu na časopis, ve kterém jsou zveřejněny. Budou brány v úvahu jak možnosti publikování s otevřeným přístupem, tak možnosti vlastní archivace (nazývané také „zlatý“ nebo „zelený“ model s otevřeným přístupem).

2.2.5 Komunikační plan a činnosti

Účinná komunikační strategie pro projekt ARV byla navržena na základě jasného porozumění složitosti hodnotového řetězce a posouzení netechnických překážek, které souvisejí především s konzervativní povahou stavebního odvětví a energetických trhů. Konsorcium bude propagovat projekt a jeho výsledky strategickým a účinným poskytováním cílených informací více různým publikům a zapojením do **jednosměrné a obousměrné výměny.** Komunikační aktivity začnou na začátku projektu a budou pokračovat po celou dobu jeho životnosti. Celkovým cílem je vytvořit mezi veřejností povědomí o řešeních navržených společností ARV a jejich významu pro náš každodenní život. Komunikační aktivity kromě zviditelnění ARV a technických věd obecně s veřejností také seznámí studenty ze škol a univerzit s vědou, výzkumem a inovacemi.

Komunikační strategie bude brát v úvahu **tradiční komunikační činnosti**, jako jsou tištěné materiály, webové stránky, účast na výstavách a konferencích v oblasti stavebnictví, energeticky účinných budov a nových stavebních materiálů, stejně jako nové metody, jako jsou **sociální sítě, spoluvytváření, virtuální cesty a živé laboratoře (WP3).** Nejúčinnější přístup bude vybrán podle konkrétního cílového publika a podle zprávy, která má být poskytnuta. Aby se maximalizoval dopad ***komunikačních aktivit***, byla předem navržena strategie, která se skládá ze dvou hlavních prvků:

1) **jasná vizuální identita a spolehlivý marketingový a komunikační plán**, který zajistí, že se projekt stane viditelným na více úrovních. Projekt bude vytvořen jako příkladný průkopnický projekt v EU.
2) **cílený lokální přístup šitý na míru pro každý demo projekt CPCC při podpoře procesu spoluvytváření.** To je důležité, aby se místní komunity a místní vlády staly aktivní a nedílnou součástí řešení. Jejich aktivní zapojení zvýší šance na úspěch a usnadní komunikaci a šíření informací po celé linii. Kampaň ARV dodá tomuto technickému projektu lidskou tvář sdílením kvantitativních a kvalitativních důkazů od obyvatel, identifikací zelených velvyslanců a usnadněním jejich školení (WP3), aby mohli fungovat jako multiplikátory. Prostřednictvím **demo stránek** bude ARV analyzovat energetické a environmentální vzorce a chování cestujících. To vytváří hlubší porozumění místní kultuře, klimatu a trhům, což má za následek praktická doporučení. Efektivní komunikace prostřednictvím více kanálů a médií (online přítomnost, zpravodaje, sociální média, audiovizuální zprávy, konference atd.) A vytvoření aktivní komunity zúčastněných stran, online i offline, zajistí, že všechny akce budou dobře začleněny v prostorovém, ekonomickém, technickém, regulačním, environmentálním a sociálním kontextu projektu. ***Komunikační strategie*** byla vymezena, aby zajistila vysokou viditelnost projektu a maximalizovala dopad výsledků. Pro každé konkrétní ***publikum*** bude navržena odlišná strategie s použitím cílených ***zpráv*** a ***aktivit***, jak je popsáno níže:

Cílené publicum

Komunikační strategie byla definována tak, aby cílila na různé skupiny, jmenovitě:

- **Městské úřady**: místní rady a obce
- **Bytová komunita**: (sdružení) majitelů domů, nájemníků (zástupců), pronajímatelů, správců portfolia, bytových družstev, sociálních/veřejných bytových společností atd.
- **Nebytová komunita:** maloobchod, péče a zdraví, vzdělávání, pohostinství, volný čas, sociální služby a další komerční nebo veřejné budovy.
- **Poskytovatelé technologií a služeb:** poskytovatel OZE, skladovací technologie, energetický management MSP, ESCO, architektura, strojírenství a stavebnictví (AEC), společnosti zabývající se zelenými technologiemi atd.
- **Regulační orgány:** provozovatel distribuční sítě, provozovatel přenosové sítě, provozovatel distribučních soustav, dopravní úřad, plánovací orgány atd.
- **Vývojáři a investoři:** banky soukromého a veřejného sektoru, investiční fondy, institucionální investoři, ESCO atd.
- **Ovlivňovatelé trhu:** tvůrci politik na národní a regionální úrovni, instituce EU (EP, GŘ ENER, VR, Výbor regionů), Světová rada pro zelené budovy (WGBC), FIEC, CEER, ACER, EFIEES, Energetická města atd.
- Partneři v příslušných „sesterských“ projektech v rámci H2020 a dalších programů EU.

Tyto cílové skupiny budou cíleny komunikačními aktivitami na vytváření povědomí o projektu ARV a konceptu využívajícím demo projekty, které budou použity jako ukázka prostřednictvím organizace místních workshopů.

Komunikační činnosti

Komunikační a informační plán/činnosti budou zahrnovat:

- **Komunikační design (logo, formuláře, akce):** NTNU již vytvořila vizuální identitu pro ARV, včetně loga projektu, šablony a formulářů pro všechny relevantní komunikační aktivity/dokumenty, a bude upřesněna a zahrnuta do komunikačního plánu.
- **Návštěvy živých laboratoří:** Konsorcium ARV bude organizovat návštěvy živách laboratoří (tj. Demo stránek). Budeme organizovat návštěvy zaměřené na širokou veřejnost, koncové uživatele, instalatéry, veřejnou správu/vládu, společenské partnery, bytovou organizaci atd. Tyto návštěvy se budou konat dvakrát v prvním roce projektu (za účelem získání trakce v komunitách) a jednou za rok po zbývající část projektu.
- **Semináře, workshopy, dny otevřených dveří a návštěvy:** Výsledky budou prezentovány široké veřejnosti na univerzitách a výzkumných ústavech, a to zejména prostřednictvím organizace místních seminářů/workshopů v každé ze zúčastněných institucí zaměřených na širokou veřejnost. Obzvláště se zaměří na mladé vědce a studenty středních škol. Konsorcium proto bude organizovat návštěvy místních středních škol, aby studenty informovalo o projektu a povzbudilo je, aby zvážili kariéru ve vědě a technice, a také pozvalo komunity středních škol na dny otevřených dveří na univerzitách. Tato opatření budou usilovat o to, aby byla pořádána jednou ročně nejméně ve dvou školách v každé zemi.
- **Evropská komise:** Zveřejnění výsledků na veřejných webových stránkách Komise. Konsorcium bude poskytovat pravidelné zprávy, které budou obsahovat zveřejnitelné shrnutí v takové kvalitě, aby ho Komise mohla okamžitě zveřejnit a bude srozumitelné pro laické publikum. Souhrn bude obsahovat informace o očekávaných výsledcích a jejich širších společenských důsledcích. Výzkum projektu bude umístěn do širšího sociálně-ekonomického a politického kontextu, aby bylo snazší vysvětlit výsledky a jejich význam pro tvůrce politik a občany.
- **Vytváření sítí:** Aktivní propojení bude navázáno s evropskými institucemi, mezinárodními organizacemi, cílovými technicko -administrativními skupinami, výzkumnými projekty financovanými EU atd. Budou monitorovány a členové ARV budou přispívat na relevantní akce z jiných projektů za účelem sdílení znalostí a výsledků. To bude spojeno s aktivitami WP10 o meziprojektové spolupráci a klastrování se „sesterskými projekty“.
- **Mediální komunikace:** bude probíhat nepřetržitá práce s veřejností, cílená komunikace a aktualizace na základě zpráv partnerů projektu a úspěchů projektu. Budou připraveny a distribuovány brožury, krátké prezentace, zpravodajské články, infografiky, tiskové zprávy a informační bulletiny. Brožury a další publikace budou upraveny v jazyce a hloubce podrobností v závislosti na různých cílových skupinách: široká veřejnost, případní replikátoři, úřady, místní obyvatelé a další blízké zainteresované strany. Budeme sdílet příběhy z každodenního života, které se v rámci projektu objeví, což médiím pomůže lépe pochopit inovace a význam projektu ARV pro občany.
- **Sociální sítě:** Aktivování a správa ve spolupráci se všemi partnery projektu akce šíření prostřednictvím nejdůležitějších sociálních sítí (LinkedIn, Twitter) a vytvoření kanál ARV YouTube.
- **Informační přehled:** Na začátku projektu a v každém vykazovaném období bude vytvořen informační list, který bude ilustrovat pokroky projektu a výsledky. Informační list bude vytištěn a vyhotoven v elektronickém formátu (pdf). Je určen cílovým skupinám uvedeným výše a bude mít schematický obsah.
- **Brožura o výsledcích projektu:** Bude vypracována brožura o výsledku projektu s popisem všech výsledků dosažených v ARV (WP10).
- **Digitální zpravodaje:** Každých 6 měsíců bude projekt distribuovat informační bulletin shrnující hlavní úspěchy za dané období a bude se zabývat nejdůležitějšími aktivitami pro další období.

Web ARV bude shromažďovat informace o těchto aktivitách, což umožní společné streamování nebo shromažďování těchto informací, zpravodaje, tiskové zprávy atd., relevantní pro aktivity projektu a partnery. Web ARV bude během projektu aktualizován, aby informoval návštěvníky o nadcházejících událostech, novinkách a vývoji hlavních projektů. Všechny dokumenty k šíření a veřejné výstupy budou k dispozici v elektronické podobě ke stažení.

Plán ARV také předpokládá způsoby měření komunikačního úsilí a dopadu v různých fázích výzkumu. Indikátory budou vybrány k vyhodnocení dopadu (reakce nebo změny) na cílové publikum.

Tabulka 2.14 Shrnutí počátečního komunikačního plánu

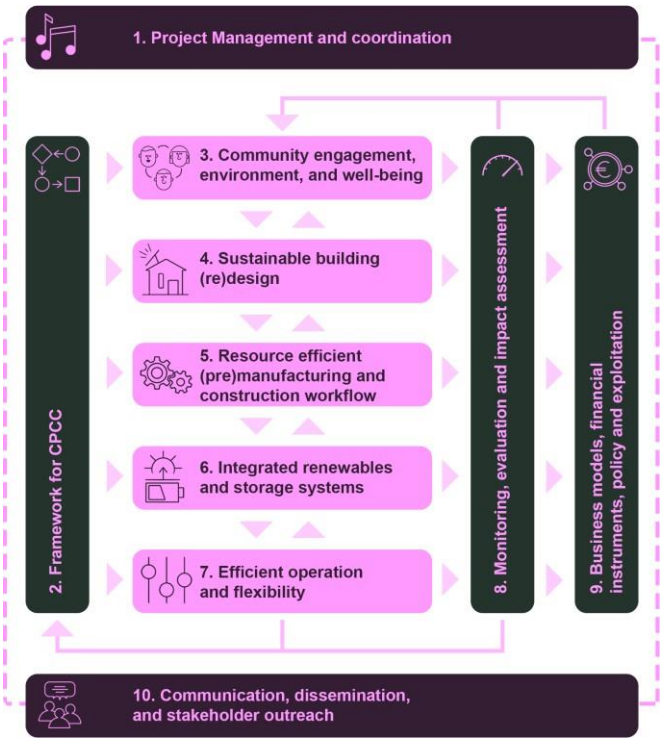
Cíle	Cílové publikum	Klíčové zprávy	Strategie
Zvýšení podílu budov a komunit s pozitivní energií	Široká veřejnost. Zúčastněné strany z výše uvedených cílových skupin, zejména technologie, energetika a stavební průmysl	Energie plus obydlí a sousedství se stávají realitou	Ukázat vývoj indikátorů výkonnosti demo projektů ARV. Sdělení požadované podmínky a řešení bariér. Získání zapojení a zelené ambasadory. Pravidelné aktualizace na online řídicím panelu propojeném s ARV Cloud Hub
Přispět ke snížení emisí skleníkových plynů	Široká veřejnost. Všechny zúčastněné strany z výše uvedených cílových skupin, zejména veřejné orgány na různých úrovních	Jak PEB a PED a CPCC přispívají ke snížení skleníkových plynů. Které opatření a podmínky jsou nejvíce nákladově efektivní na snížení kg CO_2/m^2.	Živý aktualizační kanál o snížení emisí skleníkových plynů v demo projektech (ve srovnání se současným stavem a druhým nejlepším)
Vylepšené vnitřní prostředí, což vede k vyšší míře spokojenosti uživatelů na základě jejich poptávky a chování.	Obyvatelé (majitelé domů a nájemníci) Profesionální uživatelé budov	PED a CPCC přispívají jak ke snížení emisí skleníkových plynů, tak ke zlepšení spokojenosti uživatelů (pokud jde o IEQ, kvalitativní spokojenost, úspory nákladů a kvalitu života na komunitní úrovni)	Průzkumy obsazenosti včetně měření. Publikace a prezentace zpráv o projektech, krátké videorozhovory
Podobné nebo nižší náklady ve srovnání s budovami s téměř nulovou spotřebou energie do roku 2020 jako pobídka k výstavbě domů s energetickou bilancí komunity pozitivní energie	Vlastníci a správci budov (veřejný, soukromý a neziskový sektor). Veřejné orgány (EU, národní, regionální, místní). Finanční stakeholdeři.	PED a CPCC nejsou žádná sci -fi, ale je to proveditelná možnost z hlediska úspor energie, CO2 a nákladů při současném zlepšení komfortu bydlení.	Výpočty nákladů životního cyklu uvedené ve zprávách a dalších důkazech nákladové efektivnosti přístupu PED a CPCC prostřednictvím výsledků demo projektu.
Přizpůsobit učení, školení a udržitelné chování zapojením občanů do laboratoří zeleného života v místních školách, komunitních centrech a jako informovaniéuživatele ve veřejném i soukromém sektoru budovy	Občané (koncoví uživatelé): majitelé budov, nájemníci a občané, pronajímatelé, sdružení (místní družstva), obce.	Klimaticky pozitivní cirkulární komunity, kde lidé mohou prospívat a prosperovat pro příští generace.	Zřízení výstavních prostor pro energetické vzdělávání, koučování pro nájemníky využívající energii prostřednictvím systému domácího energetického managementu (HEMS), jmenování „zelených velvyslanců“ mezi nájemníky, balíčky podpory a školicí materiály pro živé laboratoře
Dosažení vysokých architektonických kvalit navrhováním dobrých prostor pro lidi k životu, práci a prospívání.	Odvětví stavebnictví (potenciální členové elektronického trhu), občané (koncoví uživatelé), tvůrci politik a regulátory/ úřady	Ekologická, krásná, bezpečná a dostupná bydlení a komunity pro všechny	Sociální média, krátké video série, podcasty a projektová brožura.

3. Implementace

3.1 Pracovní plán – Pracovní balíčky, výstupy

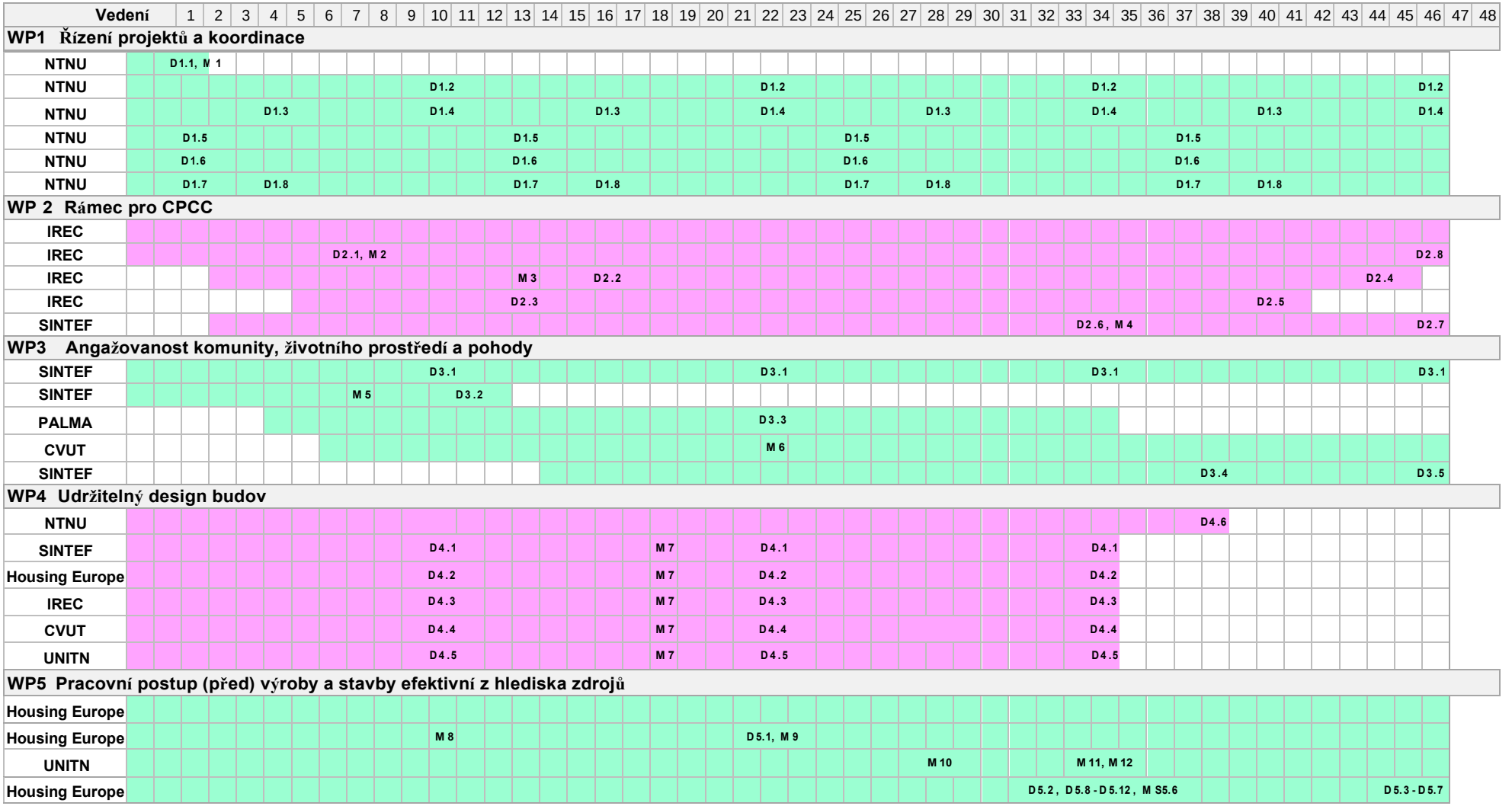
Projekt ARV bude rozdělen do deseti doplňkových pracovních balíčků, jak je znázorněno na **diagramu PERT** (vpravo).

Načasování různých pracovních balíčků a jejich součástí je uvedeno v **Ganttově diagramu** (další stránka).



Obrázek 3.1. Struktura a interakce pracovního balíčku PERT

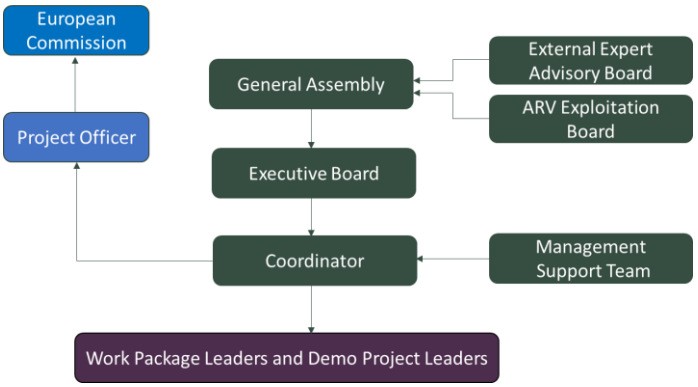
GANTT


Vedení
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
WP1 Řízení projektů a koordinace
NTNU D1.1, M 1
NTNU D1.2 D1.2 D1.2 D1.2
NTNU D1.3 D1.4 D1.3 D1.4 D1.3 D1.4 D1.3 D1.4
NTNU D1.5 D1.5 D1.5 D1.5
NTNU D1.6 D1.6 D1.6 D1.6
NTNU D1.7 D1.8 D1.7 D1.8 D1.7 D1.8 D1.7 D1.8
WP 2 Rámec pro CPCC
IREC
IREC D2.1, M 2 D2.8
IREC M 3 D2.2 D2.4
IREC D2.3 D2.5
SINTEF D2.6, M 4 D2.7
WP3 Angažovanost komunity, životního prostředí a pohody
SINTEF D3.1 D3.1 D3.1 D3.1
SINTEF M 5 D3.2
PALMA D3.3
CVUT M 6
SINTEF D3.4 D3.5
WP4 Udržitelný design budov
NTNU D4.6
SINTEF D4.1 M 7 D4.1 D4.1
Housing Europe D4.2 M 7 D4.2 D4.2
IREC D4.3 M 7 D4.3 D4.3
CVUT D4.4 M 7 D4.4 D4.4
UNITN D4.5 M 7 D4.5 D4.5
WP5 Pracovní postup (před) výroby a stavby efektivní z hlediska zdrojů
Housing Europe
Housing Europe M 8 D5.1, M 9
UNITN M 10 M 11, M 12
Housing Europe D5.2, D5.8 - D5.12, M S5.6 D5.3 - D5.7

	Vedení	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
WP6	**Integrované obnovitelné a úložné systémy**																																																
T6.1	**CVUT**																																															
T6.2	**SINTEF**																			M 13																								D6.1						
T6.3	**PZ**																			M 13							D6.2																					
T6.4	**UU**																			M 13																									D6.3					
T6.5	**CVUT**																			M 13																									D6.4					
T6.6	**EURAC**																			M 13																												D6.5		
WP7	**Efektivní provoz a flexibilita**																																															
T7.1	**Center Denmark**																																															
T7.2	**Center Denmark**																		D7.1																															
T7.3	**CVUT**																																D7.2															
T7.4	**ENFOR**											D7.3							D7.4																															
T7.5	**DTU**																																D7.5															
T7.6	**NTNU**																							D7.6									D7.7															
T7.7	**UU**																																		M 14									D7.8					
T7.8	**DTU**																																													D7.9		
WP8	**Monitorování, hodnocení a posuzování dopadů**																																															
T8.1	**EURAC**											D8.1																																				
T8.2	**Center Denmark**																		D8.2																														D8.3	
T8.3	**NTNU**																																															D8.4	
T8.4	**EURAC**																		M 15						D8.5																						D8.6	
T8.5	**EURAC**																																															D8.7, D8.8	
WP9	**Obchodní modely, finanční nástroje, politika a exploatace**																																															
T9.1	**NTNU**											D9.1													D9.1												D9.1										D9.1	
T9.2	**GDFA**						D9.2																																									
T9.3	**GDFA**																																			D9.3, M 16						D9.4, M 17						
T9.4	**GDFA**																																			D9.5								D9.6, M 18			
T9.5	**GDFA**																																													D9.7		
WP10	**Komunikace, šíření a dosah zainteresovaných stran**																																															
T10.1	**NTNU**		D10.1																																													
T10.2	**ACE**							D10.2													D10.2																	D10.2										
T10.3	**HE**			D10.3-10.4, M 19-M 20D10.4														D10.4											D10.4							D10.4					D10.5						
T10.4	**HE**																																															
T10.5	**HE**																																													D10.7		D10.6	
T10.6	**NTNU**											D10.8												D10.8												D10.8										D10.8	

3.2 Struktura řízení, milníky a postupy

Struktura řízení ARV byla vytvořena tak, aby efektivně zvládala složitost projektových a partnerských struktur a aby jasně propojila odpovědné členy různých entit konsorcia. Je také navržena tak, aby umožňovala efektivní komunikaci mezi různými partnery a řídícími orgány projektu a Evropskou komisí. Struktura řízení projektu ARV je znázorněna na obrázku 3.2 a role a úkoly různých řídících orgánů jsou popsány níže. Úplný postup tvořící strukturu řízení projektu, včetně zastoupení na schůzkách, hlasovací práva atd., budou dále nastíněny v dohodě o konsorciu CA na základě modelu DESCA pro projekty H2020 využívající modul GOV LP



Obrázek 3.2. Hlavní struktura řízení projektu ARV

Koordinátor projektu (PC) a tým pro řízení projektu (PMT): Jako příjemce a koordinátor stovek evropských projektů během let nasbíral NTNU rozsáhlé zkušenosti s řízením a koordinací velkých mezinárodních výzkumných projektů. Jako **PC** bude NTNU fungovat jako prostředník mezi příjemci a Evropskou komisí. S podporou **PMT** a finančního manažera plní všechny úkoly přidělené koordinující instituci, jak je popsáno v grantové dohodě a CA. Úkoly a povinnosti PC a PMT jsou:

- Sledovat soulad partnerů projektu s jejich povinnostmi (za pomoci vedoucích pracovních skupin);
- Působit jako asistenční služba pro všechny příjemce ve všech záležitostech týkajících se projektu;
- Spravovat průběžné hlášení, pravidelné hlášení, zajišťování kvality a předkládání výstupů, aby bylo zajištěno, že všechny dokumenty/vstupy budou doručeny včas a na nejvyšší možné úrovni.;
- Organizovat pravidelná zasedání Konsorcia a Valného shromáždění, navrhovat program těchto setkání, připravovat zápisy a sledovat provádění přijatých rozhodnutí; a
- Rozdělit finanční příspěvek EU všem příjemcům.

Valné shromáždění (GA): je konečným rozhodovacím orgánem konsorcia. PC zajistí, aby byla příslušná rozhodnutí projednána s projektovým úředníkem a formalizována v dodatku ke grantové dohodě. GA bude rozhodovat o otázkách strategického významu, jako je např:

- Obsah, finance a práva duševního vlastnictví (např. Změny popisu práce DoW nebo přílohy 2 grantové dohody, změny CA)
- Vývoj konsorcia (např. Vstup nového nebo výběr/odchod příjemce)
- Jmenování členů do Výkonné rady

Kompozice: GA se skládá z jednoho vyššího hlasujícího člena na příjemce. Během schůzí mohou být přítomni i členové bez hlasovacích práv z řad příjemců. Členové s hlasovacím právem budou považováni za oprávněné rozhodovat o záležitostech uvedených výše, ale bude jim doporučeno, aby se poradili se svým právním týmem o otázkách týkajících se práv duševního vlastnictví nebo změn konsorcia nebo rozpočtu. Schůzím bude předsedat PC. GA obdrží důležité rady od Exploatační rady ARV (AEB) a Rady pro externí expertní poradenství (EAB). **Schůzky:** Řádná zasedání GA, jimž předsedá PC, se budou konat nejméně jednou za rok. Podmínky pro svolání běžných nebo mimořádných setkání GA budou popsány ve Smlouvě o konsorciu.

Výkonná rada (EB): je zodpovědná za realizaci projektu. Bude řešit problémy související s výstupy, dokončením milníků a kritickými riziky. EB navrhne řešení těchto problémů, o nichž bude hlasovat Valné shromáždění. EB může rozhodnout o drobných záležitostech, které nezahrnují změny DoW nebo jakýchkoli položek hlasování pro Valné shromáždění uvedených v CA. Aby byla zajištěna transparentnost, jsou zápisy ze schůzí rozesílány všem příjemcům. EB bude:

- Pravidelně sbírat informace o postupu projektu za účelem monitorování a efektivního plnění úkolů, milníků a výstupů

- Pomáhat koordinátorovi při přípravě setkání s Evropskou komisí spolu se souvisejícími údaji a výstupy.
- Navrhovat rozhodnutí a připravovat program zasedání valné hromady
- Zodpovědná za řádný výkon rozhodnutí valné hromady
- Dohodnout se na obsahu a načasování tiskových zpráv a publikací v souladu s článkem 29 grantové dohody

Kompozice: EB se skládá z koordinátora projektu (PC), vedoucích pracovního balíčku (WPL) a vedoucích demo projektů (DPL). **Schůzky:** EB se bude scházet nejméně každé 3 měsíce, a to buď fyzicky v souvislosti se schůzkami konsorcia, nebo online. Každých 6 měsíců bude provedeno posouzení výkonnosti projektu (interní dodávka). PC a EB mají společnou odpovědnost za dosažení cílů projektu.

Vedoucí pracovního balíčku (WPL) a vedoucí demo projektů (DPL): budou úzce spolupracovat, aby zajistili úspěch projektu. V každém z tematických pracovních balíčků bude úkol nazvaný „Inovační řízení pracovního balíčku X“, který zajistí propojení mezi prací v pracovní skupině a demo projekty. WPL a DPL mají povinnost hlásit jakékoli závažné problémy nebo zpoždění výkonné radě a valnému shromáždění. WPL a DPL budou:

- Koordinovat a plánovat práci v pracovních balíčcích a demo projektech
- Monitorovat postup prací v jejich pracovních balíčcích a demo projektech a podávat zprávy EB
- Předsedat společným schůzkám WP a Demo projektu a pořizovat z nich zápisy
- Upozorňovat EB a GA na hlavní problémy, zpoždění nebo špatný výkon příjemce nebo dema
- Přispívat k pravidelnému hlášení
- Identifikovat problémy a příležitosti v oblasti práv duševního vlastnictví a přispívat k aktivitám šíření

Kompozice: Vedoucími WP jsou NTNU, IREC, SINTEF, NTNU, HU, CVUT, DTU, EURAC, GDFA, ACE. Vedoucími demo jsou HU, PALMA, OBF, PZ, KARV a DTTN. **Schůzky:** WPL a DPL budou organizovat společná setkání osobně nebo prostřednictvím webové konference, tak často, jak je třeba.

Externí expertní poradní výbor (EAB)

EAB je podpůrný orgán složený ze tří mezinárodně uznávaných externích odborníků na hlavní témata projektu. Vybraní odborníci jsou: **Dr Ladeja Godina Košir**, **Zakladatel a výkonný ředitel společnosti Circular Change**, Evropa/Slovinsko, **Dr Piotr Bartkiewicz**, **Profesor Varšavské univerzity a partner Go4Energy**, Polsko, a **Dr. Francis Allard, emeritní profesor na La Rochelle University a předseda Tipee,** Francie. Hlavním úkolem EAB je poskytovat pokyny ke kvalitě projektu a poskytovat konsorciu zpětnou vazbu o celkovém pokroku projektu a jeho implementaci. EAB prostřednictvím svých příslušných sítí také přispěje k šíření a širokému využití výsledků ARV. EAB bude pravidelně zván na zasedání konsorcia a může být pozván k účasti na valném shromáždění (bez hlasovacích práv).

Exploatační rada ARV (AEB)

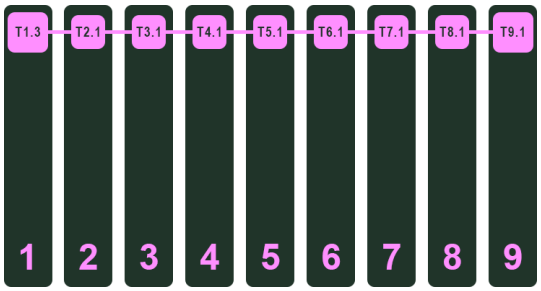
V T9.6 bude zřízena Rxploatační rada pro využití jako nástroj pro škálování obchodních modelů a finančních nástrojů. Exploatační rada bude částečně složen ze silných inovačních klastrů a hráčů finančního sektoru, kteří budou šířit koncepty zelené budovy a renovace, aby poskytly impuls „vlně renovace“, která bude politicky podložena. AEB je složena z odborníků z oboru vybraných z řad partnerů ARV a z vlivných externích společností, aby reprezentovali celý hodnotový řetězec CPCC. Externí členové EAB jsou **Werner Jager, Ředitel technologie a marketingu v Hydro Building Systems**, Německo, a **Marianne Okland, CEO společnosti Construction City Cluster**[50], Norsko a **Dr Bruno Peuportier**, **Vědecký manažer v Centru pro energetickou účinnost systémů CES**, Francie. Cílem AEB je přispět ke zlepšení využívání inovací ARV, další popis jejich úkolů viz Úkol 9.1. AEB se bude pravidelně scházet s ARV Innovation Forum (úkol 1.3), aby zajistila včasnou identifikaci a škálování komerčně životaschopných inovací.

Inovační management

Úkol 1.3 ve WP1 bude věnován managementu inovací. Úkol se bude skládat ze všech vedoucích demo projektů a vedoucích pracovních balíčků vedených manažerem inovací (IM). Manažer inovací bude hostovat NTNU s využitím odborných znalostí Úřadu pro přenos technologií NTNU (TTO),

[50]Construction City is an innovation cluster with a mission to drive collaboration and new solutions in the construction industry, www.constructioncity.no

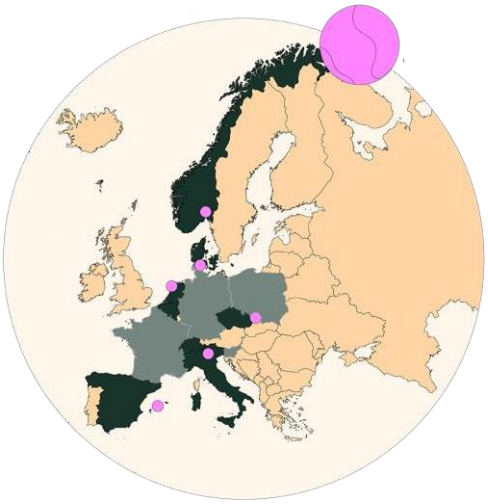
který má rozsáhlé zkušenosti s prací s managementem inovací a obchodními modely souvisejícími s udržitelnými budovami a čtvrtěmi prostřednictvím 15 let zkušeností a vymyšlením více než 1800 nápadů. Obrázek 3.3 znázorňuje ilustraci struktury řízení inovací v projektu ARV. Ve WP 1 (vlevo) je úkol věnovaný managementu inovací (Úkol 1.3). Cílem tohoto úkolu je zajistit řádné vedení demo projektů v souladu s výstupy projektu ARV a aktivitami ve WP (T1.3). Účastníci úkolu zahrnují šest vedoucích demo projektů (DPL) a jsou vedeni zástupcem PMT



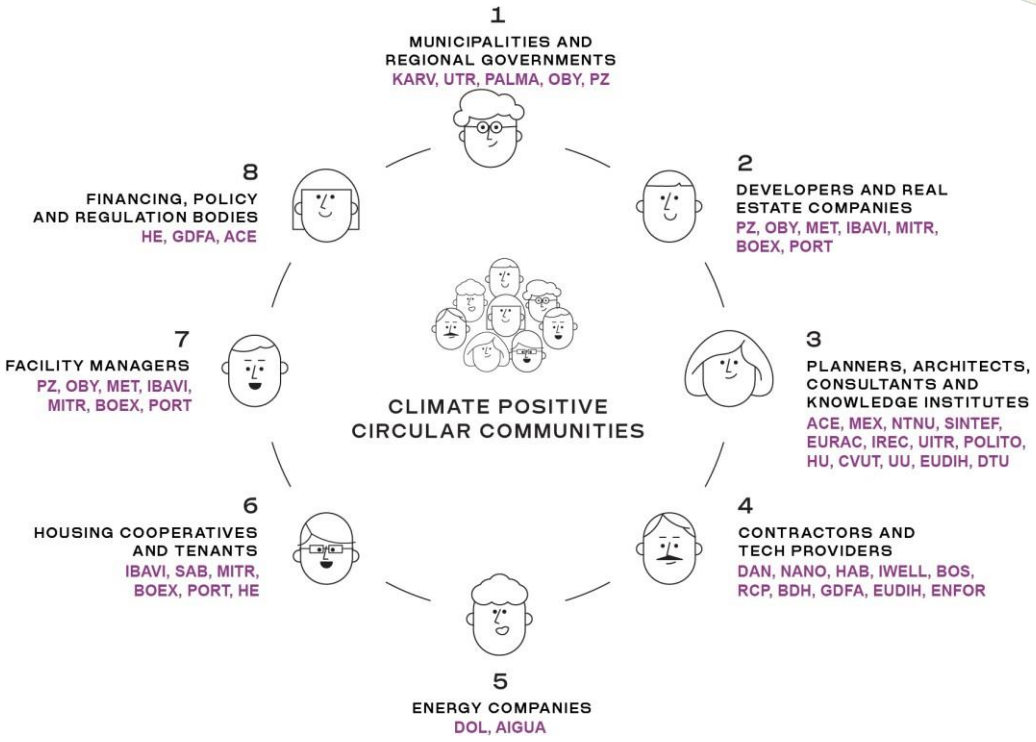
Obrázek 3.3. Vazba mezi aktivitami souvisejícími s demo projekty a řízením inovací napříč WP

(NTNU). DPL budou měsíčně podávat NTNU zprávu o postupu demo projektů, stavu inovací, dodržování a aktualizacích plánování, potenciálních problémech a jejich potenciálním řešení. To pomůže sledovat stav a vztahy demo projektu. Kromě toho bude v každé pracovní skupině úkol (úkol 2.1, 3.1, 4.1 atd.) věnovaný managementu inovací, který propojí související práci v demo projektech s pracovní skupinou.

3.3 Konsorcium jako celek



35 partnerů ARV je pečlivě vybíráno na základě jejich zkušeností, znalostí a dovedností, aby přispěly vynikajícími inovacemi pro Klimaticky pozitivní cirkulární komunity (CPCC). Dohromady tvoří celý hodnotový řetězec CPCC, od plánování, návrhu, výstavby až po provoz a využívání těchto komunit. Také se navzájem doplňují, pokud jde o znalosti, dovednosti, produkty a služby, které do projektu přinášejí, a mají široké pole působnosti a sítě, které položily základ pro rozsáhlé přijetí řešení ARV na trh. **11 z partnerů jsou malé a střední podniky**. Kromě 35 partnerů ARV v 8 zemích máme **38 přidružených společností a organizací** (potvrzeno dopisy o podpoře) **v rámci Evropy**, a členové poradních a exploatačních rad jsou z Francie, Německa, Polska a Slovinska, jak je uvedeno na mapě. Partneři, jejich role a přínos v ARV jsou popsány níže.



Obrázek 3.4 ARV partneři podél hodnotového řetězce CPCC.

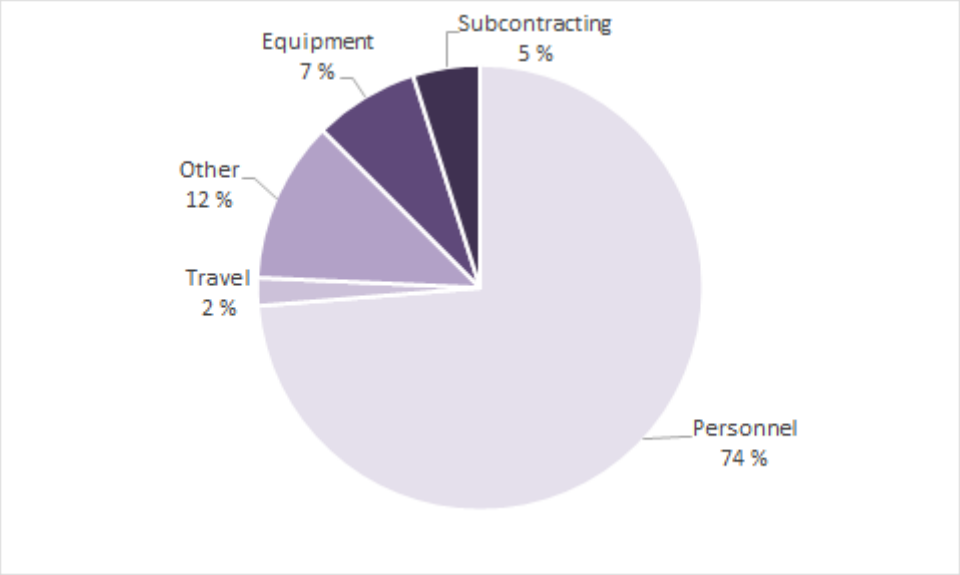
1) NTNU, norská univerzita vědy a technologie (Institut znalostí) je hlavní norskou univerzitou v oboru strojírenství a technologie, **povede WP 1** o projektovém řízení a koordinaci a **WP 4** o udržitelném (re) designu budov. NTNU přispívá do všech WP. NTNU má profesionální tým podpory administrativních projektů, který zajišťuje vysokou kvalitu a hladkou implementaci projektu. Tým NTNU má rozsáhlé zkušenosti a znalosti v budovách a čtvrtích s nulovými emisemi (přední výzkumné centrum ZEB51 a výzkumné centrum ZEN52 Sustainable Plus Energy Neighborhoods, syn.ikia H202053).	
2) Rada architektů Evropy (ACE) zastupuje zájmy více než 600 000 architektů z 31 zemí v Evropě. ACE se skládá ze 44 členských organizací. Díky rozsáhlým zkušenostem z projektů EU **povede** ACE **WP10** pro komunikaci, šíření a dosah zúčastněných stran a přispěje k WP1–5, WP8 a WP9.	
3) České vysoké učení technické (CVUT) (Znalostní institut) v Praze je jednou z nejstarších a největších technických univerzit v Evropě. Projekt ARV bude realizovat Univerzitní centrum energeticky efektivních budov (CVUT UCEEB), což je národní centrum excelence v energeticky účinných a udržitelných budovách. CVUT UCEEB povede WP 6 o inovativních obnovitelných a úložných systémech a českém demo případu v Karviné.	
4) DTU, (Znalostní institut) Technická univerzita v Dánsku **povede WP7** o efektivním provozu a flexibilitě s klíčovými členy DTU Compute, kteří mají rozsáhlé zkušenosti s digitalizací energetických systémů. Tato skupina DTU byla iniciátorem konceptu energetické flexibility a měla ústřední postavení v rámci IEA Příloha 6754 v budovách a metodikách k využití této flexibility ke snížení emisí CO2 a nákladů. Skupina má rozsáhlé zkušenosti se sladěním poptávky a spotřeby energie v budovách a přispěje k WP2 a WP6.	
5) Danfoss (DAN) má sídlo v Sønderborgu, DK, a je největší dánskou soukromou průmyslovou společností s 28 000 zaměstnanci obsluhujícími zákazníky ve více než 100 zemích. V ARV bude Danfoss vyvíjet a předvádět inovativní řešení pro systémy řízení vytápění, hardwarové i softwarové, se zaměřením na dosažení vynikající energetické náročnosti budov. Danfoss bude přispívat hlavně na WP7 technickými řešeními snížení teploty zpětného vytápění z budov do sítě dálkového vytápění.	
6) ENFOR je přední dánský MSP v oblasti energetických předpovědí a optimalizačních řešení pro energetický sektor. V ARV bude ENFOR poskytovat řešení pro předpovídání výroby obnovitelné energie, poptávky elektřiny a tepla a také optimalizace systémů dálkového vytápění. ENFOR bude primárně přispívat k WP6 a WP7.	
7) Project Zero (PZ) je partnerství veřejného a soukromého sektoru na podporu obce Sønderborg, aby se do roku 2029 stala NULOVOU uhlíkovou obcí kompenzací 700 000 tun emisí uhlíku souvisejících s energetickým systémem. **PZ bude vedoucím demo projektu v Sønderborgu**, který bude koordinovat činnosti a zavádět opatření pro úsporu energie prostřednictvím dovybavení. PZ se bude účastnit procesu implementace a šíření informací.	
8) EURAC Research je soukromé výzkumné centrum s více než 500 zaměstnanci, kteří jsou v současné době zapojeni do 81 projektů financovaných z prostředků EU. EURAC se silně zaměřuje na obnovitelné energie a životní prostředí, ale také na zdraví a politické a sociální systémy. V ARV povede EURAC **WP8** o monitorování, hodnocení a posuzování dopadů ale mimo jiné také přispěje k WP3–5.	
9) SINTEF, která je jednou z největších nezávislých výzkumných organizací v Evropě, povede WP3 o zapojení komunity, životním prostředí a pohodě. Skupina SINTEF má rozsáhlé zkušenosti a znalosti v oblasti práce se zapojením zúčastněných stran a vývoji technologií pro budovy a čtvrti pracující s nulovými emisemi napříč tématy, jako jsou živé laboratoře, územní plánování, městské modelování, integrativní energeticky účinné budovy a LCA. SINTEF také přispívá na WP1–8 a WP 10.	
10) Palma City (PALMA) (Veřejný orgán) je hlavním městem Baleárských ostrovů (Španělsko) s více než 460 000 obyvateli. Hlavní práci v ARV provádí oddělení městského modelu. Je podporován ministerstvem pro bydlení, odborem zapojení občanů, odborem životního prostředí a odbor infrastruktury PALMA je vedoucí demo ve Španělsku. Příspěvek PALMA v ARV se zaměří hlavně na WP2, WP4 a WP9	
11) IBAVI, Baleárský institut bydlení má jako hlavní cíl vytvořit a udržovat a dostupné sociální bydlení. V ARV bude IBAVI přispívat hlavně k WP4, WP5 a WP8, což zahrnuje integrovaný cirkulární design a konstrukce španělského demo projektu.	
12) IREC, Katalánský institut pro energetický výzkum má rozsáhlé zkušenosti a odborné znalosti v oblasti udržitelného rozvoje prostřednictvím nových technologických řešení a technologií obnovitelné energie. IREC pomáhá politickým činitelům. V ARV **povede** IREC **WP2** o rámci a nástrojích pro efektivní implementaci a hodnocení CPCC a hlavně přispěje svými odbornými znalostmi o integrovaném energetickém designu na úrovni budov a okresů, obchodních modelů pro rozsáhlé modernizace, občanských energetických společenství a simulace městské energie. IREC také povede španělský demo projekt	
13) Metrovacesa (MET) je jedním z největších realitních developerů ve Španělsku, který pracuje s rezidenční a komerční zástavbou a také se správou půdy. Zvláště pokud jde o financování a obchodní modely, MET přispěje ARV svými zkušenostmi na podporu výstavby nebo renovace energeticky účinných a udržitelných budov. MET se bude podílet hlavně na WP3, WP7 a WP8.	
14) Univerzita aplikovaných věd Utrecht (UAS Utrecht) **(Znalostní institut)** přináší odborné znalosti o přechodu na okresy bez fosilních zdrojů, zdravé budovy, chytrou mobilitu a městské zkušenosti. UAS Utrechtmain se zaměřuje na integraci různých systémů nabízených partnery ARV pro malé a střední podniky do pracovních toků dodatečně vybavených energeticky a zdrojově efektivním způsobem.	

[51] https://www.zeb.no/index.php/en/
[52] https://fmezen.no/
[53] https://www.synikia.eu/
[54] http://www.annex67.org/about-annex-67/

15) Housing Europe (Housing Europe) je Evropská federace veřejného, družstevního sociálního bydlení, síť 42 národních a regionálních federací, které dohromady zahrnují přibližně 41 400 veřejných, sociálních a družstevních poskytovatelů bydlení ve 22 zemích a spravují více než 25 milionů domů, což představuje 12% obydlí EU. V ARV bude Housing Europe zapojeno hlavně do WP3 a WP10.	
16) Buro DeHaan (Buro de Haan) (SME) má zkušenosti s industrializací a digitalizací pro škálovatelné renovační projekty V ARV BURO DE HAAN předvede předběžné rozpoznání typologií fasád a přístupů nulového inženýrství (WP5) a přispěje k bodové cloudové technologii, inženýrství, rozpoznávání obrazu a úřístup „file2factory“	
17) EU Digital Innovation Hub (CENTER DENMARK) provozuje Centre Denmark, což je nezisková a nezávislá organizace, která pracuje na podpoře rozvoje digitálně integrovaných energetických systémů s cílem zlepšit přechod společnosti na 100 % OZE a snížit dopad na životní prostředí prostřednictvím digitalizace a propojení odvětví. V ARV CENTER DENMARK předvede digitální infrastrukturu pro optimalizaci spotřeby energie a výkonu budov a čtvrtí pomocí digitálních nástrojů (AI) ve WP7 a WP8.	
18) Sønderborg Andelsboligforening (SAB) je nezisková nezávislá a soukromá společnost sociálního bydlení, kterou vlastní jejich obyvatelé (nájemníci). V ARV bude SAB, jako hostitel projektu Demo v Sønderborgu, DK předvede nová inovativní opatření pro úsporu energie v budovách, zejména bytových domech. SAB zapojí do projektu občany/nájemníky a výsledky rozešle dalším sdružením sociálního bydlení v Evropě.	
19) Green Digital Finance Alliance (GDFA) je nezisková organizace, která rozšiřuje financování Pařížské dohody prostřednictvím inovací podporujících fin-tech. GDFA je znalostním partnerem pracovní skupiny G-20 pro udržitelné finance a pracovní skupiny OSN pro digitální financování cílů udržitelného rozvoje v rámci své vedoucí práce v oblasti myšlení. V ARV **povede** GDFA **WP9** ohledně využití na trhu, aby urychlila inovace partnerů tím, že jim umožní nasadit nové schopnosti fin-tech k řešení současných překážek pro škálování zeleného financování uhlíkově pozitivních komunit a navrhnout standardizované nástroje pro škálování v celé EU.	
20) BOEX (Společnost sociálního bydlení) předvedla v předchozím projektu první evropskou dodatečnou energetickou budovu pro rekonstrukci desetipatrového bytového domu ze 60. let a nabídne své zkušenosti s učením ostatním utrechtským bytovým korporacím. V projektu ARV bude Bo-Ex dále uplatňovat přístup PEB pro dodatečnou montáž na 4 příbězích středně velkých bytových domů. Kromě toho se Bo-Ex bude podílet na optimalizačních aktivitách Smart Building a Smart Communities pomocí (BI) PV a skladování baterií	
21) RCP RC Panels (SME) je inovativní společnost nabízející montované fasády pro renovace s nulovou spotřebou energie. Hlavní zaměření RC panelů je na integraci a předvedení jejich fasádních panelů do energetický a zdrojově efektivních systémů dodatečné montáže. RCP zapojené do holandského demo projektu bude nejaktivnější ve WP4 a WP5.	
22) Univerzita v Utrechtu (UU) (Znalostní institute) přináší odborné znalosti o přechodu k udržitelným systémům energie a zdrojů, se zvláštním zřetelem k integraci efektivního využívání energie a zdrojů do řešení dodávek obnovitelné energie v různých měřítcích. Hlavním cílem projektu ARV je demonstrace integrace obnovitelných zdrojů (primární BIPV) do systémů renovace a ukázka inteligentní budovy a komunit Virtuální elektrárny pro lepší flexibilitu sítě v různých měřítcích (budova, okres, město, země) WP6 a WP7	
23) Obec Utrecht (Město UTRECHT) (Veřejný orgán) přináší odborné znalosti o městském plánování, zapojení občanů a komunity a regulačních aspektech. V projektu ARV bude obec Utrecht předvádět inovace sociální renovace, zaměstnanosti a energetického koučování a v případě potřeby přispěje k dodatečnému vybavení pracovních toků účinně využívajících energii a zdroje.	
24) Bos Installatiewerken (BOS GROEP) se prokázal v předchozím projektu s Bo-Ex prototyp “Inside out” dovybavení a má rozsáhlé zkušenosti s instalačními pracemi. V projektu ARV bude Bos poskytovat systémové inženýrské služby pro všechny stavební a instalační komponenty do modulárních komponent pro rychlou masovou zakázkovou výrobu a dodatečné vybavení (WP4 a WP5)	
25) iWELL (SME) je vývojářem inteligentních systémů pro skladování energie. V projektu ARV iWell předvede integrace stacionárních akumulátorů jako součást systému inteligentních budov a komunit, které nabízejí flexibilitu sítě v různých měřítcích (budova, okres, město, země) (WP6, WP7)	
26) MEX architects (SME) je architekt se zkušenostmi s dodatečnou montáží bytových jednotek sociálního bydlení. V předchozím projektu s Bo-Ex Mex se zúčastnil prototypu “Inside out”dovybavení. V projektu ARV bude Mex poskytovat inovativní designové služby pro integraci stavebních komponent, aktivních fasád, BIPV do atraktivních a nízkozdrojových designů (WP4 a WP5)	
27) Mitros (MITROS) (Společnost pro sociální byty) se prokázala v předchozím projektu Rekonstrukce budovy s nulovými emisemi a nabídne své zkušenosti z učení ostatním bytovým korporacím v Utrechtu. V ARV Mitros připraví plán dodatečné montáže pro PEB pomocí nízkoteplotního dálkového vytápění, specifické zaměření této činnosti spočívá v nastavení modulárního systému větrání, vytápění a chlazení. Kromě toho se Mitros bude podílet na optimalizačních aktivitách Smart Building a Smart Communities pomocí (BI) PV a skladování baterie.	
28) Město Karviná (KARV) se nachází na východě České republiky na hranicích s Polskem a má přes 50 000 obyvatel. V ARV bude město Karvina přispívat hlavně implementací obytných laboratoří CPCC a zapojí občany na WP3 a implementace řešení pro ukládání dat na WP6.	
29) DOL Dolomiti Energia je italský dodavatel energie a plynu se silným úsilím o snížení dopadů na životní prostředí díky dodávce 100% čisté energie s vysledovaným a zaručeným původem, plynu bez CO2 a inovativním službám energetické účinnosti navrženým speciálně pro rodiny a firmy. Hlavní role DOL bude ve WP3.	
30) Habitech (DTTN) – Okres energie a životního prostředí propagovaný autonomní provincií Trento je přední národní centrum pro zelené budovy, obnovitelné zdroje energie a inovace. DTTN propaguje a koordinuje	

integrované a inovativní procesy ke zlepšení budov a majetku nemovitostí. V ARV povede DTTN aktivity v případové studii v Trentu a bude úzce spolupracovat s EURAC a UNITN, zejména ve WP4 a WP5.	
31) UNITN, the University of Trento, má vynikající zkušenosti s mezinárodními projekty, protože se podílela na 117 výzkumných projektech RP7 a 119 H2020. V ARV bude oddělení civilní ochrany životního prostředí a strojního inženýrství UNITN zajišťovat vědeckou koordinaci pro modulární přístup montovaného dřeva, laboratorní testy, technické průzkumy a návrh systému pasivních a aktivních energií ve WP4, WP6 a WP8.	
32) Politecnico di Torino (POLITO), je jednou z předních evropských univerzit v technicko-vědeckém výzkumu a má výjimečné zkušenosti s mezinárodními výzkumnými projekty RP7 a H2020. V ARV bude zapojeno oddělení konstrukčního, geotechnického a stavebního inženýrství (DISEG) a katedra architektury a designu (DAD). Ve WP4 a WP5 budou přispívat k návrhu, instalaci a správě energetického tunelu (tunel Piedicastello), inovativní architektura a BIPV.	
33) Oslobygg (OBF) je jedním z největších norských stavitelů a realitních hráčů s cca. 2,5 milionu m2 majetku a je ve vlastnictví obce Oslo. Jejich cílem je být v popředí udržitelných a inovativních řešení a technických řešení. V ARV bude OBY **vývojářem a lídrem norského demo** projektu a bude přispívat hlavně na WP3, WP4 a WP8.	
34) NANO Power je integrátorem přepravních baterií a systémů pro skladování energie, které přispějí hlavně na WP6 a WP7 na potenciální využití baterií s druhou životností, optimalizaci výkonu baterie vs. velikost baterie zaměřenou na optimalizaci nákladů a možnost snížit fixní náklady na energii.	
35) AIGUASOL je energetická poradenská, inženýrská a výzkumná společnost se sídlem v Barceloně, která pracuje hlavně s pohodlnými vnitřními a venkovními prostory a efektivními energetickými systémy. V ARV se primárně podílejí na WP2 a WP4, zaměřují se na používání a testování nástrojů pro implementaci CPCC a integraci cirkulárního designu ve španělském demo projektu.	

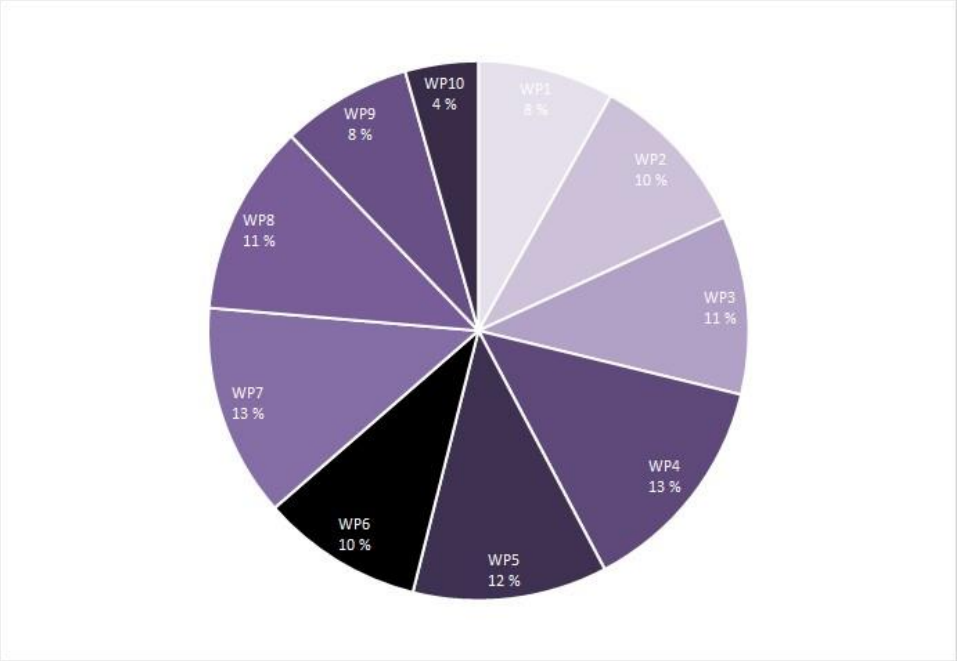
3.4 Přidělené zdroje



Obrázek 3.6. Podíl přímých způsobilých nákladů

Rozpočet na celkové způsobilé náklady na projekt ARV je 21 316 652,68 EUR s **požadovaným grantem z EU na 19 998 409,07 EUR**. Obrázek 3.6 ukazuje rozdělení přímých způsobilých nákladů.

Lví podíl na rozpočtu připadá na personál provádějící práci v projektu, což je 74% podílu. Druhá největší složka je pro ostatní zboží a služby s 12% podílem, která pokryje materiály a instalace podporující stavební činnost v projektu. Cestovní náklady, které tvoří 2% podílu, se vypočítávají podle celkového cestovního plánu za použití standardních sazeb. Cestovní činnost zahrnuje především účast příjemců na projektových setkáních a návštěvy demo stránek příjemců, jejichž dema se nacházejí v různých městech. Je potřeba zadat část práce v úkolu 2.5 pro IREC, úkol 3.3 pro BOEX, MITROS, PALMA, úkol 4.3 pro RC panely, úkol 4.4 pro IBAVI, úkol 5.4 pro BOEX,, úkol 7.5 PALMA, úkol 7.6 pro BOEX , úkol 9.5 pro MĚSTO UTRECHT, jakož i některé práce týkající se školení pro PROJECTZERO a IT bezpečnosti pro ENFOR. Subdodávky tvoří 5% celkových přímých způsobilých nákladů.



Obrázek 3.7. Podíl PMs podle WP

Přidělené úsilí WP je znázorněno na obrázku 3.7. Obrázek ukazuje, že distribuce úsilí je rovnoměrná, s výjimkou WP10, pracovní balíček pro komunikaci, se 4% úsilí. WP7 je pracovní balíček s největším úsilím, s 13%, zatímco zbytek má každý mezi 8% a 12% úsilí. NTNU má díky své integrační roli větší rozpočet než ostatní partneři, pokrývající téměř všechna témata pracovní skupiny: V tabulce 3.4a je uvedeno rozdělení PM mezi pracovní skupinu a partnery, zatímco v tabulce 3.4b jsou náklady pro partnery, kde náklady u „cestování", „vybavení" a „zboží a služby" je uvedeno více než 15% osobních nákladů pro daného partnera. Veškeré náklady na odpisy zařízení, infrastruktury nebo jiná aktiva v projektu jsou v souladu s článkem 6 a budou zaúčtovány v příslušných účtech příjemců, zakoupeny v souladu s článkem 10 grantové dohody a odepsány v souladu s mezinárodními účetními standardy a obvyklé účetní postupy příjemce.

Tabulka 3.4b: 'Ostatní položky přímých nákladů (cestování, vybavení, další zboží a služby, velká výzkumná infrastruktura)

02 – ACE	**Náklad (€)**	**Odůvodnění**
Cestování	10 000	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem), další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran, cestování na demo místa (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem)
Další zboží a služby	42 000	15 000 EUR za webové stránky, infrastrukturu ICT, cloudové služby, databázi a náklady na hosting, propojené s dílčím úkolem 10.3.1; 12 000 EUR za 2 konference pro průmysl a občanskou společnost, spojené s dílčím úkolem 10.4.3; 5 000 EUR na akce zvyšování povědomí spojené s dílčím úkolem 10.4.3; 10 000 EUR za závěrečnou konferenci navazující na T10,5
Celkem	52 000	
03 – CVUT	**Náklad (€)**	**Odůvodnění**
Cestování	15 000	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem); další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran, cestování na demo místa (2 osoby za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok na osobu, Celkem 10 000 €)
Další zboží a služby	428 500	8500 EUR za software pro online usnadnění a zpracování dat související s úkoly 3.3 a 3.4; 9 000 EUR za workshopy spojené s úkoly 3.2, 3.3, 3.4 37 000 EUR na stavbu integrovaného vyměnitelného fasádního systému s integrovaným OZE, navázáno na dílčí úkol 5.4.4 16 000 EUR za místní systém jednotek Peltier HVAC, spojený s dílčím úkolem 5.4.4 29 000 EUR za systém skladování energie z baterie druhé životnosti spojený s úkolem 6.3 13 000 EUR za systém předpovědi počasí, spojený s úkolem 7.4 15 000 EUR na platformu pro monitorování kvality vnitřního ovzduší navazující na úkol 8.2 7 000 EUR za platformu pro monitorování kvality venkovního ovzduší v souvislosti s úkolem 8.2 4 000 EUR za monitorovací stanice související s úkolem 8.2 41 000 EUR na řešení systému obnovitelné energie a skladování energie pro energetické potřeby budov - část BIPV, propojeno s T 6.3 15 000 EUR na hospodaření se zelenou střechou a dešťovou vodou související s dílčím úkolem 5.4.4

		31 000 EUR na řešení systému obnovitelné energie a skladování energie pro potřeby budování elektřiny - část BAPV, propojená s T6.3 6 000 EUR za nabíjecí systém EV spojený s T 6.3 70 000 EUR na OZE a sklady řešení energetického systému pro potřeby elektřiny v budovách - vytápění, navázáno na úkol 6.2 74 000 EUR na systém energetického managementu budov (BEMS), spojený s úkoly 7.5, 7.6, 7.7, 8.1, 8.2 14 000 EUR za systém stínění budov, T6.3 35 000 EUR na systém energetického managementu budovy - provoz, monitorování a řízení, T 8.2 4 000 EUR za audit CFS
Celkem	443 500	

05 – DANFOSS	**Náklad (€)**	**Odůvodnění**
Cestování	9 250	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem); další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran, cestování na demo místa (1 osoba za rok po dobu 4 let: let (750 EUR) + průměrně 1,25 noci * 250 EUR za noc dává 1 000 EUR za rok, 4250 EUR Celkem)
Vybavení	62 500	1 jednotka prototypu pro posilovač oběhu pro teplou užitkovou vodu za 21 000 EUR, včetně nákladů na instalaci. Technické vybavení je prototyp a bude mít dobu odpisování odpovídající 2letému období monitorování v projektu (souvisí s T6.3); 4x45 jednotek prototypu pro radiátorové termostaty SOLO/automatické za 41 EUR Celkem 500, včetně nákladů na instalaci: technické vybavení jsou prototypy a budou mít dobu odpisování odpovídající 2letému období monitorování v projektu (souvisí s T6.3).
Další zboží a služby	35 000	Ke sledování termostatů Danfoss SOLO je zapotřebí více připojení k internetu a k tomu je nutné předplatné internetového připojení (propojeno s T6.3). Rozpočet je stanoven na 25 000 EUR. K interpretaci a uzavření záznamů dat může být zapotřebí specializovaných poradců pro výzkum a vývoj mimo společnost Danfoss A&S. Rozpočet je stanoven na 10 000 EUR (v návaznosti na T6,3).
Celkem	106 750	

10 – PALMA	**Náklad (€)**	**Odůvodnění**
Cestování	15 000	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem); další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran, cestovánís na demo místa (2 osoby za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok na osobu, 10 000 EUR celkem)
Další zboží a služby	123 600	Náklady spojené se službou Jednotné kontaktní místo (Celkem 9 600 EUR), spojené s úkolem 3.3; katalog řešení renovace (celkem 10 000 EUR), spojené s úkolem 4.4; expozice, předváděcí místnosti a materiály pro vzdělávací a školicí akce mimo pracoviště atd. v laboratoři Energy Transition Living Lab-TE21 (celkem 25 000 EUR), spojené s úkolem 3.3; vstupní kampaň pro CEC - Citizen Energy Communities (Celkem 15 000 EUR), spojená s úkolem 3.3; harmonizace a generování dat GIS pro demo čtvrť z různých zdrojů dat v jedinečném společném městském 3D nástroji (celkem 40 000 EUR), spojený s úkoly 2.3 a 3.3; Přenosné senzory IEQ a elektřina měřicí systém (20 jednotek po 1 000 EUR každý, celkem 20 000 EUR), spojený s úkolem 8.1; 4 000 EUR za audit CFS
Celkem	138 600	

11 – IBAVI	**Náklad (€)**	**Odůvodnění**
Cestování	6 250	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem); další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran, cestování na demo místa (1 osoba na 1 rok: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR celkem)
Vybavení	9 900	Řídicí systém hybridního ventilačního systému a další prvky znehodnocené aktivním používáním v projektu, spojené s úkolem 4.4
Další zboží a služby	57 980	45 000 EUR za senzory IEQ a komunikační prostředky pro monitorování a hodnocení, spojené s úkolem 8.3; 9400 EUR na externí pomoc pro monitorovací systém IEQ, spojený s úkolem 8.3; 4 000 EUR za audit CFS
Celkem	74 130	

13 – MET	**Náklad (€)**	**Odůvodnění**
Cestování	6 250	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem); další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran, cestování na demo místa (1 osoba na 1 rok: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR celkem)
Další zboží a služby	64 000	54 000 EUR za monitorování a pokročilý řídicí systém pro centralizované služby (HVAC + PV) ve dvou vícegeneračních budovách, spojený s úkolem 8.2; 10 000 EUR za multi senzory IEQ, propojené s T8.2
Celkem	70 250	

14 – UAS Utrecht	**Náklad (€)**	**Odůvodnění**
Cestování	21 250	Setkání konsorcia (průměrně 2,25 osoby za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 11 250 EUR celkem); další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran

		cestování na demo místa (2 osoby za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 EUR 250 za rok na osobu, 10 000 EUR celkem)
Vybavení	70 000	Náklady na vybavení pro inovativní integraci energetických instalací plug-play, odepisované při aktivním používání během trvání projektu: k optimalizaci výkonu fasádních prvků (sestávajících z nízkouhlíkových materiálu a integrované energetické instalace), stavebních materiálů a senzorů vybavení, spojené s T 4.3.
Other goods and services	4 000	€4 000 za CFS audit
Celkem	95 250	

15 – HOUSING EUROPE	**Náklad (€)**	**Odůvodnění**
Cestování	13 750	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem); další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran (1 osoba na 1 rok: let (750 EUR) + 2 noci * 250 EUR za noc dává celkem 1 250 EUR); cestování na demo místa (1 osoba navštíví 6 demo: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za demo návštěvu, 7 500 EUR celkem)
Další zboží a služby	49 800	13 900 EUR za šíření a komunikaci prostřednictvím tištěných materiálů spojených s dílčím úkolem 10.3.3; 17 500 EUR za online nástroje pro webové schůzky, videorozhovory, video pro 6 demo CPCC, animované video, podcasty (opatření odolná proti COVID), propojené s dílčím úkolem 10.3.3; 6 000 EUR za 1 specializovaný workshop na demo, spojený s dílčím úkolem 10.4.1; 6 000 EUR na jednu cílenou akci pro obce spojenou s dílčím úkolem 10.4.2; 5 000 EUR za zvyšování povědomí o akcích.
Celkem	63 550	

16 – Buro deHaan	**Náklad (€)**	**Odůvodnění**
Cestování	6 250	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem); další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran, cestování na demo stránky (1 osoba na 1 rok: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR celkem)
Vybavení	35 000	35 000 EUR za nástroje digitalizace a soubory dat pro předběžné rozpoznání typologií fasád, propojené s T5.2
Celkem	41 250	

18 - SAB	**Náklad (€)**	**Odůvodnění**
Cestování	3 250	Setkání konsorcia (1 osoba za rok na 3 roky: let (750 EUR) + 1 noc * 250 EUR za 1,33 noci v průměru dává 1 082,5 EUR za rok, 3 250 EUR celkem)
Vybavení	54 000	Instalace předváděcího vybavení do 45 bytů, odepsáno v období projektu. 45 jednotek v ceně 1 200 EUR za technické vybavení jsou prototypy a budou mít dobu odpisování odpovídající období sledování 2 roky v projektu. Je nezbytné mít 2 samostatné bytové bloky každým s 22 + 23 byty, aby byl určitý počet monitorovaných bytů s různým druhem obyvatel, spojený s úkolem 6.3.
Celkem	57 250	

20 - BOEX	**Náklad (€)**	**Odůvodnění**
Cestování	6 250	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem); další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran, cestovánís na demo místa (1 osoba za 1 rok: let (750 EUR) + 2 noci * 250 EUR za noc dává celkem 1 250 EUR)
Vybavení	535 000	250 000 EUR náklady na vybavení, za návrh a předvádění inovativních prvků fasádních panelů (biologický / recyklovaný materiál pro fasádní panely a integrované systémy pro vytápění, větrání, izolaci, elektřinu), spojené s úkoly 4.3 a 5.4. Rozpis odhadu nákladů: 1) Nízko uhlíkový biologický/recyklovaný materiál pro výrobu prefabrikovaných sendvičových fasádních panelů. odhadované náklady: 50 bytů x 2 500 EUR = 125 000 EUR celkem nákladů plně odepsaných po dobu projektu. 2) Integrovaná energetická instalace, vybavení (vybavení energetické instalace na míru (potrubí, kabely, konektory). Odhad nákladů: 50 bytů x 2 500 EUR = 125 000 EUR celke, nákladů plně odepsáno po dobu projektu. 60 000 EUR za inovativní BIPV panely, které mají být instalovány v budovách demo místa, propojené s úkolem 6,3; 100 000 EUR za monitorovací systém Home Energy Management System, spojený s úkolem 7.4 a WP8; 50 000 EUR za nákup baterií v bytových domech, spojený s úkolem 7.6 . 1) 3) Náklady na vybavení pro inovativní prvky pro integraci konceptů renovace Hemubo a Inside Out, zaměřených na modulární, plug-and-play instalace vybavení energie a větrání. Odhadované náklady: 25 bytů x 3 000 EUR = 75 000 EUR Náklady celkem plně odepsané po dobu projektu.
Další zboží a služby	4 000	€4 000 za CFS audit
Celkem	545 250	

27 – Mitros	**Náklad (€)**	**Odůvodnění**
Cestování	6 250	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem); další cestování, např. konference/workshopy, politické akce, akce zúčastněných stran, cestování na demo místa (1 osoba za 1 rok: let (750 EUR) + 2 noci * 250 EUR za noc dává celkem 1 250 EUR)

Vybavení	176 000	1) 28 000 EUR za integraci LT DH a souvisejících systémů HVAC, spojených s úkolem 6.2; 48 000 EUR na monitorovací systém Home Energy Management System, spojený s úkolem 7.4 a WP8; 25 000 EUR na nákup baterií v bytových domech v návaznosti na T7.6. 2) Náklady na vybavení pro inovativní prvky pro integraci konceptů renovace Hemubo a Inside Out, zaměřených na modulární, plug-and-play instalaci vybavení energie a větrání. Odhadované náklady: 25 bytů x 3 000 EUR = 75 000 EUR Celkem náklady plně odepsané po dobu projektu.
Other goods and services	4 000	€4 000 za CFS audit
Celkem	186 250	

29–DOL	**Náklad (€)**	**Odůvodnění**
Cestování	5 000	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem
Další zboží a služby	253 000	210 000 EUR za prototyp energetického tunelu ve stávajícím tunelu Piedicastello v Trentu, spojený s dílčím úkolem 6.2.5: zajištění a instalace radiálního BHE (60 000 EUR), potrubí (15 000 EUR), spritz a izolace (20 000 EUR)), bezpečnostní a doplňkové náklady (50 000 EUR), připojovací potrubí k budovám (40 000 EUR), podpora při návrhu prototypu (25 000 EUR); 43 000 EUR za tepelnou aktivaci podlahové desky NSGE v nové konstrukci, navazující na podúkol 6.2.5: podpora při návrhu prototypu (8 000 EUR), zajištění a instalace potrubí (12 000 EUR), náklady na pracovní sílu (3 EUR) 000), bezpečnost a další náklady (10 000 EUR), zajištění a instalace tepelných čerpadel (10 000 EUR).
Celkem	258 000	

30– DTTN	**Náklad (€)**	**Odůvodnění**
Cestování	5 000	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem
Celkem	5 000	

Linked third partyto DTTN – X-LAM Dolomiti)	**Náklad (€)**	**Odůvodnění**
Další zboží a služby	454 000	Prototyp prefabrikovaných, multifunkčních a modulárních fasád na bázi dřeva, testování obkladů, laboratorní testování, navázáno na dílčí úkol 5.4.5 (42 500 EUR). Prototyp nové stavby budov s pozitivní energií, spojený s dílčím úkolem 5.4.5, 6.3.5: zřízení základů pod přímým dohledem (90 000 EUR), zajištění a instalace dřevěné konstrukce (255 000 EUR). zajištění dalších systémů, systémů distribuce energie, ICT, BEM, integrace a bezpečnost (62 500 EUR). 4 000 EUR za audit CFS.
Celkem	454 000	

Linked third partyto DTTN – Fanti Legnami)	**Náklad (€)**	**Odůvodnění**
Další zboží a služby	285 000	Prototyp prefabrikovaných, multifunkčních a modulárních fasád na bázi dřeva, testování obkladů, laboratorní testování, navázáno na dílčí úkol 5.4.5 (42 500 EUR). Prototyp nové stavby budov s pozitivní energií, propojený s dílčím úkolem 5.4.5, 6.3.5: zajištění a instalace inovativní fasády 500m2 BIPV, zelená řešení, okna (180 000 EUR), poskytování dalších systémů, systémů distribuce energie, ICT, BEM, integrace a bezpečnost (62 500 EUR).
Celkem	285 000	

34 – NANO	**Náklad (€)**	**Odůvodnění**
Cestování	5 000	Setkání konsorcia (1 osoba za rok po dobu 4 let: let (750 EUR) + 2 noci * 250 EUR za noc dává 1 250 EUR za rok, 5 000 EUR celkem)
Další zboží a služby	30 000	30 000 EUR za skladovací systém baterií s druhou životností - baterie a hardware, spojený s T6.3.
Celkem	35 000	

Sekce 4: Členové konsorcia

4.1. Účastníci (žadatelé)

NTNU Norwegian University of Science and Technology	**1. Norges teknisk-naturvitenskapelige universitet NTNU | NO Norská univerzita vědy a technologie**	
	Webová stránka: www.ntnu.no **číslo PIC: 999977851**	**Počet zaměstnanců: 7400** **Počet studentů: 42 000**

Stručný popis právnické osoby/partnerské organizace

NTNU je největší univerzitou v Norsku se 14 fakultami a 70 katedrami a divizemi. NTNU má 42 000 studentů a více než 4 600 osob-let na akademických nebo vědeckých pozicích (41% žen). Univerzita využívá svůj hlavní vědecký profil v oblasti technologií a přírodních věd a své interdisciplinární kompetence k řešení globálních výzev, což shrnuje její vize: Znalosti pro lepší svět. Tři ze čtyř oblastí strategického výzkumu na NTNU - udržitelnost, energie a zdraví
– -přispívat přímo k udržitelné urbanizaci poskytováním kreativních inovací s dalekosáhlými sociálními a ekonomickými dopady v úzké spolupráci s městy, průmyslem, úřady a občanskou společností. NTNU se silně zaměřuje na mezinárodní mobilitu a školení v oblasti výzkumu. 11% jejích studentů a 41% absolventů doktorského studia jsou cizinci a asi 1/3 akademičtí pracovníci
. NTNU se v současné době podílí na 126 podepsaných projektech H2020, 30% koordinuje NTNU. V RP7 se NTNU podílela na 139 projektech.

NTNU hostí řadu **národních center excelence a národních center pro inovace založených na výzkumu**. Nejrelevantnější pro tento návrh jsou:

- **ZEN, Čtvrti s nulovými emisemi v Chytrých městech**, vyvíjí řešení pro budoucí budovy a čtvrti/oblasti, která přispějí k realizaci společnosti s nulovými emisemi.
- **CenSES, Centrum pro studie udržitelné energie**, rozvíjí znalosti založené na faktech pro strategická rozhodnutí relevantní pro vládu a průmysl. Důraz je kladen na znalosti národní energetické politiky, národní a mezinárodní klimatické politiky a strategií inovací a komercializace.
- **CINELDI, Centrum pro inteligentní distribuci elektřiny**, zajistí, že budujeme inteligentní energetický systém budoucnosti. CINELDI přispěje k návrhu flexibilní a robustní elektrické distribuční sítě budoucnosti za přijatelné náklady. CINELDI usnadní obnovitelnou energii, elektrifikaci dopravy a efektivnější využívání energie.
- **HighEFF, Centrum pro energeticky účinný a konkurenceschopný průmysl pro budoucnost,** vyvíjí energeticky účinné procesy a součásti s cílem snížit spotřebu energie o 20-30% a emise skleníkových plynů o 10%. HighEFF pomůže zajistit, aby Norsko mělo nejzelenější průmysl na světě.
- **HydroCen, Norské výzkumné středisko pro vodní technologie**, si klade za cíl zajistit a rozvíjet výzkum a vzdělávání v oblasti technologií souvisejících s vodní energií. Středisko poskytuje odvětví vodní energie prvotřídní znalosti a inovativní řešení.

Příspěvek k pracovním balíčkům a úkolům v projektu

NTNU vede projekt ARV a projektové řízení a koordinaci WP1. NTNU také **povede WP4**. Ve WP4 je NTNU vedoucím inovačním fórem T4.1 o integrovaném a cirkulačním designu a přispívá k úkolu 4.2, který se týká návrhu a hodnocení norského demo projektu. Navíc bude NTNU koordinovat a usnadňovat spolupráci mezi všemi úkoly v rámci WP4. NTNU také přispívá ke všem WP.

WP2. Rámec a nástroje pro efektivní implementaci a hodnocení CPCC: NTNU přispívá do fóra pro inovace, rámce pro posuzování Klimaticky pozitivních cirkulárních komunit a hodnotících nástrojů.

WP3. Angažovanost komunity, životní prostředí a pohoda: NTNU přispívá k plánu, celkové metodice pro zřízení laboratoří CPCC živých laboratoří a implementaci.

WP5: NTNU přispívá do inovačního fóra efektivních (před) výrobních a stavebních pracovních toků T5.1

WP6: NTNU přispívá k úkolům inovativních obnovitelných a úložných systémů T6.1, T6.2 a T6.5

WP7: Efektivní provoz a flexibilita. NTNU přispěje k funkcím flexibility a indexu a optimalizaci výkonu. NTNU povede úkol 7.5 ohledně nasazení metod pro popis energetické flexibility.

WP8: NTNU bude přispívat ke všem úkolům v oblasti monitorování, hodnocení a posuzování dopadů

WP9: NTNU provede ekonomickou analýzu dlouhodobé udržitelnosti některých obchodních modelů uvedených GDFA a povede dílčí úkol v 9.3. NTNU také povede úkol týkající se politiky a předpisů pro rozsáhlé nasazení cirkulárních komunit pozitivních na klima.

WP10: NTNU bude mít podstatnou roli ve všech úkolech. Šíření, komunikace a zapojení zúčastněných stran. Povede vizuální identitu T10.1 ARV a bude přispívat ke všem úkolům.

Profil klíčového personálu v projektu

[redacted] [redacted] (F) je profesorkou integrovaného energetického designu na Norské univerzitě vědy a technologie. Vede také kurzy dalšího vzdělávání v budovách s nulovými emisemi. [redacted] byla vedoucí výzkumu pilotních a předváděcích budov v rámci Výzkumného centra budov s nulovými emisemi (www.zeb.no). V současné době je zapojena do výzkumného centra Čtvrti s nulovými emisemi v Chytrých městech (www.fmezen.no), 2017-2024, kde byla vedoucí práce na pilotních projektech a živých laboratořích. Je lídrem WP2 v syn.ikia H2020 v oblasti vývoje a demonstrace více energetických vícepodlažních bytových domů. [redacted] má více než 20 let zkušeností z výzkumu a vývoje v oblasti energeticky účinných budov a obnovitelné energie. Má také zkušenosti z poradenské a stavební praxe. [redacted] se angažovala jako výzkumná pracovnice SINTEF Building and Infrastructure, byla environmentální manažerkou v architektuře LINK a energetickou poradkyní ve Skanska[redacted]

[redacted]

[redacted] (M) je profesorem stavební fyziky a ředitelem Výzkumného centra sousedství s nulovými emisemi v inteligentních městech (ZEN Research Center) na Norské univerzitě vědy a technologie (NTNU). Výzkumné centrum ZEN má 32 partnerů ze stavebního průmyslu a energetiky, jakož i vládních organizací a obcí. Naším cílem je vyvinout řešení pro budoucí budovy a čtvrti bez emisí skleníkových plynů, a tím přispět k nízkouhlíkové společnosti. [redacted]

má titul MSc z fyziky životního prostředí a titul PhD ze stavební fyziky. Napsal a přispěl do více než 100 článků a má h-index 27. Jeho výzkumné zájmy zahrnují budovy a čtvrti s nulovými emisemi, využití energie v nových a stávajících budovách, přenos tepla, vzduchu a vlhkosti v obalových systémech budov a také vývoj a aplikace nových stavebních materiálů. [redacted] e také projektovým manažerem rozvoje rozsáhlé výzkumné infrastruktury na budovách s nulovými emisemi (laboratoř obytných budov o rozloze 1800 m2) a ředitelem výzkumného centra Budovy s nulovými emisemi. Dříve působil jako vedoucí vědecký pracovník ve SINTEF Building and Infrastructure a hostující vědecký pracovník v Národní Laboratoř Lawrence Berkeleya (LBNL). E-mail: [redacted]

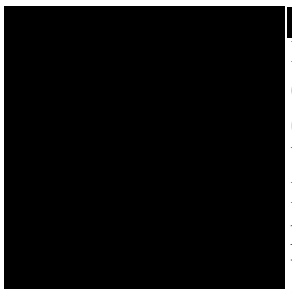
[redacted] **(F)** je docentkou integrovaného energetického designu na katedře architektury a technologie na Norské univerzitě vědy a technologie, NTNU. Má více než patnáctileté zkušenosti s energetickou účinností a strategiemi udržitelného navrhování od budov po čtvrti a městské měřítko. Její odborné znalosti se týkají energetické náročnosti budov, integrovaného energetického designu, konceptů čtvrtí s nulovými emisemi, oblastí s pozitivní energií, fyziky měst a budov a odolnosti stavebního prostředí vůči klimatu. [redacted] je autorem 64 publikací, z toho 22 článků v recenzovaných vědeckých časopisech s vysokými dopadovými faktory,

které získaly 1094 citací (h-index je 12). Snaží se přispět k přenosu technologického pokroku dosaženého v udržitelné architektuře a inženýrství do aplikací, které dláždí cestu k nízkouhlíkovému, energeticky účinnému a odolnému zastavěnému prostředí. S aktivní rolí ve více než dvaceti výzkumných projektech financovaných EU (RIA, IA, CSA a MSCA ITN) je Niki Gaitani vedoucím projektu syn.ikia H2020 (IA) a vedoucím dílčího úkolu D v příloze IBC EBC 83-pozitivní energetické obvody.

[redacted]

[redacted] (M) je profesorem architektury a vyučuje v rámci mezinárodního magisterského programu Udržitelné architektury na NTNU Fakultě architektury a designu. Jeho hlavním zájmem v oblasti výuky a výzkumu je udržitelná architektura a sousedství (budovy a čtvrti s nulovými emisemi). Má zvláštní zájem o pasivní energetický design, kde samotná architektura reaguje na klima a využívá pasivní strategie k dosažení nulových emisí a navíc energetických budov a čtvrtí

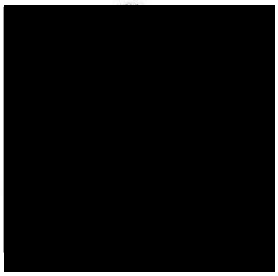
[redacted] má zkušenosti z výzkumu v oblasti nízkoenergetické architektury (8 let na SINTEF), kde vedl a podílel se na několika národních a mezinárodních výzkumných projektech, mimo jiné na projektech EU RetroKit (FP7) a Cohereno (IEE). Pracoval také jako konzultant v soukromém průmyslu (8 let) a vedl velkou architektonickou kancelář (3 roky), kde byl zodpovědný za několik nízkoenergetických a plus energetických budov v oblasti vzdělávání, zdravotnictví a bydlení.
E-mail: [redacted]



(M) je vedoucí výzkumný pracovník IØT-NTNU, který pracuje ve čtyřech projektech H2020: SET-Nav (vedoucí WP), INVADE (spolupracoval na úkolech), +CityxChange (spolupracoval na úkolech a vedoucí) a Open ENTRANCE (Vedení WP). Působí také jako poradce a vědecký pracovník ve skupině Smart Distribution Grids ve společnosti SINTEF-Energy (Norsko). Předtím pracoval ve společnosti ETH Zurich (Švýcarsko). Tam podporoval výzkumnou práci a řízení dvou multidisciplinárních stěžejních projektů, zaměřených na návrh trhu s elektřinou a kombinování energeticko-ekonomických modelů.

Je držitelem titulu PhD v operačním výzkumu na Lancaster University (UK) a titulu M.Sc. v oboru systémového inženýrství a operačního výzkumu z Univerzity George Washingtona (USA). Mezi jeho hlavní témata výzkumu patří inteligentní sítě a distribuovaná výroba, skladování energie, aplikované stochastické programování a integrace modelu energeticko-ekonomických systémů za účelem analýzy energetické transformace.

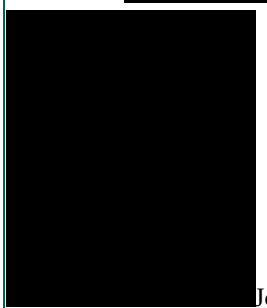
E-mail:



(F) je profesorkou na EPT na NTNU. Má silné znalosti v oblasti dálkového vytápění, energetického plánování, monitorování energetické náročnosti budov, simulace budov, optimalizace a detekce poruch. Je členkou programu Vynikající akademický stipendijní program na NTNU, který se zaměřuje na kvalifikaci některých z našich předních mladých výzkumných talentů pro mezinárodní vedoucí výzkumnou kariéru. Je vedoucí projektu dvou výzkumných projektů, jednoho Horizontu 2020 MSCA-IF, několika projektů spolupráce a průmyslu a projektu inovativní výuky. Některé z

jejích projektů se zaměřovaly na výkonovou a řídicí analýzu tepelných čerpadel a systémů zásobování energií budov. To vše jí dalo spoustu praktických zkušeností a nápadů ohledně inovací souvisejících s implementací tepelných čerpadel a systémů zásobování energií budov. Dále byla díky ní v laboratoři NTNU/EPT iniciována a vyvíjena celá továrna na tepelné čerpadlo CO2 a vytápěná místnost společně s laboratorními inženýry NTNU/EPT. byla dosud hlavní školitelkou více než 45 studentů magisterského studia, dvou dokončených doktorandů, pěti probíhajících doktorandů a čtyř postdoktorandů (dva absolvovali a dva pokračovali). Je autorkou nebo spoluautorkou 39 časopisů a má Scopus h-index 16. Je recenzentkou více než 10 relevantních časopisů a byla hodnotitelkou návrhů výzkumu v Itálii, Kazachstánu, Austrálii, Singapuru a Švédsku.

E-mail:



(M) je docent a vedoucí strategické oblasti „Řešení pro chytrá města“ na Katedře civilního a environmentálního inženýrství (IBM) na Norské univerzitě vědy a technologie (NTNU). Má 15 let zkušeností v oblasti výzkumu, konzultací a výuky v oblasti integrovaného projektování budov v rámci klimaticky neutrálních inteligentních měst. Je odborníkem na simulaci a optimalizaci pro podporu včasného rozhodování. Vyvinul několik metodik a indikátorů pro kvantifikaci výkonu budovy v případě kdy intereagují obvodové plášťe budov, HVAC systémy, obnovitelné zdroje a flexibilita aktiv

Jeho sada nástrojů zahrnuje simulaci výkonu budovy (BPS), systémy automatizace budov (BAS), víceobjektovou optimalizaci (MOO), analýzu nákladů životního cyklu (LCCA) a modelování budov (BIM). Během své kariéry se podílel na vývoji dvou vlastních optimalizačních nástrojů založených na simulaci: MOBO a OptnZEB-

I. Jako akademický autor/spoluautor dosud publikoval 28 recenzovaných časopisů, 4 kapitoly knih, 22 konferenčních článků. Má 2030 citací, h-index: 18 a i10-index: 25. Jako vedoucí projektu/partner je partnerem ZEN Center a skupiny ENERSENSE (oblast strategického výzkumu se zaměřením na spojení účinnosti energie, skladování energie a senzorové technologie, včetně automatizace). je aktivním členem programu International Energy Agency-Energy in Building and Communities (IEA EBC) a partnerem projektů H2020 TRANURBAN-EU-CHINA a QUANTUM. Jinak je řídícím výborem a členem

poradního výboru pro výzkumné projekty: „OCCuPANt“ financované Univerzitou v Liège, Radou pro výzkum a vývoj. [redacted] je také spolupracovníkem na projektu „Optimální přechody z interaktivně izolovaných systémů do vzájemně integrované jednoty mezi budovami s nulovou energií a vozidly s nulovou energií“, který financuje Hongkongská polytechnická univerzita , Univerzitní grantový výbor (UGC).
E-mail: [redacted]

[redacted] (F) je postdoktorandkou ve Výzkumném centru ZEN na Norské univerzitě vědy a technologie (NTNU) a výzkumná pracovnice na katedře interdisciplinárních studií kultury NTNU. [redacted] je sociální antropoložka, jejíž hlavní oblastí výzkumu je interakce mezi lidmi a fyzickým a technickým prostředím. Její výzkum je interdisciplinární a zabývá se energetickým výzkumem, studiemi STS a architekturou. Současný výzkumu se zaměřuje na udržitelný přechod a důsledky pro dobrý
Život prostřednictvím navrhování a používání experiment v živých laboratořích umístěných v devíti pilotních čtvrtích ZEN v Norsku.. [redacted] také pracovala s dlouhodobým rezidenčním experimentem v **laboratoři ZEB Living**. Kde byl studován dopad technologie nulových emisí na domácí rutiny a domácí strategie. [redacted] hodně publikovala v mezinárodních časopisech. Zúčastnila se také mezinárodních konferencí v oblasti sociálních věd a energetického výzkumu. [redacted] má rozsáhlé zkušenosti s projekty financovanými Norskou radou pro výzkum a EU (CommonEnergy, Retrofit, EcoCity).
E-mail: [redacted]

Příslušné publikace a/nebo produkty, služby nebo jiné úspěchy

Publikace (posledních 10):

1. Resch, E.; Andresen, I. (2018). Databázový nástroj pro systematickou analýzu ztělesněných emisí v budovách a sousedstvích. Budovy, nákl. 8 (106).
2. Wiik, M.R.K.; Fufa, S.M.; Kristjansdottir, T.F.; Andresen, I. (2018). Poučení z provedených výpočtů emisí skleníkových plynů v budovách s nulovými emisemi (ZEB) od norského výzkumného centra ZEB. Energetika a budovy, Nákl. 165.
3. Homaei S., Hamdy M. (2020). Přístup založený na robustnosti rozhodování pro víceúčelové budovy s vysokým výkonem. Aplikovaná energie, Nákl. 267, 2020, 114868, ISSN 0306-2619
4. Mariño S., Eguia P., Grandaa E., Hamdy M. (2020). Porovnání výkonu víceobjektových přístupů založených na optimalizaci pro kalibraci energetických modelů budov typu White-box. Energetika a budovy, Nákl. 216, 2020, 109942, ISSN 0378-7788, see
5. Schönfeldt Karlsen S., Hamdy M., Attia S. (2020). Metodika hodnocení obchodních modelů dynamických sazeb cen v plně elektrických domech. Energetika a budovy, Nákl. 207, 2020, 109586, ISSN 0378-7788, see.
6. M. Rabani, H. B. Madessa, O. Mohseni, N. Nord (2020). Minimalizace dodávané energie a nákladů životního cyklu pomocí grafického skriptu: Případ pro dodatečnou montáž kancelářské budovy, Aplikovaná energie, Nákl. 268
7. Woods, Ruth; Berker, Thomas. (2019) Živé laboratoře v kontextu sousedství s nulovými emisemi. Série konference IOP: Věda o Zemi a životní prostředí (EES).nákl. 352 (1).
8. Zepter, J. M., Lüth, A., Crespo del Granado, P., Egging, R., (2019). Integrace prosumerů na velkoobchodních trzích s elektřinou: Synergie obchodu “rovný s rovným” a domácího skladování. Energetika a budovy, Nákl. 184.
9. J. Brozovsky, N. Gaitani, A. Gustavsen (2020). Systematický přehled výzkumu městského klimatu v oblastech s chladným a polárním podnebím, Recenze obnovitelné a udržitelné energie, https://doi.org/10.1016/j.rser.2020.110551

10. Jak definovat (čisté) budovy s nulovými emisemi skleníkových plynů: Výsledky mezinárodního průzkumu jako součást přílohy 72 IBC EBC. Budova a životní prostředí. Nákl. 192, April 2021, 107619D.Satola M.Balouktsi c T.Lützkendorf A. HoulihanWiberg A.Gustavsen .

Produkty a služby:

Definice Budovy s nulovými emisemi – Přístup životního cyklu k plánování, návrhu a stavbě budov s nulovými emisemi.

Výzkumný tým NTNU přispěl k realizaci **8 demonstračních budov s nulovými emisemi v reálném životě** v Norsku (http://www.zeb.no/index.php/en/pilot-projects) prostřednictvím Výzkumného centra budov s nulovými emisemi. Patří mezi ně rodinné domy, kancelářské budovy a vzdělávací budovy. Úroveň ambicí u několika ukázek ZEB je vyšší než plusová úroveň energie, protože bilance také zahrnuje ztělesněné emise z materiálů.

Příspěvek **k definicím budov Plus Energy a Plus Energy Neighborhoods pro** FutureBuilt (www.futurebuilt.no) a města Osla(https://www.oslo.kommune.no/).

Projekt a činnosti

1. **Výzkumné centrum ZEN** má 32 partnerů ze stavebního průmyslu a energetiky, jakož i vládních organizací a obcí. Naším cílem je vyvinout řešení pro budoucí budovy a čtvrti bez emisí skleníkových plynů, a tím přispět k nízkouhlíkové společnosti.
2. **Výzkumné centrum ZEB** s 21 partnery ze stavebnictví. Činnosti zahrnovaly vývoj nových pokročilých stavebních materiálů (např. Izolačních materiálů, elektrochromních materiálů, povlaků s nízkou emisivitou a materiálů s fázovou změnou), inteligentních obalových systémů budov a nových ventilačních systémů/membrán pro lepší kvalitu vzduchu v interiéru.
3. Národní projekty (Norská rada pro výzkum) ve vývoji, modelování a simulaci a testování pokročilých obalových systémů budov- SkinTech (2016–2019), ReInVent Windows (2017–2021).
4. Rozsáhlý projekt infrastruktury financovaný Norskou radou pro výzkum o laboratoři ZEB (kancelářské budovy o rozloze 1 800 m2 k vyšetřování plus energetické a bezemisní technologie budov a interakce mezi uživatelem. pracovníkem a technologií).

Relevantní probíhající a předchozí projekty

Výzkumné centrum ZEN o sousedstvích s nulovými emisemi v inteligentních městech (Centrum pro energetický výzkum šetrný k životnímu prostředí financovaný Radou pro výzkum Norska + průmysl), 2017-2024 Výzkumné centrum ZEN pořádané NTNU si klade za cíl umožnit přechod na nízkouhlíkovou společnost vyvíjením řešení pro budoucí budovy a čtvrti/oblasti, které přispějí k realizaci společnosti s nulovými emisemi. Výzkumné centrum ZEN má laboratorní zařízení ZEB Test Cell Lab, Živé laboratoře ZEN a 9 rozsáhlých demonstračních projektů v Norsku.

syn.ikia H2020 project/ Sustainable Plus Energy Neighborhoods, financovaný EU, koordinovaný NTNU. Inovační projekt syn.ikia v rámci rámce EU Horizont 2020 zahrnuje 13 partnerů ze šesti zemí a jeho cílem je umožnit rozvoj udržitelných a energetických čtvrtí v různých klimatech, kontextech a trzích v Evropě. V průběhu projektu budou vyvinuty, analyzovány, optimalizovány a monitorovány čtyři sousedské demo projekty v reálném životě plus energie přizpůsobené čtyřem různým klimatickým pásmům, což prokáže funkčnost koncepce sousedství s plusovou energií pro zbytek Evropy..

+CityxChange (H2020, Chytrá města a komunity), 2018-2023. NTNU koordinuje 32 partnerů v projektu. Majáková města jsou Trondheim, Norsko a Limerick, Irsko.

ECHOES - Energy Choices (H2020) se zaměřuje na energetické chování spotřebitelů a podporuje energetickou unii a plán SET. Koordinuje NTNU.

INVADE (H2020) se zaměřuje na inteligentní systém skladování energie z obnovitelných zdrojů založený na integrovaných EV a bateriích pro posílení mobilního, distribuovaného a centralizovaného skladování energie v distribuční síti. NTNU je vedoucím WP.
EERA JP Chytrá města, které předsedá NTNU. V EERA JP Chytrá města spolupracují univerzity a výzkumné ústavy z celé Evropy s průmyslem, městy a občany na podpoře inovačních a předváděcích projektů experimenty založenými na znalostech, aplikovaném a základním výzkumu, k zajištění kvality a dopadu a k zajištění škálovatelnosti a replikovatelnosti místně vyvinutých a testovaných řešení/procesů. EERA JP Chytrá města, která vychází ze zkušeností z projektů chytrých majákových měst H2020 a odpovídajících národních/regionálních iniciativ, hraje v evropském prostředí výzkumu a inovací v oblasti chytrých měst klíčovou roli směrem ke klimaticky neutrální Evropě a světu.

SET-Nav-Navigace v plánu pro čistou, bezpečnou a efektivní energetickou inovaci, která byla zahájena v dubnu 2016 a je spolufinancována z programu EU Horizont 2020. Projekt má v úmyslu podpořit strategické rozhodování v evropském energetickém sektoru a posílit inovace směrem k čistému, bezpečnému a účinnému energetickému systému.

Výzkumné centrum ZEB v budovách s nulovými emisemi (Centrum pro energetický výzkum šetrný k životnímu prostředí financovaný Radou pro výzkum Norska + průmysl), 2009-2017

QUANTUM (Řízení kvality pro výkonnost budov), byl čtyřletý projekt od ledna 2016 do prosince 2019. Cílem projektu bylo vyvinout a předvést pragmatické služby a vhodné nástroje s vysokým potenciálem replikace podporující management kvality (QM) pro výkonnost budovy ve fázi návrhu, výstavby, uvádění do provozu a provozu jako prostředek k zaplnění mezery mezi předpokládanou a skutečnou energetickou náročností v evropských budovách.

Významná infrastruktura a/nebo technické vybavení

NTNU má laboratorní zařízení, která lze použít v tomto projektu:

ZEB Živá laboratoř

ZEB Živá laboratoř je víceúčelové experimentální zařízení postavené Budovama s nulovými emisemi,Fakulta architektury a výtvarných umění, NTNU. Živá laboratoř je testovací zařízení, které je obsazeno skutečnými osobami využívajícími budovu jako svůj domov. Důraz je kladen na obyvatele a jejich používání inovativních stavebních technologií, jako je inteligentní řízení
instalací a zařízení, interaktivní uživatelská rozhraní a souhra s energetickým systémem jako celkem. Vysoce flexibilní a energetický dům. Tato laboratoř je 100 m2 velká běžná obytná budova, ale vysoce flexibilní, instrumentovaná a ovladatelná. Mezi typické experimenty patří interakce mezi uživatelskou technologií (např. Grafický uživatelské rozhraní), testování energeticky flexibilního provozu (např. Prediktivní řízení modelu a vlastní spotřeba obnovitelné energie) a testování různých (interakce mezi nimi) obnovitelných zdrojů energie (jsou instalovány fotovoltaické, solární tepelné a tepelné čerpadlo).

<u>Laboratoř testovacích buněk ZEB</u> pro výzkum a vývoj technologií budování plusové energie a nulových emisí/energie. Laboratoř testovacích buněk se používá k testování nízkoenergetických integrovaných stavebních systémů za realistických provozních podmínek. Testovací buňku lze rozdělit na dvě menší komory, které lze použít k porovnání různých technologií. Laboratoř testovacích buněk je zařízení technického vývoje, kde se nacházejí různé prvky stavebních materiálů, obvodových plášťů budov, energetických instalací a řízení , systémy jsou vyvíjeny a optimalizovány společně.

ZEB Office Living Laboratory

Laboratoř ZEB je laboratoří budov s nulovými emisemi, arénou, kde se vyvíjejí, zkoumají, testují a předvádějí nové a inovativní materiály a řešení ve vzájemné interakci s lidmi. Budova zahrnuje systémy, jako je integrovaná fotovoltaika (BIPV), materiály s fázovou změnou (PCM), tepelná čerpadla, vysoce flexibilní řídicí systém, možnosti prediktivního modelování ovládání, kombinovaný mechanický a přirozený ventilační systém. Systémy lze měnit/upravovat v různých experimentálních nastaveních.

Laboratoře Advanced Materials and Component Laboratories se používají jak pro vývoj, tak pro výzkum stavebních materiálů, komponent obvodových plášťů budov (například inteligentních fasád), technologie pro zásobování energií (například integrovaná fotovoltaika budov) a stavební služby, jako jsou například ventilační systémy. Nejdůležitějšími laboratořemi jsou: simulátor klimatu velkých vertikálních plášťů budov, laboratoř zrychleného stárnutí klimatu, laboratoř expozice klimatu, laboratoř tepelných vlastností stavebních prvků a struktury, rotační aparát horkého boxu, laboratoř pokročilého spektrometru a laboratoř pokročilých materiálových technologií.

e- Infrastruktura (hardware)

Pro usnadnění výpočetních úloh (tj. Simulačních a analytických úloh)

NTNU má ve většině oddělení **vlastní superpočítače** umístěné v klimatizovaných místnostech. Obrázek ukazuje jeden ze superpočítačů na katedře civilního a environmentálního inženýrství NTNU. Kromě toho je k dispozici obrovský výpočetní výkon přibližně 85 milionů CPU

národní vysoce výkonné výpočetní systémy (HPC). Například systém HPC „SAGA“, který je provozován pod záštitou společnosti UNINETT Sigma2 AS. SAGA poskytuje několik výpočetních cloudových služeb (tj. Paralelní výpočet a ukládání dat) a nachází se v datovém centru s názvem Valhall na NTNU.

e-Infrastruktura (software). Aby se usnadnily výpočetní úlohy (tj. Úlohy simulace a analýzy dat), má NTNU sadu licencovaných softwarových balíčků včetně:

- IDA ICE Expert 4.8: IDA Indoor Climate and Energy (IDA ICE) je nový typ simulačního nástroje, který posouvá výkon budovy na další úroveň. Přesně modeluje budovu, její systémy a ovladače - zajišťuje nejnižší možnou spotřebu energie a nejlepší možný komfort uživatelů.
- BesignBuilder Pro v6: DesignBuilder Packages for Engineers jsou integrovanou sadou vysoce produktivních nástrojů, které pomáhají s udržitelným projektováním budov a získávají kredity s environmentálními schématy, jako jsou LEED a BREEA.M. Přední inženýři služeb a energetičtí modeláři používají DesignBuilder k výběru designu, který optimalizuje energetickou účinnost, pohodlí a náklady.
- HOMER Pro: Software HOMER Pro® microgrid od společnosti HOMER Energy je celosvětovým standardem pro optimalizaci designu mikrosítí ve všech sektorech, od vesnických elektráren a ostrovních utilit až po areály připojené k síti a vojenské základny. Původně vyvinut v Národní laboratoři pro obnovitelné zdroje energie a vylepšen a distribuován společností HOMER Energy, HOMER (hybridní optimalizační model pro více zdrojů energie) v sobě skrývá tři výkonné nástroje v jednom softwarovém produktu, takže inženýrství a ekonomika fungují vedle sebe.
- MATLAB: MATLAB® kombinuje desktopové prostředí vyladěné pro iterativní analýzy a návrhové procesy s programovacím jazykem, který přímo vyjadřuje maticovou matematiku.
- ModeFrointier: Komplexní řešení pro automatizaci a optimalizaci procesů v průběhu projektování. ModeFRONTIER modulární prostředí je klíčem ke snížení složitosti, zlepšení efektivity a zkrácení doby vývoje.

Provozní kapacita právnické osoby/partnerské organizace

n/a

	**2. Rada architektů Evropy ACE | BE Conseil des Architectes d'Europe**	
	Webová stránka: **www.ace-cae.eu** **Číslo PIC: 924742517**	**Počet zaměstnanců: 8**

Stručný popis právnické osoby/partnerské organizace

Rada architektů Evropy (ACE) je reprezentativní organizací pro architektonickou profesi na evropské úrovni. Její sídlo a sekretariát se nacházejí v Bruselu. Jeho členství v současné době tvoří 44 členských organizací, které jsou regulačními a odbornými zastupitelskými orgány ve všech členských státech Evropské unie (EU) a přistupujících zemích, Švýcarsku a Norsku. Prostřednictvím nich ACE zastupuje zájmy více než 600 000 architektů z 31 zemí v Evropě. Hlavní funkcí ACE je sledovat vývoj na úrovni EU a snažit se ovlivnit ty oblasti politiky a legislativy EU, které mají dopad na architektonickou praxi a na celkovou kvalitu a udržitelnost zastavěného prostředí. ACE se zaměřuje na lepší porozumění technickým, environmentálním a kulturním hodnotám a na podporu nejvyšších standardů vzdělávání a praxe v architektuře. Jejím mandátem je zajistit, aby byly názory a odborné znalosti dané profese poskytovány orgánům Evropské unie, a usilovat pokud možno o shodu mezi jejími členy ve všech jejích politických pozicích. Její politika je definována a schválena Valným shromážděním všech členských organizací, scházející se dvakrát ročně. **Hlavní rolí ACE v ARV je vést WP10**: Komunikace, šíření a dosah zúčastněných stran

Příspěvek k pracovním balíčkům a úkolům v projektu

WP 1 Management: Koordinace a obecné činnosti řízení
WP 2 Rámec pro efektivní plánování, návrh, konstrukce a provoz CPCC: Rámec pro hodnocení CPCC
WP 3 Komunita, životní prostředí a pohoda: Kontextualizace a implementace laboratoří CPCC Živé laboratoře
WP 4 Udržitelný (re) návrh budovy: Integrovaný návrh CPCC
WP 5 Pracovní postupy efektivní (před) výroby a konstrukce: Optimalizace pracovních toků
WP 8 Monitorování a hodnocení: Hodnocení KPI pro návrh a konstrukci
WP 9 Příjem na trhu: ARV e-marketplace a obchodní modely
WP 10 Komunikace, šíření a školení: vedoucí WP. Šíření a komunikační strategie, Šíření a komunikační kanály, dosah zúčastněných stran

Profil klíčového personálu v projektu

[redacted] vedoucí projektu (F) [redacted]
Diplom v architektuře, magisterský titul v oboru ekonomie nemovitostí a správy zařízení, PhD ve stavebním managementu na téma: „Analýzy sociálních sítí při přenosu znalostí v projektech udržitelných kancelářských budov ve Velké Británii a Německu". Pracovní zkušenosti v různých sektorech zastavěného prostředí, od malých nezávislých společností po globální blue-chip skupiny v Evropě a USA. Odbornost na širokou škálu problémů udržitelnosti v zastavěném prostředí a řízení znalostí. Sedm let práce na různých projektech financovaných z EU (FP7, H2020, Erasmus+), vedoucí pracovní balíčky v oblasti komunikace, šíření, využívání, zapojení zúčastněných stran, mezinárodní workshopy a tvorba strategických dokumentů.

[redacted] **Asistent projektu** (F) [redacted]
Vystudovaná architektka a urbanistka s magisterským titulem ve stavebnictví z USP (Brazílie) a Master of Science v udržitelném environmentálním designu z AA School (UK). Samostatně motivovaná architektonická designérka se čtyřletou praxí ve Velké Británii. Navíc sedm let praxe

v Brazílii - pracovala v maloobchodě na návrhu a výstavbě obchodních jednotek po celé zemi. Práce na projektech H2020 od března 2019.

[redacted] **asistentka projektového ředitele** (F)[redacted]

Master of Architecture z Polytechnic School of University of Palermo (IT). Čtyři roky praxe a výzkumu v oboru architektury a jako hostující vědecký pracovník na univerzitě v Coimbře. Silná odbornost v inovativních technologiích (laserové skenování, fotogrammetrie, skenování do BIM) aplikovaná jak na architekturu, tak na kulturní dědictví. Práce na projektech H2020 od srpna 2019.

[redacted] **generální tajemník** (M)[redacted]

Absolvent moderních jazyků má 30 let zkušeností s prací pro profesní orgány ve třetím sektoru (architektura) na národní, evropské a mezinárodní úrovni. Odpovědný za výzkum a analýzu dokumentace za účelem informování při rozhodování a vývoji politik s cílem zastupovat zájmy architektů a ovlivňovat legislativní návrhy EU; řízení týmu ACE.

[redacted] **vedoucí správy** (F)[redacted]

Magistr v sociologii. Obecná pomoc generálnímu tajemníkovi Řídící činnosti, účetní úkoly, administrativní řízení personálu, příprava administrativních podkladů pro návrhy projektů a administrativní sledování schválených projektů, finanční výkaznictví projektů, organizace akcí, příprava a implementace dotazníků, statistická analýza výsledků

Příslušné publikace a/nebo produkty, služby nebo jiné úspěchy

ACE Publikace:

- ACE Guide Úvod do BIM, 2019
- Hodnota designu a role architektů, 2019
- 20 architektonických projektů proti změně klimatu, 2018
- Spolupráce s evropskými architekty !, 2018
- Sektorová studie: Architektonická profese v Evropě, 2018

Relevantní předchozí projekty

1. RenoZEB www.renozeb.eu (H2020) Urychlení téměř nulové renovace budov a sousedství
2. TripleA-reno www.triplea-reno.eu (H2020) Atraktivní, přijatelná a cenově dostupná hloubková renovace přístupem orientovaným na spotřebitele a na základě důkazů o výkonu
3. Cultural-E www.cultural-e.eu (H2020) Design založený na klimatu a kultuře a cenná technologická řešení pro energetické budovy Plus
4. Drive0 www.drive0.eu (H2020) Podpora dekarbonizace fondu budov EU zlepšením procesu cirkulární renovace zaměřeného na spotřebitele a místně založeného
5. DigiPLACE www.digiplaceproject.eu (H2020) *Směrem k evropské digitální platformě pro Stavebnictví*

Významná infrastruktura a/nebo technické vybavení

n/a

Provozní kapacita právnické osoby/partnerské organizace

n/a

	3. ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE **CVUT | CZ** **CZECH TECHNICAL UNIVERSITY IN PRAGUE**
Webová stránka: www.uceeb.cvut.cz **Číslo PIC: 999848744**	**Počet zaměstnanců: 4084 (2019)** **Počet studentů: 17 229 (2019)**

Stručný popis právnické osoby/partnerské organizace

ČVUT (založená v roce 1707) je jednou z nejstarších a největších technických univerzit v Evropě. Nabízí řadu více než stovky studijních programů s více než 400 studijními obory. Projekt bude realizovat Univerzitní centrum pro energeticky účinné budovy (ČVUT UCEEB), které je národním centrem excelence v oblasti energeticky účinných budov a udržitelných inovací pro celý životní cyklus budovy. Hlavní silnou stránkou centra je přenos znalostí do praxe prostřednictvím úzké spolupráce s průmyslem a obcemi. ČVUT UCEEB má pět výzkumných oddělení, která zahrnují energetickou a zdrojovou účinnost, pokročilé řídicí systémy, kvalitu vnitřního prostředí a udržitelnost v zastavěném prostředí.
Od svého založení v roce 2012 se ČVUT UCEEB zaměřuje na aplikovaný výzkum a spolupráci s průmyslem. Již dokončilo/zahájilo více než 600 projektů - financovaných z veřejných i soukromých zdrojů. V současné době ČVUT UCEEB realizuje 3 probíhající projekty H2020: SPARCS - Udržitelná energie Pozitivní komunity a
komunity s nulovým obsahem uhlíku https://sparcs.info/, Powerskin+ https://www.powerskinplus.eu/ a PLURAL https://www.plural-renovation.eu/ a výzkumní pracovníci jsou zapojeni do evropské sítě pozitivních energetických oblastí-COST Action -
CA17126 https://www.cost.eu/actions/CA19126/#tabs|Name:overview, ČVUT UCEEB je vedoucím pracovní skupiny 1: PED mapování, charakterizace a učení. V příloze 83 IBC EBC jsou také dva projekty-Pozitivní energetické oblasti https://annex83.iea-ebc.org/ a IEA EBC Příloha 72- Posouzení vlivů budov na životní prostředí souvisejících s životním cyklem https: //annex72.iea- ebc.org.
ČVUT UCEEB budou zastupovat odborníci z následujících tří výzkumných oddělení:

- Architektura a životní prostředí
- Energetické systémy v budovách
- Řízení a monitorování inteligentních budov

Příspěvek k pracovním balíčkům a úkolům v projektu

WP1: Účast na hladkém průběhu projektu.
WP2: Rámcová odbornost v oblasti pozitivní energetické oblasti, hodnocení místní výroby OZE v městském prostředí, výkonnost studie slunečního potenciálu.
WP3: zapojení občanů, komunit a zúčastněných stran, zvyšování povědomí a učení, participační metody, vývoj metodiky, workshopy společné tvorby, návrh stavebních systémů zaměřený na uživatele, průzkumy před a po, sběr kvalitativních a kvantitativních údajů, mapování zapojených zúčastněných stran , zájmy a potřeby.
WP4: koncepce budov s nulovými emisemi/pozitivní energií, integrovaný a efektivní návrh budovy, řešení digitálního designu, integrace OZE v projektování budov, digitální design a 3D simulace (digitální dvojčata), řešení odolná vůči změně klimatu.
WP5: odbornost v oblasti opatření přizpůsobujících se změně klimatu- letní chlazení tepelnými čerpadly, zelená střecha, eliminace tepelných ostrovů, hospodaření s dešťovou vodou (dešťové zahrady, zeleň), vyměnitelné fasády integrované OZE (flexibilní řešení umožňující snadnou aplikaci PV/PV-T/ solární tepelné/fasádní výměníky tepla pro případné propojení s tepelnými čerpadly).
WP6: návrh, simulace a strategie pro budovy a dálkové energetické systémy (tepelné a elektrické), aplikace obnovitelných zdrojů energie, sklady energie (baterie, voda) a jejich provoz, simulace energetických systémů, odbornost v - tepelné čerpadlo, BAPV, BIPV, PVT, skladování energie, odpadní teplo.
WP7: Monitorování provozní účinnosti.

WP8: Návrh architektury dat, komunikační protokoly, datawarehouse, monitorování, sběr dat, analýza, senzory a vyhodnocení IAQ, platforma IoT.
WP10: šíření a komunikace výsledků projektu a projektu, komunikační kanály (webové stránky, sociální média, zpravodaje), marketing.

Profil klíčového personálu v projektu

[redacted] (M) vystudoval Stavební fakultu VUT v Brně, obor Pozemní stavby, kde pracoval i jako vědecký pracovník. Několik let pracoval ve Skandinávii a jihovýchodní Asii v oblasti udržitelné výstavby. Ve skupině ČEZ se zaměřil na téma Smart City a elektromobilita. Od roku 2019 je vedoucím výzkumného oddělení Monitorování a řízení inteligentních budov na ČVUT UCEEB.

[redacted] (M), Vedoucí oddělení Architektura a životní prostředí je odborníkem na systémy hodnocení udržitelnosti a výkonnost zastavěného prostředí. Vystudoval a získal doktorát na stavební fakultě ČVUT a pracoval na různých pozicích výzkumu a vývoje a poradenství ve stavebnictví a průmyslu OZE. Od roku 2006 vědecký pracovník na stavební fakultě a od roku 2012 na ČVUT UCEEB. Účastnil se projektů- LEnSE (FP6), PERFECTION (FP7), SuPerBuildings (FP7), MORE-CONNECT (H2020) a přispěl k rozvoji národního systému certifikace udržitelnosti budov SBToolCZ. [redacted] e aktivním členem International Initiative for Sustainable Built Environment (iiSBE), zakládajícím členem České rady pro zelené budovy a organizátorem série konferencí www.cesb.cz. https://orcid.org/0000-0002-3142-2631

[redacted] (M) získal titul Ph.D. na elektrotechnické fakultě ČVUT a zaměřuje se na návrh elektroniky a senzorů pro speciální aplikace. V letech 2007-2012 jako postdoc výzkumník a vedoucí týmu v Tyndall NI, Irsko. Od roku 2012 na ČVUT UCEEB, kde založil a vedl oddělení Monitoring a Intelligent Control v období 2015-2019, v roce 2019 jako hostující vědecký pracovník InnoRenew CoE, Slovinsko, se zaměřením na obnovitelné stavební materiály. Je spoluzakladatelem dvou společností a vynálezcem několika patentů EU a USA. Je hlavním řešitelem několika výzkumných projektů v oblasti designu senzorů IoT, obnovitelných zdrojů energie a dalších témat. https://orcid.org/0000-0002-0647-2987

[redacted] (M) je držitelem titulu PhD na katedře elektroniky na Polytechnické univerzitě v Katalánsku (UPC). Jeho zázemí je v dohledu a automatické detekci poruch ve fotovoltaických systémech připojených k síti (PV), jakož i v modelování a analýze degradace různých technologií FV modulů. Ve společnosti ČVUT se UCEEB zabývá FV aplikacemi, mikrosítěmi, inteligentním řízením energie z více obnovitelných zdrojů energie (OZE) a bateriovými systémy skladování energie (BESS). [redacted]

[redacted] (M) vystudoval Matematicko -fyzikální fakultu Univerzity Karlovy v Praze, poté pracoval jako konzultant na volné noze a vývojář softwaru. Od roku 2018 člen oddělení monitorování a řízení inteligentních budov, kde se zaměřuje na vývoj predikce služby ozařování FV a předpovědi PV. [redacted]

[redacted] (F) získala bakalářský titul z mediálních studií a sociologie na Masarykově univerzitě v Brně a následně magisterský titul ze sociologie na Západočeské univerzitě. Poté pracovala jako analytik výzkumu specializovaný na kvantitativní výzkum v oblasti neformální péče. Od roku 2019 se jako vědecký pracovník ČVUT UCEEB podílí na hospodaření s dešťovou vodou v urbanizované krajině a implementaci principů Chytrá města do českých měst a obcí. V současné době pracuje na metodice, která má českým obcím pomoci s nasazením modrozelené infrastruktury a projektů v efektivních procesech řízení a plánování města a uplatňováním participativního procesu navrhování veřejných prostranství a budov.

[redacted] (M) vystudoval katedru tepelné energie na Omské dopravní univerzitě (Rusko). Od roku 2014 pracuje jako vědecký pracovník na ČVUT UCEEB, kde se zabývá výzkumem a vývojem obnovitelných zdrojů energie integrovaných do obvodového pláště budovy. Zabývá se modelováním a experimentálním testováním solárních prvků a pokročilým zasklením. V současné době dokončuje doktorské studium na Institutu environmentálního inženýrství Přírodovědecké fakulty ČVUT v Praze. [redacted]

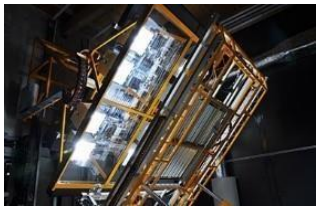
Příslušné publikace a/nebo produkty, služby nebo jiné úspěchy

- Envilop - ekologická stavební obálka - propojená s několika užitnými vzory, hlavní s reg. č. CZ 266197, https://isdv.upv.cz/webapp/!resdb.pta.frm
- PV Forecast - nástroj pro předpověď ozařování FV - pro CZ, lokální pomocí skyscannerů nebo lokálně nainstalované senzory expozice, http://wp2.pvforecast.cz/en/home/#services
- SBToolCZ National Sustainability Assessment Tool - česká metoda pro komplexní hodnocení kvality výkonu budovy, ve které jsou hodnoceny vlastnosti budovy a jejího okolí s ohledem na udržitelný rozvoj, https: //www.sbtool.cz/cs/homepage-english /
- Volf, M., et al. Aplikace strategií projektování budov k vytvoření pláště budovy šetrné k životnímu prostředí pro budovy s téměř nulovou spotřebou energie ve středoevropském klimatu. Energetika a budovy. 2018, 165 35-46. ISSN 0378-7788. DOI 10.1016/j.enbuild.2018.01.019.
- Kichou, S .; Skandalos, N .; Wolf, P. Vylepšení energetické náročnosti výzkumného centra na základě analýzy potenciálu slunečního záření a energetického managementu. Energie. 2019, 183 1195-1210. ISSN 0360-5442.

Relevantní předchozí projekty

- **MORE CONNECT** - Vývoj a pokročilá prefabrikace inovativních, multifunkčních obalových prvků budov pro MOdular REtrofitting a CONNECTions, H2020 GA 633477, 2014-2019, https://www.more-connect.eu/
- **POWERSKIN+** Inteligentní modulární fasádní systémy budov pro dovybavení budou cenově dostupné zvyšovat energetickou účinnost, H2020 GA 869898, 2019-2023, https://www.powerskinplus.eu/
- **SPARCS** - Udržitelná energie Pozitivní a nulové karbonové komunity, H2020 GA 864242, 2019-2024, www.sparcs.info
- **Autonomous curtain wall panel,** Technologická agentura České republiky, GA TH03020341, 2018-2020, https://starfos.tacr.cz/cs/project/TH03020341?query_code=4feqaacjmlpa
- **IEA EBC Annex 72** - Posouzení vlivů budov na životní cyklus souvisejících s budovami https: //annex72.iea-ebc.org

Významná infrastruktura a/nebo technické vybavení



Solární laboratoř

- Sluneční simulátor s umělým slunečním zářením s testovacím stanovištěm v interiéru
- Venkovní testovací stanice pro dlouhodobé monitorování solárních komponent
- Testovací stanoviště pro stanovení optických charakteristik průhledných materiálů
- Přenosný ultrazvukový průtokoměr a teploměr pro potrubí DN 10 až DN 2000 pro měření na místě
- Zařízení Mertel EurotestPV pro kompletní testování a diagnostiku fotovoltaických panelů a instalací
- Hmotnostní průtokoměry pro měření různých druhů kapalin
- Venkovní testovací článek (3 x 3 m) pro solární komponenty integrovaný do pláště budovy
- Akreditované testování kapalných solárních tepelných kolektorů (tepelný výkon, časová konstanta, teplota stagnace)
- Testování předběžné akreditace slunečních kolektorů (test expozice, odolnost vůči vysokým teplotám, teplotní šok)
- Vývoj a testování vzduchových solárních tepelných kolektorů a hybridních konceptů (vzduch-kapalina, fotovoltaika-termál)
- Optické hodnocení homogenních a nehomogenních zasklení a hranolových struktur
- Výzkum a vývoj v oblasti integrace pláště budov solárních komponent
- Testování PV vlastností kolektorů PVT

Elektronické systémy a diagnostika

- Elektronická zařízení - zdroje energie, osciloskopy, spektrální analyzátor, měřicí systémy, pájecí pracoviště
- Diagnostické systémy - termokamera, endoskopická kamera, přesné akcelerometry, laserové měřiče, magnetometry a detektory kovů
- 3D tiskové centrum FORTUS 400mc-modelovací prostor 406 × 355 × 406 mm, rozlišení až 0,127 mm, materiály ABS-M30, PC-ABS, PC, PC-ISO, ULTEM
- Spektrální analyzátory - měřené spektrum od 200 do 1750 nm, přesnost měření ± 20 pm, dynamický rozsah až 60 dB
- Interogátor -měřené spektrum od 1270 do 1650 nm, přesnost měření ± 1 hod., Maximální počet vlnových kanálů 1000, práh detekce -40 dBm
- Zdroj laseru - pásmo C+L, šířka spektrální čáry <100 kHz, krok ladění: 1 hod., Výstup 15 dBm
- Svařovací sada - Fitel S178A včetně optického jističe, rychlé svařování za sedm sekund, umožňuje přímé přivaření konektorů

Fotovoltaické systémy

- Simulátor FV pole s maximálním výkonem 20 kW (1000 V / 20 A) schopný statické i dynamické simulace elektrického výkonu FV modulů podle nastavených provozních podmínek (intenzita záření, teplota, stínění)
- Přesný analyzátor výstupu ZIMMER LMG 670 pro měření a záznam elektrických veličin
- Sestava tří programovatelných zátěží ZSAC pro AC i DC zátěž s výkonem do 5,2 kW
- Experimentální FV pole o výkonu 2,5 kWp a sestava pro ověřování chování hybridních systémů v reálných podmínkách

Řídicí systémy a optimalizace

- Laboratoř má testovací zařízení s topným okruhem se vším potřebným senzorickým vybavením a širokou škálu možností ovládání pohonů. Všechna data jsou průběžně zaznamenávána; experiment lze navíc ovládat pomocí zcela vzdáleného přístupu.
- Za tímto účelem tým vytvořil platformu, která je konkrétně zaměřena na rychlé prototypování a uvádění do provozu různých experimentálních sad.

Provozní kapacita právnické osoby/partnerské organizace

n/a

Tekniske Universitet	**4. Danmarks Tekniske Universitet** **DTU | DK** **Dánská technická univerzita**
	Webová stránka: **www.dtu.dk** **Číslo PIC: 999990655**
	Počet zaměstnanců: 5881 **Počet studentů: 12048**

Stručný popis právnické osoby/partnerské organizace

Společnost DTU, založená v roce 1829 s posláním vytvářet hodnotu ve prospěch společnosti, je mezinárodní elitní technickou univerzitou, kde vzdělávání, vědecké poradenství a inovace stojí na pevných základech výzkumu světové úrovně. Univerzita je v akademickém a multidisciplinárním čele technických a přírodních věd - s novými iniciativami v řadě náročných technických oborů. DTU má dobré výsledky v průmyslovém partnerství a podle agentury Reuters je zařazena na 1. místo v severském regionu a na 9. místo v Evropě mezi nejinovativnější univerzity. K dnešnímu dni DTU koordinovala nebo se podílela na 399 projektech H2020 a má rozsáhlou centrální podpůrnou síť pro evropské projekty, která zahrnuje: projektové, finanční, právní, IPR/inovace a řízení rizik.

DTU Compute je největší prostředí pro matematiku a informatiku v DK, které pokrývá témata od výzkumu po ICT. DTU Compute hostuje CITIES, což je největší národní výzkum inteligentních energetických systémů. Projekty EU související s DTU Compute: SmartNet, FLEXCoop, eBalance+, syn.ikea, OpenE, SmartCityAccelerator, HEAT 4.0, uGRIP, COOL Data, CESI atd. Společnost DTU Compute definovala AI, IoT a zelený přechod jako klíčové oblasti výzkumu.
DTU Civil Engineering (DTU Byg) provádí výuku a výzkum v oblasti chytrých měst a přispívá k vytvoření digitalizovaného stavebního sektoru v Dánsku. DTU Byg vyvíjí metody založené na velkých datech, které poskytují energetickou účinnost a řešení energetické flexibility pro budovy a městské části. Byg je aktivní v projektech chytrých měst, např. CITIES, HEAT 4.0, SCA, EnergyLab Nordhavn.

Příspěvek k pracovním balíčkům a úkolům v projektu

DTU bude primárně přispívat na WP2, 6, 7 a 8, dále také WP1 a 10.

WP 2 Rámec pro efektivní plánování, návrh, konstrukci a provoz CPCC:

DTU bude používat a testovat inovativní metody a nástroje pro akce rozsáhlého dovybavení v demo verzi Sønderborg.

WP 6 Obnovitelná energie a skladování:

DTU přispěje k demonstraci nízkoteplotního dálkového vytápění a předpovídání výroby fotovoltaické energie.

WP 7 Efektivní provoz a flexibilita:

DTU je lídrem WP a bude vyvíjet a testovat digitální řešení a infrastruktury pro efektivní provoz v projektu ARV. Konkrétně se zaměřujeme na uvolnění dostupné flexibility ve všech šesti demo webech pro optimalizaci vlastní spotřeby a minimalizaci uhlíkové stopy pomocí inteligentních

operací založených na datech. DTU bude spolupracovat s ARV Cloud HUB (CENTER DENMARK) na efektivním provozu všech demo stránek a sklízet inovační digitální synergie.

WP 8 Sledování a vyhodnocování:

DTU přispěje k rozvoji monitorování, hodnocení a posuzování dopadů.

Profil klíčového personálu v projektu

[redacted] (M) je profesorem a vedoucím sekce Dynamické systémy - DYNSYS. Kromě toho je vedoucím Centra pro inteligentní energetické systémy IT (CITIES). Získal titul Ph.D. ve statistikách z Technické univerzity v Dánsku v roce 1986. Byl jmenován Asst. Prof. ve statistice v roce 1986, doc. Profesor v roce 1989 a profesor v matematické statistice se zvláštním zaměřením na stochastické dynamické systémy v roce 1999 a vedoucí Národního centra pro systémy inteligentní energie IT (CITIES) 2014. Celkový rozpočet na výzkumné projekty, které získal, je vyšší než 30 milionů eur. Publikoval 550 publikací včetně 230 časopisů, 12 výzkumných monografií (Citace:> 24 000, h-index:> 70, i10-index:> 400 (Google Scholar)). Další podrobnosti najdete na [redacted] Jeho hlavní výzkumný zájem se týká analýzy a modelování systémů stochastické dynamiky. To zahrnuje zpracování signálu, analýzu časových řad, identifikaci, odhad, modelování v šedém poli, predikci, optimalizaci a řízení. Aplikace se většinou týkají energetických systémů, inteligentních měst, informatiky, environmentálních systémů, bioinformatiky, biostatistiky, modelování procesů a financí.

[redacted] (F) je docentkou na katedře stavebnictví DTU. Získala titul Ph.D. v oboru inženýrství architektury na univerzitě v Tokiu v roce 2014. V letech 2014 až 2016 byla postdoktorandkou na katedře zastavěného prostředí Eindhovenské technické univerzity, poté na katedře stavebnictví DTU v letech 2017 až listopadu 2018. V roce 2018 byla jmenována odbornou asistentkou. Byla hlavní přispěvatelkou a vedoucí pracovní skupiny/úkolu několika velkých výzkumných a demonstračních projektů v oblasti inteligentních energetických systémů a chytrých měst, včetně CITIES (IFD), EnergyLab Nordhavn (EUDP) , COMBIOTES (H2020) atd. Zabývá se řízením poptávky po energii ve skutečných budovách pomocí integrovaných ICT budov a kvantifikací potenciálu energetické flexibility v budovách pomocí přístupů založených na datech založených na dolování dat a strojovém učení. Pod jejím dohledem úspěšně obhájili své práce tři kandidáti doktorského studia a čtyři pokračují. Byla významným přispěvatelem Mezinárodní energetické agentury EBC, příloha 67- Energeticky flexibilní budovy, 2014- 2019. Je spolupracujícím agentem IEA EBC příloha 82- Energeticky flexibilní budovy směrem k odolným nízkouhlíkovým energetickým systémům, 2021-2024. Její výzkumný zájem zahrnuje chytrá města, flexibilitu poptávky po energii, modelování energetického systému, analýzu velkých dat, fyziku budov a služby. Je také autorkou více než 60 článků, včetně 40 recenzovaných časopisů.

Příslušné publikace a/nebo produkty, služby nebo jiné úspěchy

1. Real, J. P., Rasmussen, C., Li, R., Leerbeck, K., Jensen, O. M., Wittchen, K. B. & Madsen, H (2021): Charakterizace dynamiky tepelné energie obytných budov s omezenými daty, Energie a budovy, vol. 230.
2. R.G. Junker, C.S. Kallesøe, J.P. Real, B. Howard, R.A. Lopes, H. Madsen (2020): Stochastické nelineární modelování a aplikace cenové flexibility, Aplikovaná energie, vol. 275.
3. C. Finck, R. Li, W. Zeiler (2020). Optimální kontrola flexibility poptávky za ceny v reálném čase pro topné systémy v budovách: Demonstrace v reálném životě. Aplikovaná energie, vol. 263.

4. C.M. Herget, R. Li, P. Pinson (2020): Řízení tepla na straně poptávky v inteligentních domech: experimenty v obytných laboratořích, Energie, vol. 195.

5. R.G. Junker, A.G. Azar, R. Lopes, K. Lindberg, G. Reynders, R. Relan, H. Madsen (2018). Charakterizace energetické flexibility budov a čtvrtí. Aplikovaná energie, vol. 225.

Relevantní předchozí projekty

- CITIES (Dánský inovační fond, 2014-2020)

Rozvoj integrovaných městských energetických systémů, budování krátkodobých provozních modelů, které napájí modely dlouhodobého plánování, s ohledem na prostorově časové rozdíly, interakce, dynamiku a stochastiku v energetickém systému. Relevantní činnosti v rámci projektu zahrnují vývoj řadiče nízkoúrovňových systémových komponent, které mohou informovat agregační modely vyšší úrovně používané při návrhu tržního a řídicího rámce; vývoj indexu energetické flexibility, který lze použít jako měřítko chytrosti budov. http://smart-cities-centre.org/

- Flexible Energy Denmark (Dánský inovační fond, 2019-2023)

Cílem projektu je vyvinout nástroje a řešení založená na velkých datech a umělé inteligenci, která aktivují flexibilitu na všech úrovních energetického systému. Metody jsou testovány v živých laboratořích. Jako součást projektu bude ke shromažďování a ukládání dat použita cloudová datová platforma, zatímco produkty od různých průmyslových partnerů jsou testovány a vylepšovány z hlediska lepších ovládacích prvků a algoritmů prací DTU.

https://www.energiforskning.dk/da/project/flexible-energy-denmark-fed

- SmartNet (Horizon 2020, 2016-2019)

Distribuční sítě byly dosud spravovány filozofií „přizpůsob se a zapomeň“. V budoucnu bude nutná přísná koordinace v reálném čase mezi různými aktéry, kteří se podílejí na poskytování doplňkových služeb. Optimalizace rozhraní mezi provozovateli přenosových soustav a provozovateli distribučních soustav se ukáže jako klíčový faktor pro zajištění dosažení celkového cíle účinnosti. Různé způsoby interakce TSO-DSO jsou porovnávány na základě klíčových národních případů (Itálie, Dánsko a Španělsko); kde budou vyvinuty fyzické piloty ke sledování distribučních parametrů přenosu a prozkoumání způsobů získávání pomocných služeb ze specifických zdrojů umístěných v distribučních systémech.

http://smartnet-project.eu/

- Syn.ikia (Horizon 2020, 2020-2024)

Cílem syn.ikia je vyvinout a testovat metodiky pro rozvoj udržitelných a energeticky výhodných čtvrtí, tj. Vysoce energeticky účinných čtvrtí s přebytkem obnovitelné energie ve čtyřech různých klimatických pásmech v Evropě. Koncept syn.ikia se opírá o souhru nových technologií ve čtvrtích, energetické účinnosti a flexibility, sdílení energie mezi uživateli, dobrých architektonických a prostorových kvalit, udržitelného chování a zapojení občanů.

https://synikia.eu/

- ebalanceplus (Horizon 2020, 2020-2024)

Cílem projektu je zvýšit flexibilitu energetických sítí, testovat nové obchodní modely a podporovat importní subjekty pomocí rozhraní koncových uživatelů šitých na míru. Projekt pomůže reformovat fungování elektrických sítí a trhů pro budoucí nízkouhlíkovou společnost. Díky využívání digitálních technologií

nabízejí inteligentní sítě vyšší energetickou účinnost a umožňují do sítě integrovat více obnovitelných zdrojů energie. Ebalanceplus se zabývá technickými, ekonomickými a sociálními aspekty inteligentních elektrických sítí a zvyšuje jejich flexibilitu a odolnost.

Významná infrastruktura a/nebo technické vybavení

- CTSM-R - Grey-box modelování

V DTU Compute vedeme vývoj CTSM-R, což je nástroj používaný v příloze 58 a 71 IEA pro podrobný popis tepelných charakteristik budov. Byly vyvinuty a použity také prototypové nástroje pro oddělení celkové spotřeby energie na součásti související s konstrukcí budovy a další složku, která je způsobena chováním při obsazení
66. Budou použity oba softwarové systémy a případně budou dále upgradovány.

- Centrum Dánsko (CENTER DENMARK)

Evropské centrum pro digitální inovace pro inteligentní energetické systémy a poskytovatel platformy inteligentních energetických systémů ERA-NET. Jedná se o nezávislé a neziskové národní a evropské výzkumné centrum s cílem sjednotit a začlenit výsledky výzkumu v oblasti digitalizace energetických systémů a inovovat datově inteligentní metody společně s průmyslem a nízkouhlíkovými městy a obcemi. CENTER DENMARK se zaměřuje na rozsáhlé využívání dat, aniž by byla ohrožena ochrana soukromí a GDPR, a důraz je kladen na poskytování znalostí pro přechod na budoucí energetický systém řízený počasím a současně zajištění demokratické správy.

- Climify

Climify je vyvinut společností DTU COMPUTE. Climify je digitální platforma pro plug and play připojení senzorů a akčních členů IoT pro snadné monitorování a řízení budov a systémů HVAC budov. Platforma climify.org nabízí 3 hlavní aplikace. První aplikací je aplikace pro instalaci zařízení IoT, která se používá na přenosných zařízeních (např. Mobilních telefonech nebo tabletech správců systému): tato aplikace umožňuje snadnou instalaci a umístění senzoru nebo aktuátoru v budově. Druhá aplikace je online službou pro vizualizaci dat a řízení HVAC: zatímco monitorovací data lze vykreslit, služba nabízí několik metod vyhodnocení dat; navíc lze upravit a ovládat nastavení připojených pohonů (např. nastavenou teplotu inteligentního termostatického ventilu). Třetí aplikaci lze nainstalovat na přenosná zařízení (mobilní telefony a tablety obyvatel budov) a umožňuje obyvatelům poskytnout zpětnou vazbu o svém vnímání vnitřního klimatu prostřednictvím několika formátů dotazníků.

Prostřednictvím tří aplikací vyvinutých v rámci climify.org se zaměřujeme na zajištění nejlepšího vnitřního klimatu a nejnižší spotřeby energie prostřednictvím levného digitálního řešení. DTU právě vytváří spin-off pro komercializaci Climify.

- uni-lab.dk

Změna klimatu vyžaduje silnou společnou akci výzkumu, průmyslu a občanů. S uni- lab.dk si klademe za cíl spojit všechny živé laboratoře a testovací laboratoře v Dánsku, abychom posílili jejich vzájemnou spolupráci a spolupráci s dánským průmyslem.

Uni-lab.dk může univerzitám v Dánsku pomoci najít vhodnou laboratoř, kde by mohli vyvíjet svá další udržitelná řešení související s jejich konkrétním výzkumným oborem. Může ale také pomoci dánským společnostem najít ty pravé partnery pro vývoj, testování a předvádění svých produktů nové generace. Uni-lab.dk je postavení

na Centre Denmark, národním centru pro digitalizaci dánských energetických systémů. V současné době je k uni-lab.dk přidruženo 9 Living Labs a 4 testovací laboratoře

Provozní kapacita právnické osoby/partnerské organizace

n/a

ENGINEERING TOMORROW	**5. Danfoss A/S** **DAN | DK**	
	Webové stránky: **www.danfoss.com** **Číslo PIC:** 999914316	**Počet zaměstnanců: 28 000**

Stručný popis právního subjektu/partnerské organizace

Technologie inženýrů společnosti Danfoss umožňují světu budoucnosti dosáhnout více s menšími náklady. Uspokojujeme rostoucí potřeby v oblasti infrastruktury, zásobování potravinami, energetické účinnosti a řešení šetrných ke klimatu.

Působíme v oblasti obnovitelných zdrojů energie a infrastruktury dálkového vytápění pro města a městské komunity. Kromě toho se naše výrobky a služby využívají v oblastech, jako je chlazení, klimatizace, vytápění, řízení motorů a mobilní stroje.

Systémy dálkového zásobování energií jsou velmi flexibilní. Efektivní vytápění a chlazení budov snižuje emise a náklady na energii a umožňuje vedoucím představitelům měst přijmout novou vizi zásobování měst energií, která inteligentním a inovativním způsobem kombinuje místní obnovitelné zdroje, kogenerační zařízení a dálkovou energii.

Historie našeho inovativního inženýrství se datuje od roku 1933. Dnes je společnost Danfoss světovou jedničkou, která zaměstnává 28 000 zaměstnanců (2019) a poskytuje služby zákazníkům ve více než 100 zemích. Obrat za rok 2019 dosáhl 6,3 miliardy EUR. Společnost Danfoss má sídlo v Nordborgu. V současné době je společnost strukturována do čtyř specializovaných obchodních segmentů: Pohony, Vytápění, Chlazení a Energetická řešení. Jsme v soukromém vlastnictví rodiny zakladatelů.

Na této práci se podílí především Teplárenské aplikační centrum, specializovaný tým odborníků, kteří působí jako interní a externí konzultanti v oblasti vývoje produktů, koncepčního rozvoje energetických systémů a technicko-ekonomických studií. Dále jsou do ní zapojeny příslušné obchodní jednotky, např. obchodní jednotka Vytápění obytných budov, a obchodní jednotky související s realizací prototypů.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 7 Efektivní provoz a flexibilita:
Vývoj produktů/koncepcí/systémů HVAC systémů
Rozsáhlé znalosti stavební fyziky
Rozsáhlé znalosti zařízení pro řízení komfortu
Rozsáhlé znalosti principů řízení, rovněž na bázi umělé inteligence
Vysoká kvalifikace v oblasti technicko-ekonomické analýzy

WP 8 Monitoring a hodnocení:
Monitorování, analýza a řízení na bázi umělé inteligence je klíčovou strategickou oblastí do budoucna. Byly provedeny investice, a proto je k dispozici vysoká úroveň dovedností.

WP 9 Využití na trhu:
Velký podnik se silnou pozicí na trhu a schopností zavádět nové koncepty.

WP 10 Komunikace, šíření informací a školení:
Velký podnik se silnými komunikačními kanály na trhu.

Profil klíčových pracovníků projektu
[redacted] [redacted] (M) - ředitel aplikačního centra Danfoss Heating Segment - vede aktivity v oblasti koncepčního vývoje energetických technologií, zahrnující vývoj komponent a systémů a jejich interakci v inteligentních energetických systémech. Aplikační centrum hraje roli interních a externích konzultantů v oblasti podpory trhu a projektů, technologií pro dálkové dodávky energií a vývoje produktů. [redacted] [redacted] (M), aplikační specialista v aplikačním centru Danfoss Heating Segment - pracuje na vývoji a testování nových produktů a konceptů v oblasti topných systémů, obvykle ve spolupráci s externími obchodními partnery a univerzitami. V poslední době se zaměřuje na dálkový sběr dat a uvádění topných zařízení do provozu. [redacted] [redacted] (M), ředitel výzkumu a vývoje RH-DT Controls. Specialista na řešení vnitřního klimatu, včetně vývoje elektronických termostatů a souvisejících pokročilých principů řízení. Zabývá se analýzou obchodních modelů a studiemi proveditelnosti. [redacted]
Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy
Publikace: Thorsen, J.E., Brand, M., Gudmundsson, O. „Smart Operation of ULTHD Booster Substation for Multifamily Building“, 5. mezinárodní konference o chytrých energetických systémech, Kodaň, 2019. Thorsen, J.E., Ommen, T., „Field experience with ULTDH substation for multifamily building, Energy Procedia 149 (2018) 197-205. Lund, H., Werner, S, Wiltshire, R., Svendsen, S., Thorsen, J.E, Hvelplund, F., Mathiesen, B.V. “4th Generation District Heating (4GDH). Integrating Smart Thermal Grids into Future Sustainable Energy Systems.” Energy Journal, EGY5906, 2014. Thorsen, J.E., Gudmundsen, O., Brand M. “Performance Specifications for Heat Exchangers for DH Substations of the Future”, 14. mezinárodní sympozium o dálkovém vytápění a chlazení, 2014, Stockholm, Švédsko. Thorsen, J.E., Iversen, J. “Impact of lowering dT for Heat exchangers used in DH systems”, 13. mezinárodní sympozium o dálkovém vytápění a chlazení, 2012, Kodaň, DÁNSKO.
Relevantní předchozí projekty
EUDP (DK) – EnergylabNordhavn, Nové městské energetické infrastruktury a chytré komponenty, www.energylabnordhavn.dk Naší úlohou je: Vývoj a předvedení ultranízkoteplotní rozvodny tepla, přesun zátěže bytů a rekuperace tepla ze supermarketů. **Innovation Fund DK – HEAT 4.0**, digitálně podporované chytré dálkové vytápění Naší úlohou je: Předvedení inteligentního řízení vytápění v budovách s více byty

EU H2020 – REWARDHeat, Chytré sítě, integrace obnovitelných a odpadních zdrojů energie, www.rewardheat.eu
Naší úlohou je: Vývoj a předvedení smyčkové stanice dálkového vytápění pro dům s více byty.

Inovační fond DK – 4DH, 4. generace dálkového vytápění, www.4dh.dk
Naší úlohou je: Člen vědecké komise, poskytování údajů o energetických systémech a příspěvky na konference.

Inovační fond DK – RE-INVEST, Inovativní výzkumné úsilí na cestě k 100% obnovitelnému energetickému systému v Evropě, www.reinvestproject.eu
Naší úlohou je: člen vědecké komise a podíl na datech pro infrastrukturu tepelné energie.

Významná infrastruktura a/nebo technické vybavení

V průběhu projektu budou vyvinuty příslušné prototypy pro demonstraci.

Provozní kapacita právnické osoby/partnerské organizace

Vývoj produktů/koncepcí/systémů HVAC systémů
Hluboké znalosti stavební fyziky
Hluboké znalosti zařízení pro řízení komfortu
Hluboké znalosti principů řízení, rovněž na bázi umělé inteligence
Vysoká kvalifikace v oblasti technicko-ekonomické analýzy
Klíčovou strategickou oblastí je monitoring, analýza a řízení na základě umělé inteligence.
Velký podnik se silnou pozicí na trhu a schopností zavádět nové koncepty.

	6. ENFOR A/S **ENFOR | DK**	
	Webové stránky: https://enfor.dk **Číslo PIC:** 968694478	**Počet zaměstnanců:** 11 **Počet studentů:** 4

Stručný popis právního subjektu/partnerské organizace

Společnost ENFOR poskytuje špičková řešení pro energetické prognózy a optimalizaci pro energetický sektor. Energetické společnosti, obchodníci s energií, provozovatelé přenosových a distribučních soustav využívají řešení ENFOR k předpovídání výroby energie z obnovitelných zdrojů, poptávky po elektřině a teple a k optimalizaci systémů dálkového vytápění. Společnost ENFOR byla založena v roce 2006 jako spin-off v rámci Dánské technické univerzity. Společnost vykazuje solidní provozní výsledky a již mnoho let úspěšně slouží zákazníkům po celém světě.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 6 Obnovitelná energie a skladování: Systémy předpovědi a optimalizace pro obnovitelnou energii a skladování energie

WP 7 Efektivní provoz a flexibilita: Systémy předvídání a optimalizace pro obnovitelné zdroje energie a skladování energie

Profil klíčových pracovníků projektu

[redacted] (M) je vedoucím vývoje modelů a spoluzakladatelem společnosti ENFOR. Je držitelem doktorátu v oboru statistika z informatiky a matematického modelování na Dánské technické univerzitě v oblasti modelování parametrických a neparametrických systémů. Před založením ENFOR pracoval jako docent na Dánské technické univerzitě a již 15 let se zabývá modelováním a optimalizací ve vztahu k energetickým systémům. Publikoval velké množství výzkumných prací týkajících se predikce větrné energie, tepelné zátěže, výkonové zátěže a souvisejících témat.

Profesní zkušenosti:

- Vývoj metod pro předpověď větrné energie, předpověď tepelného zatížení, předpověď zatížení elektřinou, předpověď cen elektřiny.
- Vývoj metod pro pokročilé prognostické produkty (pravděpodobnostní předpovědi, tvorba scénářů).
- Vývoj metod pro optimální podporu rozhodování / strategii řízení na základě předpovědí.
- Vývoj metod pro odhad tepelných vlastností budov

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

- Systémy předpovědi větrné a sluneční energie
- Software pro předpověď vytápění a optimalizaci teploty

Relevantní předchozí projekty

Účast na projektu H2020 **Syn.ikia**

Významná infrastruktura a/nebo technické vybavení

není k dispozici

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

ProjectZero SØNDERBORG	**7. Project Zero A/S PZ | DK**	
	Webové stránky: www.projectzero.dk Číslo PIC: 950688077	**Počet zaměstnanců: 5**

Stručný popis právního subjektu/partnerské organizace

ProjectZero je partnerství veřejného a soukromého sektoru založené v roce 2007 s cílem podpořit přechod obce Sonderborg na obec s NULOVOU uhlíkovou stopou v roce 2029 snížením emisí uhlíku spojených s energetickým systémem ze 700 000 tun na nulu.

Nejvyšším orgánem partnerství ProjectZero je nadace Project Zero-Foundation, jejíž správní rada zastupuje zakladatele a klíčové sponzory: městskou radu města Sonderborg, nadaci Danfoss, Jihodánskou univerzitu, městský podnik veřejných služeb a banku Sydbank. Nadace Project Zero stoprocentně ovládá společnost Project Zero A/S, která působí jako orgán PPP pro energetické plánování, koordinaci, opatření, monitorování, komunikaci atd. v celé komunitě Sonderborgu. Představenstvo společnosti Project Zero A/S zastupuje klíčové místní zúčastněné strany, jako jsou: domovní sdružení, banky, školy/školství, komunální služby, městská správa a městská rada.

Současný plán Roadmap2025 (vytvořený 100 místními odborníky/zainteresovanými stranami a schválený městskou radou v roce 2018) určuje rámec k dosažení 75% snížení emisí uhlíku ve všech odvětvích v Sonderborgu. Realizace plánu Roadmap2025 je rozdělena do 8 segmentovaných pracovních skupin, v nichž se 100 odborníků nyní zaměřuje na realizaci.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 1 Řízení**:** *Řízení a koordinace projektu*

WP 3 Společenství, životní prostředí a pohoda: *Vytváření inovativních participativních platforem pro opatření v oblasti klimatu, vytváření rolových modelů*

WP 4 Udržitelné navrhování budov: *Navrhování budov s nulovou spotřebou energie a udržitelných městských oblastí*

WP 6 Obnovitelná energie a skladování: *Navrhování a implementace systémů obnovitelné energie a skladování v budovách*

WP 7 Efektivní provoz a flexibilita: *Řízení udržitelných budov a energetické modernizace. Řízení systémů dálkového vytápění v budovách.*

WP 8 Monitorování a hodnocení: *Plánování a řízení monitorovacích systémů, hodnocení demonstračních projektů energetické modernizace.*

WP 9 Využití na trhu: *Využití, replikace, veřejné záležitosti*

WP 10 Komunikace, šíření informací a školení: *Školení, publikace, zapojení společnosti a komunikace.*

Profil klíčových pracovníků projektu

[redacted](M), generální ředitel
Vzdělání a vzdělání v oblasti sociálních věd (obchod). S ProjectZero spolupracuje od roku 2007. Vnitrostátní i mezinárodní zkušenosti z oblasti projektů, politiky a komunikace. V uplynulých 10 letech působil jako projektový/WP/task-manager v několika projektech EU. Místopředseda výzkumného a předváděcího projektu CITIES od roku 2014.

Člen panelu EU POD (od roku 2019) a zástupce NORLYS (energetická společnost) (od roku 2018).
[redacted]

[redacted] (M), odborník na budovy/obnovitelné zdroje energie
Držitel titulu M.Sc. v oboru energeticky efektivních budov na DTU s celoživotní praxí v oblasti stavebního/energetického poradenství. Několik let vede vlastní poradenskou společnost, ale je také partnerem v DEM Danish Energy Management. V poslední době zaměstnanec na částečný úvazek ve společnosti ProjectZero. Má rozsáhlé znalosti o domovních sdruženích v celém Sonderborgu a v minulosti pracoval jako externí recenzent výzkumu a využití pro Komisi EU. [redacted] je v současné době projektovým manažerem projektu HAPPI v rámci programu H2020 Sonderborg, který se zaměřuje na rozšiřování energetické modernizace v šesti domovních sdruženích.
[redacted]

[redacted] (F), manažerka síťových projektů
Absolventka magisterského studia v oboru energetického plánování na univerzitě v Aalborgu. Od roku 2016 spolupracuje s ProjectZero a nyní se specializuje na monitoring energií, projekty digitalizace, replikaci projektu EU H2020 SmartEnCity - prostřednictvím sítě SmartEnCity, komunikaci atd.
[redacted]

[redacted] (M), ProjectZero Business Development
Držitel magisterského titulu z Jihodánské univerzity. Má více než 20 let zkušeností z průmyslu, zaměřených na rozvoj trhu a nových obchodních aktivit v oblasti řešení energetické účinnosti. Nyní se zaměřuje na zapojení (zelených) podniků, inovace a předváděcí projekty.
[redacted]

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

Participační platformy pro zapojení segmentů:
ZERObolig; ZERObolig forening; ZEROcompany; ZERObutik; ZEROskole; House of Science

Publikace:
- Roadmap2025
- Grøn Vækst Sønderborg

Relevantní předchozí projekty

EU H2020 **SmartEnCity**
EU Interreg **BSR ActNow**
EU H2020 **Happi**
EU H2020 **Refurb**
Energibyerne.dk

Významná infrastruktura a/nebo technické vybavení

není k dispozici

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

eurac research	**8. EURAC Research** **EURAC | IT**	
	Webové stránky: www.eurac.edu **Číslo PIC:** 999887253	**Počet zaměstnanců:** 517

Stručný popis právního subjektu/partnerské organizace

EURAC je centrum aplikovaného výzkumu sídlící v Bolzanu v Jižním Tyrolsku. Centrum EURAC bylo založeno v roce 1992 jako soukromé sdružení a v současné době je tvoří jedenáct institutů rozdělených do čtyř hlavních oblastí výzkumu: Autonomie, Hory, Zdraví a Technologie. Prostřednictvím interdisciplinárního přístupu se centrum zabývá ochranou menšin a mnohojazyčností, zkoumá klimatické změny, vypracovává plány udržitelného rozvoje s využitím obnovitelných zdrojů energie a přispívá ke zdraví obyvatelstva prováděním biomedicínských studií. Obrat centra dosahuje přibližně 21 milionů eur. V uplynulých devíti letech se EURAC podílel na přibližně 70 projektech a v současné době je zapojen jako koordinátor nebo partner do 45 projektů financovaných v rámci různých programů EU, včetně H2020, 7. RP, IEE, Interreg. Kromě evropského financování a projektů zadaných na zakázku získává EURAC příspěvky od členů centra a má finanční dohodu s provincií Bolzano.
Institut pro obnovitelné zdroje energie provádí aplikovaný výzkum pokročilých energetických systémů, které jsou založeny na udržitelných zdrojích energie nebo je zahrnují. Jeho činnost zahrnuje národní a mezinárodní výzkumné projekty i přímou spolupráci s průmyslovými partnery. Institut rovněž podporuje propagaci technologií obnovitelných zdrojů energie a poskytuje vědecké poradenství politickým činitelům k usnadnění rozhodování. Vědecké výsledky jsou založeny na laboratorních testech jednotlivých komponent a integrovaných energetických systémů, jakož i na sledování aplikovaných předváděcích objektů, experimentálních venkovních instalací a obytných budov. Institut nabízí podporu také při vypracovávání komplexních energetických modelů jako systému na podporu rozhodování pro jednotlivé energetické systémy nebo budovy a pro městské a regionální oblasti.

Způsobilost k projektu/úloze v projektu:
V rámci Institutu pro obnovitelné zdroje energie nabízí výzkumná skupina "Městské a regionální energetické systémy" - URS vysoké kompetence a zkušenosti týkající se: vývoje městských a regionálních energetických plánů a akčních plánů udržitelné energie v alpských obcích (SEAP); vývoje nástrojů a modelů pro energetické strategické plánování; monitorování vnitřního a vnějšího prostředí a mikroklimatu; podpory prostorového rozhodování; analýzy velkých dat a správy databází; finančního hodnocení udržitelných energetických řešení na městské a regionální úrovni, projektů inteligentních měst a řízení demonstračních případů. Členové skupiny jsou zapojeni do mezinárodních a národních vědeckých sítí a iniciativ: Mezinárodní energetická agentura (IEA), Mezinárodní společnost městských a regionálních plánovačů (ISOCARP), Alpský konvent, EUSALP AG9.

URS se aktivně zapojila do různých projektů EU (STARDUST, SINFONIA, SMARTBEEJS RECHARGE.GREEN, LOCSEE, GRETA) a národních projektů (SEAP města BOLZANO a BRESSANONE) týkajících se řízení energetického přechodu v městském nebo regionálním měřítku. V současné době je URS koordinátorem předváděcího místa projektu STARDUST H2020 smart city v Trentu a projektu SINFONIA FP7 smart city v Bolzanu, kde vyvíjí inovativní a integrovaná ICT-energeticko-mobilní řešení zaměřená na hloubkovou energetickou modernizaci budov a digitalizaci systémů i městského prostředí s cílem zvýšit kvalitu života ve městech. Současně je USR zapojen do projektu SMARTBEEJS Marie Curie H2020, zaměřeného na definování dovedností a multidisciplinárních znalostí potřebných pro doktorandy k rozvoji čtvrtí s pozitivní energií, se schopností porozumět potřebám občanů a komunit a zapojit se do nich.

Kromě toho v administrativních záležitostech poskytují výzkumným pracovníkům podporu při přípravě a řízení výzkumných projektů Kancelář pro rozvoj výzkumu (RDO), Útvar pro vědeckou komunikaci a Účetní a právní kancelář.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

EURAC Research patří mezi vědecké partnery projektu.
Koordinuje WP8 (monitorování a hodnocení).
Podporuje také předváděcí město Trento při navrhování a realizaci CPCC „Piedicastello Destra Adige“ a podílí se na činnosti všech pracovních skupin:

- WP1 Řízení projektu
- WP2 Rámec pro CPPC
- WP3 Společenství, životní prostředí a dobré životní podmínky
- WP4 Udržitelný (re)design budov
- WP5 (Re)konstrukce účinně využívající zdroje
- WP6 Inovativní obnovitelné zdroje energie a systémy skladování
- WP7 Efektivní provoz a flexibilita
- WP8 Monitorování a hodnocení
- WP9 Využití trhu
- WP10 Komunikace

Profil klíčových pracovníků projektu

Koordinátor týmu [redacted] (M) (doktorát z urbanismu a regionálního plánování, doktorát z environmentálního/energetického inženýrství) zodpovídá za výzkumný tým pro městské a regionální energetické systémy. Je technicky zodpovědný za projekt Smart City 7. RP SINFONIA a za projekt H2020 STARDUST SCC, který koordinuje realizaci 2 LH okrsků ve městech Bolzano a Trento. Koordinoval projekt Interreg South East Europe LocSEE "Low-Carbon South East Europe", na kterém spolupracoval s 8 zeměmi jihovýchodní Evropy. Je expertem Mezinárodní energetické agentury SHC TASK 51: Solární energie a územní plánování a Příloha 83 EBC o okrscích s pozitivní energií a v akci COST Okrsky s pozitivní energetickou bilancí, COST Action CA19126. Byl zvolen viceprezidentem ISOCARP, Mezinárodní společnosti urbanistů a regionálních plánovačů s odpovědností za akademický rozvoj. Od roku 2015 propaguje mezinárodní konference "Chytré a udržitelné plánování pro města a regiony" -SSPCR- pořádanou EURAC (http://www.sspcr.eurac.edu/). V roce 2018 se zúčastnil jako řečník Světového fóra měst 9 a konference REAL CORP 2018. Je již aktivní v platformě zúčastněných stran SCC a v pracovní skupině SCIS.

[redacted] (M) je vystudovaný urbanista a ekolog, doktorát získal v oboru ekonomie nemovitostí. Vychází z více než desetiletých praktických zkušeností v oblasti plánování a v současné době se ve svém výzkumu zaměřuje na projekty chytrých měst a vícenásobné přínosy přechodu na energetiku. Od roku 2015 je zodpovědný za koordinaci mezinárodní konference "Chytré a udržitelné plánování pro města a regiony" (SSPCR) a působí jako moderátor/předseda zasedání nebo hlavní řečník na národních a mezinárodních akcích. Koordinuje místní pracovní tým projektu chytrých měst H2020 STARDUST v Trentu a aktivity Eurac v projektu VARCITIES (H2020). [redacted] je členem akce COST Okrsky s pozitivní energetickou bilancí, COST Action CA19126, spoluvedoucím dílčího úkolu v IEA Příloha 83 EBC o okrscích s pozitivní energií, týkajícího se ekonomického, environmentálního a sociálního hodnocení. Podílel se také na řadě výzkumných projektů EU (FP7 Sinfonia, SEE Locsee, AS Recharge.green), na tvorbě akčních plánů pro udržitelnou energii (SEAP) a je autorem více než 20 článků ve vědeckých časopisech a na konferencích. Od roku 2015 koordinuje mezinárodní konference "Smart and Sustainable Planning for Cities and Regions" -SSPCR- pořádané EURAC (http://www.sspcr.eurac.edu/) a je editorem sborníku vydaného nakladatelstvím SPRINGER.

[redacted] (F) (titul v oboru architektura, doktorát v oboru udržitelné energetické systémy) - MITPortugal Program) je postdoktorandkou ve skupině Městské a regionální energetické systémy. Kombinuje profesní zkušenosti architektky z Portugalska, Dánska a Nizozemska s výzkumným myšlením založeným na datech. Od roku 2011 se podílí na různých projektech, většinou zaměřených na vývoj přístupů k posuzování vlivů na životní prostředí pro podporu rozhodování. Zejména má zkušenosti s aplikací posuzování životního cyklu na městské systémy (např. budovy, doprava), městský metabolismus, oběhové hospodářství a předcházení vzniku odpadů a nakládání s nimi. Ve společnosti Eurac pracovala mimo jiné na projektech oběhového hospodářství (SEC - Strategie pro oběhové hospodářství v provincii Bolzano), čtvrtí s pozitivní energetickou bilancí (IEA Task 83), inteligentních měst (STARDUST), pokročilé mobility (LifeALPS).

[redacted] [redacted] (F) (titul z městského a regionálního plánování, doktorát z environmentálního/energetického inženýrství) je postdoktorandkou v týmu pro městské a regionální energetické systémy v EURAC. Její pracovní aktivity se týkají především prostorově explicitní analýzy a zpracování dat pomocí GIS (geografických informačních systémů) za účelem odhadu nebo výpočtu energetické náročnosti budov a potenciálu výroby energie z obnovitelných zdrojů energie (OZE). Během svého doktorského studia získala také zkušenosti v oblasti strategického posuzování vlivů plánů na životní prostředí (SEA) a vypracovávání scénářů pro udržitelnou energetickou transformaci měst a regionů.

[redacted] (M) získal bakalářský titul v oboru matematika (Università degli Studi di Torino), magisterský titul v oboru matematika (Università degli Studi di Torino) a doktorský titul v oboru čistá a aplikovaná matematika (Università degli Studi di Milano & Universitat Politècnica de Catalunya), disertační práce na téma matematická analýza a parciální diferenciální rovnice. Jeho **hlavní oblastí činnosti je** analýza dat, modelování hodnocení dopadů a modelování dynamických systémů. [redacted] se aktuálně podílí na následujících projektech: Sinfonia FP7 (monitorovací akce); Tendr na obnovitelné chlazení pro komisi EU, BuiltHub H2020.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

- Bisello, A. Assessing Multiple Benefits of Housing Regeneration and Smart City Development: The European Project SINFONIA. *Sustainability* 2020, *12*, 8038
- S. Croce, D. Vettorato „The definition of urban surface uses: a systemic approach for climate resilient and sustainable cities“ Série konferencí IOP: 2020, prosinec 2020
- D'Alonzo V, Novelli A, Vaccaro R, Vettorato D, Albatici R, Diamantini C, Zambelli P „A Bottom-up Spatially Explicit Methodology to Estimate the Space Heating Demand of the Building Stock at Regional Scale“ Energy and Buildings, leden 2020
- Bisello, A. and Vettorato, D. (2018) „Multiple Benefits of Smart Urban Energy Transition“, in Droege, P. (ed.) Urban Energy Transition. Vydání druhé. Elsevier, str. 467–490.
- Mosannenzadeh, F., Bisello, A., Vaccaro, R., D'Alonzo, V., Hunter, G. W., & Vettorato, D. (2017). Smart energy city development: A story told by urban planners. Cities, 64, 54-65.

Relevantní předchozí projekty

STARDUST - Holistický a integrovaný městský model pro chytrá města https://cordis.europa.eu/project/rcn/212410_en.html , H2020, 2017 – 2022.

Akce COST PED - Pozitivní energetické okrsky, akce COST CA19126, https://www.cost.eu/actions/CA19126/ 2020-2024

VARCITIES - projekt VARCITIES financovaný EU má za cíl vytvořit vizi budoucích měst, jejichž středobodem bude občan a tzv. lidské společenství. Bude proto realizovat inovativní myšlenky a vytvářet přidanou hodnotu prostřednictvím udržitelných modelů pro zlepšení zdraví a pohody občanů po celé Evropě, kteří čelí různým klimatickým podmínkám a výzvám. https://www.varcities.eu/ H2020 – 2020-2025

SINFONIA - Chytrá iniciativa měst plně odhodlaných investovat do pokročilých rozsáhlých energetických řešení https://cordis.europa.eu/project/rcn/197825_it.html , FP7, 2014 -2020.

SMARTBEEJS Marie Curie H2020 - Human-Centric Energy Districts: Chytrá tvorba hodnot prostřednictvím efektivity budov a energetické spravedlnosti pro udržitelné bydlení, https://cordis.europa.eu/project/rcn/223178/factsheet/en, 2019 – 2023.

Významná infrastruktura a/nebo technické vybavení

Institut pro obnovitelné zdroje energie nabízí ve svých specializovaných laboratořích zkušební služby pro studium tepelných čerpadel s tepelným i elektrickým pohonem, solárních fotovoltaických modulů a měření tepelných vlastností pasivních a aktivních solárních stavebních prvků. Provádějí se rozsáhlé dynamické simulace, které zlepšují proces vývoje výrobků a prakticky integrují součást do celkového systému.

VNITŘNÍ ZAŘÍZENÍ

- SOLÁRNÍ LABORATOŘ - Simulátor slunce pro fotovoltaické moduly
- LABORATOŘ PRO ZRYCHLENÉ ZKOUŠKY ŽIVOTNOSTI - Klimatická komora pro zrychlené zkoušky životnosti
- MULTIFUNKČNÍ FASÁDNÍ LABORATOŘ - Laboratoř pro charakterizaci vlastností multifunkčních fasád
- LABORATOŘ PRO TEPELNÁ ČERPADLA - Laboratoř pro testování systémů tepelných čerpadel

VENKOVNÍ ZAŘÍZENÍ

- LABORATOŘ PRO INTEGRACI FV - zařízení pro integraci fotovoltaických systémů do budov a sítí
- LABORATOŘ ENERGETICKÉ VÝMĚNY - zařízení pro testování pokročilých sítí dálkového vytápění a chlazení
- LABORATOŘ INTERAKCÍ FASÁDNÍCH SYSTÉMŮ - zařízení pro hodnocení interakcí fasádních systémů a vnitřního prostředí

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

SINTEF	**9. SINTEF AS** **SINTEF | NO**	
	Webové stránky: **https://www.sintef.no/** **Číslo PIC: 919303808**	**Počet zaměstnanců: 2000**

Stručný popis právního subjektu/partnerské organizace

SINTEF je jednou z největších nezávislých výzkumných organizací v Evropě. Každý rok realizuje několik tisíc projektů pro velké i malé zákazníky. Již více než 60 let vyvíjí SINTEF řešení a inovace pro společnost a zákazníky po celém světě. Díky tomu se společnost stala předním světovým výzkumným institutem. Její vizí je *Technologie pro lepší společnost*.
Inovace přináší prostřednictvím vývoje znalostí a technologií, které se využívají v praxi. SINTEF je multidisciplinární a disponuje špičkovými mezinárodními odbornými znalostmi v oblasti technologií, přírodních věd, medicíny a společenských věd. Provádí smluvní výzkum a vývoj jako partner pro soukromý i veřejný sektor a jsme jednou z největších institucí smluvního výzkumu v Evropě. Práci SINTEF v ARV bude vykonávat institut **SINTEF Community**, oddělení architektury, stavebních materiálů a konstrukcí, které pracuje na tématech integrativní energetické účinnosti budov, analýzy životního cyklu, modelování měst, živých laboratoří a územního plánování, a oddělení mobility a ekonomiky.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

Kontakt pro předvádění v Norsku: Steinar Grynning
WP 1 Řízení: -/-
WP 2 Rámec pro efektivní plánování, navrhování, výstavbu a provoz CPCC: (Jo Skjermo, Judith Thomsen).
WP 3 Společenství, životní prostředí a pohoda: Vedoucí pracovního balíčku (Judith Thomsen), vedoucí úkolu 3.2 obecná metodika Living lab (Caroline Cheng), přispěvatel (Daniela Baer).
WP 4 Udržitelné navrhování budov: vedoucí úkolu 4.5 Řešení BIPV (Steinar Grynning) a přispěvatel Nicola Lolli, a řešení založená na přírodě (Berit Time)
WP 5 Výrobní a stavební pracovní postupy účinně využívající zdroje: přispěvatel LCA (Nicola Lolli)
WP 6 Obnovitelná energie a skladování: přispěvatel (Steinar Grynning)
WP 7 Efektivní provoz a flexibilita: přispěvatel (Steinar Grynning)
Pracovní skupina 8 Monitorování a hodnocení: přispěvatel, propojení se sběrem dat v pracovní skupině 3, návaznost na monitorování v rámci projektu Oslo Demo (Judith Thomsen, Caroline Cheng)
WP 9 Využití trhu: přispěvatel (Caroline Cheng)
WP 10 Komunikace, šíření informací a školení: propojení s činnostmi Living Lab v rámci WP 3. Vedoucí úkolu 10.2.2 (Daniela Baer)

Profil klíčových pracovníků projektu

[redacted] (F), PhD v oboru architektury, MSc v oboru architektury, je vedoucí výzkumu na oddělení architektury, stavebních materiálů a konstrukcí ve SINTEF Community. [redacted] je v současné době vedoucí pracovního balíčku ve Výzkumném centru pro nulové emise v inteligentních městech (www.fmezen.no), kde vede pracovní balíček týkající se pilotních projektů a živých laboratoří. [redacted] je držitelkou titulu PhD v oblasti bydlení a výzkumu spokojenosti se zastavěným prostředím pomocí kvalitativních a kvantitativních metod. V minulosti [redacted] pracovala v Centru pro budovy s nulovými emisemi (www.zeb.no) a v národním výzkumném projektu EBLE - Hodnocení bydlení s nízkou potřebou energie.

[redacted] (M), PhD doktor architektury, historie a technologie, je vedoucím výzkumu na oddělení architektury, stavebních materiálů a konstrukcí v SINTEF Community. [redacted] má rozsáhlé zkušenosti jak z teoretických studií, tak z navrhování, realizace a provádění laboratorních a terénních měření. Úzce spolupracuje se stavebním průmyslem prostřednictvím mnoha národních průmyslových a výzkumných projektů, jako je Výzkumné centrum pro nulové emise v inteligentních městech (www.fmezen.no),

Zero Emission Buildings (www.zeb.no), Národní centrum pro výzkumné inovace (SFI) *Klima 2050 - Snížení rizik prostřednictvím adaptace budov a infrastruktury na změnu klimatu a* národní výzkumný projekt EBLE - Hodnocení bydlení s nízkou potřebou energie. [redacted] se rovněž podílí na mezinárodním výzkumu prostřednictvím různých akcí IEA-Annexes, COST. Absolvoval dva výzkumné pobyty v Lawrence Berkeley National Laboratories v Berkeley v Kalifornii.

[redacted] (F): Je vedoucí vědeckou pracovnicí SINTEF Community, stavební inženýrkou a držitelkou doktorátu ze stavební fyziky z norské NTNU. Její odborné znalosti se týkají přizpůsobení budov klimatickým podmínkám, transportu vlhkosti, tepla a vzduchu v obvodových pláštích budov obecně a dřevostaveb zvláště. Pracovala jako projektantka obcí a má za sebou dlouhou kariéru ve výzkumu na různých výzkumných pozicích, například v bývalém Norském stavebním výzkumném ústavu. Časem se podílela na několika mezinárodních projektech a sítích v Evropě, byla také členkou mnoha národních a mezinárodních komisí. Je výkonnou ředitelkou Národního centra pro inovace založené na výzkumu (SFI) *Klima 2050 - Snížení rizik prostřednictvím adaptace budov a infrastruktury na změnu klimatu*.

[redacted] (M): (PhD v oboru architektury, MSc v oboru udržitelné architektury, březen) je vedoucí vědeckou pracovnicí na oddělení architektury, stavebních materiálů a konstrukcí v SINTEF Community. [redacted] prováděla výzkum v oblasti posuzování životního cyklu aplikovaného na budovy, energetických simulací budov, energetické účinnosti a účinnosti zdrojů v budovách, uživatelského komfortu v budovách a analýzy nákladů na budovy s nulovými emisemi. [redacted] byl vedoucím úkolu v projektu 7. RP EU PROFICIENT, v současné době je vedoucím pracovního balíčku v projektu H2020 NERO a publikoval řadu článků v mezinárodních časopisech a na konferencích zaměřených na aspekt dopadu materiálů a spotřeby energie v obytných budovách na životní prostředí. [redacted] působí 10 let na akademické půdě a 3 roky jako profesionál.

[redacted] (F), PhD v oboru ekonomiky průmyslu a řízení technologií, MSc v oboru průmyslové ekologie (environmentální management), je vědeckou pracovnicí na oddělení architektury, stavebních materiálů a konstrukcí v SINTEF Community. [redacted] se zabývá výzkumem v oblasti využívání různých typů nástrojů na podporu inovačního úsilí a spolupráce mezi organizacemi. V současné době je vedoucím úkolu pro řízení inovací, jejich využívání a zavádění na trh v projektu H2020 syn.ikia (2020-2023). Působí také jako odborná asistentka na NTNU Business School na Norské univerzitě vědy a techniky. Před svou výzkumnou a pedagogickou kariérou zastávala [redacted] manažerské pozice v oblasti strategického marketingu a rozvoje podnikání ve finančním sektoru v Singapuru a Hongkongu.

[redacted] (F), PhD v oboru geografie, je vědeckou pracovnicí na oddělení architektury, stavebních materiálů a konstrukcí ve Společenství SINTEF. [redacted] se podílí na činnosti výzkumného centra pro čtvrti s nulovými emisemi v inteligentních městech (www.fmezen.no) a sdílené čtvrti (https://www.sintef.no/en/projects/sharing-neighbourhoods/). [redacted] je aktivním členem norského řídicího výboru akce COST PED-EU-NET European Network for Positive Energy Districts. Předtím, než se stala výzkumnou pracovnicí, pracovala 8 let v různých projektech městského plánování (spolupracovnice v projektu "Future Urban Industries", Stiftung Neue Verantwortung, Berlín, Německo (2011-2012); konzultantka a manažerka sousedství pro Business Improvement District (BID) v CIMA GmbH, Hamburk a Luebeck, Německo (2009-2010); projektová manažerka v Büro für Stadterneuerung [Úřad pro obnovu měst] Berlín, Německo (2006-2009).

[redacted] (M), PhD. v oboru vizualizace a počítačové grafiky, je vědeckým pracovníkem na oddělení mobility a ekonomiky na SINTF Community a má více než 20 let zkušeností s výzkumem pomocí pokročilých vizualizačních metod. Byl vedoucím projektu, vedoucím pracovního balíčku a klíčovým členem dlouhé řady projektů, včetně několika projektů týkajících se virtuální reality. Kromě toho je v současné době vedoucím centra GEMINI pro eXtended Reality, které vzniklo ve spolupráci SINTEF a Norské univerzity vědy a techniky (NTNU). Má silné zázemí a kompetence v oblasti vývoje, modelování, programování a implementace simulovaných scénářů pro použití ve VR a AR a vyvinul malé i plnohodnotné simulace řízení pro Norskou správu veřejných silnic a SINTEF. V současné době vede výzkumnou skupinu SINTEF moderní VR-laboratoř.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

1. Thomsen, Judith; Berker, Thomas; Hauge, Åshild Lappegard; Denizou, Karine; Wågø, Solvår Irene; Jerkø, Sidsel. The Interaction between Building and Users in Passive and Zero-Energy Housing and Offices: The Role of Interfaces, Knowledge and User Commitment. *Smart and Sustainable Built Environment* 2013; Vol 2.(1) s. 43-59
2. Hauge, Åshild Lappegard; Thomsen, Judith; Löfström, Erica. How to get residents/owners in housing cooperatives to agree on sustainable renovation. *Energy Efficiency* 2013; Vol 6 (2); s. 315-328
3. Taveres-Cachat, Ellika; Grynning, Steinar; Thomsen, Judith; Selkowitz, Stephen. Responsive building envelope concepts in zero emission neighborhoods and smart cities – A roadmap to implementation. *Building and Environment* 2019; Vol 149. s. 446-457
4. Lolli, Nicola; Lien, Anne Gunnarshaug; Rønneseth, Øystein. Cost optimization of a zero-emission office building. *Buildings* 2020, Vol. 10.
5. Gullbrekken, Lars; Time, Berit. Towards Upgrading Strategies for nZEB-Dwellings inNorway. *Journal of sustainable architecture and civil engineering.* 2019; Vol 25.(2) s. 35-42

Relevantní předchozí projekty

H2020 NMBP- EEB-2019 syn.ikia
Trvání: 2020-2023
Webové stránky:
https://www.synikia.eu/
Role SINTEF: Vedoucí WP

FME ZEN Výzkumné centrum pro čtvrti s nulovými emisemi v inteligentních městech (Centrum pro výzkum energie šetrné k životnímu prostředí financované Norskou radou pro výzkum + průmysl)
Trvání: 2017-2024
Webové stránky:
www.fmezen.no
Role SINTEF: Výzkumný partner, vedoucí WP

FME ZEB Výzkumné centrum pro čtvrti s nulovými emisemi v inteligentních městech (Centrum pro výzkum energie šetrné k životnímu prostředí financované Norskou radou pro výzkum + průmysl)
Trvání: 2009-2017 Webové stránky: www.zeb.no
Role SINTEF: Výzkumný partner, vedoucí WP

H2020-EE-2016-CSA: NERO – Dřevostavby s téměř nulovou spotřebou energie v severských zemích
Trvání: 2017-2020
Webové stránky:
https://cordis.europa.eu/project/rcn/210342/factsheet/enRole
SINTEF: WP leader

SFI Klima 2050 – Centrum pro inovace založené na výzkumu: Snížení rizik prostřednictvím přizpůsobení budov a infrastruktury klimatickým změnám (financováno Norskou radou pro výzkum a národními partnery)
Trvání: 2015-2022
Webové stránky:
http://www.klima2050.no/
Role SINTEF: Vedoucí střediska

Významná infrastruktura a/nebo technické vybavení

Laboratorní infrastruktura NTNU/SINTEF pro ARV:

- Laboratoře pro zkoušení stavebních materiálů a komponentů
- VR - laboratoř virtuální reality pro vizualizaci 3D scénářů

Laboratoře s nulovými emisemi:

- Laboratoř zkušebních buněk ZEB (dvojité buňky) pro výzkum a vývoj technologií ZEB
- ZEB Living Lab - obydlí pro studium interakce mezi uživatelem a technologií
- ZEB Lab - flexibilní kancelář pro výzkum v oblasti vytápění, větrání, BIPV, skladování PCM a designu pracovišť

Provozní kapacita právnické osoby/partnerské organizace

SINTEF je výzkumný institut s několika odděleními/instituty, jejichž výzkumné aktivity jsou v souladu s aktivitami projektů. V případě potřeby bude zváženo zapojení výzkumných pracovníků z jiných oddělení/institutů na základě potřeby úkolů, na kterých se SINTEF podílí. Tím se zabrání narušení a zpoždění vývoje projektu.

Ajuntament de Palma	**10. Rada města Palma** **PALMA | ES**	
	Webové stránky: www.palma.cat **Číslo PIC:** 967168474	**Počet zaměstnanců:** 881

Stručný popis právního subjektu/partnerské organizace

Účastníkem ARV je městská rada města Palma de Mallorca, hlavního města Baleárských ostrovů (více než 460 000 obyvatel).

Práce bude provádět Oddělení modelování města (Model de Ciutat). Na projektu budou spolupracovat i další oddělení a veřejné organizace, které jsou rovněž součástí Ajuntament de Palma. Mezi ně budou patřit např: PMH (Patronat municipal de l'Habitatge), Oddělení angažovanosti (Participació Ciutadana), které se zabývá začleněním účasti občanů do některých rozhodovacích procesů, Oddělení životního prostředí (Mediambient), které má na starosti revizi stávajících předpisů, jako je PACES, a vypracování nových, a Oddělení infrastruktury (Infraestructures), které zodpovídá za energetickou účinnost budov ve vlastnictví radnice.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 2 Rámec pro efektivní plánování, navrhování, výstavbu a provoz CPCC:
Využití metod a nástrojů plánování pro rozsáhlé modernizační akce na úrovni okresu, pro CEC na úrovni okresu a pro plánování měst na úrovni okresu: Energetický a cirkulární dopad

WP 3 Společenství, životní prostředí a pohoda:
Sociální angažovanost při rozsáhlé renovaci. Centrum pro energetický přechod -TE21 & Living Labs
CEC- Občanské energetické komunity
Předváděcí developer v Districte Innovador Llevant v Palma de Mallorca

WP 4 Udržitelné navrhování budov:
Integrovaný proces návrhu a katalog řešení pro renovaci budov s 50% snížením spotřeby energie

WP 5 Výrobní a stavební pracovní postupy účinně využívající zdroje:
Integrovaný pracovní postup pro rozsáhlou renovaci hustě obydlených městských oblastí prostřednictvím partnerství veřejného a soukromého sektoru (PPP).

WP 7 Efektivní provoz a flexibilita:
Optimální řízení v CEC

WP 8 Monitorování a hodnocení:
Sledování spotřeby energie a sběr dat ve stávajících, modernizovaných a nových budovách a v CEC.

WP 9 Využití na trhu:
Obchodní a finanční modely pro rozsáhlou renovaci a CEC

Profil klíčových pracovníků projektu

[redacted] (M)
Generální ředitel, technický ředitel, zástupce ředitele pro městské modelování, spravedlivé bydlení a udržitelnost městské rady města Palmy od roku 2015. Je architektem a doktorem urbanismu na „Universitat Politècnica de Catalunya“ a spojuje výzkum v oblasti urbanismu s odpovídajícím přenosem znalostí v oblasti plánování, programů a projektů na městské a nadměstské úrovni. Mezi jeho významná angažmá patří práce:

- V městských radách Calvià (Mallorca), Gavà (Barcelona) a v metropolitní oblasti Barcelony.
- Na Universitat Politècnica de Catalunya působí jako zástupce koordinátora výzkumné skupiny urbanismu, profesor na katedře urbanismu a územního plánování a na evropském postgraduálním magisterském studiu urbanismu.
- Spoluředitel časopisu *Revista Iberoamericana de Urbanismo*.

Generální ředitel, technický ředitel, zástupce ředitele pro městské modelování, spravedlivé bydlení a udržitelnost městské rady města Palmy

[redacted] (M)
Josep Maria je průmyslový inženýr specializující se na budovy. V roce 2010 se stal ředitelem pro energetiku ve vládě Baleárských ostrovů a v současné době působí jako ředitel pro bydlení v Palmě a ředitel koordinačního oddělení strategie udržitelného a integrovaného rozvoje měst. [redacted] má zkušenosti v oblasti udržitelnosti a regenerace měst.

Ředitel odboru bydlení a vedoucí městské rady pro bydlení a integrální obnovu čtvrtí

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

Relevantní předchozí projekty

- FP7 – projekt CIVITAS-DYNAMO. Webové stránky: https://civitas.eu/content/dynmo
- FP7 – projekt CONURBANT. Webové stránky: https://www.conurbant.eu/en/
- Interreg MED – projekt INCIRCLE. Webové stránky: https://incircle.interreg-med.eu/
- Evropský parlament - projekt Biodivercity.
  Webové stránky: https://oppla.eu/groups/biodivercities/timing-and-end-date-biodivercities-project

Významná infrastruktura a/nebo technické vybavení

není k dispozici

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

IBAVI Institut Balear de l'Habitatge Govern de les Illes Balears	**11. Institut Balear de l'Habitatge** **IBAVI | ES**	
	Webové stránky:	**Počet zaměstnanců:**

Stručný popis právního subjektu/partnerské organizace

Baleárský institut bydlení (IBAVI) je veřejný subjekt při ministerstvu mobility a bydlení vlády Baleárských ostrovů, jehož cílem je podpora chráněného bydlení. Hlavním účelem IBAVI je vytváření a udržování nemovitostního parku veřejného sociálního bydlení, které je dostupné a cenově přijatelné pro občany tohoto společenství. Baleárský institut bydlení rovněž zpracovává a spravuje granty a dotace určené k usnadnění a zlepšení přístupu k bydlení pro obyvatele tohoto společenství. IBAVI byl založen 30. prosince 1986 a jeho ústavní dekret byl zveřejněn v BOCAIB č. 9 z 20. ledna 1987.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP4: Udržitelný (re)design budov
WP5: Integrované výrobní procesy a pracovní postupy - **úkol 5.3**
WP8: Monitorování a hodnocení
WP9: Využití na trhu
WP10: Komunikace

Profil klíčových pracovníků projektu

[redacted] (F)

[redacted] je v současnosti ředitelkou a vedoucí Baleárského institutu sociálního bydlení (IBAVI). Vystudovala ekonomii na Pompeu Fabra University v Barceloně a Ludwig Maximilians Universität v Mnichově. Je držitelkou magisterského titulu v oboru společenské odpovědnosti firem (CSR) a udržitelnosti na UNED & Jaume I University (UJI). Od srpna 2015 do března 2019 byla ředitelkou Rady ostrova Mallorca pro finance, rozpočty a projekty, přičemž od července 2017 měla na starosti rozvoj SCR. V letech 2012-2020 byla rovněž zakladatelkou a výkonnou ředitelkou společnosti Tucktuck Community, S.L. a od března 2011 do června 2012 mezinárodní spolupracovnicí pro projekt Fair Trade v nadaci Vicente Ferrer v Anantapuru v Indii.

Email: [redacted]

Telefon: [redacted]

[redacted] (M)

Pan [redacted] je architektem z Barcelonské školy architektury (ETSAB). Během studia získal stipendium na studium na UC Los Angeles, TU Delft a ETSAM. V současné době je vedoucím technického oddělení Baleárského institutu sociálního bydlení a byl ředitelem projektu Life Reusing Posidonia, financovaného z evropského programu LIFE+ pro projekty ochrany přírody a přizpůsobení se změně klimatu. Jako člen týmu IBAVI obdržel několik ocenění, která mu propůjčují důvěryhodnost při vysvětlování, že lze věci dělat jinak, jako je například cena FAD 2018, cena Španělského bienále 2018, cena Španělská architektura 2019 a nominace na Cenu Miese van der Rohe 2019. Přednáší po celé Evropě a jeho práce jsou hojně publikovány a vystavovány.

Email: [redacted]

Telefon: [redacted]

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

Publikace:

- Kniha Life Reusing Posidonia. 2017. http://eng.reusingposidonia.com/the-book/
- Dokument Life Reusing Posidonia. 2017 .http://eng.reusingposidonia.com/the-documentary/
- Katalog stavebních materiálů šetrných k Baleárským ostrovům.2018. http://eng.reusingposidonia.com/catalog-of-materials/
- Posidonia oceanica as thermal insulation. Journal of Construction. Vol 17, č. 2 (srpen 2018).
- http://revistadelaconstruccion.uc.cl/index.php/RDLC/article/view/2067/2135

Další publikace: file:///C:/Users/aparato/Downloads/AFTERLIFE-LRP-ENG.pdf

Relevantní předchozí projekty

- LIFE +: LIFE12/ENV/ES000079 (Life Reusing Posidonia). 2013-2018.
- Euroregió Pirineus Mediterrània: projekt 'Buildings that tend to industrialization and the nZEB'2014-2015.

Významná infrastruktura a/nebo technické vybavení

1- Tepelná izolace z trávy Posidonie mořská, řešení na přírodní bázi, které bude provedeno na demonstrační budově a které lze použít pouze na místech, kde je Posidonie mořská lokálním zdrojem.
2- Metoda výpočtu ztělesněné energie.
3- Nízkoemisní architektonická řešení pro stavbu <500 kg CO2/m2.

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

Shaping Energy for a Sustainable Future	**12. Institut de Recerca en 110nergía de Catalunya IREC | ES**	
	Webové stránky: www.irec.cat **Číslo PIC: 996435993**	**Počet zaměstnanců: 120**

Stručný popis právního subjektu/partnerské organizace

Katalánský institut pro energetický výzkum (IREC) je veřejně financovaná instituce s přibližně 120 zaměstnanci, která byla založena v roce 2008 v Barceloně a Tarragoně a která provádí výzkum a podporuje inovace v celé řadě vědeckých a technologických oblastí souvisejících s energetikou. IREC přispívá k udržitelnosti prostřednictvím vývoje nových technologických řešení, podpory vědeckého a technologického know-how souvisejícího s čistou energií a jejím účinným využíváním a také přenosu řešení a odborných znalostí na účastníky trhu. Jeho aktivity zahrnují národní a mezinárodní projekty i přímou spolupráci s předními průmyslovými partnery. Institut rovněž podporuje propagaci technologií v oblasti obnovitelných zdrojů energie a pomáhá politickým činitelům.
IREC disponuje rozsáhlými odbornými znalostmi a dovednostmi v oblasti výzkumných a průmyslových projektů s ročním obratem přibližně 10 milionů EUR. IREC je členem sítí výzkumných a technologických center CERCA a TECNIO katalánského Generalitatu a několika společných programů Evropské aliance pro energetický výzkum (EERA, www.eera-set.eu). IREC je řádným členem a zakladatelem KIC Innoenergy a Katalánského klastru pro energetickou účinnost (CEEC) na podporu energetických inovací v Evropě. V neposlední řadě IREC vede komunitu RIS3CAT v oblasti energetiky patřící do platformy Smart Specialization Platform - S3 (http://s3platform.jrc.ec.europa.eu/), publikoval více než 600 recenzovaných článků, je držitelem více než 35 patentů a podpořil vznik 3 spin-off společností. IREC disponuje nejmodernějším experimentálním laboratorním vybavením ke hodnocení a zlepšování výkonnosti nových energetických technologií a tepelných/elektrických komponent budov v reálných dynamických podmínkách.
IREC se skládá ze dvou oddělení: i) oddělení energetické účinnosti pro systémy, budovy a komunity (ECOS); ii) oddělení pokročilých materiálů pro energetiku. Mezi oblasti jeho zájmu patří obnovitelné zdroje energie (např. fotovoltaika, vítr, rekuperace tepla, palivové články, vodík), oběhové hospodářství (např. přeměna uhlíku, katalyzátor), inteligentní řízení energie a systémy (pro systémy, budovy a komunity), analýzu energetických systémů (např. internet energie) a skladování energie (např. elektrochemické baterie, redoxní průtokové baterie).
V oblasti ECOS funguje skupina pro tepelnou energii a výkonnost budov. Tato skupina disponuje rozsáhlými odbornými znalostmi v oblasti dynamické energetické simulace a zavádění strategií energetické účinnosti, opětovného využití tepla a integrace obnovitelných zdrojů energie v budovách, hodnocení po ukončení provozu a flexibility budov.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

IREC **povede WP2** „Rámec a nástroje pro efektivní implementaci a hodnocení CPCC“ a bude působit jako podpůrné technologické centrum pro ukázkový případ ve městě Palma de Mallorca.
Kromě toho IREC přispěje k následujícím pracovním skupinám:

- **WP 2** Rámec pro efektivní plánování, navrhování, výstavbu a provoz CPCC
  - Definice rámce hodnocení CPCC
  - Testování a používání metod a nástrojů pro technicko-sociálně-ekonomické plánování rozsáhlých renovací budov a energetických komunit občanů.
  - 3D modely virtuální reality pro plánování a informovanost občanů
- **WP 3** Společenství, životní prostředí a pohoda:
  - Technická podpora při implementacích Living Labs
- **WP 4** Udržitelné navrhování budov:
  - Energetické modelování a integrované navrhování pro modernizaci budov v ukázkovém městě Palma de Mallorca

- Analýza a modelování BIPV. Testování řešení BIPV
- **WP 7** Efektivní provoz a flexibilita:
  - Modelové prediktivní řízení pro vylepšení centralizovaných systémů v budovách s více rodinami
- **WP 8** Monitorování a hodnocení:
  - Analýza dat a hodnocení dopadu zavedených inovací v Palma de Mallorca
- **WP 9** Využití na trhu:
  - Analýza obchodních modelů pro rozsáhlou modernizaci a CEC
- **WP 10** Komunikace, šíření informací a školení:
  - Zveřejňování výsledků a mezinárodní konference a semináře

Profil klíčových pracovníků projektu

[redacted] (M)
[redacted] je v současnosti vedoucím výzkumné skupiny pro tepelnou energii a výkon budov v IREC. Před nástupem do IREC spoluzaložil a vedl kooperativní firmu AIGUASOL, která se stala mezinárodní referencí v oblasti tepelné energetické účinnosti, obnovitelných zdrojů energie, stavební fyziky a vývoje softwaru. Je držitelem doktorského titulu v oboru tepelného inženýrství z Katalánské polytechnické univerzity (Španělsko) a má výzkumné a odborné zkušenosti v oblasti přenosu tepla a hmoty, mechaniky tekutin, energetické účinnosti budov, tepelné pohody a dynamické simulace. Ve své současné pozici vede spolupráci na několika národních, mezinárodních a průmyslových výzkumných projektech zaměřených na zlepšení energetické náročnosti budov a energetických systémů.

[redacted] (F)
[redacted] je od roku 2011 členkou skupiny pro systémy energetické účinnosti, budovy a komunity (ECOS) v IREC. Pracuje jako výzkumná pracovnice v oblasti energetické účinnosti budov. Podílela se na národních a mezinárodních projektech týkajících se renovace budov, koncepcí NZEB / nZEB, energetické flexibility budov, stochastických modelů obsazenosti a environmentálního komfortu uživatelů (MEDNICE, MARIE, RePuBlicZEB, ECOE, SABINA, Rehab-SALUT). Nedávno získala doktorát v oboru udržitelnosti na Katalánské polytechnické univerzitě, kde se zaměřila především na hodnocení renovace obytných budov ve středomořském klimatu. Od roku 2016 kombinuje svou práci výzkumné pracovnice v IREC s pozicí docentky na katedře mechaniky tekutin na Katalánské polytechnické univerzitě.

[redacted] (M)
[redacted] je výzkumným pracovníkem Katalánského institutu pro výzkum energie (IREC). Doktorát získal v roce 2020 na Katalánské polytechnické univerzitě (UPC) a v rámci financování grantového schématu Marie Skłodowska-Curie Actions Evropské unie (projekt INCITE) pracuje v IREC. Jeho výzkum se zaměřuje na navrhování účinných řídicích strategií pro systémy tepelných čerpadel, zejména za účelem zvýšení energetické flexibility budov. Tato práce zahrnuje simulační studie, ale také rozsáhlou experimentální část, kde se strategie testují na reálných systémech tepelných čerpadel v polovirtuálním laboratorním prostředí. Aktivně se také podílí na činnosti IEA EBC Annex 67 o energeticky flexibilních budovách. Thibault Péan absolvoval v roce 2014 duální studium na École Centrale v Nantes (Francie) a Dánské technické univerzitě (DTU). Po dokončení studia zastával v letech 2015-2016 pozici výzkumného asistenta v Mezinárodním centru pro vnitřní prostředí a energii (ICIEE) na DTU, kde se zabýval studiem výkonnosti plusových energetických domů a využitím solárních panelů pro noční sálavé chlazení, přičemž obě témata zahrnovala i experimentální úlohy.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

1. **Salom, J.,** Pascual, J., (2018). Residential Retrofits at district scale. Business Models under Public Private Partnerships. ©InnoEnergy, 2018. ISBN 978-84-09-07914-8. http://www.innoenergy.com/residentialretrofitsreport
2. **T. Péan, J. Salom, J. Ortiz**, Environmental and Economic Impact of Demand Response Strategies for Energy Flexible Buildings. Proceedings of BSO 2018: 4. konference o simulaci a optimalizaci budov, Cambridge, Velká Británie: 11.-12. září 2018.
3. A. Tejero**, J. Ortiz**, **J. Salom**, Evaluation of Occupancy Impact In A Residential Multifamily nZEB Through A High Resolution Stochastic Model. Proceedings of BSO 2018: 4. konference o simulaci a optimalizaci budov, Cambridge, Velká Británie: 11.-12. září 2018.
4. **T. Péan, J. Ortiz and J. Salom**. Impact of Demand-Side Management on Thermal Comfort and Energy Costs in a Residential nZEB. Buildings, sv. 7, č. 2, s. 37. (2017)
5. **Péan T., Salom J**., Costa-Castelló R., 2018, "Review of control strategies for improving the energy flexibility provided by heat pump systems in buildings", Journal of Process Control, doi: 10.1016/j.jprocont.2018.03.006.

Relevantní předchozí projekty

- **H2020 syn.ikia** (https://synikia.eu/; 2020-2024). V rámci projektu syn.ikia bude navržen plán pro udržitelné plus energetické budovy a čtvrti. Ten bude zahrnovat vyvážené uplatňování integrovaného energetického designu, energeticky a nákladově efektivních opatření, místních obnovitelných zdrojů energie, místního skladování energie, energetické flexibility a sdílení energie a obchodování s energiemi. Projekt podpoří zapojení komunity a umožní flexibilní řízení poptávky po energii. Poskytne také správu infrastruktury založenou na velkých objemech dat a inteligentní sítě.
- **H2020 EmpowerMED** (https://www.empowermed.eu/; 2019-2023). Projekt, který zohledňuje dynamickou roli žen v ekonomice, je propojí s odborníky z oblasti zdravotnictví v rámci řady pilotních programů zaměřených na zvyšování povědomí s cílem snížit energetickou chudobu, posoudit její dopad na zdraví a sdílet znalosti pro tvorbu politik na místní úrovni i na úrovni EU.
- **H2020 GrowSmarter** (http://www.grow-smarter.eu/home/; 2015-2019) předvede ve třech majákových městech (Stockholm, Kolín nad Rýnem a Barcelona) 12 chytrých integrovaných řešení jako přípravu pro širší uvedení na trh. Prostřednictvím tohoto projektu bude v Barceloně realizována modernizace budov a infrastruktury pro připojení k dodávkám energie. Spotřeba energie a tepelný komfort v domech občanů jsou monitorovány za účelem vyhodnocení dopadu energetických zásahů v budovách. Projekt bude mít velký dopad v celé EU, a to prostřednictvím diseminačních aktivit a také zapojením následných měst.
- **H2020 SABINA** (http://sabina-project.eu/; 2016-2020) se zaměřuje na vývoj nových technologií a finančních modelů pro propojení, řízení a aktivní správu výrobních a akumulačních zdrojů s cílem využít synergie mezi elektrickou flexibilitou a tepelnou setrvačností budov. SABINA se zaměřila na flexibilní skladování energie s využitím stávající tepelné setrvačnosti v budovách a propojení tepelných a elektrických sítí s cílem snížit účty za elektřinu a zároveň dát možnost na budovách účastnit se trhů s energií a získat dodatečné příjmy pro trhy s energií na straně poptávky.
- **FP7 RENEWIT** (http://www.renewit-project.eu/: 2013-2016) vyvinul pokročilé simulační nástroje pro integraci obnovitelných zdrojů v datových centrech IT a pro aplikace opětovného využití tepla. Úloha IREC v tomto projektu spočívala v laboratorních experimentech pro testování technik řízení energie a opětovného využití tepla na datovém centru, definování energetické koncepce a řídicích strategií pro dodávky energie z obnovitelných zdrojů a strategií opětovného využití tepla v datových centrech a provádění energetických simulací.

Významná infrastruktura a/nebo technické vybavení

IREC disponuje nejmodernějším experimentálním laboratorním vybavením pro hodnocení a zlepšování výkonnosti nových energetických technologií a tepelných/elektrických komponent budov v reálných dynamických podmínkách. Laboratorní infrastrukturou, která je pro tento projekt nejvýznamnější, je polovertikální laboratoř pro energetickou integraci (SEILAB) vybavená špičkovou technologií zahrnující datové centrum a a systémy pro spotřebu energie, skladování a integraci dálkového vytápění a chlazení. SEILAB je vybaven systémy pro výrobu a skladování tepla a energie a nejmodernějšími zařízeními pro testování tepelných a elektrických zařízení. Novým a výhodným rysem laboratoře je její semivirtuální přístup, který umožňuje provozovat reálná zařízení v závislosti na poptávce po energii/výrobě dynamického virtuálního modelu budovy. Laboratoř IREC používá semivirtuální testovací prostředí budovy pro hodnocení výkonnosti komplexní škály technologií zařízení, jako jsou systémy výroby energie, akumulace tepla a zařízení pro vytápění a chlazení prostor, s cílem definovat strategie pro hodnocení a integraci hlavních energetických systémů v budovách. V prostředí SEILAB je rovněž k dispozici kapalinou chlazené mikrodatové centrum pro testování strategií opětovného využití tepla a řídicího algoritmu. Toto mikrodatové centrum je propojeno buď s klimatickou komorou, nebo s dálkovým vytápěním/chlazením. Kromě toho má SEILAB k dispozici následující zařízení: 3 tepelné zkušební stanice pro emulaci zátěže/zdrojů tepelné energie; 2 elektrické zkušební stanice pro výrobu/spotřebu elektrické energie; klimatická komora; meteostanice: teplota, rychlost větru, relativní vlhkost, globální a difúzní záření. Fotovoltaická stanice; vzduchotechnické zařízení: tepelné čerpadlo vzduch-voda Buderus a tepelné čerpadlo voda-voda Dynaciat se zásobníky vody 1500, 1000 a 300 l.

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

metrovacesa	**13. Metrovacesa, S.A.** **MET | ES**	
	Webové stránky: **www.metrovacesa.com** **Číslo PIC: 915199269**	**Počet zaměstnanců: 190**

Stručný popis právního subjektu/partnerské organizace

Společnost Metrovacesa s více než 100letou historií je jedním z největších developerů ve Španělsku a ke konci třetího čtvrtletí roku 2020 měla 125 aktivních projektů (7 429 jednotek). Naším posláním je vytvářet domovy, které zlepšují život našich klientů. Vizí společnosti je stát se národním šampionem v oblasti rezidenčního developmentu a být developerem, kterého si sami vybírají zákazníci, zaměstnanci, komunity i akcionáři. K tomu musíme neustále dosahovat vynikajících finančních a provozních výsledků a zároveň dodržovat nejvyšší standardy obchodního chování. Máme tři obchodní linie: rezidenční development, komerční development a správu pozemků.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 3 Společenství, životní prostředí a pohoda: Průzkumy POE jako součást procesu spokojenosti po prodeji v budovách s vysokou energetickou účinností ve skutečném stavu v rámci laboratoří Energy transition Living Labs.
WP 7 Efektivní provoz a flexibilita: Efektivní provoz a řízení centralizovaných systémů v budovách pro více rodin s cílem zlepšit sladění energie s obnovitelnými zdroji energie.

Profil klíčových pracovníků projektu

[redacted] (M) [redacted] má 20 let zkušeností v oblasti nemovitostí a v uplynulých 12 letech pracuje ve společnosti Metrovacesa. Nasbíral rozsáhlé zkušenosti v oblasti správy pozemků. Před svým jmenováním do funkce manažera pro pozemky ve společnosti Metrovacesa v říjnu 2015 působil rok jako regionální manažer spravující 700 000 m2 pro obytné a komerční využití. Od června 2005 do ledna 2015 [redacted] působil jako Land Manager v regionech Levante a Katalánsko, kde dohlížel zejména na oblast městského rozvoje. Od července 2001 do května 2005 měl na starosti development ve španělské soukromé architektonické firmě García de los Reyes. V tomto období byl členem obecního úřadu pro územní plánování na radnici v Almuñécaru (Granada). [redacted] vystudoval architekturu na Vyšší odborné škole architektury v Granadě a získal titul Executive MBA na Madridském obchodním institutu.

[redacted] (M) [redacted] má 19 let zkušeností v oblasti nemovitostí a v uplynulých 2,5 letech pracoval ve společnosti Metrovacesa jako manažer rezidenčního developmentu pro regiony Katalánsko a Baleáry. Je zodpovědný za rezidenční projekty, které společnost Metrovacesa aktuálně rozvíjí v sektoru Levante District v Palmě. [redacted] má předchozí zkušenosti z jiných významných společností v tomto odvětví ve Španělsku, jako jsou Solvia, Building Center, Applus+, Gerens Hill International nebo Colonial. [redacted] vystudoval technickou architekturu na Universitat Politécnica de Catalunya a je držitelem titulu Executive Real Estate Development na IESES Business School.

[redacted] (M) [redacted] má 15 let zkušeností v oboru stavebnictví a poslední tři roky pracoval ve společnosti Metrovacesa jako technický manažer pro zařízení budov. [redacted] má předchozí zkušenosti ze společnosti FCC, jedné z největších stavebních skupin v zemi. Pedro vystudoval strojní inženýrství na Leónské univerzitě.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy
Relevantní předchozí projekty
Významná infrastruktura a/nebo technické vybavení

JARDINS DE LEVANT (https://metrovacesa.com/promociones/illes-balears/palma-de-mallorca/jardins-de-llevant) 114 bytových jednotek v okrsku Sector Levante v Palmě. V současné době ve výstavbě. Předpokládané dokončení na konci roku 2021.

JARDINS DE LEVANT (https://metrovacesa.com/promociones/illes-balears/palma-de-mallorca/jardins-de-llevant) 114 bytových jednotek v okrsku Sector Levante v Palmě. V současné době ve výstavbě. Předpokládané dokončení na konci roku 2021.

SOL DE LLEVANT & TERRASES DE LLEVANT. Rezidenční výstavba 115 a 88 bytových jednotek v okrsku Sector Levante v Palmě.
V současné době probíhá řízení o udělení stavebního povolení. Je podepsána smlouva s AEW o smlouvě budoucí na výstavbu nájemního projektu na klíč.
Předpokládané dokončení v roce 2023.

Provozní kapacita právnické osoby/partnerské organizace
není k dispozici

	14. Univerzita aplikovaných věd v Utrechtu **HU | NL**
Webové stránky: www.hu.nl nebo **Číslo PIC:** 986208507	**Počet zaměstnanců: 3 329** **Počet studentů:** 36 000

Stručný popis právního subjektu/partnerské organizace

Univerzita aplikovaných věd v Utrechtu - Univerzita aplikovaných věd v Utrechtu přispívá prostřednictvím svého výzkumu založeného na praxi k řešení široké škály společenských problémů. O získání titulu na UAS Utrecht usiluje asi 36 000 zapsaných studentů a univerzita nabízí více než 70 různých studijních oborů (bakalářské a magisterské studium, prezenční a kombinované studium, letní školy a odborné kurzy). Vzdělávání a výzkum jsou na HU úzce propojeny.

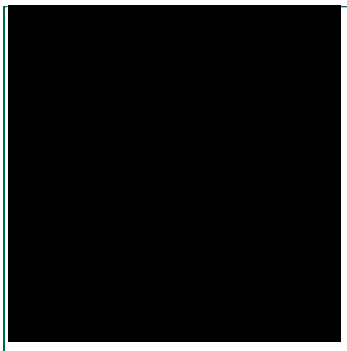
V roce 2014 bylo založeno odborné centrum Smart Sustainable Cities pod vedením UAS Utrecht, které je společnou iniciativou firem, vzdělávacích institucí a místní samosprávy a jehož cílem je zajistit pokrok směrem k udržitelnému městu. Řízením centra je pověřena programová rada, kterou tvoří zástupci poskytovatelů odborného vzdělávání a přípravy (HU-UAS a ROC-MN), zástupci odvětví a průmyslu (BAM, Engie, Stroomversnelling, Happpy Balance, USI) a místní samosprávy (město Utrecht). Toto centrum působí ve čtyřech programech: oblasti bez fosilních paliv, zdravé budovy, inteligentní mobilita a městské zkušenosti. Důležitým tématem centra je přechod na oblasti bez fosilních paliva a v této oblasti nabízí výzkum a vzdělávání. Centrum má více než 100 partnerů, kteří se podílejí na jedné nebo více činnostech. Na programech centra spolupracují multidisciplinární (stavebnictví, inženýrství, IT, modernizace, společné návrhy, provoz a údržba, stavební fyzika, monitoring a financování nemovitostí atd.) výzkumné a studentské týmy.

Výzkumná skupina Applied Urban Energy Transition (Přechod k aplikované městské energetice) disponuje odbornými znalostmi z těchto oborů: stavebnictví, inženýrství, renovace, provoz a údržba, stavební fyzika, monitorování a financování nemovitostí, cesta k zákazníkovi, inovace dodavatelského řetězce, vývoj produktů. Výzkumná jednotka je součástí CoE Smart Sustainable Cities.

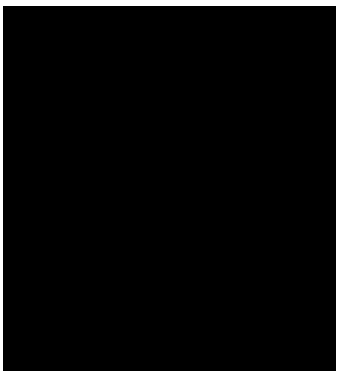
Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 1: Řízení: *Koordinace ukázkových projektů*
WP 2 Rámec pro efektivní plánování, navrhování, výstavbu a provoz CPCC: *Předvýrobní rámec*
WP 3 Společenství, životní prostředí a pohoda: *Sociální dopad v okresech.*
WP 4 Udržitelné navrhování budov: *Oběhový a energeticky účinný návrh modernizace stavebních prvků s přesahem mezi instalací a stavební technologií. Navrhování modernizací v obsazeném stavu prostřednictvím multidisciplinárních projekčních týmů.*
WP 5 Výrobní a stavební pracovní postupy účinně využívající zdroje: *Stavební proces modernizace v obsazeném stavu. Cirkulární HUBy pro distribuci a výrobu*
WP 6 Obnovitelná energie a skladování: *Navrhování a monitorování systémů obnovitelné energie*
WP 7 Efektivní provoz a flexibilita: *Sociální inovace pro zavádění inovací*
WP 8 Monitorování a hodnocení: *Hodnocení klíčových ukazatelů výkonnosti pro výstavbu a projektování s cílem poskytnout záruky výkonnosti.*
WP 9 Využití na trhu: *Obchodní modely jako služba.*
WP 10 Komunikace, šíření informací a školení: *Vložené metody vzdělávání v oblasti výzkumu designu.*

Profil klíčových pracovníků projektu



(F) je profesorkou přechodu k aplikované městské energetice na Univerzitě aplikovaných věd v Utrechtu. Vede téma energeticky neutrálních a cirkulárních regionů v Centru expertízy Smart Sustainable Cities. Její úrofesura je spojena s kurzy Institutu pro design a inženýrství (IDE). Od ledna 2012 do roku 2019 působila jako profesorka prostorových proměn na Hanze University v Groningenu. Do roku 2016 kombinovala pozici v Groningenu s profesurou Inovativní technologie ve stavebnictví na Saské univerzitě vystudovala architekturu na Technické univerzitě v Delftu, kde také získala doktorát s prací *Components Design: The role of architects in product innovation*. Kromě toho pracovala 4 roky ve společnosti Bouwbedrijven ve Slavenburgu, kde měla na starosti zavádění inovací zaměřených na klienty do provozních procesů. Poté nastoupila do TNO (Nizozemská organizace pro aplikovaný vědecký výzkum) na pozici vedoucí výzkumné pracovnice v oblasti inovací stavebních procesů v oddělení energetických a komfortních systémů, kde se společně s firmami z oblasti stavebnictví zaměřila na vývoj udržitelných stavebních prvků a procesů, které splňují potřeby klientů a koncových uživatelů. Na svém kontě má více než 50 publikací a pracovala na několika projektech EU, například ManuBuild, eHub, Retrokit a Cost Effective. Jako předsedkyně Urban Energy (všechny nizozemské profesury univerzit aplikovaných věd zaměřené na energetickou transformaci v zastavěném prostředí) je členkou výboru pro psaní programu BTIC (Nizozemské centrum pro inovace v oblasti stavebních technologií) o energetické transformaci v zastavěném prostředí. Je členkou představenstva organizace Earth, Wind & Fire (EWF) prosazující principy pasivní klimatizace, Eurosolar NL propagující obnovitelné zdroje energie a Booosting, sítě pro inovace ve stavebnictví, a členkou Groninger EnergieKoepel (GrEK). Dále je členkou akademických sítí Het Groene Brein, W104 Open Building Implementation a W119 Customized Industrial Construction (dříve TG57, Industrialised Building) Mezinárodní rady pro výzkum a inovace ve stavebnictví (CIB).



(M)

Vedoucí lektor vystudoval fyziku na univerzitě v Utrechtu v roce 1994 a následně vedl doktorandský výzkum v oblasti atomové a molekulární fyziky ve Stichting FOM. Od roku 1999 do roku 2006 pracoval jako výzkumný pracovník a projektový manažer v oblasti vodíkových technologií v ECN (Nizozemské výzkumné centrum pro energetiku, nyní známé jako TNO) v Pettenu pro využití e v zastavěném prostředí, průmyslu a mobilitě. Tyto aplikace vyvíjel společně s několika evropskými konsorcii. Hlavními úkoly byl další vývoj a optimalizace palivových článků a komínů. V letech 2007 až 2009 pracoval v TNO v Apeldoornu, kde svou pozornost zaměřil na systémy pro ukládání energie a technologie tepelných čerpadel pro bytové a nebytové budovy. Vedle základního výzkumu v oblasti ukládání energie se zabýval otázkami udržitelné energetiky, a to mimo jiné v zastoupení zahradníků, datových center, bytových korporací a instalačního sektoru, jako jsou energetické piloty a termochemické materiály. V roce 2010 provedla společnost výzkum v rámci mezinárodního programu monitorování tepelných čerpadel (Sepemo Build) ve vládní agentuře RVO a podílela se na vypracování protokolu o monitorování obnovitelných zdrojů energie a nařízení rady týkajícího se skladování tepla a chladu v městském prostředí. Od konce roku 2010 působí na Univerzitě aplikovaných věd v Utrechtu v oblasti výzkumu a vzdělávání energetických systémů. Od roku 2013 je vedoucím lektorem s profesurou v přechodu k aplikované městské energetice, a má na starosti akvizice, řízení projektů a výzkum v oblasti lokálních energetických systémů a technik udržitelnosti pro oblasti a budovy.

[redacted] **MSc** (M)
[redacted] pracuje jako výzkumný pracovník a projektový manažer v rámci profesury přechodu k aplikované městské energetice v odborném centru Smart Sustainable Cities a v Institutu zastavěného prostředí. Je iniciátorem několika workshopů zaměřených na propojení obchodu a průmyslu, výzkumu a vzdělávání s cílem dosáhnout co největšího pozitivního dopadu na společnost. Je vedoucím projektu Inside Out na Univerzitě aplikovaných věd v Utrechtu a výzkumným pracovníkem v oblasti monitorování komfortních parametrů a stavebního procesu, v jehož rámci probíhá přestavba desetipodlažního bytového domu na byty s vysokou energetickou náročností pro bytovou společnost Bo-Ex. Studenti se na tomto projektu podílejí jako projektanti a testující. Nové projekty, na kterých [redacted] pracuje, se týkají nizozemských a mezinárodních znalostí stávajícího bytového fondu, znalostí (potenciální) poptávky ve vztahu k Business to Consumer a Business to Business; aplikace Průmyslu 4.0 prostřednictvím několika kombinací trhu s výrobky, které se řídí stejnou produktovou řadou; Open Building jako modulární strategie pro stavební komponenty navržené na základě přání uživatelů a technologie stávajícího bytového fondu, implementované v prostředí produktů Průmyslu 4.0. [redacted] koordinuje několik kurzů na Institutu pro stavební prostředí, například odborný kurz Udržitelná transformace a renovace (120EC). Přednáší o renovacích domů s nulovou spotřebou energie, což je jeho specializace.

Arno Peekel MSc (M)

[redacted] (M)
[redacted] vystudoval architekturu a stavební inženýrství na Univerzitě aplikovaných věd v Utrechtu a poté architekturu a stavební inženýrství na Technické univerzitě v Delftu. V roce 2017 získal na Technické univerzitě v Delftu doktorát s prací *Future-proof Renovation*. Na Univerzitě aplikovaných věd v Utrechtu působí od roku 2002 jako vedoucí lektor v oboru Budovy a bydlení odolné vůči budoucnosti, výzkumný pracovník v Laboratoři inovací, výzkumník v oblasti Správy majetku a projektový manažer magisterského oboru městského inženýrství.

[redacted] vystudoval fyzickou geografii na Institutu pro biodiverzitu a dynamiku ekosystémů na Amsterdamské univerzitě. Specializuje se na rozvoj a koordinaci udržitelných inovačních projektů, které vycházejí z regionu Utrecht a přispívají k přechodu k udržitelným městským regionům na národní i mezinárodní úrovni. Utrechtský region se vyznačuje mnoha znalostními institucemi a společnostmi poskytujícími udržitelná řešení. Propojením jejich znalostí s regionálními ambicemi v oblasti udržitelnosti lze komplexní problémy řešit integrovaným způsobem. [redacted] úzce spolupracuje se znalostními centry, vládami, podniky a společenskými organizacemi a propojuje je ve výzkumných a inovačních projektech vedoucích k inteligentním a udržitelným přístupům souvisejícím se strategickými zásobami energie, vody a materiálů v městských oblastech. [redacted] je projektovým manažerem a vedoucím pracoviště Lighthouse City v rámci projektu IRIS Smart Cities (https://irissmartcities.eu/), který demonstruje řešení v měřítku městských čtvrtí integrující chytré domy a budovy, chytré obnovitelné zdroje energie a uzavřené energeticky pozitivní čtvrti. Také demonstruje řešení chytrého řízení a ukládání energie zaměřená na flexibilitu sítě a demonstruje integrovaná řešení městské mobility zvyšující využívání alternativních paliv šetrných k životnímu prostředí. [redacted] je rovněž manažerem projektu Inside Out (https://tki-inside-out.nl/), v němž konsorcium vyvíjí a testuje modulární renovační systém pro vytváření energeticky pozitivních výškových bytových domů. Konsorcium Inside Out integruje instalace do multifunkčních stavebních prvků na vnější straně budovy.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

- Oostra, Mieke, *De circulaire energietransitie van de gebouwde omgeving, verkenning voor woongebieden* (Cirkulární energetická transformace zastavěného prostředí, průzkum pro obytné prostory), zveřejnění v roce 2021, studie pro Enpuls.
- Oostra, Mieke, *Nieuwe Energie, Energietransitie van de gebouwde omgeving als onderdeel van complexe maatschappelijke transformatie; Přechod k aplikované energetice v městech, Energetický přechod zastavěného prostředí jako součást*

komplexní společenské transformace, úvodní přednáška, Univerzita aplikovaných věd v Utrechtu, Utrecht, 2019.
https://centreofexpertise.mett.nl/publicaties/downloads_getfilem.aspx?id=1120470&forcedownload=true

- Oostra, M. 'Smart Open Retrofitting', sborník *CIB World Building Conference 2019 Constructing Smart Cities*, 17.-21. června 2019.
- Oostra, Mieke & Civic architects, *Circulaire Stations*, Spoorbeeld inspiratie, Spoorbouwmeester, Utrecht, 2019
- Oostra, Mieke, 'Democratising Large-Scale Retrofitting of Housing', sborník z *konference UIA*, Soul, 2017.

Relevantní předchozí projekty

1. **Energy Poverty in the rented sector (H2020) (Energetická chudoba v nájemním sektoru (H2020)).** Tento projekt programu Horizont 2020 je zaměřen na podporu politik pro zmírnění energetické chudoby v nájemním sektoru v různých evropských členských státech.
2. **Smart Solar Charging (EFRO) (Chytré solární nabíjení (EFRO))**. Udržitelný energetický systém na úrovni městské části: v systému Smart Solar Charging se lokálně vyrobená solární energie ukládá do (sdílených) automobilů prostřednictvím inteligentního a dynamického systému (Vehicle2Grid). Univerzita aplikovaných věd zkoumá vhodnost této služby pro uživatele. Jaké jsou potřeby, přání a obavy občanů? Jak by bylo možné zapojit občany do podpory systému nabíjení?
   De stroomversnelling (Energiesprong). Výzkumná skupina Applied Energy Transition (Přechod k aplikované energetice) byla součástí několika projektů v rámci programu Energiesprong (Energetický skok), který zadalo nizozemské ministerstvo vnitra. V těchto projektech byli podporováni majitelé a uživatelé a tři konsorcia společností, kteří usilovali o to, aby domy v soukromém vlastnictví byly energeticky neutrální. V rámci projektu Living Lab One-Stop-Shop byl vyvinut systém podpory konsorcií při výzkumu nezbytném pro vývoj průmyslových konceptů renovací, modulárních stavebních prvků, konceptů služeb a rekonfigurace dodavatelských řetězců pro řadové bydlení.
3. **Future Factory (MMIP3 & 4) (Továrna budoucnosti (MMIP3 & 4))**. Na základě programového přístupu vyvíjí konsorcium v rámci tohoto projektu továrnu budoucnosti, která vyrábí moduly pro zajištění udržitelného bydlení ve velkém měřítku. Prostřednictvím vývoje ve třech generacích dochází k nezbytné změně systému, aby bylo možné realizovat velkosériovou výrobu: generace 1 (současné výrobní zařízení) jako prototyp, výrobní zařízení generace 2 a nakonec generace 3 realizace výrobního zařízení, které může dodávat 25 000 domů ročně. https://future-factory.nl
4. **IRIS Smart Cities (H2020)**. Evropské inovační partnerství pro chytrá města a obce (EIP-SCC) spojuje města, průmysl a občany s cílem zlepšit život ve městech prostřednictvím udržitelnějších integrovaných řešení, včetně aplikovaných inovací, lepšího plánování, participativnějšího přístupu, vyšší energetické účinnosti, lepších dopravních řešení a inteligentního využívání informačních a komunikačních technologií (ICT). Projekt IRIS se zavazuje aktivně se podílet na 6 „akčních klastrech" definovaných EIP-SCC.

Významná infrastruktura a/nebo technické vybavení

ZKUŠEBNÍ ZAŘÍZENÍ PROFESURY
Profesura má přímý přístup k následujícím technickým laboratořím:

- Energetická laboratoř
- Klimatická komora
- Laboratoř udržitelné energie - střecha pro testování modulů pro výrobu obnovitelné energie
- Inovační laboratoř - pro montáž a testování stavebních komponent
- Wonen 3.0 - např. biologické a energeticky neurální domy, které lze použít k testování

Zkušební laboratoře Univerzity aplikovaných věd v Utrechtu
Prostřednictvím našich kontaktů na Univerzitě aplikovaných věd máme také přístup k:

- Laboratoře pro společné návrhy

- laboratoř ProtoSpace, v níž lze mimo jiné pomocí rychlého prototypování a 3D tisku převést technologické inovační koncepty na zkušební verze
- Laboratoř Block Chain
- iLabs – přírodovědná laboratoř

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

	15. Housing Europe **HE | BE**	
	Webové stránky: https://www.housingeurope.eu/ **Číslo PIC:** 991142024	**Počet zaměstnanců:** 10

Stručný popis právního subjektu/partnerské organizace

HOUSING EUROPE je Evropská federace veřejného, družstevního a sociálního bydlení. Housing Europe sídlí v belgickém hlavním městě Bruselu a je registrována jako nevládní organizace (AISBL podle belgického práva). Od roku 1988 vytvořila Housing Europe síť 45 národních a regionálních federací sdružujících 43 000 poskytovatelů bydlení ve 24 zemích. Dohromady spravujeme zhruba 27 milionů bytů, což je přibližně 11 % bytů v Evropě.
Poskytovatelé sociálního, veřejného a družstevního bydlení sdílejí vizi Evropy, která zajišťuje přístup k důstojnému a cenově dostupnému bydlení pro všechny obyvatele v sociálně, ekonomicky a ekologicky udržitelných komunitách a v níž je každému umožněno plně rozvinout svůj potenciál. Podle Housing Europe by mělo být prioritou Evropské unie a jejích členských států v oblasti udržitelnosti, energetiky a klimatu v příštím desetiletí vytvoření příznivého podnikatelského prostředí pro snižování spotřeby energie v sektoru bydlení, přičemž zvláštní pozornost by měla být věnována sektoru dostupného bydlení.
Housing Europe se úspěšně podílelo na více než tuctu projektů programu Horizont 2020 jako koordinátor projektu (Power House), vedoucí pracovního balíčku (Syn.ikia) a partner v několika pracovních balíčcích, které často zahrnují komunikaci, šíření informací, replikaci, politická doporučení a výzkumné činnosti.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 1 Řízení**:** Sorcha Edwards s pomocí Clary Mafé zajistí efektivní řízení a realizaci projektu.

WP 2 Rámec pro efektivní plánování, navrhování, výstavbu a provoz CPCC: Dara Turnbull a Clara Mafé budou čerpat ze svých zkušeností s přispíváním k již existujícím rámcům pro hodnocení udržitelných plusových energetických čtvrtí (www.synikia.eu), zejména s ohledem na klíčové ukazatele sociální výkonnosti.

WP 3 Společenství, životní prostředí a pohoda: Sebastien Garnier a Clara Mafé budou čerpat ze svých zkušeností s přípravou průzkumu přijatelnosti a spokojenosti uživatelů pro HEART (https://heartproject.eu/) a s vytvářením a rozvojem Living Labs v rámci projektů inteligentních měst H2020.

WP 7 Efektivní provoz a flexibilita: Dara Turnbull a Clara Mafé budou podporovat a sledovat pokrok v této pracovní skupině, aby se zvýšil potenciál opakovatelnosti inovací v celé komunitě Housing Europe.

WP 9 Využití na trhu: Dara Turnbull, Sébastien Garnier a Clara Mafé přispějí k návrhu inovativních finančních nástrojů pro energeticky pozitivní nemovitosti a komunity.

WP 10 Komunikace, šíření informací a školení: Diana Yordanova, Clara Mafé a Sorcha Edwards zajistí efektivní oslovení a zapojení zúčastněných stran díky dobře zavedeným sítím a komunitám Housing Europe a zajistí sladění obsahu v rámci konsorcia i mimo něj prostřednictvím vývoje vhodných online platforem a materiálů pro šíření informací.

Profil klíčových pracovníků projektu

[redacted] (F) je generální tajemnicí a koordinátorkou pro energie organizace Housing Europe a má na starosti takzvanou síť energetických expertů CECODHAS, skupinu v rámci Housing Europe sdružující odborníky z 20 národních federací pro bydlení z celé Evropy. Vedla projekt POWER HOUSE EUROPE, iniciativu zaměřenou na vytvoření národních a evropských platforem klíčových zúčastněných stran na podporu energetické účinnosti a udržitelné energie v oblasti bydlení. [redacted] a v současné době koordinuje projekt POWER HOUSE Nearly Zero Energy Challenge, jehož cílem je zapojit místní organizace zabývající se bydlením do sdílení zkušeností a identifikovat chyby, kterým se lze vyhnout v rámci plnění povinnosti téměř nulové spotřeby energie stanovené ve směrnici o energetické náročnosti budov. Po studiu komunikace a jazyků, během něhož strávila rok v Německu, absolvovala magisterské studium evropských politik na univerzitě v belgické Lovani. Pracovala také pro Irský institut pro evropské záležitosti, kde připravovala vzdělávací semináře o politikách EU, a pro Kancelář technické pomoci EU TACIS, kde monitorovala provádění programu TACIS. [redacted] hovoří anglicky (mateřský jazyk), francouzsky, německy a španělsky.

[redacted] (F) je v Housing Europe ředitelkou komunikace. Zodpovídá za vnější i vnitří komunikaci organizace, včetně její online prezentace, vztahů s tiskem, kurátorství akcí a komunikačních aktivit souvisejících s evropskými projekty. Má na starosti kurátorství publikací a přípravu dvoutýdenního zpravodaje. Před nástupem do Housing Europe vedla [redacted] komunikační tým bruselského obchodního sdružení, kde získala zkušenosti s jednoduchou a poutavou komunikací složitých a odborných otázek EU, mediálními kampaněmi a zvyšováním povědomí o značce. Po působení v komunikační poradenské společnosti se také specializovala na kampaně v sociálních médiích pro Generální ředitelství pro životní prostředí. [redacted] je držitelkou bakalářského titulu z žurnalistiky z UNWE v Sofii a magisterského titulu v oboru Nová média a společnost v Evropě z Vrije Universiteit Brussel. [redacted] je rodilá Bulharka a hovoří plynně také anglicky a francouzsky.

[redacted] (F) působí v Housing Europe jako junior projektová manažerka. Pracuje převážně na projektech H2020 souvisejících s energetickým přechodem prostřednictvím inovačních opatření týkajících se udržitelných plus energetických čtvrtí a cirkulární hloubkové renovace v sektoru bydlení. Kromě toho také řídí iniciativu Housing Europe „Our Homes, Our Deal“, jejímž cílem je srovnávat práci vykonanou v sektoru veřejného, družstevního a sociálního bydlení v oblasti výstavby a renovace energeticky a zdrojově účinným způsobem. Před nástupem do Housing Europe v roce 2020 získala zkušenosti v oblasti inovací zaměřených na uživatele, spoluvytváření a Living Labs v Evropské síti Living Labs (ENoLL). [redacted] získala bakalářský titul v oboru ekonomie na univerzitě ve Valencii (Španělsko) a magisterský titul v oboru městského a regionálního plánování na univerzitě v Birminghamu (Spojené království). Hovoří španělsky (mateřský jazyk), anglicky (C2) a v současné době se učí francouzsky (B1).

[redacted] (M) zodpovídá za rozšiřování a řízení sítě členů Housing Europe a za akce pořádané federací. Současně se podílí na práci související s migrační a integrační politikou a je zapojen do projektu Triple A reno zaměřeného na přiměřené, cenově dostupné a atraktivní hloubkové renovace prostřednictvím herních obchodních modelů pro koncové uživatele.

[redacted] (M) působí v Housing Europe jako koordinátorka výzkumu a spojuje různé aspekty naší práce. Patří sem příprava výzkumu pro Observatoř, koordinace sdílení znalostí s našimi členy a mezi nimi a také spolupráce s naším manažerem pro inovace a projekty při zajišťování úspěšné účasti Housing Europe v řadě projektů na úrovni EU. [redacted] je vzděláním ekonomka a do analýzy otázek týkajících se financování sociálního bydlení a národních a unijních programů financování souvisejících s poskytováním netržních řešení bydlení vnáší také pět let zkušeností v oblasti financí.

[redacted] (M) je manažerem pro inovace a projekty Housing Europe. Již téměř deset let pracuje v oblasti sociálního a dostupného bydlení. Nejprve jako poradce ve finančním oddělení a oddělení pro veřejné záležitosti nizozemské federace poskytovatelů sociálního bydlení Aedes a jejích 300 členů. Později byl šest let zodpovědný za řízení evropských záležitostí bruselské kanceláře Aedes. Tři roky byl předsedou pracovního výboru pro sociální záležitosti Housing Europe. Aktivně se také podílel na partnerství pro bydlení v rámci Městské agendy EU, na Mezinárodním festivalu sociálního bydlení a spoluvytvářel Housing Evolutions Hub, který mapuje inovace v tomto sektoru v Evropě.

[redacted] (M) je zástupcem generálního tajemníka a politickým koordinátorem Housing Europe, který koordinuje politickou činnost organizace, sleduje veškerý relevantní politický vývoj a vypracovává stanoviska. [redacted] koordinuje práci všech výborů a zajišťuje spojení mezi nimi a každodenní prací v Bruselu. Rovněž zastupuje Housing Europe na různých akcích, kde přednáší nejrůznější prezentace.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

1. The future of Smart Energy Homes in 32 Words - A Housing Europe HEART Glossary, April 2019: https://www.housingeurope.eu/resource-1264/the-future-of-smart-energy-homes-in-32-words
2. Impact of the revised Energy Performance of Buildings Directive on affordable housing providers - Housing Europe Policy Brief, červen 2018: https://www.housingeurope.eu/resource-1123/impact-of-the-revised-energy-performance-of-buildings-directive-on-affordable- housing-providers
3. The financing of renovation in the social housing sector - A comparative study in 6 European countries, červen 2018: https://www.housingeurope.eu/resource-1124/the-financing-of-renovation-in-the-social-housing-sector
4. Decarbonisation of the building stock: a two-front battle, A Housing Europe position paper, duben 2018: https://www.housingeurope.eu/resource-1096/decarbonisation-of-the-building-stock-a-two-front-battle
5. From blind gambling to visible impact - Making housing finance work for society, říhen 2017: https://www.housingeurope.eu/blog-1020/from-blind-gambling-to-visible-impact

Relevantní předchozí projekty

1. HEART (H2020 - č. 768921)

Období: 2017-2022
Celkový rozpočet: 6 638 687,50 EUR

Sada nástrojů HEART zahrnuje různé komponenty a technologie, které spolu vzájemně spolupracují na přeměně stávající budovy na inteligentní budovu. Vývojem této sady nástrojů projekt podporuje a zlepšuje energetickou účinnost a využívání obnovitelných zdrojů energie v budovách v celé Evropě, zejména ve střední a jižní Evropě, kde změna klimatu vede ke zvýšené spotřebě elektrické energie v letním i zimním období.

Naší úlohou v projektu je dohlížet na předváděcí aktivity v případových studiích se specifickou podporou hodnocení sledovaných údajů a jejich přijetí uživateli a zároveň výrazně podporovat činnosti spojené s využíváním/šířením.

2. **syn.ikia: (H2020 - č. 841850)**

Období: 2020 - 2024

Celkový rozpočet: 7 435 278,75 EUR

Inovačního projektu syn.ikia v rámci programu EU Horizont 2020 se účastní 13 partnerů ze šesti zemí. Jeho cílem je umožnit rozvoj udržitelných energetických čtvrtí s pozitivní energetickou bilancí v různých klimatických podmínkách, kontextech a trzích v Evropě. V průběhu projektu budou vyvinuty, analyzovány, optimalizovány a monitorovány čtyři reálné předváděcí projekty čtvrtí s pozitivní energetickou bilancí přizpůsobené čtyřem různým klimatickým zónám, které budou demonstrovat funkčnost konceptu čtvrtí s pozitivní energetickou bilancí pro zbytek Evropy. Naše úloha v projektu zahrnuje vedení pracovního balíčku zahrnujícího komunikaci, šíření informací a zapojení zúčastněných stran. Zajišťujeme obsahový soulad v rámci projektu i mimo něj tím, že přizpůsobujeme sdělení syn.ikia různým skupinám městských odborníků, politiků a obyvatel, kteří jsou schopni šířit informace a posunout koncept čtvrti s pozitivní energetickou bilancí o krok dál. Jsme také zodpovědní za založení a rozvoj online komunity zainteresovaných stran, které se chtějí dozvědět více o s syn.ikia a podobných výzkumech a projektech v Evropě. Náš příspěvek k projektu zahrnuje také návrh a vývoj systémů zapojení uživatelů a klíčových ukazatelů sociální výkonnosti pro ukázkové čtvrti.

3. **HIROSS4ALL/OpenGela (H2020 - č. 846707, 2019-2022)**

Období: 2019-2022

Celkový rozpočet: 1 786 766,25 EUR

„Vytvoření jednotných kontaktních míst pro integrální regeneraci měst ve zranitelných čtvrtích“ je projekt programu Horizont 2020, který vyvíjí a zavádí nové integrované služby renovace domů (IHRS) pro soukromé obytné budovy ve dvou čtvrtích v Baskicku (Španělsko). Společně s hráči z oblasti veřejného bydlení bude replikován ekonomicky životaschopný obchodní model v rámci regionu a propojeno aktivní zapojení občanů a inovativní finanční nástroj, díky čemuž bude služba vhodná pro zranitelné skupiny obyvatel. Naše síť zapojených organizací do služeb HIROSS4ALL slouží dvěma hlavním úkolům:

navázat kontakt s dalšími iniciativami One-Stop-Shop v Evropě a poučit se z jejich osvědčených postupů (WP2) a šířit výsledky projektu mezi zúčastněnými stranami v oblasti veřejného a sociálního bydlení za účelem jejich replikace v celé Evropě.

4. **TRANSITION ZERO (H2020 - č. 696186)**

Období: 2016-2018

Celkový rozpočet: 3 570 438,75 EUR

Díky projektu TRANSITION ZERO se renovace s nulovou spotřebou energie (E=0) stanou běžnou skutečností na trhu ve Velké Británii, Francii a Nizozemsku. Energiesprong zprostředkoval dohodu mezi bytovými sdruženími a stavebními firmami o renovaci 111 000 domů na úroveň E=0 v Nizozemsku, jejíž zavádění bude dále podporováno. Na základě stejné metodiky a inspirativního příkladu bude podobná inovační trajektorie umožněna prostřednictvím dohod pro 5 000 domů ve Velké Británii a Francii a budování zásobníku další poptávky.

V rámci tohoto projektu jsme šířili získané poznatky a realizované tržní podmínky prostřednictvím naší sítě členů a také tvůrcům politik na národní úrovni a na úrovni EU.

5. **Triple-A-Reno (H2020 - č. 784972, 2018-2021)**

Období: 2018-2021

Celkový rozpočet: 1 999 933,88 EUR

Ke zvýšení atraktivity renovací s téměř nulovou spotřebou energie (nZE) pro spotřebitele chce TripleA-reno nabízet jasné informace a komunikovat o skutečné spotřebě energie, kvalitě vnitřního prostředí a osobním zdraví tím, že vytvoří otevřenou a na koncového uživatele zaměřenou herní platformu (aplikace prvků herního designu a herních principů) pro podporu rozhodování, ověřování kvality / prokázané kvality a budování komunity. Jako zastřešující organizace se sídlem v Bruselu, která zastupuje zájmy přidružených organizací, jsme měli za úkol mimo jiné informovat členy a podporovat výměnu osvědčených postupů z celé EU a zviditelňovat toto odvětví u širší veřejnosti. Jakmile budou výsledky projektu k dispozici, budou z nich těžit všichni členové Housing Europe.

Významná infrastruktura a/nebo technické vybavení

není k dispozici

Provozní kapacita právnické osoby/partnerské organizace

Naše společenství tvoří 46 národních a regionálních federací, které dohromady sdružují přibližně 43 000 poskytovatelů veřejného, sociálního a družstevního bydlení ve 25 zemích. Dohromady spravují přibližně 25 milionů bytů.

Poskytovatelé sociálního, veřejného a družstevního bydlení sdílejí vizi Evropy, která poskytuje přístup k důstojnému a cenově dostupnému bydlení pro všechny v komunitách, které jsou sociálně, ekonomicky a ekologicky udržitelné a kde každý může plně využít svůj potenciál.

Proto neposkytují pouze cenově dostupné bydlení, ale i řadu dalších služeb, jako jsou:

- Domácí péče a podpůrné služby pro obyvatele se specifickými potřebami

- Další služby pro nájemníky (mateřské školy, komunitní centra, služby v oblasti zaměstnanosti a vzdělávání, finanční poradenství)
- Sousedské služby
- Správa jiných typů chráněného bydlení
- Rozvoj a regenerace měst.

Náš vliv:

- 43 000 místních organizací zabývajících se bydlením
- 24 936 000 bytů
- zhruba 200 000 nových bytů ročně.
- více než 200 000 renovovaných bytů ročně.
- zhruba 40 miliard eur nových investic ročně.
- více než 7 500 zaměstnanců zaměstnaných přímo federacemi
- více než 300 000 zaměstnanců místních poskytovatelů bydlení.

BURO DE HAAN	**16. Buro de Haan (BURO DE HAAN) | NL**	
	Webové stránky: www.bdh.nl **Číslo PIC: 898384222**	**Počet zaměstnanců: 64**

Stručný popis právního subjektu/partnerské organizace

Buro de Haan je dynamická společnost specializující se na problematiku bydlení a stavebních systémů. Nabízíme architektonické znalosti, od iniciativy až po realizaci stavebních záměrů.
Naše znalosti a dovednosti v kombinaci s pokročilými konstrukčními a inženýrskými nástroji umožňují klientům stavět lépe, protože jim poskytují realistickou představu o jejich plánech. Naší charakteristickou schopností je přemýšlení v průběhu celého procesu výstavby a množství informací, které klientovi poskytujeme, aby mohl učinit správná rozhodnutí. Působíme v šesti obchodních jednotkách s naším ústředním posláním: „Stavět lépe“. Naši společnost tvoří následující jednotky: územní rozvoj, architektura, inženýring, stavebnictví, měření a informační technologie.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 5 Výrobní a stavební pracovní postupy účinně využívající zdroje:
Naše zkušenosti s industrializací a digitalizací jsou uplatňovány při rychlé, pohodlné a škálovatelné renovaci. Naše zkušenosti s digitalizací v oblasti technologie mračna bodů, inženýrství, rozpoznávání obrazu a přístupu „file2factory“, rozšířené o přístup geo/district, pomáhají snižovat náklady v několika fázích procesu, v projektování a inženýrství i ve výrobě mimo staveniště.

Návrh renovace a inženýrství spolu v současnosti příliš nespolupracují. U velkých stavebních projektů majitelé obvykle uzavírají smlouvu s firmou, která vytvoří koncepci nebo předběžný návrh, který je poté předán dodavatelům k dalšímu dopracování. Ti nemají mnoho možností vyjádřit se k původnímu návrhu, což může vést k tomu, že složitosti na stavbě a problémy s proveditelností se řeší až v pozdní fázi procesu, nikoliv na jeho začátku.

Proces navrhování je třeba zefektivnit, zvýšit spolupráci a podpořit opakovatelnost návrhů, aby bylo možné zvýšit rozsah výroby prvků používaných ve stavebních projektech. Zero Engineering má velký potenciál ovlivnit konečné náklady projektu. Omezení nadměrného rozsahu návrhu, zlepšení koordinace, odstranění nejednoznačností a vytvoření nákladově efektivního stavebního návrhu, který maximalizuje množství prvků, jež lze vyrobit mimo staveniště, budou mít významný dopad na zbytek stavebního procesu.

Zero Engineering
Digitální sběr dat pomocí skenování mračen bodů a rozpoznávání obrazu, které nám umožňuje klasifikovat budovy. Naše vývojové algoritmy využívající umělou inteligenci dokáží rozpoznat tvar a vygenerovat nový povrch na stávající budově. Tím, že majitelům budov umožníme přístup k této technice pomocí konfigurátorů, je možné přizpůsobit formát vzhledu nových prvků.

WP 6 Obnovitelná energie a skladování:
Odborné znalosti v oblasti integrace skladování do stavebních prvků a celkových konceptů/návrhů.

WP 9 Využití na trhu:
Zkušenosti se skutečnou dynamikou trhu, využíváním a obchodními modely.

Profil klíčových pracovníků projektu

[redacted] (M)
[redacted] vystudoval fakultu architektury na TUDelft. Specializuje se na analytičtější formu navrhování. Jeho osobní vášní je svět digitálního designu v oblasti programování a modelování.
V činnosti jeho týmu Zero Hours Engineering ve společnosti buro de haan hraje ústřední roli automatizace založená na parametrických modelech a zpracování souborů dat. Jinými slovy: informovaný návrh založený na analýze dat. V rámci společnosti jsme vybudovali znalosti, které umožňují zefektivnit a zefektivnit proces BIM pomocí dalších nástrojů, jako je Grasshopper, a programovacích jazyků, jako jsou Python a Java. Zatímco tradiční proces BIM je charakterizován ručním zadávání dat, my věříme v automatizovaný proces, kdy návrh a jeho model jsou navrhovány jako celek pomocí parametrických modelů. V rámci týmu pracujeme podle zásady D2RPO (design to robotic production & operation), což znamená, že všechny prvky návrhu jsou navrhovány s ohledem na možnosti moderních technologií, jako je například hromadná customizace. Všechny parametrické modely jsou nastaveny tak, aby bylo možné i ve fázi realizace pružně reagovat na případné zádrhele ve výrobním procesu a v případě potřeby rychle a adekvátně jednat.

[redacted] (M)
[redacted] vystudoval Fakultu architektury na Windesheimské univerzitě aplikovaných věd ve Zwolle. Je zakladatelem společnosti Buro de Haan a jeho hlavním úkolem je řídit různé týmy a také celou společnost dále vést k poslání „Stavět lépe“. Kromě této role plní také úkol technického vývoje v rámci společnosti RcPanels. Díky svému přehledu o pracích potřebných pro projekty renovací, stejně jako díky znalostem týmů společnosti Buro de Haan / RcPanels a vysokému zájmu o nové techniky, často působí jako hybná síla při zkoumání další úrovně v oblasti techniky a výroby. Na tomto projektu se podílí proto, aby zajistil vazbu mezi požadovaným konečným výsledkem a technickými možnostmi.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

Beyond 2020
Upscaling the housing renovation market through far-reaching Industrialization
Y Decorte, M Steeman, U B Krämer, C Struck, K Lange, B Zander a A de Haan
https://iopscience.iop.org/article/10.1088/1755-1315/588/3/032041

BIM a továrna
Společnost Buro de Haan je dodavatelem inženýrského a výrobního systému RcPanels. Na začátku výroby byly výkresy vytvořeny zaměstnanci společnosti Buro de Haan a stroje byly ručně opatřeny daty. Díky vývoji v oblasti BIM, plánování tahů a skladového hospodářství se podařilo omezit manuální činnosti na méně než 30 %. V současné době se zákazník, stroje, plánování a koordinace na staveništi řídí z modelu BIM.

BIM funguje jako jednotný informační zdroj pro celý projekt a podporuje všechny pracovníky, kteří mají přístup k aplikacím BIM. Tato integrace informací je možná díky zapojení 3D modelů stavebních plánů, „hotového objektu“, jakož i dat souvisejících s následnou modernizací budovy nebo pro koncepční řešení problémů, které se mohou vyskytnout po uvedení budovy do provozu. BIM se tedy stává způsobem, jak virtualizovat výstavbu, projektování a správu budovy po celou dobu jejího životního cyklu.

Tahové plánování / LPS jsou vyvinuty odborníky, kteří později založili Lean Construction Institute. Metoda nabízí plánovací monitorovací a kontrolní systém, který se řídí principy štíhlého stavění. Jejím konečným cílem je umožnit spolehlivější a předvídatelnější výrobu projektů a také podpořit plynulý pracovní postup v rámci celého projektu, podpořit spolupráci a důvěru v rámci projektového týmu a poskytnout bezpečné a kvalitní výsledky s rychlejší dobou realizace. Díky zcela hladké integraci

mezi plánováním LPS a daty z modelů BIM dokáže RcPanels udržovat rovnováhu ve výrobě a všichni zaměstnanci mají kdykoli přístup k nejnovějším údajům o stavu výrobku nebo výroby. https://www.youtube.com/watch?v=E97LRybwIy4.

Relevantní předchozí projekty

Indu Zero

Jen v severomořském regionu se nachází 22 milionů zastaralých bytů postavených v letech 1950-1985, které potřebují renovaci. V současné době se v renovačním průmyslu používají především manuální renovační techniky přímo na místě, což má za následek nízké tempo renovace, relativně vysoké náklady na pracovní sílu a dlouhou dobu trvání. K vyřešení naléhavé potřeby rychlých renovací spolupracuje šest zemí severomořského regionu na zvýšení úrovně současného renovačního procesu v rámci projektu Interreg INDU-ZERO „Industrializace renovací domů směrem k energetické neutralitě“. Projekt se zaměřuje na modulární prefabrikované renovační balíčky s plně integrovanými technologiemi HVAC, které mají vést k energeticky neutrálním obydlím. Projekt zkoumá možnosti dalekosáhlých automatizovaných a industrializovaných výrobních procesů. Bude navržen plán inteligentní továrny, který urychlí tempo renovace na cílovou hodnotu 15 000 renovačních balíčků ročně na jednu továrnu při současném snížení současné ceny o 50 %.

Future Factory

Na základě programového přístupu vyvíjí konsorcium Future Factory, výrobní, dodavatelskou a prodejní společnost, s jejíž pomocí lze ve velkém měřítku zvýšit udržitelnost domů a obytných budov. Na systémové změně, která je pro tento bezprecedentní rozsah nezbytná, pracují tři generace. Upscaling z generace 1 (současná výrobní zařízení) na prototypy výrobních zařízení generace 2 a nakonec na výrobní zařízení 3. generace, které může dodávat 25 000 domů ročně. Interakce se zákazníky probíhá v rámci programu. Ne každý výrobek je však vhodný pro sériovou výrobu. Nezbytný výzkum a vývoj stavebních komponentů probíhá po linii, střešní modul, fasádní modul a instalační modul.

Významná infrastruktura a/nebo technické vybavení

Projektové portály

V rámci společnosti Buro de Haan byl vyvinut portál pro spolupráci na projektech, jehož součástí je i služba Connect. Řídit lépe. Komunikujte a podávejte zprávy v reálném čase na stejném digitálním nástroji se všemi, kteří se podílejí na stavebním projektu. Stavební projekty s sebou nesou značné riziko. Abychom toto riziko mohli řídit, rozdělujeme projekty do fází a v sektoru máme nástroje pro sledování jednotlivých fází v následujících oblastech:

- Peníze
- Riziko
- Organizace
- Čas
- Informace
- Kvalita

Tato platforma nám nyní výrazně usnadňuje práci na projektech a každodenně přináší hodnotu. Dále ji rozvíjíme, abychom mohli nabízet stále více nástrojů pro správu vlastním zaměstnancům / přidruženým stranám a zákazníkům. V kontextu tohoto projektu, v němž je ambicí urychlit proces, je důležité, že tato platforma je interní. Zde ji můžeme využít ke strukturování vstupních dat mezi uživateli a algoritmy umělé inteligence, s nimiž se navrhují budovy.

Měřicí zařízení

Jedním z našich oddělení je měření. Další automatizovaný inženýrský proces vyžaduje vyšší přesnost zadávání, protože odpadne lidská kontrola. Tento kurz změní i řemeslné zpracování mimo toto oddělení a pravděpodobně bude mít dopad i na vybavení. Vzhledem k tomu, že tuto společnost vlastníme, můžeme snadněji provádět změny v zařízení nebo pracovních procesech než při závislosti na jiných dodavatelích, kteří nesdílejí stejné zájmy.

Bimpact
Částečně vlastníme také společnost Bimpact. Tato společnost prodává software, který v rámci softwaru BIM automaticky kontroluje, zda je budova v souladu se zákony a předpisy. Tyto znalosti a zkušenosti jsme získali v rámci společnosti Buro de Haan a budeme je velmi potřebovat při automatickém vytváření renovačních balíčků.

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

	17. Center Danmark/EU Digital Innovation Hub **CENTER DENMARK | DK**
	Webové stránky: **www.centerdenmark.com** **Číslo PIC:** 894818114
	Počet zaměstnanců: 6

Stručný popis právního subjektu/partnerské organizace

Center Denmark poskytuje důvěryhodnou platformu pro sdílení dat se zaměřením na datovou inteligenci a integrované energetické systémy pro identifikaci a využití flexibility na straně poptávky napříč energetickými systémy.

Center Denmark je nezávislá, samostatná a nezisková organizace, která se snaží podporovat rozvoj digitálně integrovaných energetických systémů s cílem posílit přechod společnosti na obnovitelné zdroje energie a snížit dopad na životní prostředí. Centrum Dánsko přispívá k vytvoření národního rámce na podporu výzkumu, vzdělávání, inovací a vývoje, testování a demonstrací v souvislosti s přechodem na zelenou společnost bez fosilních zdrojů a buduje základy dánského "Silicon Valley" energetických systémů.

Členy správní rady Center Denmark jsou proděkan Aalborgské univerzity Jakob Stoustrup, proděkan Aarhuské univerzity Brian Vinter, hlavní konzultant SDU Niels Langvad a ředitel digitalizace společnosti Energinet Nicolaj Peulicke, generální ředitel Thorsen Invest Henrik Thorsen, technický ředitel HOFOR Bjarne Korshøj, generální ředitel Aalborg Forsyning Søren Gais Kjeldsen, profesor na DTU Henrik Madsen (místopředseda) a generální ředitel EWII Lars Bonderup Bjørn (předseda).

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 1 Řízení**:** Zkušenosti s rozsáhlými evropskými projekty

WP 3 Společenství, životní prostředí a pohoda: Můžeme poskytnout digitální uživatelské rozhraní pro zpětnou vazbu od uživatelů a inteligentní ovládání.

WP 6 Obnovitelná energie a skladování: Digitální infrastruktura pro data v reálném čase a řízení v reálném čase, kdy ukládat nebo spotřebovávat energii, aby sloužila celkovému výkonu budovy z hlediska snižování emisí CO2.

WP 8 Monitorování a hodnocení: Můžeme získávat data IoT a poskytovat monitorovací systémy a datové panely, které mohou poskytnout inteligentní náhled na výkon budovy a chování uživatelů.

WP 9 Využití na trhu: Center Denmark může dát digitální řešení k dispozici průmyslu prostřednictvím naší digitální platformy pro důvěryhodné sdílení dat.

Profil klíčových pracovníků projektu

Primárně zodpovědná osoba:

[redacted] (M), ředitel Center Denmark.

Zaměstnanci:

[redacted] (M), vedoucí projektový manažer a informatik.

[redacted] (M), softwarový inženýr.

[redacted] (F), datová vědkyně.

[redacted] (M), datový vědec.

+ 2 noví softwaroví inženýři, kteří právě nastupují.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

- Center Denmark poskytuje digitální infrastrukturu a v rámci projektu Dánského inovačního fondu Flexible Energy Denmark vyvinulo vůbec první datové jezero, které dokáže zpracovávat datové toky v reálném čase z oblasti spotřeby elektřiny, tepla a vody.
- Obousměrné nastavení, které může odesílat řídicí signály v reálném čase.
- Digitální inovační centrum schválené Evropskou komisí.
- ERA-net Smart Energy Systems je schválena jako poskytovatel digitální platformy a živých laboratoří a testovacích lůžek.

Relevantní předchozí projekty

Klíčový partner v projektu Dánského inovačního fondu: **Flexible Energy Denmark**, www.flexibleenergydenmark.dk

Klíčový partner v projektu Dánského inovačního fondu: **HEAT4.0**. Zaměřuje se na další rozvoj digitální infrastruktury pro dálkové vytápění.

Klíčový partner v projektu Dánského inovačního fondu: **Cool-Data Flexibilní chlazení datových center**

Významná infrastruktura a/nebo technické vybavení

Center Denmark vlastní a spravuje vlastní servery umístěné na DTU v Dánsku.

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

	18. Sonderborg Andelsboligforening SAB | DK	
	Webové stránky: www.sab-bolig.net **Číslo PIC: 929565842**	**Počet zaměstnanců: 30**

Stručný popis právního subjektu/partnerské organizace

SAB je nezisková, nezávislá a soukromá společnost pro sociální bydlení, která byla založena jako členská družstevní organizace obyvatel (nájemníků), kteří jsou vlastníky organizace. Nájemníci jsou organizováni v bytových odděleních, která mají samostatné hospodaření a sama rozhodují o svém bytovém oddělení. Pro každé oddělení existuje představenstvo a SAB má hlavní představenstvo pro celou organizaci. SAB může pracovat pouze s činnostmi souvisejícími s bydlením svých nájemníků. SAB má 46 oddělení s celkem 3 400 byty ve městě Sonderborg v Dánsku.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 3 Společenství, životní prostředí a pohoda: *Vlastník budovy, údržba budov*
WP 4 Udržitelné navrhování budov: *Plánování energetických modernizací a nových stavebních projektů*
WP 6 Obnovitelná energie a skladování: *Vlastník několika fotovoltaických elektráren na různých budovách*
WP 7 Efektivní provoz a flexibilita: *Plánování energetických modernizací, údržba budov, vlastníci budov*
WP 8 Monitorování a hodnocení: *Zkušenosti s pilotními a demonstračními projekty v rámci bytových družstev*
WP 10 Komunikace, šíření informací a školení: *Odborníci na komunikaci a školení nájemníků v bytových družstvech, informovanost občanů*

Profil klíčových pracovníků projektu

[redacted] (M)
Technický ředitel SAB
E-mail: [redacted]
Telefon: [redacted]

[redacted] (M)
Technický inspektor oddělení SAB 22 E-mail: [redacted]
Telefon: [redacted]

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

Relevantní předchozí projekty

- Partner v projektu H2020/SCC-01-2015 č. 691883: SmartEnCity. Úspěšný návrh.
- Partner v projektu H2020/EE-2017-CSA č. 785147: HAPPI. Vedoucí pracovního balíčku WP2: Energetický screening a studie proveditelnosti.

Významná infrastruktura a/nebo technické vybavení

není k dispozici

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

	19. Green Digital Finance Alliance **GDFA | CH**	
	Webové stránky: **https://greendigitalfinancealliance.org** **Číslo PIC: 893237208**	**Počet zaměstnanců: 3**

Stručný popis právního subjektu/partnerské organizace

GDFA je nezisková organizace, jejímž úkolem je rozšířit financování Pařížské dohody prostřednictvím inovací v oblasti fintech. Usměrňujeme a podporujeme inovace našich partnerů tím, že jim umožňujeme využívat nové možnosti fintech k řešení současných překážek pro škálování zeleného financování (mezi překážky patří velikost zelených aktiv, vysoké náklady na strukturování zelených aktiv a vydávání dluhopisů, nedostatečné zelené metriky z reálné ekonomiky a další). Naše práce se řídí třemi strategickými pilíři: 1) myšlenkové vedení 2) umožnění zelených digitálních metrik připravených pro investory 3) experimentování s cílem dosáhnout rozšíření. V rámci myšlenkového vedení je GDFA znalostním partnerem pracovní skupiny G-20 pro udržitelné financování a pracovní skupiny generálního tajemníka OSN pro digitální financování cílů udržitelného rozvoje. V rámci této práce GDFA úzce spolupracovala s několika evropskými jurisdikcemi na identifikaci inovativních modelů financování pro dosažení národních zelených cílů. K organizacím, s nimiž GDFA spolupracuje, patří BMU v Německu, Centrální banka Španělska a Centrální banka Nizozemska. GDFA disponuje sítí vztahů s finančními institucemi a asociacemi finančních institucí (např. Evropskou bankovní federací) v Unii, které lze v rámci projektu využít. GDFA disponuje globálním katalogem inovativních modelů financování pro zvyšování energetické účinnosti a dodávek energie z obnovitelných zdrojů, který je přínosem pro nově vznikající postupy, jež je třeba v projektu využít. Práci GDFA řídí její poradní sbor na vysoké úrovni, který bude rovněž přínosem v projektu ARV. GDFA propojuje své znalosti a výsledky myšlenkového vedení a experimentování s cílem rozšířit práci do sítě UNEP FI, která má 350 členských institucí FI. Experimenty GDFA se škálování práce demonstrují škálovatelné zelené digitální finanční nástroje prostřednictvím experimentů na úrovni trhu a využití ověřených inovativních finančních nástrojů v dialogu s partnery FI k přizpůsobení napříč jurisdikcemi prostřednictvím standardizovaných rámců.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 9 Využití na trhu:

Green Digital Finance Alliance (GDFA) je znalostním partnerem pracovní skupiny G-20 pro udržitelné financování a pracovní skupiny generálního tajemníka OSN pro digitální financování cílů udržitelného rozvoje. V této oblasti GDFA spolupracovala napříč jurisdikcemi s tvůrci politik, regulačními orgány a institucemi finančních služeb prostřednictvím inovačních procesů na vývoji nových konceptů inovace zeleného financování pomocí fintech. GDFA pracuje na projektech "Experimentation to Scale", které sdružují partnery za účelem navrhování a testování inovativních zelených digitálních finančních nástrojů. GDFA tedy přináší sadu nástrojů a procesů pro navrhování inovativních digitálně podporovaných finančních nástrojů. GDFA byla spoluzaložena UNEP a úzce spolupracuje s Finanční iniciativou UNEP, jakožto digitální finanční složkou, která slouží jako zdroj informací pro práci 350 členských organizací. GDFA má rozsáhlou síť k institucím finančních služeb v Evropské unii a spolupracuje s bankami při navrhování konceptů zelených digitálních dluhopisů. GDFA do své práce zapojuje schopnosti svého poradního sboru na vysoké úrovni, mezi něž patří mimo jiné MIT Media Lab, Evropská klimatická nadace, a také vztahy mimo poradní sbor například s nizozemskou centrální bankou, španělskou centrální bankou, Evropskou bankovní federací a dalšími.

Profil klíčových pracovníků projektu

[redacted] (F): ředitelka Green Digital Finance Alliance. [redacted] vedla projekty s bankami (vč. HSBC) týkající se inovací finančních nástrojů prostřednictvím automatizace, stála v čele návrhu rámce pro měření dat pro tvůrce politik a regulační orgány, který má sloužit jako vodítko pro cesty k rozšíření zeleného financování pomocí fintech a navrhla přístupy k inovacím ve financích v rámci GDFA. Řídila znalostní partnerství v pracovní skupině OSN SG pro digitální financování cílů udržitelného rozvoje. [redacted] je držitelkou titulu M.Sc. v oboru environmentálních věd a dalších certifikátů v oblasti digitalizace financí.

Specialista na zelené financování (bude zaměstnán): Tento specialista bude vybrán ze sítě našeho spolupředsedajícího UNEP FI, aby bylo možné určit nejvhodnějšího specialistu na zelené financování. Klíčové schopnosti a dovednosti budou zahrnovat hluboké znalosti strukturování finančních nástrojů pro škálování flexibilního financování energie spojeného s různými třídami nemovitostí.

[redacted] (M): Pracovník pro obchodní model a finance. Svou kariéru zasvětil navrhování obchodních modelů a finančních nástrojů. Byl zmíněn v několika akceleračních programech, včetně Growth Train. Vybudoval fintechový podnik na strukturování investic do fondů s využitím tokenizace aktiv. Angažoval se jako expert a konzultant pro společnosti zabývající se obnovitelnými zdroji vč. Ørsted podporující inovace financování flexibilní energie a institucím poskytujícím finanční služby. Má zkušeností s tokenizací v rámci návrhu prosumerských trhů. Je držitelem titulu B.Sc. v oboru podnikání a finance a M.Sc. na London School of Economics.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

1. *Blockchain – Gateway to Sustainability linked Bonds.* Spolupráce GDFA a HSBC.
2. *Fintech for Sustainability – German Country Report.* Spolupráce GDFA a FairFinance, Institute for Social Banking, and Conscious Fintech.
3. *Fintech for Sustainability* – Zpráva o Španělsku.
4. *Fintech for Sustainability* – Zpráva o Nizozemsku.

Relevantní předchozí projekty

- Iniciativa Pathfinder v rámci pracovní skupiny generálního tajemníka OSN pro digitální financování cílů udržitelného rozvoje. Vývoj rámce pro měření udržitelného digitálního financování v jednotlivých zemích.
- Inovace financování v oblasti klimatu pomocí technologií - projekt spolupráce mezi svěřenským fondem CAFI, čínskou univerzitou CUFE a GDFA.

Významná infrastruktura a/nebo technické vybavení

není k dispozici

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

	20. Stichting Bo-Ex ’91 **BOEX | NL**	
	Webové stránky: **www.boex.nl** **Číslo PIC: 934165485**	**Počet zaměstnanců:90**

Stručný popis právního subjektu/partnerské organizace

Stichting Bo-Ex '91 je bytová společnost podle nizozemského práva, zákona o bydlení, založená v roce 1907. Jejich hlavním úkolem je zajišťovat kvalitní a dostupné bydlení pro nízkopříjmové domácnosti. Bo- Ex nemůže být při přijímání domácností do svých bytů postupovat selektivně a jediným kritériem je příjem (je stanoveno maximum). Společnost Bo-Ex je vlastníkem více než 9 000 bytů ve městě Utrecht. Bo-Ex má velmi ambiciózní program renovace. V období 2020-2025 bude zrekonstruováno více než 1 000 bytů. Bo-Ex rovněž pracuje na realizaci několika projektů novostaveb: v období 2020-2025 bude realizováno více než 500 novostaveb.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 3 Společenství, životní prostředí a pohoda:
Společnost Bo-Ex přispívá k tomuto pracovnímu balíčku v následujících aspektech:

- Sociální renovace: zapojení nájemníků ve stávajících bytových domech s cílem vypracovat plán, který bude podporován nájemníky a plán pro udržitelnou komunitu po provedení renovace.
- Bouw = Wouw (program lidského kapitálu): zapojení (místních) studentů do realizace renovačních prací.
- Energetický přechod: zapojení nájemníků a jejich školení, aby pochopili energetickou koncepci a možnosti svých obydlí. Díky lepšímu porozumění mohou nájemníci řídit své využívání energie.

WP 4 Udržitelné navrhování budov:
Společnost Bo-Ex přispívá k tomuto pracovnímu balíčku účastí na inovačním fóru, jehož cílem je lepší škálovatelné řešení pro renovační práce s vysokou mírou energetické účinnosti.

WP 5 Výrobní a stavební pracovní postupy účinně využívající zdroje:
Společnost Bo-Ex přispívá k tomuto pracovnímu balíčku tím, že vypracovává návrh na renovaci bytových domů, který účinně využívá zdroje.

WP 6 Obnovitelná energie a skladování:
Společnost Bo-Ex přispívá k tomuto pracovnímu balíčku vypracováním návrhu BIPV pro maximalizaci sběru solární energie v kombinaci s místním a regionálním ukládáním elektřiny, které poskytuje podporu síti a EV-V2G.

WP 7 Efektivní provoz a flexibilita:
Společnost Bo-Ex přispívá k tomuto pracovnímu balíčku vypracováním následujících ukázkových projektů:

- Systémy energetického managementu budov
- Chytré sítě na úrovni okresů a měst

WP 8 Monitorování a hodnocení:
Společnost Bo-Ex přispívá k tomuto pracovnímu balíčku shromažďováním informací a monitorováním údajů pocházejících z chování nájemníků a energetické náročnosti rekonstruovaných bytových domů.

WP 9 Využití na trhu:
Bo-Ex přispívá k tomuto pracovnímu balíčku tím, že přispívá k financovatelným obchodním modelům pro nové replikovatelné iniciativy.

Profil klíčových pracovníků projektu

[redacted] (M) – projektový manažer a developer několika projektů rekonstrukcí a nové výstavby bytů. [redacted] má více než desetileté bohaté zkušenosti v oblasti veřejných služeb a bytových projektů. Kromě toho se [redacted] podílí na projektu IRIS programu Horizont 2020 jako koordinátor projektu a vedoucí pracovního balíčku dvou pracovních balíčků. [redacted] bude zodpovědný za jeden z vybraných renovačních projektů.

[redacted] (M) – projektový manažer a developer několika projektů rekonstrukcí a nové výstavby bytů. [redacted] má více než desetileté bohaté zkušenosti v rámci bytových společností v několika funkcích. [redacted] bude zodpovědný za jeden z vybraných projektů rekonstrukce.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

Společnost Bo-Ex má zkušenosti s následujícími produkty/službami:

- Údržba bytů / bytových domů
- Rekonstrukce bytů / bytových domů
- Údaje o energetické náročnosti bytů / bytových domů
- Opětovné použití materiálů v rámci nových iniciativ pro byty / bytové domy

Relevantní předchozí projekty

Společnost Bo-Ex se v současné době podílí na následujících inovačních projektech:

1. Evropský inovační projekt: IRIS - projekt Horizon2020 (2018-2022)
   Okres Kanaleneiland-Zuid, Utrecht
2. Národní inovační projekt: TKI (2018-2021) - Henriettedreef
   okrsek Overvecht, Utrecht

Významná infrastruktura a/nebo technické vybavení

není k dispozici

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

RCPANELS	**21. RC Panels** **RCP | NL**	
	Webové stránky: **www.rcpanels.com** **Číslo PIC: 892078931**	**Počet zaměstnanců: 23**

Stručný popis právního subjektu/partnerské organizace

Společnost Rc Panels je inovativním lídrem na nizozemském trhu s prefabrikovanými fasádami pro renovace s nulovou spotřebou energie a v poslední době rychle rozšiřuje své portfolio také o střechy a novostavby. Je přední společností v oblasti industrializace a digitalizace, která provozuje proces „file2factory“. Posláním společnosti Rc Panels je zajistit výnosnost energeticky neutrálního bydlení. Zaměřuje se na atraktivní renovace „hned napoprvé správně“ s rozsáhlými úsporami energie, díky čemuž je flexibilní prakticky pro všechny typy bezfosilních energetických systémů. Díky velkým investicím do rozvoje znalostí v kombinaci s odlišným pohledem na stavební proces si společnost Rc Panels vytvořila technologický náskok podpořený patenty. Společnost Rc Panels má znalosti a zkušenosti s vývojem a realizací inteligentní výroby.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 1 Řízení: zkušenosti s řízením národního inovačního programu i mezinárodního inovačního projektu a s řízením jeho vlastní části.

WP 4 Udržitelné navrhování budov: Naše odborné znalosti v oblasti navrhování integrovaných výrobků (včetně integrace vzduchotechniky a fotovoltaických zařízení do stavebních prvků), celkových koncepcí i výroby (včetně DFM) zajišťují řešení, která jsou proveditelná a rozšiřitelná pro větší dopad.

WP 5 Výrobní a stavební pracovní postupy účinně využívající zdroje: Naše zkušenosti s industrializací a digitalizací budou využity pro rychlé, pohodlné a škálovatelné renovace. Námi uplatňovaný přístup „file2factory“ pomáhá snižovat náklady v několika fázích procesu. Na čele ve výrobě mimo staveniště. Inovativní dalekosáhlá prefabrikace a integrace šetří čas, náklady a nepohodlí na stavbě. Zkušenosti a odborné znalosti pro vyrobitelnost vyvinutých řešení, stejně jako proveditelnost, cirkulárnost a škálovatelnost.

WP 6 Obnovitelná energie a ukládání: Odborné znalosti pro integraci skladování do stavebních prvků a celkových koncepcí / návrhů.

WP 8 Monitorování a hodnocení: Odborné znalosti v oblasti realizace renovací, inovačních programů a pilotních projektů, vysoce výkonných metod, LCA a analýz nedostatků.

WP 9 Využití na trhu: Zkušenosti se skutečnou dynamikou trhu, absorpcí a obchodními modely, jakož i inovacemi v rámci těchto modelů a novými rolemi / systémovými inovacemi.

WP 10 Komunikace, šíření informací a odborná příprava: zkušenosti s komunikací technických i netechnických témat s tvůrci politik, (budoucími) klienty, dalšími institucemi a také odborná příprava studentů.

Profil klíčových pracovníků projektu

[redacted] (F). Manažerka pro rozvoj obchodu. Více než 25 let zkušeností v oblasti inovací, managementu, obnovitelných zdrojů energie a udržitelné výstavby. Vzděláním technická fyzička a koučka. Má zkušenosti ve vytváření spojenectví a propojování zájmů, včetně zájmů zákazníka. Propojuje sociální, ekonomické, environmentální a technické inovace a realizaci proveditelných a škálovatelných renovací. Vedoucí v základním týmu národního inovačního programu Future Factory.

[redacted] (M). Manažer inovací. Více než 25 let zkušeností u různých dodavatelů a od samého počátku jeden z průkopníků renovací s nulovou spotřebou energie (Nul Op de Meter). Vystudoval inženýrství i ekonomii a má přehled o tom, co lze ve stavebnictví udělat. Jeho dlouholeté zkušenosti inovátora i realizátora mu dávají ještě vhled do toho, co ještě není možné, ale bude to možné provést v budoucnosti, díky čemuž společně se svým inovačním týmem ve společnosti Rc Panels pracuje strukturovaně i rychle na nových generacích výrobků.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

Relevantní produkty: vysoce izolační a prefabrikované fasády (včetně dveří, oken, povrchových úprav atd.) pro renovace s nulovou čistotou, rychlé a pohodlné, a proto vhodné pro renovace v obsazeném stavu.
Publikace:

1. https://www.cobouw.nl/innovatie/nieuws/2020/04/de-renovatiefabriek-van-lemelerveld-we-kunnen-al-hele-huizen-maken-101283670
2. "Rekuperační fasáda", prefabrikovaná integrovaná ventilace s rekuperací tepla ve fasádě, je nominována na národní cenu Rabobankinovace.Z veřejněno na adrese: https://www.bouwmagazine.nl/nominaties-rabobank-innovation-challenge-2020-bekend/.
3. Společnost RC Panels se věnuje několika videím a filmům o renovacích a inovacích. Příklad naleznete zde: https://www.youtube.com/watch?v=yy6-rZFE4JY. Objevuje se také v dokumentu natočeném pro národní program 139ppro renovace 139tion: https://youtu.be/KwLEk2k85lI.

Relevantní předchozí projekty

Předchozí:

***Inside Out*:** Rc Panels dodal konečnou fasádu bytového domu Inside Out a renovací zajistil vysokou hodnotu izolace. Fasáda je osazena fotovoltaickými panely.

Předchozí a probíhající:

Několik projektů energetické renovace (140, přibližně 1000 bytů/rok), všechny s našimi průmyslově vyráběnými prefabrikovanými vysoce izolačními fasádami.

Probíhající:

***Future Factory*:** Nizozemský národní program zaměřený na inovace s investicí 30 milionů eur, 180 vzájemně propojených inovačních projektů, 29 členů koalice. Rc Panels je jednou ze tří vedoucích stran a řídí program v základním týmu. Výsledky tohoto výzkumného a vývojového programu lze předvádět a testovat v Utrechtské demonstraci (navazující úrovně TRL). Rc Panels aUAS Utrechts slouží jako spojovací body.

***MustBe0*:** projekt EU Interreg zaměřený na nastartování trhu s modernizací bytových domů s nulovou spotřebou energie. Rc Panels je jedním z partnerů. Zkušenosti z tohoto projektu mohou být využity a dále rozvíjeny v utrechtské demonstraci.

***INDU ZERO*:** projekt EU Interreg zaměřený na vytvoření plánu pro megatovárnu na modernizace s nulovou spotřebou energie. Společnost Rc Panels byla na začátku projektu členem poradního sboru. Potřeba jejich odborných znalostí byla tak vysoká, že se společnost stala řádným účastníkem projektu. Poskytování odborných znalostí pro renovační balíček a továrnu, vitríny a realizaci holandských vitrín (nízká budova) včetně integrace systému HVAC do stavebních prvků. Zkušenosti z tohoto projektu mohou být využity a dále rozvíjeny v rámci ukázek v Utrechtu.

Významná infrastruktura a/nebo technické vybavení

Společnost Rc Panels vlastní továrnu, která je schopna vyrábět mimo jiné prefabrikované fasády pro realizaci renovace demonstračních bytových domů. Společnost Rc Panels má inovační laboratoř pro vývoj a výzkum nových nebo integrovaných materiálů, komponentů a výrobků.

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

Utrecht University	**22. Utrechtská univerzita** **UU | NL**
Webové stránky: https://www.uu.nl/en Číslo PIC: 999985805	Počet zaměstnanců: 6500 Počet studentů: 30000

Stručný popis právního subjektu/partnerské organizace

Utrechtská univerzita (UU), založená v roce 1636, je mezinárodně uznávanou výzkumnou univerzitou. O kvalitě výzkumu na univerzitě svědčí pozitivní hodnocení výzkumu a vysoké umístění v mezinárodních žebříčcích. V Šanghajském žebříčku světových univerzit 2020 se Utrechtská univerzita umístila na prvním místě v Nizozemsku a na 52. místě na světě. Fakulta geověd zaujímá přední mezinárodní pozice v akademickém výzkumu v oblasti udržitelnosti, solární energie a urbanizace. Rozsáhlý a mezinárodně orientovaný výzkum fakulty významně přispívá k šanghajskému žebříčku. Kopernikův institut pro udržitelná rozvoj na fakultě si klade za cíl přispět ke zlepšení znalostí souvisejících se všemi cíli udržitelného rozvoje (SDGs), jak je stanovila Organizace spojených národů v roce 2015. Výzkumná skupina Energie a zdroje (E&R) Kopernikova institutu se bude podílet na projektu ARV (https://www.uu.nl/en/research/141anagement-institute-of-sustainable-development)

Výzkumná skupina Energie a zdroje (E&R) je hlavní skupinou Kopernikova institutu pro udržitelný rozvoj, s přibližně 60 zaměstnanci a výzkumnými pracovníky. Její výzkum se zaměřuje na přechod k udržitelným systémům energie a zdrojů, přičemž zvláštní pozornost věnuje integraci účinného využívání energie a zdrojů s řešeními dodávek energie z obnovitelných zdrojů, a to v různém měřítku. Ambicí E&R je podpořit přechod k udržitelnému energetickému a oběhovému systému zdrojů. Vědecká kvalita skupiny E&R byla v posledním národním hodnocení kvality hodnocena externí komisí. Získala 19 z 20 bodů, což odráží její postavení na špičkové mezinárodní vědecké úrovni. Skupina E&R se zabývá řadou velkých výzev pro přechod k udržitelné společnosti. Stále rostoucí poptávka naší společnosti po energii a materiálech vytváří obrovský tlak na přírodní zdroje, obnovitelné i neobnovitelné, což snižuje kvalitu životního prostředí a zvyšuje omezení dostupnosti zdrojů. Reakce na tyto výzvy vyžaduje odlišný přístup k naplnění poptávky společnosti po energetických službách, včetně účinného využívání energie a materiálů, přechodu na obnovitelné zdroje energie, zmírnění rizik změny klimatu a přizpůsobení se jí, omezení neudržitelných změn ve využívání půdy a přesměrování průmyslového metabolismu. Tato transformace je multidisciplinárním procesem, jehož se účastní mnoho stran a který vyžaduje porozumění a vstupy z různých oborů, aby bylo možné dospět ke společným řešením. Skupina E&R nabízí jedinečné multidisciplinární prostředí pro rozvoj znalostí a společných vědeckých projektů v této složité oblasti. Jednou z oblastí jejího výzkumu je rozvoj inteligentních sítí, rozsáhlá penetrace fotovoltaiky a potřeba flexibility našich energetických sítí. Výzkumné aktivity se zabývají integrací fotovoltaiky a dalších intermitentních obnovitelných zdrojů do energetického systému, převážně aplikovaných v městském prostředí. Výzkum zahrnuje platformy pro správu dat pro inteligentní energetická řešení a řešení mobility ve městech, jakož i monitorování, vyhodnocování a optimalizaci těchto řešení v praxi. V této oblasti se specializují čtyři starší a dvanáct mladších výzkumných pracovníků.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 4 Udržitelný (re)design budov:
UU přispívá k tomuto pracovnímu balíčku účastí na inovačním fóru, jehož cílem je lepší škálovatelné řešení pro renovační práce s vysokou mírou energetické účinnosti. UU rovněž přispívá k tomuto pracovnímu balíčku tím, že demonstruje principy návrhu BIPV u flexibilních renovačních stavebních prvků.
WP 5 (Před)výrobní a stavební pracovní postupy účinně využívající zdroje:
UU přispívá k tomuto pracovnímu balíčku integrací fotovoltaiky do stavebních prvků typu plug and play, které jsou prefabrikovány v továrně.
WP 6 Inovativní obnovitelné zdroje energie a systémy ukládání:
UU přispívá k tomuto pracovnímu balíčku vypracováním návrhu BIPV pro maximalizaci sběru solární energie v kombinaci s místním a regionálním ukládáním elektřiny, které poskytuje podporu síti a EV-V2G.

WP 7 Efektivní provoz a flexibilita:
UU přispívá k tomuto pracovnímu balíčku vypracováním následujících předváděcích projektů se zaměřením na předpovědi a služby flexibility prostřednictvím agregačních subjektů pro účely optimalizace trhu i sítě:

- Systémy energetického managementu budov
- Chytré sítě na úrovni okresů a měst

WP 8 Monitorování, hodnocení a posouzení dopadů:
UU přispívá k tomuto pracovnímu balíčku shromažďováním informací a monitorovacích údajů pocházejících ze systému BEMS se zaměřením na optimální energetickou náročnost rekonstruovaných bytových domů.
WP 10 Komunikace, šíření informací a oslovování zúčastněných stran:
UU přispívá k tomuto pracovnímu balíčku publikováním důležitých výsledků a šířením poznatků na konferencích.

Profil klíčových pracovníků projektu

[redacted] (M), - Fakulta geověd, Koperníkův institut pro udržitelný rozvoj. Wilfried van Sark absolvoval v roce 1985 na Utrechtské univerzitě v Nizozemsku obor experimentální fyzika obhajobou magisterské práce na téma měření a analýza I-V charakteristik c-Si článků. Doktorát získal na univerzitě v nizozemském Nijmegenu; tématem jeho doktorské práce byl vývoj, modelování a zpracování III-V solárních článků. Poté strávil 7 let jako post-doktorand/senior výzkumný pracovník na Utrechtské univerzitě a specializoval se na depozici a-Si:H článků a jejich analýzu. Je odborníkem na plazmovou chemickou depozici z par, a to
jak na rf, tak na velmi vysokých frekvencích. Po působení na univerzitě v Nijmegenu, kde pracoval na solárních článcích III-V, se vrátil na univerzitu v Utrechtu, kde se zaměřil na (jednomolekulární) konfokální fluorescenční mikroskopii nanokrystalů. V roce 2002 přešel na pozici odborného asistenta ve výzkumné skupině Věda, technologie a společnost Koperníkova institutu na Utrechtské univerzitě v Nizozemsku. Od roku 2012 se tato skupina přesunula na fakultu geověd a byla přejmenována na Energy & Resources. Zde byl v roce 2014 jmenován docentem. V roce 2018 byl jmenován řádným profesorem oboru Integrace fotovoltaické solární energie. Nyní provádí a koordinuje výzkum fotovoltaických zařízení nové generace zahrnující nanokrystaly, např. luminiscenční solární koncentrátory, a dále výzkum výkonnosti fotovoltaiky a předpovědí v reálném čase, vývoje inteligentních sítí včetně Evs, V2G, řízení přetížení, analýzy životního cyklu, socioekonomiky a rozvoje politiky. Je členem pracovní skupiny pro digitalizaci ETIP-PV a nizozemským zástupcem v úkolu 13 (výkonnost a spolehlivost fotovoltaických systémů), úkolu 15 (BIPV) a úkolu 16 (solární zdroje) IEA PVPS. Je přidruženým redaktorem časopisu Solar Energy vydavatelství Elsevier a časopisu Frontiers in Energy Research. Je členem různých organizačních výborů fotovoltaických konferencí EU, IEEE a SPIE. Je (spolu)autorem více než 300 publikací v recenzovaných časopisech a na konferencích a kapitol v knihách. Je editorem (spolu)pěti knih.

[redacted] (F) – Fakulta geověd, Koperníkův institut pro udržitelný rozvoj. Je řádnou profesorkou v oblasti integrace intermitentních obnovitelných zdrojů energie ve skupině Energy & Resources. [redacted] získala v roce 2003 doktorát z elektrotechniky na Washingtonské univerzitě v USA. Její výzkumné zájmy se týkají modelování a simulace energetických soustav a trhů s elektřinou s velkou penetrací obnovitelných zdrojů energie. Od roku 2004 působí [redacted] v Nizozemsku na různých akademických pozicích na TU Delft, TU Eindhoven a Utrecht University, kde vede výzkum v oblasti inteligentních sítí a systémové integrace větrných elektráren a solárních fotovoltaických zdrojů.
Vybraná témata zahrnují dlouhodobé plánování sítě za velké nejistoty, přeshraniční vyrovnávání, metody strojového učení pro předvídání a zavádění flexibility v energetických komunitách, odezvu na poptávku ze strany komerčních/průmyslových spotřebitelů, tržní řízení akumulačních systémů, nové koncepty pro místní trhy s elektřinou a koordinaci mezi provozovateli přenosových soustav a provozovateli distribučních soustav. Byla členkou odborné skupiny IEA Wind Task 25 "Design and Operation of Power Systems with Large Amounts of Wind Power" (2009-2014). V roce 2015 byla členkou místního organizačního výboru odpovědnou za vztahy s veřejností konference IEEE PowerTech, která se konala v Eindhovenu a měla rekordní účast více než 600 účastníků. [redacted] byla prozatímní ředitelkou a spoluřešitelkou šestiletého programu financovaného z prostředků Perspektivního fondu I-TTW - Chytré energetické systémy v

zastavěném prostředí (2014-2020). [redacted] je spoluautorkou více než 200 recenzovaných časopiseckých a konferenčních článků a kapitol v knihách.

[redacted] (F) – Fakulta geověd, Koperníkův institut pro udržitelný rozvoj. Elena získala titul M.Sc. v oboru jaderného inženýrství na Politecnico di Milano v Itálii a titul Ph.D. v oboru energetického inženýrství na univerzitě v Padově v Itálii. Ve své disertační práci se zaměřila na vývoj motivačního regulačního rámce pro elektrické sítě. Jako postdoktorandka pracovala na Politecnico di Milano, kde pokračovala ve své kariéře a stala se docentkou ekonomiky energetiky na fakultě managementu, ekonomie a průmyslového inženýrství a zastávala koordinační pozice na MIP, obchodní škole Politecnico di Milano. V září 2018 se připojila ke skupině Energie a zdroje na Kopernikově institutu pro udržitelný rozvoj a po dlouhé spolupráci se stala profesorkou na částečný úvazek na Evropském univerzitním institutu, Florentské škole regulace, sekce Energetika a klima. Kromě regulační ekonomie patří mezi její výzkumné zájmy konkurence na trzích s elektřinou, design trhu s elektřinou a politika a šíření technologií. V těchto oblastech prováděla statistické analýzy založené na datech, pracovala s optimalizačními modely a prováděla srovnávací studie alternativních politických přístupů. Jako hlavní řešitelka nebo spoluřešitelka se podílela na několika výzkumných a poradenských projektech pro italský regulační úřad pro energetiku, sítě a životní prostředí (ARERA), italskou státní advokátní komoru (Avvocatura dello Stato), italskou energetickou burzu a řadu energetických společností. Působí jako recenzentka mezinárodních časopisů (Energy Economics, Energy Journal, Energy Policy) a jako členka vědeckých výborů na mezinárodních konferencích. Je (spolu)autorkou více než 70 odborných publikací v recenzovaných časopisech a na konferencích a jedné knihy.

[redacted] (M) je odborným asistentem ve skupině Energy & Resources (E&R) na Kopernikově institutu na Utrechtské univerzitě. [redacted] je držitelem titulu z katedry elektrotechniky a výpočetní techniky na Národní technické univerzitě v Aténách, titulu M.Sc. (cum laude) v oboru technologie udržitelné energie na Technické univerzitě v Delftu a titulu Ph.D. v oboru elektrické energetické systémy na Technické univerzitě v Eindhovenu. Pracoval jako projektový inženýr ve společnosti Siemens Řecko v oblasti integrovaných řešení řízení a kontroly a v oddělení inovací společnosti Enexis, provozovatele distribuční soustavy v Nizozemsku, kde realizoval jednu z prvních studií svého druhu o vlivu nabíjení baterií elektromobilů na nízkonapěťové distribuční sítě. Jeho výzkumné zájmy se týkají plánování a provozu energetických soustav, řízení poptávky, odezvy na straně poptávky, agregovaných služeb flexibility a integrace obnovitelných zdrojů energie do energetické soustavy. Prováděl výzkum v rámci několika projektů, včetně projektů H2020, 7. rámcového programu EU, ERA-NET a nizozemských projektů Top Sector Energy. Je členem IEEE Senior Member a členem pracovní skupiny pro vývoj standardu IEEE Smart City Planning and Technology P2784.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

- Ioannis Lampropoulos, Machteld van den Broek, Erik van der Hoofd, Klaas Hommes, Wilfried van Sark, A system perspective to the deployment of flexibility through aggregator companies in the Netherlands, Energy Policy, svazek 118, červenec 2018, strany 534-551.
- W. L. Schram, T. AlSkaif, I. Lampropoulos, S. Henein and W. G. J. H. M. van Sark, "On the Trade-Off Between Environmental and Economic Objectives in Community Energy Storage Operational Optimization," in IEEE Transactions on Sustainable Energy, svazek 11, č. 4, str. 2653-2661, říjen 2020.
- Lampropoulos, I., Alskaif, T., Schram, W., Bontekoe, E., Coccato, S., van Sark, W. (2020) *Review of energy in the built environment*, Smart Cities, 3, str. 248–287.
- Brinkel, N. B.G., Gerritsma, M. K., AlSkaif, T. A., Lampropoulos, I., van Voorden, A. M., Fidder, H. A., van Sark, W. G.J.H.M. (2020). Impact of rapid PV fluctuations on power quality in the low-voltage grid and mitigation strategies using electric vehicles. *International Journal of Electrical Power and Energy Systems*, 118, 105741.

- Brinkel, N. B.G., Schram, W. L., AlSkaif, T. A., Lampropoulos, I. & van Sark, W. G.J.H.M.(2020). Should we reinforce the grid? Cost and emission optimization of electric vehicle charging under different transformer limits. *Applied Energy*, 276, 115285.

Relevantní předchozí projekty

Vybrané projekty:

IRIS Smart Cities (EIP-SCC): IRIS je projekt financovaný v rámci H2020 (2017-2022). Projekt byl vytvořen kolem tří majákových měst - Utrechtu (Nizozemsko, koordinátor), Nice (Francie) a Göteborgu (Švédsko) - která budou fungovat jako spolupracovníci a testovací místa pro následná města Vaasa (Finsko), Alexandroupolis (Řecko), Santa Cruz de Tenerife (Španělsko) a Focsani (Rumunsko). Každé město bude využívat kombinaci univerzit a výzkumných organizací, místních orgánů, inovačních agentur a soukromých odborných znalostí, aby urychlilo přijetí ambiciózních iniciativ v oblasti energetiky, mobility a informačních a komunikačních technologií celými komunitami. Ve světle takto proměnlivého prostředí je stále zřejmější potřeba strategií, které městům pomohou chytře integrovat technologická řešení. Vzhledem k tomuto stavu a skutečnosti, že města mohou působit jako rozsáhlí demonstrátoři integrovaných řešení a chtějí přispět k sociálně inkluzivnímu přechodu na energetiku a mobilitu, nabízí IRIS vynikající příležitost k demonstraci a replikaci velkého potenciálu měst. Předvedením inteligentních řešení, která integrují energii, mobilitu a informační a komunikační technologie, zakotvených v městské inovační platformě, IRIS kvantifikuje jejich hodnotu a propojuje zájmy mnoha různých zúčastněných stran v inovativních obchodních modelech, což umožňuje rozšíření a replikaci integrovaných řešení pro udržitelná města v Evropě i ve světě. Úkolem UU je definovat a řídit klíčové ukazatele výkonnosti celého projektu.

PV Prosumers4Grid je projekt financovaný z H2020 (2018-2020), Vývoj inovativních konceptů vlastní spotřeby a agregace pro PV Prosumers s cílem zlepšit zatížení sítě a zvýšit tržní hodnotu PV. Doba trvání projektu: 11/2017-4/2020, H2020-LCE-2017-RES-CSA, 12 partnerů. Cíle: Vyvinout a zavést inovativní koncepty vlastní spotřeby a agregace a obchodní modely pro PV prosumers, které pomohou integrovat udržitelnou a konkurenceschopnou elektřinu z FVE do elektrizační soustavy. Přínosem bude mj. další podpora zavádění fotovoltaických systémů pro výrobu elektřiny se zaměřením na fyzickou a finanční interakci se sítí a poskytnutí fotovoltaickým prosumerům (domácnostem a průmyslovým podnikům) konkurenceschopné a udržitelné elektřiny s inovativními koncepcemi vlastní spotřeby a agregace a obchodními modely. Úkolem UU je posoudit situaci v Nizozemsku a analyzovat dopady vlastní spotřeby na emise skleníkových plynů.

PARENT: *PARticipatory platform for sustainable Energy 144anagement* (2016-2019, financováno z programu ERA- NET Co-fund Smart Cities and Communities). Tento projekt se zaměřil na úspory energie v domácnostech prostřednictvím aplikace inovativních informačních technologií. Softwarové řešení se stává rozšiřitelnou, opakovaně použitelnou, společensky přijatelnou a prodejnou platformou, která zahrnuje informace o energii v reálném čase, nové herní a jiné mechanismy odměňování s cílem dosáhnout energetické účinnosti stimulací změny chování. Úkoly UU spočívaly ve vývoji strategií změny chování pro prosumery, s instalací fotovoltaických panelů, v pilotním projektu pro 100 domácností.

CESEPS: *Co-Evolution of Smart Energy Products and Services* (2015-2019, financováno z programu ERA-NET Smart Grids Plus). Cílem tohoto projektu bylo vytvořit životaschopný trh s chytrými energetickými systémy pro domácnosti a zaměřuje se na interdisciplinární výzkum postupů zúčastněných stran, energetického chování uživatelů, místního obchodování s energií, produktů řízených zákazníky, řízení poptávky, místní výroby udržitelné elektřiny, e-mobility a prognostických technik v Nizozemsku a Rakousku. Úkolem UU je analyzovat datové toky v pilotních projektech inteligentních sítí včetně fotovoltaiky a elektromobilů.

PEARL-PV (spolehlivost výkonnosti FVE), Akce COST (2018-2022).

Významná infrastruktura a/nebo technické vybavení

UU provozuje venkovní testovací zařízení pro fotovoltaiku s kapacitou 50 standardních fotovoltaických modulů současně. Je plně vybaveno meteorologickými senzory, celooblohovou kamerou a spektroradiometrem. I-V křivky všech modulů lze měřit v subminutovém časovém rozlišení. Bude se

používat pro testování komponent BIPV. Univerzitní fotovoltaický systém o výkonu 1,2 MQ je rovněž monitorován a ~200 regionálních malých fotovoltaických systémů je sledováno za účelem vypracování prognóz. Přístup k datům pilotních projektů využívajících fotovoltaiku a elektromobily je zajištěn prostřednictvím různých projektů.
Data a (PV) modely využívají rozsáhlá cloudová řešení ICT, která jsou k dispozici na úrovni fakult a univerzity.

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

	23. Město Utrecht **UTR | NL**	
	Webové stránky: **www.utrecht.nl** **Číslo PIC: 998300818**	**Počet zaměstnanců: 4 350**

Stručný popis právního subjektu/partnerské organizace

Gemeente Utrecht (město Utrecht) je čtvrtou největší obcí v Nizozemsku. Počet obyvatel města vzroste ze současných 339 000 na 400 000 v roce 2028. V Utrechtu sídlí největší nizozemská univerzita (Utrechtská univerzita) a mnoho dalších renomovaných (aplikovaných) výzkumných ústavů, jako je například Univerzita aplikovaných věd HU. Město si vysoce cení spolupráce více zainteresovaných stran, která kombinuje technické a sociální inovace. Svědčí o tom název jeho koaliční smlouvy „Utrecht tvoříme společně“ a účast Gemeente Utrecht v mnoha evropských sítích, především v síti EUROCITIES (spolupředsednictví pracovní skupiny Kvalita ovzduší, změna klimatu a energetická účinnost), EIP Smart Cities and Communities (zejména předsednictví pracovní skupiny SCC-01 pro replikaci), sítě Open and Agile Smart Cities (OASC), Climate-KIC (největšího evropského partnerství veřejného a soukromého sektoru pro inovace v oblasti změny klimatu), Energy Cities, ERRIN, POLIS a Evropského institutu pro inovace a technologie. Vzhledem k přirozené roli města jako dopravního uzlu se město Utrecht již desítky let prioritně zaměřuje na udržitelnou mobilitu, obnovitelné zdroje energie a energetickou účinnost. První akční plán pro udržitelnou energii (SEAP) byl předložen v roce 2008. Gemeente Utrecht se zavázalo, že se v roce 2030 stane klimaticky neutrálním městem. Do roku 2020 snížíme emise CO2 o 30 % oproti roku 2010 a zvýšíme podíl obnovitelné energie na 20 %.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 1 Řízení:
Město Utrecht má bohaté zkušenosti jako partner v mnoha evropských projektech, včetně projektů FP7 a H2020, mimo jiné v oblasti energetiky a mobility, a jako koordinátor koordinuje projekt H2020 IRIS Smart Cities (2017-2022, celkový rozpočet projektu 20,4 milionu eur).

WP 2 Rámec pro efektivní plánování, navrhování, výstavbu a provoz CPCC:
Jako veřejný orgán se zákonným mandátem pro územní plánování má město Utrecht hluboké odborné znalosti v oblasti integrovaného plánování měst, rámců politiky územního plánování a právních předpisů.

WP 3 Společenství, životní prostředí a pohoda:
Jako orgán veřejné správy máme hluboké odborné znalosti a zkušenosti v oblasti zapojení komunit a občanů a ochrany veřejných hodnot, jako je prostředí vhodné pro život, veřejné zdraví a blahobyt. V ukázkové čtvrti Overvecht umožňuje integrovaný program zapojení veřejnosti nazvaný „Samen voor Overvecht“ (Společně pro Overvecht) inovativní přístupy k zapojení místních obyvatel do obnovy čtvrti.

WP 4 Udržitelné navrhování budov:
Specifické odborné znalosti týkající se provádění stavebních předpisů, nařízení, energetické náročnosti budov a sociální péče.

WP 5 Výrobní a stavební pracovní postupy účinně využívající zdroje:
Město Utrecht je nejrychleji rostoucím městem v Nizozemsku s mnoha projekty zahušťování vnitřního města. Utrecht experimentuje s novými přístupy ke stavební logistice a stavebními uzly, které nabízejí efektivnější stavební pracovní postupy.

WP 6 Obnovitelná energie a ukládání:

Odborná a právní role při schvalování infrastruktury pro výrobu a skladování energie ve veřejném prostředí. Dále koordinace přechodu k energetice prostřednictvím sdružování všech společenských subjektů za účelem dosažení společných cílů.

WP 7 Efektivní provoz a flexibilita:
Město Utrecht se podílí na různých ukázkových projektech chytrých sítí spolu s inovativními malými a středními podniky, energetickými společnostmi a provozovateli sítí.

WP 8 Monitorování a hodnocení:
Jako orgán veřejné správy má obec vlastní výzkumné oddělení, které nabízí hodnocení politik, přehled cílů udržitelného rozvoje a další cenzurované výzkumné nástroje.

WP 9 Využití na trhu:
Jako orgán veřejné správy spolupracujeme s regionální hospodářskou radou Utrecht na rozšiřování řešení v našem regionu a na přilákání firem do regionu Utrecht.

WP 10 Komunikace, šíření informací a školení:
Jako veřejný orgán máme přímý komunikační mandát vůči našim obyvatelům a společnostem s hlubokými odbornými znalostmi a zkušenostmi v oblasti komunikace a kampaní.

Profil klíčových pracovníků projektu

[redacted] (M) je hlavní politický poradce pro energetickou transformaci ve stavebním prostředí se zvláštním zřetelem na společnosti zabývající se sociálním bydlením. [redacted] zodpovídá za koordinaci záležitostí sociálního bydlení a energetické transformace ve městě Utrecht. Bude se podílet především na WP4 a WP5 a nabídne projektovému týmu podporu při propojování s různými organizačními složkami města.

[redacted] (F) je sociální geografka a urbanistka, pracuje jako manažerka pro energetickou transformaci na městském úřadě v Utrechtu. Dříve působila jako programová manažerka pro bydlení a sousedství ve společnosti Platform31, kde řídila znalostní programy o trhu s bydlením, sousedském přístupu, zmenšování regionů a energetické transformaci. [redacted] bude vedoucí strategickou poradkyní projektového týmu především pro úkoly v rámci WP4 a WP5.

[redacted] (M) Poradce pro inovace na odboru rozvoje města v Utrechtu. V současné době vede jako koordinátor projekt H2020 IRIS Smart Cities. IRIS je celoevropský projekt 43 partnerů financovaný Evropskou komisí a vedený městem Utrecht v oblasti udržitelného rozvoje měst, energeticky pozitivních čtvrtí, elektrické mobility a inovativních IT služeb. [redacted] bude působit jako hlavní strategický poradce projektového týmu a bude zapojen do WP1, WP9 a WP10.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

Příslušné publikace:

- Energetický plán (2015): vypracovalo 165 osob, které byly pro tento úkol určeny losem.
- Energetické agendy 2016-2020.
- Vize řešení vytápění města (2017)
- Akční plán pro udržitelnou energii (SEAP) schválený Konventem starostů.

Relevantní úspěchy:

13 % střech je osazeno solárními panely (2019); 1607 veřejných nabíjecích míst pro elektromobily (2019); nový akční plán pro udržitelnou energii (2016-2020) vypracovaný 165 náhodně vybranými občany - průlomový inovativní experiment s aleatorickou participativní demokracií.

Relevantní předchozí projekty

- **H2020 IRIS Smart Cities**: (H2020-SCC-01-2017 - Smart Cities and Communities, IA, 2017-2022). Město Utrecht je koordinátorem projektu IRIS Lighthouse „Integrated and Replicable solutions for co-creation In Sustainable cities“. Projekt urychluje integraci iniciativ v oblasti energetiky, mobility a ICT do „komunit“. IRIS vyvíjí a stimuluje služby v oblasti energetiky a mobility na základě potřeb uživatelů. Město Utrecht se podílí na činnosti Rady koordinátorů a předsedá pracovní skupině pro replikaci na podporu rozšiřování řešení pro chytrá města v celé Evropě.
- **H2020REG**: Podpora veřejných kapacit pro plánování, financování a řízení integrované městské regenerace za účelem udržitelného využívání energie (H2020-EE-07-2014 - Posílení kapacit veřejných orgánů pro plánování a provádění politik a opatření v oblasti udržitelné energie - CSA, 2015- 2017). Město Utrecht bylo jedním ze tří orgánů veřejné správy, které se účastnily projektu FosterREG zaměřeného na posílení veřejné kapacity na místní, regionální a národní úrovni pro plánování, financování a řízení integrované regenerace měst pro udržitelné využívání energie, a to prostřednictvím budování kapacit, podpory a artikulace účinné víceúrovňové koordinace a posilování národních i evropských sítí.
- **URBACT URGE**: cirkulární budování měst (URBAN Action Planning Network, 2019- 2022). Vedoucím partnerem je město Utrecht. URGE, což je zkratka pro „circUlaR 148uilding citiEs“, je síť akčního plánování v oblasti oběhového hospodářství v sektoru stavebnictví - významného spotřebitele surovin. Protože v tomto odvětví existují nedostatky v uplatňování zásad oběhového hospodářství, sdružuje URGE devět měst a jejich zúčastněné strany, aby se vzájemně inspirovaly a učily při rozvoji své integrované městské politiky. To podporuje integraci oběhového hospodářství do úkolů ve stavebnictví, a přispívá tak k udržitelným městům

Významná infrastruktura a/nebo technické vybavení

- *Urban Data Platform:* Utrecht využívá dobře fungující městskou informační platformu s více než 200 sadami dat veřejně dostupnými na adrese www.utrecht.dataplatform.nl. Utrecht využívá CKAN jako otevřenou datovou platformu již několik let. Na datové platformě spolupracuje s velkým počtem nizozemských měst. Jedná se o osvědčené řešení pro sběr, ukládání a poskytování otevřených dat. Utrecht integroval datovou platformu s interními procesy a zefektivnil tak zveřejňování dat. Jedním z příkladů je integrace správy veřejných záležitostí na základě Open311.
- *Digital Twin*: Současná 3D verze města Utrecht - jeho „digitální dvojče“ - je **založena na široce známé a používané otevřené herní platformě Unity** a vizualizuje městská data z (aktuálně) 125 datových sad prostřednictvím SPOTINFO, přičemž pro geografickou analýzu dat se používá ArcGIS (komerční nástroj společnosti ESRI). Digitální dvojče obsahuje informace týkající se objektů, takže může počítat, vytvářet simulace a komunikovat s uživateli.

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

	24. Bos Installatiewerken B.V. **BOS GROEP | NL**	
	Webové stránky: **www.bosgroep.com** **Číslo PIC: 892047406**	**Počet zaměstnanců:55**

Stručný popis právního subjektu/partnerské organizace

Společnost Bos Installatiewerken B.V. je dodavatel stavebních služeb / technický dodavatel založený v roce 1939. Naším hlavním úkolem je zajišťovat čistou vodu, dostatečné větrání a udržitelné stavební služby.
V uplynulých letech se Bos významně podílel na konceptu renovace Inside Out.
Koncepce renovace se zaměřuje na vytváření energeticky soběstačných / pasivních bytových domů. Domníváme se, že pro udržitelné stavební prostředí je nezbytné, aby se pozornost přesunula od projektů ke konceptům, které se zaměřují na prefabrikaci, nižší náklady na práci na stavbě a industrializaci.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 4 Udržitelné navrhování budov:
Bos přispívá k tomuto pracovnímu balíčku tím, že vypracovává řešení pro energeticky účinné návrhy budov. Chytřejší budovy, které mohou být napojeny na místní a okresní energetické infrastruktury. Tyto budovy pomohou s účinným hospodařením s energií. Společnost Bos pomůže navrhnout a zdokonalit modulární instalační infrastruktury a komponenty používané v konceptu Inside Out.

WP 5 Výrobní a stavební pracovní postupy účinně využívající zdroje:
V rámci projektů Bos a Inside Out se zaměřujeme na integrovanou instalační infrastrukturu v prefabrikovaných modulech, abychom zlepšili industrializační procesy a omezili výstavbu na místě. Společnost Bos přispívá k automatizované integraci v rámci BIM a má zkušenosti s procesy výstavby šetrnými k obyvatelům. To má také vazbu na minimalizaci výstavby na místě pro všechny dodavatele a subdodavatele.

WP 6 Obnovitelná energie a ukládání:
Společnost Bos má zkušenosti s vytvářením nízkoteplotní topné infrastruktury ve výškových budovách. Společnost Bos pomůže rozšířit znalosti a vytvořit řešení pro integraci nízkoteplotního dálkového vytápění do výškových budov. Kromě integrace infrastruktury pro vytápění bude Bos zpracovávat integraci BIPV a infrastruktury BIPV ve výškových budovách.

WP 7 Efektivní provoz a flexibilita:
Bos přispívá k tomuto pracovnímu balíčku tím, že zpracovává následující ukázky:

- Systémy energetického managementu budov
- Inteligentní sítě na úrovni okresů a měst

WP 8 Monitorování a hodnocení:
Společnost Bo-Ex přispívá k tomuto pracovnímu balíčku shromažďováním informací a monitorováním údajů pocházejících z projektu Inside Out a dalších demonstračních projektů.

WP 9 Využití na trhu:
Bos přispívá k tomuto pracovnímu balíčku tím, že přispívá k bankovním obchodním modelům pro nové opakovatelné iniciativy

Profil klíčových pracovníků projektu

[redacted] (M) – ředitel společnosti Bos Installatiewerken B.V. - Rogier má bohaté zkušenosti v oblasti HVAC systémů, solární energie /BIPV a NZEB budov. [redacted] e navíc jednou z hlavních postav realizace první energeticky přebytkové výškové budovy Inside Out. Společnost Bos Installatiewerken je průkopníkem v oblasti výškových budov s nulovou spotřebou energie.

[redacted] (M) – projektový manažer a vývojář několika inovativních projektů, jako je projekt Inside Out, kde je výšková budova rekonstruována na NZEB s přebytkem. V tomto projektu [redacted] zodpovídal za část návrhu, výzkumu a stavebního procesu renovace. [redacted]

[redacted] (M) – projektový manažer a tvůrce konceptu. Pracoval jako projektový manažer při realizaci konceptu Inside Out. [redacted] hrál významnou roli po stránce návrhu a výzkumu a napsal svou magisterskou práci na téma Propojení teorie přechodu s vícenásobnou případovou studií s cílem prozkoumat potenciál rozšiřování koncepcí modernizace s nulovou čistou spotřebou energie pro výškové budovy. [redacted]

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

Společnost Bos má zkušenosti s následujícími produkty/službami:

- Systémy HVAC pro byty / bytové domy
- Výroba a skladování energie v inteligentních sítích
- Údaje o energetické náročnosti bytů / bytových domů
- Integrace instalačních infrastruktur pro modulární a prefabrikované komponenty, jako jsou fasády nebo topné systémy.
- Zkušenosti s realizací NZEB v rámci projektu Inside Out.

Relevantní předchozí projekty

Národní inovační projekt: TKI (2018-2021) – **okrsek Henriettedreef Overvecht v Utrechtu**

Významná infrastruktura a/nebo technické vybavení

není k dispozici

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

	25. iWELL B.V. **iWELL | NL**	
	Webové stránky: **www.iwell.nl Číslo PIC:** **892079707**	**Počet zaměstnanců: 11** **Počet studentů: 1**

Stručný popis právního subjektu/partnerské organizace

iwell je soukromá společnost.
Čistá a cenově dostupná energie pro všechny - jedna z největších výzev naší doby. Přechod na novou energetiku si žádá změnu. Proto mnoho stran vede nekonečné rozhovory o tom, jak by se věci mohly a měly dělat jinak. To vše však zabere spoustu času.

Urychlujeme přechod na energetiku a budujeme energetické dodávky budoucnosti již dnes. Společně vylepšujeme svět, aby byl udržitelnější, čistší a ekologičtější. Již dnes podnikáme kroky k lepšímu světu díky našim chytrým bateriím.

Příspěvek k pracovním balíčkům a úkolům v rámci projektu

WP 6 Obnovitelná energie a ukládání:
Chytré baterie

WP 7 Efektivní provoz a flexibilita:
Cloud pro inteligentní správu energie

Profil klíčových pracovníků projektu

[redacted] (M)
Nejraději bych změnil svět energetiky jako podnikatel, protože věřím, že právě tak mohu mít největší vliv. A nejlépe praktickým a konkrétním přístupem. Nemluvme stále o roce 2050, ale spolupracujme na řešeních, která udělají svět lepším už dnes!

[redacted] (M)
Jak můžeme dělat věci chytřeji, lépe, rychleji a především udržitelněji? Po letech práce konzultanta v oblasti stavebnictví a státní správy je pro mě výroba konkrétních výrobků, které přispívají k energetické transformaci, vítanou změnou. Moje znalosti stavebních instalací a rozhodování v rámci státní správy zde přijdou vhod!

[redacted] (M)
Podívejte se na historii lidstva a uvidíte, že technologie nás ovlivňují více než naopak. Jakmile mi došlo, odkud lidé pocházejí, jsem si jako mladý kluk uvědomil, že evoluční teorie se nevztahuje jen na biologii. Budoucnost určuje těch několik málo lidí, kteří se odváží změnit technologii, a já si myslím, že jako technický fyzik jsem v iwellu na správném místě!

[redacted] (M)
Rád přicházím s inovativními řešeními v týmu, optimalizuji procesy a neustále e vylepšuji. Své zkušenosti mohu dobře uplatnit při vývoji softwaru a cloudových řešení. Společně jsme průkopníky rychlejšího a plynulejšího přechodu na nové zdroje energie!

[redacted] (F)
Je dobré vidět, že se stále více pozornosti zaměřuje na vliv, který máme my lidé na životní prostředí a klima. Důsledky jsou stále zřejmější. Pak ale vyvstává otázka: „Jak tyto problémy řešit?“. I když každý z nás může přispět svým dílem, věřím, že skutečnou změnu přinesou inovativní společnosti, které nabízejí praktická a nákladově efektivní řešení. iwell je právě takovou společností, která se odvažuje myslet dál. Rád k tomu využívám své technické znalosti!

[redacted] M)
Věřte mi, že přechod na čistou energii bude rychlejší, než si myslíte! Méně odpadu, chytré využívání obnovitelných zdrojů energie a zajištění spolehlivých zdrojů elektřiny jsou mými předními cíli. Tuto změnu provedeme společně a s velkým nadšením!

[redacted] (M)
S podnikatelským nadhledem zajišťuji v rámci iwellu co největší optimalizaci. Pro energetickou transformaci je zásadní, aby současné i budoucí kostky fungovaly co nejefektivněji. Jako podnikový vývojář se snažím o neustálé novace s cílem vytvořit co nejinovativnější systém.

Relevantní publikace a/nebo produkty, služby nebo jiné úspěchy

Produkty a služby:

https://iwell.nl/producten/
Cube - Vysoký špičkový výkon pro špičkové využití výtahu – již více než 100 klientů
Power Cube - propojení s nabíjecími sloupy, elektrickým vařením nebo stroji pro dodávku vysokého špičkového výkonu
Mega Cube - stabilizace sítě pomocí velkých bateriových systémů
VPP - virtuální elektrárna poskytující služby energetické sítě provozovatelům přenosových soustav a provozovatelům distribučních soustav pomocí našich baterií.
Ultra rychlý algoritmus pro snížení špiček - software pro ultra rychlé snížení špiček připojení k síti, aby nedošlo k přerušení pojistek.

Publikace:
https://www.duurzaambedrijfsleven.nl/energietransitie-business/35063/iwell-batterij-thuis

https://www.bouwinvest.com/news/latest-news/2020/smart-battery-stores-renewable-energy-when-and-where-it-s-needed/

https://iwell.nl/stedin-mitros-en-iwell-maken-werk-van-decentrale-batterij/

https://www.alteravastgoed.nl/en/nieuws/altera-launches-iwell-collaboration-with-two-cube-battery-systems/

Relevantní předchozí projekty

Druhé místo v soutěži EU proptech 2020 pro škálování - https://www.proptechhouse.eu/the-winner-of-proptech-startup-and-scaleup-europe-awards-2020/

Vítěz výzvy STEDIN na řešení elektrických špiček v bytových domech: https://iwell.nl/stedin-mitros-en-iwell-maken-werk-van-decentrale-batterij/

Vítěz výzvy provincie Drenthe dodáním řešení pro fotbalový klub s ambicí vyrábět obnovitelné zdroje do sítě s problémy s přetížením: https://energeia.nl/energeia-artikel/40089629/batterijsysteem-helpt-icoonproject-vv-nieuw-buinen-uit-de-brand

Vítěz výzvy BNG + VNG k SDG OSN v roce 2019 - https://www.bngbank.nl/Pages/Over%20BNG%20Bank/Duurzame-groei-voor-BNG-Duurzaamheidsfonds-en-iwell.aspx https://www.bngduurzaamheidsfonds.nl/initiatieven/batterijsysteem-iwell/

Významná infrastruktura a/nebo technické vybavení

Viz přiložené letáky Cube a PowerCube + Cloud software
Máme testovací zařízení (ve staré uhelné továrně v Utrechtu), v němž můžeme provádět testy.

Provozní kapacita právnické osoby/partnerské organizace

není k dispozici

26. MEX architects b.v
MEX | NL

Webové stránky:
www.mexarchitects.nl

Číslo PIC: 892092802

Počet zaměstnanců: 4

Krátký popis společnosti / partnerské organizace

Mex architects jsou architektonickou firmou, která klade důraz na architekturu a její technické rozvinutí. Mex architects se od 70. let 20. století mimo zdravotnických projektů specializují na renovaci rezidenčních budov.

Společnost je technickou architektonickou firmou s nadšeným týmem odborníků, kteří odpovídají za realizaci široké škály projektů. Úzce spolupracujeme se sítí zkušených externích poradců a partnerů. Mezi naše klienty patří instituce, bytové korporace, projektoví developeři a soukromé osoby.

Mex Architects jsou flexibilní stranou. Tým hráčů schopných koordinovat velké projekty, aniž by ztratili cit pro detail. S velkým smyslem pro odpovědnost za celý proces. Od návrhu až po dodání a následnou péči.

Mex Architects přeloží požadavky klienta do udržitelného návrhu, který stojí ve svém okolí na správném místě. U Mex Architects je rozpočet, plánování a proveditelnost minimálně stejně podstatná jako návrh.

Díky využití metody BIM (informační model budovy) jsou Mex Architects schopni zajistit komplexní proces.

Příspěvky do pracovních balíčků a úkoly v tomto projektu

WP 4 Udržitelný návrh budovy:
Návrh modulární architektury, architektonické povědomí, spojení mezi partnery. Architektonický návrh základních komponentů budovy.

WP 5 Zdroje využívající výroba a výrobní postupy:
Návrh modulární architektury, architektonické povědomí, spojení mezi partnery. Architektonický návrh typologie budovy.

WP 6 Obnovitelné energie a skladování:
Shromažďování informací pro WP4 & WP5

WP 9 Zájem spotřebitelů:
Architektonické povědomí

Profil klíčového personálu v projektu

[redacted] MSc (M) – Ředitel Mex Architects. Architekt, BIM modelář, 3D vizualizace, architektonický průzkum v oblasti stavebních typologií.

Relevantní publikace a/nebo produkty, služby či další úspěchy
Projekty naruby
Relevantní předchozí projekty
Projekty naruby
Významná infrastruktura a/nebo technické vybavení
N/A
Provozní kapacita společnosti / partnerské organizace
N/A

	27. Stichting Mitros **MITROS | NL**	
	Webové stránky: www.mitros.nl **Číslo PIC: 892081356**	**Počet zaměstnanců: 250**

Krátký popis společnosti / partnerské organizace

Mitros je holandská bytová korporace. Poskytujeme bydlení domácnostem s nízkými příjmy v regionu Utrecht. Mitros vlastní 30 000 bytových jednotek, fungujeme již 100 let a budeme pokračovat i nadále. Naším cílem je růst, abychom udrželi krok s růstem města. Stavíme nové projekty a renovujeme staré. Také prodáváme nemovitosti a provádíme demolice za účelem stavby více a lepších nových domů.

Příspěvky do pracovních balíčků a úkoly v tomto projektu

WP 3 Komunita, prostředí a pohoda:
Mitros přispívá do pracovního balíčku v následujících aspektech:

- Sociální renovace: organizace podpory pro nájemníky v mnoha aspektech jejich života. Nastavení a udržování spolupráce s partnery v sociální doméně.
- Komunitní centrum: abychom podpořili sociální renovaci, naším cílem je vytvořit místo, kde se lidé budou setkávat při různých aktivitách, ve spolupráci s místní vládou a mnoha partnery v sociální doméně i partnery v oblasti energií. Mohou se zde také podílet a účastnit samotní nájemníci.
- Bouw = Wouw (program lidského kapitálu): cílem je zvýšit zájem studentů a nezaměstnaných osob o práci v sektoru stavebnictví a renovace. Vytváříme startovací pracovní pozice a stáže a úzce spolupracujeme se školami.
- Energetické transformace: zapojení a koučování nájemníků, aby lépe porozuměli konceptu energií a možnostem v jejich bydlení. Díky lepšímu pochopení mohou nájemníci kontrolovat svou spotřebu energie.

WP 6 Obnovitelné energie a skladování:
Mitros přispívá do této práce:

- účastí v průzkumu v oblasti integrace PV panelů v modernizaci 10podlažních bytů;
- účastí v průzkumu nižší teploty oblastního vytápění: jaká opatření jsou nezbytná ke snížení vstupní teploty?
- účastí v průzkumu řešení decentralizované ventilace s možností kombinování různých řešení obnovy tepla.

WP 7 Efektivní provoz a flexibilita:
Mitros se účastní průzkumu a pilotuje s bateriemi s cílem stabilizovat vrchol poptávky po elektřině. Tento balíček slouží k vybudování systému řízení energií a přispívá k chytrému rozvádění na okresní a městské úrovni.

WP 9 Zájem spotřebitelů:
Hlavním příspěvkem Mitros je zde velikost a rozsah modernizace 10podlažních bytů.

WP 10 Komunikace, rozšiřování a školení:
Mitros v této oblasti přispívá tím, že do programu zapojuje i nájemníky. To může zahrnovat malé workshopy v modelovém bytě, individuální návštěvy, letáčky a informační zpravodaje i širší publicitu v místních médiích a online.

Profil klíčového personálu v projektu
[redacted] (M), senior stavební investor do nemovitostí, má velké zkušenosti s plánováním a organizací velkých renovačních projektů a budováním podpory ze strany nájemníků a rozhodujících orgánů. [redacted] se bude podílet na pracovním balíčku 3 a 10. [redacted] (M), senior projektový manažer, s širokými zkušenostmi v oblasti výstavby a inovačních prací. [redacted] má technické pozadí a bude se podílet na práci v pracovních balíčcích 6 a 7. [redacted] spolu pracují v týmu na renovaci 10podlažní bytové budovy v Overvecht. V rámci tohoto programu se renovuje 1800 bytů, se zahájením prací v r. 2018 a s dokončením v r. 2025.
Relevantní publikace a/nebo produkty, služby či další úspěchy
Relevantní předchozí projekty
Významná infrastruktura a/nebo technické vybavení
N/A
Provozní kapacita společnosti / partnerské organizace
N/A

	28. Statutární město Karviná **KARV | CZ**	
	Webová stránka: https://www.karvina.cz/ **Číslo PIC:** 918490867	**Počet zaměstnanců:** 303 (12/2020)

Krátký popis společnosti / partnerské organizace

Lokalita: severovýchod České republiky, Moravskoslezský kraj. Polovina města zároveň tvoří hranici s Polskem. Z historického hlediska se Karviná nachází v oblasti Těšínské Slezsko.
Oblast: 57.48 km 2
Populace: 52,998 (k datu 1/1/2019)
Struktura osídlení města: město má 9 městských obvodů pojmenovaných Karviná-Fryštát, Karviná-Doly, Karviná-Lázně Darkov, Karviná-Ráj, Karviná-Staré Město, Karviná-Nové Město, Karviná-Mizerov, Karviná-Hranice, Karviná-Louky.

Oddělení vzdělávání a výzkumu
Zajišťuje a koordinuje rozpracování konceptu strategického plánu pro ekonomický rozvoj města. Jeho rozsah zahrnuje těžbu a životní prostředí a dopravu. Na seznamu aktivit jsou také marketing města včetně rozvoje turismu, zajištění organizace a propagace kulturních a sportovních událostí napříč městem, pravidla dotací a projektový management vybraných projektů statutárního města Karviná a vzdělávání.

Příspěvky do pracovních balíčků a úkoly v tomto projektu

WP 1 Management: projektový management, koordinace demo stránky aktivit.

WP 2 Struktura efektivního plánování, projektování, výstavby a provozu CPCC: znalost demo-místa lokality, účast a koordinace místních investorů, poskytování vstupních dat a zpětná vazba k CPCC KPI v místních podmínkách.

WP 3 Komunita, životní prostředí a pohoda: převod energií, účast komunity, vzdělávání občanů a studentů a zahrnutí občanů a investorů, řešení propagace.

WP 4 Udržitelný stavební návrh: zkušenosti v oblasti stavebního navrhování a legislativních postupů, koordinace aktivit na demo-stránce

WP 5 Výroba s efektivním využitím zdrojů a výrobní pracovní postupy: zkušenosti ve výrobní fázi při projektech hlubokého zdokonalení, validace pracovních postupů na demo stránce, poskytování obecních nemovitostí k testování automatizovaných analýz výkonu energií

WP 6 Obnovitelná energie a uskladnění: spolupráce a koordinace s RES a implementace systému skladování v demo budově.

WP 7 Efektivní provoz a flexibilita: supervize provozu budovy, odpovídá za komunikaci provozu v demo prostoru pro nájemníky a jejich vzdělávání.

WP 8 Monitoring a hodnocení: účast manažera města pro energie při monitoringu a hodnocení demo prostoru, koordinace hodnotících aktivit v rámci demo prostoru.

WP 10 Komunikace, rozšiřování a školení: Zapojení PR oddělení při komunikaci a rozšiřování projektu a výsledky demo prostoru.

Profil klíčového personálu v projektu

[redacted] (M) je více starostou pro vývoj města, politiky dotací, lázně a turismus, a více.
Jako vedoucí projektu se účastnil na implementaci více investičních a neinvestičních projektů financovaných ESIF a národních zdrojů a také se účastnil projektů přeshraniční česko-polské spolupráce. Díky jeho schopnostem zaručuje prezentaci projektového plánu na úrovni obecního managementu a v projektu představuje týmovou osobnost, pověřenou rozhodováním v rámci statutárního města Karviná.
Tel.: [redacted]
Email: [redacted]

[redacted] (M) je úředník oddělení strategie a plánování, oddělení vzdělávání a výzkumu statutárního města Karviná a jedná jako projektový manager pro programy grantů a projekty spolufinancované z ESIF nebo národních zdrojů.
V rámci projektu bude plnit funkci projektového manažera a administrátora projektu pro statutární město Karviná.
Tel: [redacted]
Email: [redacted]

Relevantní publikace a/nebo produkty, služby či další úspěchy

Relevantní předchozí projekty

- **Strategické dokumenty statutárního města Karviná**
  Financované z Operačního programu Zaměstnanost – CZ.03.4.74/0.0/0.0/17_080/0009841 V rámci implementace projektu budou vytvořeny následující dokumenty:
  - Strategický plán vývoje města
  - Plán udržitelné mobility města
  - Koncept zeleně ve městě

- **Adaptační strategie města Karviná u klimatických změn**
  Financováno Norway Grants, číslo projektu 3194100020

- **Izolace fasády domu č. 871, U Lesa, Karviná-Ráj**
  Financované zkombinováním následujících zdrojů:
  - Integrovaný regionální operační program – CZ.06.2.11/0.0/0.0/17_097/0011752
  - Národní enviromentální fond, číslo projektu. – 04381961
  - Rozpočet města Karviná

- **Úspory za energie v budovách ve vlastnictví města Karviná**
  Financováno Operačním programem životní prostředí – CZ.1.02/3.2.00/09.04823

- **Revitalizace budovy městské policie v Karviné**
  Financováno Operačním programem životní prostředí – CZ.1.02/3.2.00/09.04821

Významná infrastruktura a/nebo technické vybavení

Statutární město Karviná zajišťuje projekt výstavby polikliniky na adrese 2379 Žižkova ulice v Karviné (PSČ 733 01) jako vklad. Město získá tuto budovu do svého vlastnictví (leden 2021) od Moravskoslezského kraje na základě usnesení č. 16/1924 ze dne 4. června 2020. Budova byla dlouhou dobu využívána k poskytování zdravotnických služeb. Budova polikliniky byla postavena a uvedena do provozu roku 1993. Budova má čtyři podlaží a tři křídla se sklepem, plocha standardního podlaží má přibližně 1850 m_2. Budova se skládá z nemocniční lékárny, rehabilitačních prostor včetně plaveckého bazénu, ordinací lékařů, očních optik, kosmetiky, masáží, cestovní agentury atd. Uprostřed budovy se nachází centrální schodiště se dvěma výtahy. Na střeše budovy jsou strojovny pro výtahy a

klimatizaci. Je v zájmu statutárního města Karviná i nadále využívat všechen výše uvedený majetek k poskytování zdravotní péče nejen občanům Karviné, ale i občanům z širší oblasti. V rámci projektu ARV bude tato budova využita ke společnému vytvoření inovativních technologií a postupů k redukci a optimalizaci energetické účinnosti, která povede k nulové nebo plusové energetické účinnosti demonstrativní budovy.

Provozní kapacita společnosti / partnerské organizace

N/A

	29. Dolomiti Energia Solutions Srl **DOL | IT**	
	Webová stránka: www.de-solutions.it **Číslo PIC: 911841032**	**Počet zaměstnanců: 17**

Krátký popis společnosti / partnerské organizace

Dolomiti Energia Solutions Srl vznikla spojením Dolomiti Energia Rinnovabili s Nesco, již zavedenými společnostmi v oblasti obnovitelných energií a energetické účinnosti. Společnost je leaderem v Trentinu v oblasti managementu služeb účinnosti energií ve veřejném i státním sektoru, ve výrobě energie z obnovitelných zdrojů a v kogeneraci. Rozvojové aktivity jsou předkládány způsoby rizika sdíleného se zákazníkem, aby se přímo garantovala optimalizace výsledků.

Příspěvky do pracovních balíčků a úkoly v tomto projektu

Hlavní role Dolomiti Energia Solutions bude v WP3.

Profil klíčového personálu v projektu

[redacted] (M) vystudoval elektrické inženýrství na univerzitě Padua (Itálie); od roku 2007 pracuje v sektoru ESCO a v oblasti navrhování řešení úspory energií a výroby z obnovitelných zdrojů. Od roku 2007 pracuje jako CEO pro NESCO, společnost ESCO získala firma Dolomiti Energia group roku 2017, a posléze z ní vybudovali v roce 2019 Dolomiti Energia Solutions, kde pracuje na pozici zástupce ředitele. Od července 2019 je prezidentem NEOGY, společnosti dedikované elektrické a udržitelné mobilitě, která se zrodila ze společného podniku mezi Dolomti Energia Group (TN) a skupinou Alperia group (BZ). Od roku 2020 je ve společnosti Dolomtit Energia Holding manažerem energií.

[redacted] (M) roku 2009 promoval v oboru elektrické inženýrství na Univerzitě Padua. Je manažerem pro DES sektoru managementu energií a jeho rolí je vývoj a management spotřebních data skupiny Dolomiti Energia group a soukromých zákazníků. Koordinuje a rozvíjí celou oblast pobídek.

[redacted] (M), kvalifikovaný stavební expert. Ve společnosti Dolomiti Energia Solutions je vedoucím sektoru energetické účinnosti a konkrétně se soustředí na management služeb technologických systémů budov. Vytváří projekty na úsporu energií ve formuli ESCO, s garantovanými výsledky, a koordinuje jejich implementaci a měření a verifikaci výsledků

Relevantní předchozí projekty

STARDUST (2017-2022): Projekt je financován z programu Maják – chytrá města a komunity Horizontu 2020 Evropské Unie. Jde o vysoce interdisciplinární projekt, na kterém pracovalo 29 partnerů z 8 zemí, kteří všichni pracovali společně na transformaci měst napájených uhlíkem na chytrá, vysoce účinná, inteligentní a na občany orientovaná města, využívající technicky zelená řešení a inovativní obchodní modely spojené se silnou strategií replikace. Aktivity budou nejdříve demonstrovány v Pamplona (Španělsko), Tampere (Finsko), a Trento (Itálie) a budou opětovně aplikovány v následujících městech. Cílem projektu Stardust je transformace současných měst na města chytřejší prostřednictvím modelu holistické replikace. Ta bude kombinovat odborné znalosti různých partnerů konsorcia na chytré budovy, energetickou účinnost, ICT a e-mobilitu, to vše spojeno s inovací a sociální účastí místních. Tím zvýšíme povědomí mezi občany měst Pamplona, Tampere a Trento o možnostech, jak využít své město jako „inovativní ostrov“ nebo městský inkubátor technických, sociálních, regulačních a tržních řešení pro jiná města po celém světě, které projeví zájem.
Významná infrastruktura a/nebo technické vybavení
Obvodní síť vytápění:
Provozní kapacita společnosti / partnerské organizace
N/A

habitech IL DISTRETTO ENERGIA AMBIENTE	**30. Habitech DTTN | IT**	
	Webové stránky: www.habitech.it **Číslo PIC: 955168313**	**Počet zaměstnanců 18**

Krátký popis společnosti / partnerské organizace

Habitech – oblast energií a životního prostředí propagovaná Autonomní provincií Trento a uznaná italským Ministerstvem pro univerzity a výzkum, je vedoucím národním centrem zelené výstavby, obnovitelných energií a inovací: od roku 2006 Habitech v těchto oblastech pracuje a usiluje o transformaci trhu směrem k udržitelným řešením.
Habitech je neziskovou organizací a sítí více než 120 členů, kteří představují jak veřejný, tak soukromý sektor: je to nejen odkaz pro všechny své členy, když přijde na R&D, inovace, udržitelné praktiky, ale také velkým zdrojem inspirace pro mnoho dalších průmyslů v Itálii a v zahraničí.
Mise Habitech je změna způsobu zvažování udržitelnosti směrem ke strategickým nástrojům pro obchodní inovaci a vývoj, a vedení veřejnosti a soukromých klientů v poskytování konzultací při vysokém standardu výkonu.
Habitech propaguje a koordinuje integrované a inovativní postupy k vylepšení budov a nemovitého majetku díky specializovaným aktivitám: energetické audity, hodnocení udržitelnosti, retro provádění a dynamické modelování; spolupracuje se stavebním a výrobní průmyslem na udržitelnosti zapracované efektivním a ziskovým způsobem do celého designu, stavebních a operačních postupů.

Příspěvky do pracovních balíčků a úkoly v tomto projektu

V ARV Habitech povede demo aktivity v rámci projektu v Trento a bude úzce spolupracovat s EURAC a UNITN, především ve WP4 a WP5.

Profil klíčového personálu v projektu

[redacted] (F) pracuje v Habitech od roku 2009 a v současné době odpovídá za projekty financované z EU, kterých se Habitech účastní. Funguje jako PM aktivit a zapracovává technické kompetence kolegů tam, kde je to nezbytné, plánuje aktivity s požadovanými dostatečnými dovednostmi. Také řídí institucionální vztahy CEO, zapojuje členy Habitech do všech iniciativ, aktivit a projektů, které jsou plánovány v průběhu roku. V rámci Habitech bude řídit celý projekt. Už byla zapojena do koordinace a managementu mnoha projektů EU, zajišťovala správné provádění aktivit a aby byly v souladu se smluvními podmínkami konsorcia EC (STARDUST, OptEEmAL, INSTRUCT, atd.).

[redacted] (M) je inženýrem a od roku 2020 pracuje v Habitech jako CEO. Dříve pracoval jako technický ředitel služeb LEED, BREEAM, WELL a ARCA v rámci Habitech. Je také prvním certifikovaným LEED AP první školy LEED (zlatá úroveň) v Evropě a řídil technickou oblast několika projektů del různých systémů certifikace. Roku 2017 získal titul LEED Fellow od GBCI. Pracovní zkušenosti získal v Evropě a Spojených státech, kde stále aktivně spolupracuje s firmou v Michiganu.

[redacted] (M) je inženýr a pro Habitech pracuje od ledna 2012 v oblasti dřevěných budov. Konkrétně se řídí managementem certifikací ARCA a to jak pro nové výstavby, tak pro elevace a rozšiřování. V technickém obsahu podporuje oblast dedikovanou školení profesionálů pracujících se dřevem ARCA Akademie.

[redacted] (F) je architekt a pracuje pro Habitech od roku 2008. Je odborníkem akreditovaným LEED BD+C a od roku 2016 je držitelkou Potvrzení o školení G4 Global Reporting Initiative (GRI), což je mezinárodní standard reportingu udržitelnosti Propaguje implementaci Charrette a byla koordinátorkou komise pro standardy GBC okresu GBC, Itálie. Odpovídá za projekt „Zelená mapa“, který podporuje udržitelnost jako strategický nástroj při inovaci a vývoji, a zapojuje ekonomický řetězec, který přispívá k realizaci produktů, vždy s vědomím využití zdrojů, míst, osob a obchodních kultur.

Relevantní publikace a/nebo produkty, služby či další úspěchy

- Akční plány pro udržitelné energie (**PAES**): provincie Trento zahájila úctyhodný proces archivace objektiv, který nastavila Evropská Unie v rámci balíčku Klimatický a energetický balíček 2020. Habitech byl označen provinční agenturou APIAE (Provinční agentura pro stimulaci ekonomických aktivit) jako konzultant pto verifikaci SEAPs samostatných správních jednotek Trentino. Existuje okolo sedmdesáti PAES analyzovaných Habitech, včetně těch měst Trento, Rovereto, Pergine, Arco.
- **Odatech** je kvalifikačním a certifikačním orgánem Habitech. Toto jsou oblasti, ve kterých soustřeďuje své aktivity: kvalifikace energetických ověřovatelů v provincii Trento, certifikace dovedností v sektoru udržitelného stavebnictví a management certifikace ARCA – Ověření kvality dřevěných konstrukcí.
- **Greenmap** je program Habitech pro průmysl – výroba a služby. Podporuje udržitelnost jako strategický nástroj inovace a rozvoje. Podporuje orientaci klientů na poslání jejich podniků strukturalizací nových projektů: zahrnutí ekonomického řetězce k realizaci udržitelných produktů, povědomí o využití zdrojů, míst, osob a obchodních kultur. Aktivity, které Habitech uvádí na trh, zahrnují konkrétní cíle zákazníka na základě hodnocení produktů a analýza metod v souvislosti se zpracováním a v souvislosti s porovnáním konkurence.
- **Školící služby podporující pravidla pro udržitelnost podniků**. Volby udržitelnosti jsou často doprovázeny potřebou zvýšit povědomí mezi zaměstnanci – techniky, zástupci a prodejci, manažery, administrátory apod. - o "zelených" záležitostech, často spojeno se standardy hlavních certifikačních systémů (jako LEED a BREEAM, ARCA Akademie). Školící služba Habitech čerpá z analýzy potřeb klientů, hledá společné nástroje a metody, které jsou vhodné pro cíle, příjemce, místní a časová omezení. Habitech nabízí aktivní a zkušební metody a je zacílen na maximální zahrnutí účastníků. Zaměstnanci jsou odborníci LEED-AP, odborní znalci BREEAM, auditor BREEAM a ARCA s technickými dovednostmi.
- Smlouva o energetické náročnosti – **EPC**: Mabitech má zkušenosti s optimalizací energetické náročnosti jak individuálních budov, tak nemovitých prostor mimo dobrovolné protokoly. To jsou nezávislé aktivity energetického auditu, stejně jako účinná měření prostřednictvím aplikování smlouvy o energetické náročnosti (EPC) s podporou společnosti Energy Service Company (E.S.Co.).

Relevantní předchozí projekty

OptEEmal – H2020, 2015-2019. Partner. OptEEmAL vyvinul platformu Účinného navrhování optimalizované energie, schopné navrhnout projekty vylepšování účinnosti energií, které se zakládají na různých krocích pro úsporu energie ke zlepšení chování v oblasti. Nástrojem snížený čas dodání a nejistoty a výsledná lepší řešení ve srovnání s obvyklými obchodními praktikami. Partneři pracují na dodávání optimalizovaných, integrovaných a systémových nástrojů, založených na přístupu Dodání integrovaného projektu pro projekty zdokonalení budov a oblastí.

STARDUST – H2020, 2017-2022. Partner. Cílem STARDUST je představit nízkouhlíková, vysoce účinná, inteligentní a na občany orientovaná města. To bude prováděno díky poskytování zelených technických

řešení a inovativních obchodních modelů k adresování městských výzev, identifikovaných účastnícími se městy. Tyto výzvy se týkají životního prostředí, společnosti, mobility, energií, ekonomiky a viditelnosti měst. Stardust je nastaven na rozsvícení měst po celé Evropě vytvořením návrhu replikace, s využitím svých inovativních řešení v ICT, energiích, mobilitě a účasti občanů.

BUILD IN WOOD – H2020, 2019-2023. Partner. Cílem je vývoj udržitelného a inovativního hodnotového řetězce dřeva k výstavbě vícepodlažních dřevěných budov, k uspokojení současných globálních a evropských výzev ke snížení emisí GHG v oblasti stavebnictví. Bude vyvíjet materiály a komponenty, stejně jako strukturální systémy a prvky fasád pro vícepatrové dřevěné budovy, jak pro nové výstavby, tak pro modernizující aplikace. V rámci projektu bude dodán Průvodce designem – dynamický, spolu vytvořený online toolbox dokumentovaného materiálu a komponentů. Na konci projektu v roce 2023 budou demonstrovány provozní digitální případové projekty a testové systémy prototypů.

Vyrobeno v Itálii – Architettura della Performance – H2020, 2011-2017. Koordinátor. "Vyrobeno v Itálii – Architektura provedení“ je projekt představený Ministerstvem ekonomického rozvoje – Průmysl 2015 - týkající se objektivní oblasti "strategická supervize trhů". Habitech byl prvním přívržencem projektu a spolupracoval se 13 partnery (7 z nich jsou členy okresu - 8 soukromých společností a 5 výzkumných center).

Významná infrastruktura a/nebo technické vybavení
N/A
Provozní kapacita společnosti / partnerské organizace
N/A

UNIVERSITÀ DI TRENTO	**31. Univerzita Trento** **UNITN | IT**
Webové stránky: **www.unitn.it** **PIC** **číslo: 999841954**	**Počet zaměstnanců: 1 470** **Počet studentů: 16 868**

Krátký popis společnosti / partnerské organizace

UniTrento je dynamická univerzita střední velikosti (okolo 16,000 studentů) a nachází se v severovýchodní Itálii. Byl založen roku 1962 a neustále usiluje o zlepšení kvality výzkumu a učení a o posílení mezinárodní dimenze, propojování s kvalitními univerzitami a výzkumnými centry po celém světě, utváření jejich mezinárodních kampusů a podpora přítomnosti zahraničních hostujících profesorů, výzkumných pracovníků a studentů v Trento. Silné odhodlání v mezinárodním výzkumu a mobilních projektech zvýšilo jeho atraktivitu a pozici jak v národním, tak v mezinárodním hodnocení.

Univerzita se skládá ze 14 oddělení a center (Ekonomika&management, právo, sociologie&sociální výzkum, humanitní, psychologie&kognitivní věda, civilní enviromentální & mechanické inženýrství, průmyslové inženýrství informační inženýrství & počítačová věda, fyzika, matematika, mezinárodní studia, integrační biologie, věda o mysli/mozku, prostředí zemědělských potravin), která propagují, koordinují a řídí univerzitní výuku a výzkumné aktivity.

Široká akademická nabídka je doplněna ověřenými zkušenostmi v organizaci dvou, vícero a spojených titulů, mezinárodní magisterské a doktorandské programy, mobilita studentů a zaměstnanců, letní školy, workshopy, společné projekty sdílené s partnery již dlouhou dobu a také v rámci různých programů EU (např. Erasmus+, bilaterální programy apod.). UniTrento se také podílí na 3 EIT KICs: EIT Digital, EIT suroviny a EIT klima. Aktivity mezinárodního průzkumu zaznamenávají vysokou úroveň u výzkumných projektů 117 FP7 a 119 Horizont 2020, ze kterých 32 ERC projektů, okolo 10% mezinárodních studentů, rozsáhlá mezinárodní výměna mobility díky EU a mezinárodním programům a značný počet bilaterálních dohod s prominentními institucemi a organizacemi po celém světě.

Primárním cílem DICAM (Oddělení civilního enviromentálního a mechanického inženýrství) je rozvoj výzkumu a výuky v důležitých oblastech inženýrství a architektury. Výzkumné a výukové aktivity se rozvíjí v šesti hlavních předmětových oblastech, jsou zaměřeny na posílení individuálního a společenského blaha tam, kde jsou rozvíjeny a aplikovány. V tomto rámci se soustředí na kvalitu městského a přirozeného prostředí, posílení kvality života, bezpečnost a harmonický rozvoj společnosti prostřednictvím inovací produktů.

Práce DICAM v těchto sektorech dlouhodobě usiluje o vysokou úroveň vědeckých a výukových cílů, se vztahem k výzkumu a školení, v souladu s nejdůležitějšími výzkumně-intenzívními univerzitami. Oddělení také podporuje významné interrelace se státními orgány a soukromými společnostmi na místní, národní a mezinárodní úrovni.

Mise tohoto oddělení spočívá v následujících konkrétních cílech:

a) Propagace výzkumu v klíčových oblastech inženýrství, plánování a aplikovaných věd, jako ochrana životního prostředí, krajina, architektura, přírodní obnovitelné zdroje, energie, biomedicínské vědy, chytré struktury a materiály, prevence rizik, infrastruktury a účinné a udržitelné struktury, stavebnictví a pozemky, sociální sítě a teritorium.

b) Školení odborníků (inženýrů a architektů) a výzkumných pracovníků pro budoucí generace, schopných přispívat k ekonomickému a kulturnímu růstu společnosti, inovativním a kreativním způsobem, ve všech výše uvedených oblastech.

Příspěvky do pracovních balíčků a úkoly v tomto projektu

WP 4 Udržitelné navrhování budov: **Navrhování dřevěných konstrukcí, pasivní návrhy vytápění a chlazení, monitoring a management IEQ, LCA a analýza C2C**

WP 6 Obnovitelné energie a skladování: **Design aktivních a pasivních energetických systémů, integrace obálkovým systémem**

WP 8 Monitoring a evaluace**: IEQ a kampaně monitorující spotřebu energie, technický průzkum, POE**

Profil klíčového personálu v projektu

[redacted] (M), stavební inženýr a PhD v "Inženýrství pro stavební oživení a technologická inovace", je profesorem výstavby budov na Univerzitě Trento a vedoucím laboratoře stavebního navrhování na oddělení stavebního prostředí a mechanického inženýrství. Jeho výzkum se soustředí především na věci, které se týkají komfortu vnitřních prostor, bioklimatického designu pro využití pasivních solárních systémů u vytápění a chlazení vnitřních prostředí také s pomocí stavebních automatických systémů, dřevěné konstrukce, hodnocení enviromentálních stop budov v souvislosti s analýzou životního cyklu a udržitelností projektu na opětovné použití a recyklaci komponentů, vývoj systémů hodnocení k hodnocení udržitelných budov. Aktivně se účastní národních a mezinárodních výzkumných projektů (včetně H2020, program Leonardo da Vinci, Cost Action, Interreg Alpine Space). Je vyučujícím několika školících kurzů organizovaných profesionálními asociacemi a státními i soukromými orgány a věnuje se udržitelnosti enviromentální energie ve stavebním sektoru. Je autorem přes 135 publikací, mezi které se řadí monografie, články v odborných časopisech, konferenční řízení. Poslední mezinárodní projekty: "Účinnost energie a obnovitelné energie ve stavebním sektoru" - Evropská teritoriální spolupráce – Alpine Space (2009-2012), "Pearls – PLÁNOVÁNÍ A ZAHRNUTÍ ARÉN DO KRAJIN OBNOVITELNÝCH ENERGIÍ" (H2020-MSCA-RISE-2017),
"SHELDON – Vylepšení vnitřního prostoru bydlení: Chytré bydlení pro starší" (Cost Action CA16226)

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Relevantní předchozí projekty
• “Obnova zdí – řešení montování dřeva pro vylepšení budov”, Národní projekt, 2019- 2022 • “Plánování a zapojení arén pro obnovitelnou energii krajiny – PEARLS” – H2020- MSCA-RISE-2017, 2018-2022 • DPC-ReLUIS (síť univerzitních laboratoří seismického inženýrství) - “Seismické riziko a centrum slabých míst – WP5, Integrované vylepšení intervencí (seismické posílení a energetická účinnost) s rychlým provedením a nízkým dopadem”, 2019-2021 • “FLEXHEAT - energie Flexibility zesílených pump HEAT pro další generaci udržitelných budov”, národní projekt PRIN, 2019-202 • “Energetická účinnost a obnovitelné energie ve stavebním sektoru" - Evropská teritoriální kooperace – Alpine Space, 2009-2012
Významná infrastruktura a/nebo technické vybavení
Klimatická komora, ocelový portál pro seismickou charakteristiku dřevěných struktur
Provozní kapacita společnosti / partnerské organizace
N/A

POLITECNICO DI TORINO	**32. Politecnico of Turindi Torino** **POLITO | IT**
Webové stránky: **www.polito.it** **Číslo PIC: 999977754**	**Počet zaměstnanců: 1850** **Počet studentů: 35000**

Krátký popis společnosti / partnerské organizace

Regio Politecnico di Torino (Královská polytechnika Turín) byla jako instituce založena roku 1906, ale její původ jde mnohem dále. Roku 1859 jí předcházelo založení
Scuola di Applicazione per gli Ingegneri (Technické školy inženýrství) a roku 1862 Museo Industriale Italiano (Italského průmyslového muzea). V roce 1859 se Valentino Castle (Castello del Valentino) dostal do Technické školy inženýrství, nyní Polytechnika Turín, který ho vlastní. V průběhu let se Polytechnika Turín stala nejdůležitější výzkumnou a akademickou institucí v Itálii se stále rostoucí
komunitou. Polytechnika expandovala v listopadu 1958 ve velkém komplexu v Corso Duca degli Abruzzi a dále s Cittadella Politecnica, kde koexistují učebny, laboratoře, vzdělávání, výzkum a služby ve městě s moderním, živým a kreativním
kampusem. Polytechnika se stala s více než 150letou historií mezinárodní školou, kde tradice a budoucnost, minulost a modernost zůstávají všechny propojeny.

Oddělení strukturálního, geotechnického a stavebního inženýrství (DISEG) vede školu civilního inženýrství a stavebního inženýrství. Oddělení architektury a designu (DAD) je vedoucí pobočkou učení na Turínské polytechnice a soustředí se na umění a vědu designu, architektonické a městské budovy a design produktů a kulturního dědictví. DISEG propaguje, koordinuje a řídí základní a aplikovaný výzkum, školení, převedení technologií a služeb do místní komunity v oblasti strukturální mechaniky, strukturálního inženýrství, geotechnického inženýrství, stavební technologie, stavební výroby, nákresů a reprezentování. Naopak v DAD jsou tyto cíle okrajové s ohledem na architektonický a městský design včetně jeho udržitelnosti, ekonomických a finančních aspektů, stejně jako obnovy, posílení a managementu architektonického, městského a krajinného dědictví a průmyslového, grafického a virtuálního designu.

Příspěvky do pracovních balíčků a úkoly v tomto projektu

Polytechnika Turýn (POLITO) bude přispívat do **WP 4** při navrhování udržitelných budov studiem nejlepších možností integrace dodávání geotermálního tepla v budované čtvrti. Možnosti posazení energetických systémů v budovách bude POLITO podporovat svými odbornými znalostmi studií skutečných aplikací a proveditelnosti, jak s ohledem na BIPV (integrovaná fotovoltaika budovy), tak na energii geostruktur (základní desky a zdi i energetické tunely).
Tato aktivita se striktně vztahuje na **WP 6**, kde jsou potřeba odborné znalosti k zajišťování demonstrací schopnosti sezónního skladování přesným managementem různých výměn tepla v energetických tunelech (výměníky tepla s obložením a vrtové výměníky tepla), s realizací systému Podzemního skladování tepelné energie (UTES), kompletně napájeném z obnovitelných zdrojů.
Celá demonstrace je založena na akvizici souboru monitorujících dat, která vám umožní studovat, porozumět a kontrolovat ty nejvýznamnější parametry fungování systému jak na budově, tak na životním prostředí. Tyto aktivity budou součástí **WP 8**.
Tým POLITO bude dostupný pro některé aktivity One stop Shop s postupy digitálního zapojení, s cílem nastudovat vnímání a přijetí designu nových technologických řešení koncovými uživateli. Řešení návrhů bude napojeno oproti nákladově a časově efektivním volbám a stavebním postupům v porovnání s tradičními odkazovanými případy. Také zavede aktivity převádění znalostí a networkingu (profesionálové s odbornými znalostmi), aby tak podpořili budoucí vývoj pozitivních energetických strategií. Širší aktivity budou zahrnovat publikace o vědeckých přezkoumávaných mezinárodních časopisech, prezentace na vybraných mezinárodních konferencích a školení/letní školy pro vysokoškoláky a absolventy.

Díky bohatým zkušenostem s výukou, rozšiřováním a veřejnou debatou také POLITO zajišťuje výsledky výše uvedených aktivit, díky kterým se zviditelňuje.

Profil klíčového personálu v projektu

[redacted] (M) má Ph.D v oboru geotermální inženýrství, a je společník a profesor na polytechnice Turýn, kde učí numerické modelování v geotechnickém inženýrství magisterské studenty. Je uznávaným akademikem na místní i mezinárodní úrovni díky svým vědeckým úspěchům a díky aktivní účasti na několika aktivitách managementu. Je poradcem rektora pro sport, prezidentem ELGIP (evropské platformy velkých geotechnických laboratoří), členem rady IACMAG (mezinárodní asociace počítačových metod a postupů v geomechanice) a předseda mezinárodní konference 16th IACMAG.
Má více než 20 let zkušeností s koordinováním a účastí v národních/mezinárodních výzkumných projektech a aktivitách na Polytechnice v oblasti bobtnavého chování hornin a půdy, laboratorního testování, numerického modelování v geotechnickém inženýrství, ukončování a kombinované numerické metody, tunelování, mikro tunelování, strukturální a geotechnické monitorování, pozemní radarová interferometrie, hluboká a mělká geotermální energie, problémy stability svahu. Také získal rozsáhlé praktické zkušenosti jako konzultant při projektech v oblasti stability svahů, tunelování, systémů odpadních vod, základů, monitorování geotechnických struktur a základního průzkumu a jako odborník úřadu státního zástupce Turínu. Roku 2013 založil Resolving Srl, společnost zakládanou ve spolupráci s Polytechnikou Turín, ze které se stala plně strojírenská společnost, Geosolving srl., roku 2016.
Patentoval nový segment tunelové energie, je autorem učebnice, téměř dvou set odborných dokumentů v národních a mezinárodních časopisech o konferenčním řízení, a je editorem konferenčních jednání. Momentálně působí jako šéfredaktor Mezinárodního časopisu geomechaniky ASCE, je členem Redakční rady tunelování a technologie podzemních prostor a pracoval jako asistent redaktor pro časopisy Rock Mechanics a Rock Engineering.
[redacted] (F) Architektka, která promovala na Fakultě architektury – Polytechnika Turín, Ph.D. V oboru stavební a enviromentální obnovování, je profesorkou technologie architektury a zástupkyně vedoucího DAD (Oddělení architektury a designu, Polytechnika Turín). Profesorka technologie architektury, zástupce vedoucího na oddělení architektury a designu (DAD), Polytechnika Turín, Itálie.
Jejími hlavními oblastmi výzkumu jsou zabezpečení a valorizace krajiny, komponenty s nízkým enviromentálním dopadem a materiály pro eko výstavbu, architektonická a technologická renovace tradiční a moderní architektury. Je autorkou většího počtu publikací na tato témata.
V posledních letech se věnovala výzkumu v oblasti údržby, renovace a energetické modernizace tradičních budov s ohledem na enviromentální udržitelnost. Nedávno provedla průzkum do definice operačních průvodců pro údržbu a obnovování tradičních budov v oblasti Piedmont a byla vedoucí výzkumného projektu nazvaného “Současná architektura a krajina – mezi tradicí a inovací”, financovaného Evropskou komisí jako součást projektu Komunitní kultury 2000, kterého se účastnily 3 země – Itálie, Francie a Polsko – s pěti oblastmi práce rozdělené mezi spoluorganizátory a partnery. Je prezidentkou Krajinné observatoře v Mongioie, která je zapojena do sítě Landscaper Observatory.
[redacted] (M) má Ph.D v oboru architektura a stavební design a je profesorem společníkem v programu ‘Technologie architektury’ na Polytechnice Turín; koordinátorem úrovně 2 magisterského kurzu ‘Architektura dřevěných konstrukcí’ a zástupce vedoucího Ph.D. kurzu ‘Architektura. Historie a projekt’ na doktorandské škole Polytechniky Turín (ScuDo). Je spoluzakladatelem výzkumného centra JAM na Institutu horské architektury, která má základnu na Polytechnice Turín. Učí magisterské programy Architektonické konstrukce a město, magisterský program Architektura pro udržitelný design a rovněž diplomovaný kurz Design a vizuální komunikace.
Jeho výzkumné aktivity se soustředí na technologické inovace v architektuře a konkrétně se zajímá o převod technologií a projekty vývoje experimentální architektury, včetně

stavby většího počtu rezidencí, včetně Rifugio Carlo Mollino; budova nulových emisí, energeticky účinná a postavena dle standardů definovaných protokolem CasaClima Oro (Gold) v průběhu XXIII UIA válečného kongresu Turín 2008 jako jednoho z hlavních nekongresových projektů; Biosféra 2.0. Residenční modul v centru evropského Roadshow, s cílem odborně definovat úroveň psycho-fyzikálního blaha uživatelů v rámci rezidenční jednotky ve velmi odlišných prostředích.
Získal také široké praktické zkušenosti jako konzultant projektů průmyslového rozvoje, včetně Naturwall© a jeho výzkum je založen na vývoji projektu, který řeší design a následný vývoj komponentu fasády k dovybavení, využitém u první experimentální budovy Eco-Home v rámci certifikace projektu PEFC™.
Roku 2014 založil Be-eco for sustainable construction S.r.l., na Polytechnice Turín, společnost zakládanou ve spolupráci s VŠ, která vznikla na konci inkubačního období roku 2019. Během spoluzakládáni postavil 12 rodinných domů a navrhl biofilické budovy.
[redacted] (M), je národně vědecky kvalifikovaným profesorem Městského designu a plánování, má PhD v praktikách architektury a designu, je licencovaným architektem a vedoucím enviromentálním inženýrem a od roku 2003 výzkumným pracovníkem a vědeckým poradcem na Škole architektury a Plánování města na Polytechnice Turín. Prošel mezinárodním školením a má odborné zkušenosti v oblasti městské výstavby a prostorového plánování (C.T.H a K.T.H Švédsko). Byl oceněn evropskými vzdělávacími orgány a publikoval články o podpůrných systémech rozhodování o navrhování a postupech při tvoření scénářů. Je odborníkem na městské analýzy, které zahrnují sociologické, ekonomické, enviromentální GIS analýzy vývoje udržitelného designu, založeném v komunitě. Je konzultantem architektonických kanceláří, v soukromých společnostech a státních orgánech. Od roku 2008 odpovídá za radu pro místní krajinu a enviromentální komisi v oblasti Turína, publikoval četné odborné články a byl editorem knihy.
[redacted] (F) je výzkumná asistentka na Polytechnice Turín (Italy) od roku 2019. Získala Ph.D. V oboru civilní a enviromentální inženýrství na Polytechnice Turín a univerzitě Paris-Est in 2020, svou práci psala na téma energetické geostruktury. Je odbornicí na numerické modelování a problémy termo, hydro, mechanického členění a její současné výzkumné aktivity se týkají především GSHP a termoaktivních geostruktur. Nedávno se také zvýšil její zájem o průzkum v oblasti adaptace klimatickým změnám geoinfrastruktur, tunelování v obtížných podmínkách a lamino optického monitorování toku suti. Již dva roky také pracuje jako konzultantka u Geosolving srl., kde je aktivní v navrhování energetických geostruktur, numerickém modelování geotechnických problémů a monitorování interpretací dat. Má zkušenosti s výukou jako supervizor magisterských studentů a asistent v kurzu Numerické metody v geotechnickém inženýrství. Je autorkou několika vědeckých publikací v mezinárodních časopisech a v konferenčních řízeních.
[redacted] (M) je výzkumný asistent na Polytechnice Turín, kde získal titul Ph.D. v oboru civilní a enviromentální inženýrství, svou závěrečnou práci psal na téma management a plánování mělkých geotermálních zdrojů ve městských oblastech. Jeho hlavní kvalifikací je numerické modelování se soustředěním se na hydro-termální analýzy, hydro-geologické konceptuální modelování, zpracování GIS dat a environmentální a strukturální monitorování. Současná výzkumná činnost se zabývá především GSHP a energetickými geostrukturami. Praktické zkušenosti také získal jako konzultant u Geosolving srl při projektech navrhování energetických geostruktur, stability svahu a design struktur a infrastruktur. Vedl několik magisterských studentů, depozitoval italský patent pro modulární systém nové energetické zdi a je autorem několika vědeckých publikací v mezinárodních časopisech v konferenčních jednáních.

Relevantní publikace a/nebo produkty, služby či další úspěchy

- Insana A., Barla M. (2020). Experimentální a numerický výzkum výkonu energie termoaktivního tunelu, Obnovitelné Energie, vol. 152, pp. 781–792.
- Vývoj patentu ‘Vylepšení prefabrikovaného segmentového obložení tunelu, vybaveného k výměně tepla po zemi k vytápění a chlazení sousedících budov (ENERTUN)’, zapsaného u Ufficio Italiano Brevetti e Marchi dne 29/2/2016 a přiznaného dne 20/8/2018 na italské a evropské úrovni (číslo: 102016000020821). Vynálezci: Barla, M. (60%) and Di Donna A. (40%).

- Bottero, M., Ambrosini G., Callegari G., (2017). Hodnocení dopadu programů renovace sociálního bydlení: Aplikace a sociální návratnost investice (SROI), Zelená energie a technologie, pp. 291-302, ISBN: 9783319496757.
- Fregonara E., Lo Verso V., Lisa M., Callegari G. (2017). Scénáře dovybavení a ekonomické udržitelnosti. Případová studie v kontextu Itálie. Energy Procedia, pp. 245-255, ISSN: 1876-6102.
- Vývoj patentu 'Účinné multifunkční energetické fasádní systémy', který se nachází v Ufficio Italiano Brevetti e Marchi, ze dne 24/11/2014 a přiznanému dne 15/2/2017 at na italské a evropské úrovni (číslo: 102014902311769). Vynálezci: Callegari, G. (50%), Spinelli A. (45%) and Miroglio M. (5%).

Relevantní předchozí projekty

- **ENERTUN**: Le gallerie metropolitane come fonte di energia geotermica/Metro tunely jako zdroje geotermální energie. Studie proveditelnosti financovaná Regione Piemonte (Polo di Innovazione Regionale Enermhy) ve spolupráci s Desa Srl, Turýn. 2014-2015 (12 měsíců). Financování: 57.000€
- **GEOTHERMSKIN**: Sistema energetico contro terra e metodo per scambiare calore tramite tale sistema. Prokázání konceptní studie financované Links Foundation 2020-2021 (6 měsíců). Financování: 43.000€.
- Poradenská smlouva "**Studie integrace nízkoteplotního vytápění z energetických tunelů v oblasti vytápěcích systémů**", financované ze Iren SpA, 38.000 €.
- **OPTISOUNDWOOD.** Vyvíjení, experimentování a realizace na industriální škále nových panelů a kompozit založených na překližce, vyrobené z regionálního dřeva. Studie proveditelnosti financovaná Regione Piemonte (PSR je spolufinancováno evropským zemědělským fonem pro rozvoj venkova) ve spolupráci s Be-eco pro udržitelnou výstavbu S.r.l. 2010–2013 (18 měsíců). Financování: 60.000 €.
- **ECO WOOD SKIN** – Environment Carbon Offset Wall for Retrofit. Vyvinutí modelu, kterým se vytvoří řetězec renovace budovy, nástroje k progresívní dekarbonizaci rezidenčního sektoru, s využitím environmentálně přátelských produktů ve formě vysoké výkonnosti komponentů budovy k energetické obnově. Studie proveditelnosti financovaná Regione Piemonte (PSR je spolufinancováno evropským zemědělským fondem pro rozvoj venkova) ve spolupráci s Be-eco pro udržitelnou výstavbu S.r.l. 2017- -2018 (12 měsíců). Financování: 35.000 €.

Významná infrastruktura a/nebo technické vybavení

POLITO získalo široké zkušenosti v oblasti designu a managementu energetických geostruktur díky vývoji dvou různých experimentálních stránek ve významném prostředí.
První realizace odkazuje na instalaci dvou kompletních prstenců segmentovaného obložení energetického tunelu ENERTUN v jižní přístavbě linky 1 turínského metra. Prototyp měl nejdříve testovat technologie pouze v průběhu fáze výstavby infrastruktury. Díky svým skvělým výsledkům se tento systém začal využívat trvale.
Pozdější realizace odkazuje na instalaci tří modulů energie stěnového systému GeothermSkin v budově energetického výzkumného centra v Turínu. V experimentálních prostorech se měla testovat technologie a nyní se rozšiřují o integraci různých zdrojů obnovitelné energie, jako je např. solární energie, k poskytování celkového řešení energetických potřeb budov.

Provozní kapacita společnosti / partnerské organizace

Administrativní prostory POLITO mají zkušenosti s řízením velkých projektových týmů na mezinárodní (evropské a neevropské) a národní úrovni.
Organizace má přes 20 let zkušeností s evropskými projekty, pracuje se státními úřady na postupech pro udržitelný rozvoj, městské návrhy, návrhy infrastruktury a na enviromentálních projektech. Tým se také podílel na projektech financovaných z Life ("TiRec4life" který podporoval řešení PA opětovného použití gumy při vývoji nového eko silničního

chodníku), projekty Interreg (Alcotra-"Co&Go“ který podporoval PA v plánování pobídek na zvýšení udržitelné mobility), projekty H2020 ("STEVE“ který podporoval evropská města při definování politik pro e-maas) a také spolupráce na akčních projektech COST (GABI TU1405 – Geotermální aplikace v budovách a infrastrukturách).

	33. Oslobygg KF **OBF | NO**
	Webové stránky: *(Ještě není webová stránka)* **Číslo PIC:** 994216051 — **Počet zaměstnanců:** 174 nviron. 600

Krátký popis společnosti / partnerské organizace

Oslobygg KF je obecní podnik, který spadá pod kategorii Oddělení města pro průmysl a vlastnictví. Jsme jedni z největších majetkových manažerů v zemi s téměř 3 mil. Metry čtverečné v portfoliu, které je složeno ze škol, mateřských škol, sportovních hal, knihoven, kulturních budov, nemocnic, požárních stanic, sociálního bydlení, domovů s pečovatelskou službou a dalších obecních prostor.

Naše organizace má 174 nviron. 600 zaměstnanců, mezi které se většinou řadí stavební inženýři a developeři, manažeři majetku, operátoři a poradci.

Příspěvky do pracovních balíčků a úkoly v tomto projektu

Bodil Motzke je spojnicí mezi norským demonstračním projektem a projektem koordinace EU, a účastní se v síti EU společně s Romeo Apetrei Thomassen, který má předchozí zkušenosti s podobnými projekty EU.

WP 1 Management: Projektový management, vedení zkušebního zařízení

WP 2 struktura efektivního plánování, designu, výstavby a provozování CPCC: výpočet klimatických emisí a dalších 174nvironmentálních subjektů, měření energií, ekonomie, LCC-analýza, právo, fáze brzkého navrhování projektu, sociální udržitelnost.

WP 3 Komunita, životní prostředí a blaho: fáze navrhování projektu, sociální udržitelnost.

WP 4 Návrhy udržitelných budov: opatření, ekonomika, LCC-analýzy,

WP 5 Zdroje využívající výroba a výrobní postupy: ekonomie, projektový management

WP 6 obnovitelné energie a ukládání: měření energií, výroba obnovitelné energie

WP 7 Efektivní postupy a flexibilita: měření energií, výroba obnovitelné energie

WP 8 Monitoring a evaluace: výpočet klimatických emisí a dalších 174 enviromentálních subjektů, vnitřní klima a emise z prostoru budovy

WP 9 Zavádění na trh: ekonomie a právo

WP 10 Komunikace, rozšiřování a školení: management zařízení

Profil klíčového personálu v projektu

[redacted] (M)
E-mail: [redacted]
Mob.: [redacted]

[redacted] získal MBA ve Vedení a udržitelné ekonomice a dva Bc tituly v oborech Obchodní ekonomika a Inženýrství udržitelnosti. Má 15 let zkušeností s životním prostředím, energetickou účinností a inovací, jeho rolí je posílit spolupráci na trhu s inovačními segmenty.
Je klíčovou osobou v několika projektech Horizon 2020 na různá témata, všechny ale souvisí se strategickými enviromentálními góly pro vládu města Oslo.

[redacted] (F)
E-mail: [redacted]
Mob.: [redacted]

[redacted] je stavebním inženýrem v oblasti energií a enviromentální vědy. Má dlouholeté zkušenosti v oblasti enviromentálních záležitostí ve stavebním sektoru a také odpovídá za strategickou práci a enviromentální řídící systémy. Má hluboké znalosti LCA, energetické účinnosti a obnovitelných řešení a cirkulární stavební materiály.

Relevantní publikace a/nebo produkty, služby či další úspěchy

Zkušenosti s iniciací a účastí v několika vědeckých a inovativních projektech, s několika hráči na trhu. Díky této spolupráci bylo publikováno několik publikací. Poskytujeme škálu odborných znalostí, pilotní projekty a impresivní projektové portfolio.

Relevantní předchozí projekty

Prostory budov s nulovými emisemi EU spolupráce velkých kupujících
Tento projekt je společnou snahou mnoha evropských měst o spojení sil, výměnu znalostí a posilování práce na pořizování zeleně. Hlavním cílem je dosáhnout dekarbonizace i přes snahu se distancovat od využívání strojů poháněných fosilními palivy a změnu profilu na bezemisní.

Pilotní -E projekt (2018 – 2020)
Tento Pilotní-E projektový exkavátor bez emisí bude vyvíjet, navrhovat, produkovat, testovat a zavádět do provozu prototyp bezpásového exkavátoru ve třídě 25 tun.

FME SUSOLTECH (2017 -2024)
FME SUSOLTECH dává přístup odborníkům světové třídy, kapacitě laboratorní infrastruktury a výroby společně s celým řetězcem hodnot jak pro systémy solární energie na bázi krystalického silikonu, tak také systémy solární energie.

Uživateli řízený program inovativní arény (BIA) – opětovné použití betonu (2019-2023)
Společenské výzvy související s udržitelností, včetně cirkulární ekonomiky s fokusem na nulové / nízké emise a recyklaci jsou pro výzkumnou radu profesionální prioritou. Klíčové informace Opětovné použití betonu s fokusem na šestimocný chrom. Hlavním cílem projektu je zvýšení recyklace různých typů odpadu díky seznámení se s novými metodami, jak vylepšit fyzikální a chemické vlastnosti materiálů, které mohou být upotřebeny.

Výstavba integrované fotovoltaiky pro Norsko (BIPV Norsko) (2018 – 2021)
Projekt BIPV je projektem R&D. BIPV je dnes jen malým segmentem trhu v Norsku a znalosti a odborné dovednosti v této oblasti chybí. Účelem projektu BIPV je shromáždit nezbytné znalosti ve všech částech hodnotového řetězce, od výrobců produktů BIPV, zhotovitelů, konzultantů, architektů až po vlastníky budov a po celou cestu výzkumu komunity.

Významná infrastruktura a/nebo technické vybavení
N/A
Provozní kapacita společnosti / partnerské organizace
OsloBygg KF má několik oddělení, jejichž aktivity jsou v souladu s aktivitami tohoto projektu. Podíl zaměstnanců a poradců jiných oddělení se bude zvažovat v případě nutnosti, podle množství práce při plnění jednotlivých úkolů, kterých se OsloBygg účastní. To k zabránění disrupcí a zpoždění vývoje projektu.

NANO POWER	**34. Nano Power** **NANO | CZ**	
	Webová stránka: www.nanopower.eu **Číslo PIC: 892082714**	**Počet zaměstnanců: 10** **Počet studentů: 1**

Krátký popis společnosti / partnerské organizace

Integrátor přepravních balení baterií a systémů skladování energie a dedikovaný distributor baterií Altairnano a Yinlong LTO v Evropě.

Příspěvky do pracovních balíčků a úkoly v tomto projektu

WP 6 Obnovitelné energie a skladování

- Potenciální opětovné využití baterií
- Optimalizace výkonu baterie vs. velikost baterie s cílem optimalizace nákladů
- Potenciální snížení pevných energetických nákladů

Profil klíčového personálu v projektu

[redacted] (M)

- CEO, zakladatel
- Zkušenosti na trhu se skladováním energie (systémy baterií různých velikostí a technologií) a obnovitelnými zdroji, zkušenosti s tvořením řešení na míru

[redacted]. (M)

- Manažer projektu
- Zkušený inovátor & designer s prokazatelnou historií práce v automobilním & železničním průmyslu. Se schopnostmi v inženýrství, zákaznickém servise, prodeji, kontinuálním zlepšování a projektovém managementu. Silný a podnikavý profesionál s titulem ´doktor filosofie´ (Ph.D.), který se soustředí na inovativní řešení z České technické univerzity v Praze.

[redacted] (M)

- Elektrikář
- Zkušenosti s testováním, instalací s službami (nejen) systémů baterií

[redacted] (F)

- Manažer prodeje
- Zkušenosti s prodejem (stacionární) skladování elektřiny a trhu s obnovitelnými energiemi

[redacted] (M)

- Inženýr mechanického designu, student
- Zkušenosti se studentskými projekty z Technické univerzity Glassgow, účastníkem při vývoji produktu dobíjecích titanových baterií rapid

[redacted] (M)

- Manažer správy
- Administrativní podpora

Relevantní publikace a/nebo produkty, služby či další úspěchy
1. https://nanopower.eu/en/emergency-charging-not-only-for-electric-cars/ 2. https://nanopower.eu/en/the-whitelee-wind-farm-and-its-battery/ 3. https://nanopower.eu/en/the-potential-of-a-domestic-photovoltaic-power-plant-for-charging-an-electric-car/ 4. https://nanopower.eu/en/battery-life/ 5. https://nanopower.eu/en/conference-smart-city-in-practice-battery-technologies-for-urban-mobility-and-energy/
Relevantní předchozí projekty
1. Dodávání 102 kWh LiFePO4 úložného systému energie baterie ke spojení fotovoltaické elektrárny, Polsko 2. Dodávání 82 kWh LTO baterie pro systém uchování energie, projekt “druhý život baterií” vytvořený z baterií, které již nefungují
Významná infrastruktura a/nebo technické vybavení
Komponenty baterií (kabely, bms, struktury, moduly, kontrolky), instalace: napájení, nabíjení, tester baterie, multimetr, běžné nástroje k zajištění dopravení baterie na místo
Provozní kapacita společnosti / partnerské organizace
N/A

AIGUASOL	**35. AIGUASOL** **AIGUA | ES**	
	Webové stránky: **www.aiguasol.coop** **Číslo PIC: 995438057**	**Počet zaměstnanců: 19**

Krátký popis společnosti / partnerské organizace

AIGUASOL je španělská SME působící v oblasti inženýrství, poradenství a výzkumných služeb, propagující inovativní řešení k redukci dopadu v souvislosti s využíváním energie. Funguje jako pracovní družstvo, s horizontální strukturou práce za aktivní účasti managementu; AIGUASOL se věnuje transformaci organizace a soustředí se na sociální odpovědnost, inovace, školení a kvalitu. AIGUASOL kombinuje vědecké znalosti, praktické zkušenosti a manažerské dovednosti, které jsou nezbytné k úspěšnému dosažení cílů projektu. Největším podílem AIGUASOL do projektu je navíc všestranný přístup, který integruje inženýrství, poradenství a výzkum.

AIGUASOL byl založen roku 1999 a působí v oblasti inženýrství, poradenství a výzkumných služeb, propagující inovativní řešení k redukci dopadu v souvislosti s využíváním energie. Funguje jako pracovní družstvo, s horizontální strukturou práce za aktivní účasti managementu; AIGUASOL se věnuje transformaci organizace a soustředí se na sociální odpovědnost, inovace, školení a kvalitu. Tým AIGUASOL se skládá z devadesáti vědeckých a technických profesionálů na vysoké úrovni, včetně PhD odborníků, inženýrů a fyziků, kteří mají spoustu zkušeností v energetickém sektoru, jak v soukromých společnostech, tak ve výzkumných centrech.

AIGUASOL má rozsáhlé zkušenosti v několika oblastech: inženýrství a integrace konceptu energií (obnovitelné, tepelné pumpy, management odpadu apod) do pokročilých aplikovaných systémů; modelování, design, monitoring a kontrola zakázkových řešení energií; a komercializace energetických systémů ze stadia demonstrování ke skutečnému operačnímu prostředí. Schopnost AIGUASOL efektivně pracovat na projektu se zakládá na dlouholetých zkušenostech svých členů s koordinací evropských projektů (POSHIP) a s vedením pracovních balíčků v FP7 a v projektech Horizon2020.

AIGUASOL má rozsáhlé zkušenosti jak v projektech bioenergetického inženýrství, tak v nástrojích digitalizace, především s těmi, které se vztahují k poskytování energetických služeb, včetně vytváření Společnosti energetických služeb (ESCO) jako start-up.

V nedávnější době AIGUASOL propracoval španělského průvodce k propagaci občanských energetických komunit, propagován španělským Institutem energetické diverzifikace a úspor (IDAE).

Příspěvky do pracovních balíčků a úkoly v tomto projektu

V ARV, AIGUASOL se účastní především WP2 a WP4, soustředí se na využití testovacích nástrojů k implementaci CPCCs a integrovaný cirkulární design ve španělském demo projektu.

Profil klíčového personálu v projektu

[redacted] (M), mechanický inženýr a ekonom, senior odborník – od r. 2006 řídí projekty ve AIGUASOL v oblastech, které se vztahují k modelování energetického systému, solární termální energii, solárnímu chlazení, obvodní sítě, energetická účinnost a kogenerace. Účastnil se úkolu TASK 25 a TASK 38 v rámci programu IEA Solárního vytápění&chlazení. Řídil projekty EU PV-SALSA, H-SAPS a PV-DOMSYS. Koordinoval evropské projekty Indus3Es, CRESMED, POSHIP, ST-ESCOS, SAHC, a technicky přispíval do projektu HIGH-COMBI.

[redacted] (M), PhD v oboru Udržitelnost, odborník senior – od r. 2019 vede jako projektový vedoucí několik inženýrských a R&D projektů, které se vztahují ke generacím energie na bázi RE a distribuci, jak bez rozvodné sítě, tak v ní. Podílel se na četných místních, národních a mezinárodních projektech zaměřených na design integrovaných řešení energií na základě plánů udržitelnosti od technických, sociálních, regulačních, organizačních a ekonomických aspektů pro státní, soukromé a multilaterální klienty. Na technologické úrovni se specializuje na fotovoltaiku (autonomní, připojené do sítě, samo spotřeba), biomasu (termální, elektrickou, polygenerační) a řešení elektrické mikro sítě.

[redacted] (F): odborník na kritéria kvality vzduchu a bioklima. Olga zasvětila celou svou kariéru vylepšování prostoru, provádí audity kvality vzduchu a vyvíjí projekty podle standardů WELL. V současné době vede projekt rozšiřování WP Nanosens, který se věnuje vývoji vzduchových kvalitních senzorů za nízkou cenu. Vyvinula také metodologii bez COID pro skupinu Ferrer v Kalifornii.

Relevantní publikace a/nebo produkty, služby či další úspěchy

- González, A., Riba, J. a Rius, A. (2016). Kombinovaný tepelný a energetický návrh, založený na enviromentálních kritériích a nákladech. Energie, 116, pp.922-932.
- González, A., Riba, J. a Rius, A. (2015). Optimální formátování energetického systému hybridní sítě-připojené fotovoltaiky-křídla-biomasy. Udržitelnost, 7(9), pp.12787-12806.
- Carrera, A., Cámara, O., Casanova, M., Farré, M. and Serra, I. (2011). Nové metody kalkulace pro solární termální systémy. ISES Solární světový kongres 2011, Kassel (Německo)
- Arranz, P., Bellot, O., Gavaldà, O., Kemausuor, F. a Velo, E. (2016). Trigenerace založená na biomase. Konkrétní oblastní případ: zemědělská rezidua drobných zemědělců v Ghaně. Energy Procedia, 93, pp.146-153.

Relevantní předchozí projekty

INTEGRIDY - cílem inteGRIDy je integrace vyspělých technologií, řešení a mechanismů na rozšiřovatelné multifunkční platformě propojující energetické sítě s různými zainteresovanými, což usnadní optimální dynamické fungování distribuční sítě (DG), s podporou stability a koordinace distribuovaných zdrojů energie a umožňující společné vytváření schémat skladování při zvýšeném podílu obnovitelných zdrojů. AIGUASOL vyvíjí termo-elektrické modely k evaluaci různých nastavených měřítek a bude navrhovat plán monitorování a integrace v rámci existujícího systému SCADA a inženýrství, pověřování a další navazování (IPMVP).

INDUS3ES – cílem projektu Indus3Es je obnovení a revalvace neobjeveného nízkoenergetického nadbytečného tepla v průmyslových procesech s vysokou spotřebou energie využitím technologie transformace absorbovaného tepla (AHT). Indus3Es systém upgraduje proud přebytečného tepla nízké teploty na proces přetváření při vysoké teplotě a poté je využije v interním průmyslovém procesu, čímž se sníží spotřeba energie v průmyslu. AIGUASOL vede strojírenské navrhování integračních infrastruktur AHT v pilotních prostorech, monitoruje a kontroluje systém, přepravu dat a vývoj webového nástroje k analýze proveditelnosti řešení AHT

HOUSEFUL – HOUSEFUL navrhuje inovativní posun paradigmat směrem k cirkulární ekonomice pro bytový sektor. Hlavním cílem je vývoj a demonstrování integrované systémové služby (HOUSEFUL Servis), která je složena z 11 cirkulárních řešení spoluvytvářených zainteresovanými stranami v současném bytovém hodnotovém řetězci. HOUSEFUL Servis bude usilovat o cirkulární management a efektivní využití vody, odpadu, energie a materiálních zdrojů ve všech stadiích evropského stavebního cyklu. AIGUASOL drží vedení WP. Mezi nejdůležitější úkoly patří: vývoj na míru šité metodologie stavební cirkulace a optimalizace systémů pasívní a aktivní energie implementace demo případů, monitoring řešení návrhu a obchodního modelování a vývoj strategií využívání, dále detailní inženýrství konečných řešení.

PLUG-N-HARVEST – systémy odebírání aktivní a pasivní multi-modální energie, cirkulační ekonomika designem, s vysokou schopností reprodukce u soběstačných obvodů & budov téměř na nule. AIGUASOL bude přispívat definováním hraničních podmínek ve vztahu k vzorcům konečných uživatelů, a celkovému energetickému chování budov, zváží také implementaci nových moderních a chytrých fasád a kontrolou a managementem systémových řešení podle obchodních modelů cirkulační ekonomiky. AIGUASOL drží dvě vedení WP. Mezi nejrelevantnější úkoly patří: definování koncových uživatelů projektu a obchodních požadavků, vývoj LCA/LCC vyvinutých produktů a

tvorba inovativních obchodních modelů na CE bázi (jako platba za službu (PPS), platba za výkon (PPP), pro ESCO). **Montjuic projekt**: detailní návrh pro všechny instalace pro Montjuic Castle v Barceloně, včetně HVAC, elektřiny, sanitace a požární ochrany.
Významná infrastruktura a/nebo technické vybavení
N/A
Provozní kapacita společnosti / partnerské organizace
N/A

4.2. Třetí strany účastnící se projektu (včetně využití zdrojů třetích stran)

NTNU, ACE, CVUT, DTU, DANFOSS, EURAC, SINTEF, MET, UAS Utrecht, HOUSING EUROPE, Buro de Haan, Centrum Dánsko, SAB, GDFA, UU, BOSGROEP, iWELL, MEX, KARV, DOL, UNITN, POLITO, OBF, NANO, AIGUASOL: Neúčastní se žádné třetí strany. Pro informace o dalších účastnících se podívejte do následující tabulky:

Beneficienti musí zakládat své smlouvy/subdodavatelské smlouvy na postupech optimalizace zdrojů a absence střetu zájmů, dle článku 10 a 13 AMGA. Beneficienti, kteří jsou 'veřejnými zadavateli' nebo 'zadavateli' (ve významu vyhlášek o veřejných zakázkách EU 2004/18/EC a 2004/17/EC nebo jakékoliv legislativy EU, která nahrazuje tyto vyhlášky) musí dodržovat relevantní zákony dané země o veřejných zakázkách.

ENFOR

Plánuje účastník dále smluvně upravit některé úkoly (vezměte na vědomí, že hlavní úkoly projektu by neměly řešeny dalšími dílčími smlouvami)	A
Celková částka subdodavatele: €30 000 *Budeme potřebovat pomoc konzultanta IT ohledně bezpečnostních opatření IT a integrace dat bezpečnou formou (autentizace, enkrypce) a aplikace relevantních mechanismů k zabezpečení a převodu dat. To také zahrnuje integrační práci SCADA a PCL. Protože cena přidělená IT integračním službám – především bezpečnostním opatřením – největší část se utratí za T7.4, ale budou se muset provést úpravy a změny služeb, aby se pomohlo dalším úkolům a na podporu práce v T6.2, T6.3, T6.4 , T6.6, T7.2, T7.6.* *Subdodavatel t.b.d. Subdodavatelské smlouvy se zakládají na postupech optimalizace zdrojů a absence střetu zájmů, dle článku 10 a 13 AMGA.*	
Je představa účastníka taková, že část práce budou provádět připojené třetí strany [55]	N
Má účastník v úmyslu využít příspěvky poskytované třetími stranami (článek 11 a 12 obecné Modelové dohody o grantu).	N
Je představa účastníka taková, že část práce budou provádět mezinárodní partneři [56] (článek 14a Modelové dohody o grantu)?	N

PROJECTZERO

Plánuje účastník dále smluvně upravit některé úkoly (vezměte na vědomí, že hlavní úkoly projektu by neměly být dále smluvně přidělovány/	A

[55] Třetí strana, která je přidruženým subjektem nebo je právně spojena s účastníkem, implikuje spolupráci neomezenou na úkoly. (článek 14 Modelové dohody o grantu).

[56] 'Mezinárodní partner' je právnická osoba založená v zemi, která není členem EU, která není oprávněna čerpat finance dle článku 10 Nařízení o pravidlech účasti č. 1290/2013.

Celková částka subdodavatele: €20 000 *Plánování školících workshopů a školících seminářů bude předmětem zadání subdodavateli, protože partner PROJECTZERO nemá pro tyto aktivity dostatečnou kvalifikaci. Subkontraktor bude přispívat do plánovaných technických workshopů a školících seminářů. Subkontraktor musí mít bohaté zkušenosti s plánováním a vedením školících akcí pro technické stavební společnosti. Subdodavatel bude pracovat ve WP10: Komunikace. Úkol 10.2 a úkol 10.4.* *Subdodavatel t.b.d. Subdodavatelské smlouvy se zakládají na postupech optimalizace zdrojů a absence střetu zájmů, dle článku 10 a 13 AMGA.*

Je představa účastníka taková, že část práce budou provádět připojené třetí strany	N
Má účastník v úmyslu využít příspěvky poskytované třetími stranami (článek 11 a 12 obecné Modelové dohody o grantu).	N
Je představa účastníka taková, že část práce budou provádět mezinárodní partneři (článek 14a Modelové dohody o grantu)?	N

PALMA

Plánuje účastník některé úkoly řešit další smlouvou (vezměte na vědomí, že hlavní úkoly projektu by neměly být dále smluvně přidělovány/	A

Celková částka subdodavatele: €130 000

(1) Soukromá společnost odpovědná za management a koordinaci požadavku rozsáhlého procesu renovace agregátní budovy v obchodním modelu Partnerství soukromého a veřejného sektoru (PPP), který bude demonstrován v Palma de Mallorca (úkol 3.3), který se podílí na renovaci 250 bytových jednotek (400€/bytová jednotka). Služby / dílčí smlouvy budou podléhat následujícím právním nařízením a budou se řídit principy optimalizace nákladů, vyhýbat se jakémukoliv střetu zájmů, protože PALMA nemá žádné interní zdroje se všemi potřebnými kompetencemi. To je klíčovou rolí obchodního modelu ke zrychlení modernizace městského obvodu, kterou nemůže realizovat partner státního sektoru (PALMA) v konsorciu, kde bude testován PPP model jako jedna z hlavních inovací. Partnerem konsorcia je městský úřad města Palma de Mallorca /státní část PPP modelu/ a strana ze soukromého sektoru bude vybrána v souladu s právními nařízeními aplikovanými státními orgány. Odhadovaný rozpočet na tento úkol je 100.000 €.

(2) Online platforma pro P2P management, systém monitorování a vizualizace toku energie mezi PV instalací(-cemi) a členy Citizen Energy Community (CEC), včetně komunikace. Služby / dílčí smlouvy budou podléhat následujícím právním nařízením a budou se řídit principy optimalizace nákladů, vyhýbat se jakémukoliv střetu zájmů, a budou umožňovat správnou implementaci P2P CEC /úkol 7.5 a 8.3/. Odhadovaný rozpočet na tento úkol je 30.000 €.

Subdodavatel t.b.d. Subdodavatelské smlouvy se zakládají na postupech optimalizace zdrojů a absence střetu zájmů, dle článku 10 a 13 AMGA.

Je představa účastníka taková, že část práce budou provádět připojené třetí strany	N
Plánuje účastník využít příspěvky způsobem poskytovaným třetími stranami (článek 11 a 12 všeobecné modelové dohody o grantu)	N
Je představa účastníka taková, že část práce budou provádět mezinárodní partneři (článek 14a Modelové dohody o grantu)?	N

IBAVI

Plánuje účastník některé úkoly řešit další smlouvou (vezměte na vědomí, že hlavní úkoly projektu by neměly být dále smluvně přidělovány/	A

Celková částka subdodavatele: €229 172.97

Vedoucí tým projektu (architekti, inženýři a stavební znalci), autor projektu demo budovy (35 domovů k pronajmutí pod státní ochranou (PPH), které se nachází na ulicích Tous a Fornaris, La Soledad, Palma de Mallorca).

Projekt byl vybrán jako nejlepší návrh na základě udržitelnosti, architektonické kvality a technické ekonomiky a konstruktivní proveditelnosti porotou v transparentním a nediskriminačním výběrovém řízení. Soutěžní výběrové řízení bylo publikováno jako dodatek k oficiálnímu časopisu Evropské Unie: https://ted.europa.eu/udl?uri=TED:NOTICE:171861-2020:TEXT:EN:HTML&tabId=1.

Cena subdodávek zvažovaná partnerem IBAVI zahrnuje poplatky za techniky ke kontrole a supervizi stavebních prací experimentální a inovativní budovy, a také adaptaci projektu tak, aby plnil další cíle, které jsou uvedeny v návrhu projektu ARV (úkol 4.4, úkol 5.3, úkol 5.4 -podúkol 5.4.2, úkol 8.2 – podúkol 8.2.1 a 8.2.2).
V současné době jsou funkce zaměstnanců technického oddělení IBAVI řízení a koordinace více než 40 projektů modernizace obecního bydlení s více než 900 bytovými jednotkami na Baleárských ostrovech, takže vnitřní postupy pro dosažení strategických cílů vyžadují využití práce dalších externích týmů k přípravě většiny architektonických projektů a řízení stavebních prací budov obecního bydlení. Tyto týmy jsou vždy vybírány v souladu s právními nařízeními, týkajícími se právních orgánů.

Management stavebních prací zabere 15 měsíců a bude probíhat ve stejnou dobu jako stavební práce. Náklady zahrnují veškeré cestovné a spojené denní příspěvky a byly vypočítány následujícím způsobem:

PRÁCE MANAGEMENTU	VÝDAJ (15 MĚSÍCŮ)	VÝDAJ ZA MĚSÍC
PROJEKTOVÝ MANAGER - ARCHITEKT	110.703,66 €	7.380,24 €
STAVEBNÍ MANAGER - PRŮZKUMNÍK	83.027,75 €	5.535,18 €
KOORDINACE BOZP		
INSPEKTOR	19.171,20 €	1.278,08 €
TELEKOMUNIKAČNÍ MANAGER - INŽENÝR	2.100,00 €	140,00 €
MANAGER PARKOVACÍCH AKTIVIT	3.100,00 €	206,67 €
STROJÍRENSKÝ MANAGER	11.070,37 €	738,02 €
CELKOVÉ VÝDAJE ZA PRÁCI MANAGEME	**229.172,97 €**	**15.278 €**

Subdodavatel t.b.d. Subdodavatelské smlouvy se zakládají na postupech optimalizace zdrojů a absence střetu zájmů, dle článku 10 a 13 AMGA.

Je představa účastníka taková, že část práce budou provádět připojené třetí strany [57]	N
Plánuje účastník využít příspěvky způsobem poskytovaným třetími stranami (článek 11 a 12 všeobecné modelové dohody o grantu)	N

[57] Třetí strana, která je přidruženým subjektem nebo je právně spojena s účastníkem, implikuje spolupráci neomezenou na úkoly. (článek 14 Modelové dohody o grantu).

Má účastník v plánu, že část práce bude prováděna mezinárodními partnery[58] (článek 14a obecné modelové dohody o grantu)?	N

IREC

Plánuje účastník dále smluvně upravit některé úkoly (vezměte na vědomí, že hlavní úkoly projektu by neměly být dále smluvně přidělovány/	A
Celková částka subdodavatele: €40 000 *Programovací úkoly pro model 3D oblast Virtuální reality (VR) s nereálným pohonem pro demo v Palma de Mallorca (úkol 2.5). Programování specializované společnosti s Nereálným pohonem je k provedení této práce nutné, budou generovány zážitky interaktivní vizualizace a integrovány výsledky z energetických nástrojů. Tyto konkrétní vědomosti nejsou dostupné v konsorciu.* *Služby / dílčí smlouvy budou podléhat následujícím právním nařízením a budou se řídit principy optimalizace nákladů, vyhýbat se jakémukoliv střetu zájmů.* *Subdodavatel t.b.d. Subdodavatelské smlouvy se zakládají na postupech optimalizace zdrojů a absence střetu zájmů, dle článku 10 a 13 AMGA.*	
Je představa účastníka taková, že část práce budou provádět připojené třetí strany	N
Plánuje účastník využít příspěvky způsobem poskytovaným třetími stranami (článek 11 a 12 všeobecné modelové dohody o grantu)	N
Je představa účastníka taková, že část práce budou provádět mezinárodní partneři (článek 14a Modelové dohody o grantu)?	N

[58] 'Mezinárodní partner' je právnická osoba založená v zemi, která není členem EU, která není oprávněna čerpat finance dle článku 10 Nařízení o pravidlech účasti č. 1290/2013.

BOEX

Plánuje účastník dále smluvně upravit některé úkoly (vezměte na vědomí, že hlavní úkoly projektu by neměly být dále smluvně přidělovány/	A

Subdodavatelé celkem: 170 000 EUR

1. *37 500 EUR (očekávané výdaje): Kampaně pro komunitní výstavbu laboratoře Utrecht Living Lab zapojením místních agentů pro změny v souvislosti s úkolem 3.3. Utrechtská oblast Overvecht-Noord a Kanaleneiland má aktivní místní komunitní skupiny, které mají rozsáhlé odborné zkušenosti s převody energie a zapojením občanů a dalších subjektů. Tito členové komunity slouží jako nezávislí ´výměnní agenti´ v místní komunitě, protože nejsou napojeni na jednoho z institučních partnerů, jako je třeba korporace pro sociální bydlení Bo-Ex nebo obec Utrecht. Projekt ARV začlení, spolu vytvoří a umožní místním rezidentům a nájemníkům najmutím/díky smluvním členům a místním skupinám komunity řídit, expandovat a obohatit aktivity ARV kolem převodu energií a vybudovat komunitu, která bude dále fungovat i po skončení projektu. Plánovány budou následující aktivity:*
   - *Organizace a spoluvytváření sezení s místními rezidenty, nájemníky a členy komunity společně s ARV partnery /najmutí školitele/*
   - *Koordinace organizace kampaní kolem místního převádění energie (organizace/podpora zapojení pro korporaci sociálního bydlení Bo-Ex)*
   - *Implementace této dílčí smlouvy ve spolupráci mezi dvěma zapojenými korporacemi sociálního bydlení Bo-Ex, Mitros. Rozpočet se dělí mezi oba partnery, protože každá bytová korporace má ve své oblasti vlastní podkomunitu.*
   - *Struktura výdajů: očekává se, že bude organizováno 6 kampaní s celkovým rozpočtem 6 250 EUR, každá bude implementována jedním agentem změny v oblasti.*
2. *37 500 EUR (očekávané výdaje): Energetický koučink pro nájemníky modernizovaných budov Bo-Ex za účelem snížení energetické chudoby, s odkazem na úkol 3.3. V rámci projektu ARV budou koučováni nájemníci modernizovaných budov, aby udržitelně snížili spotřebu energie a jejich účet za energii a bude jin poskytováno energetické poradenství. Pro projekt ARV budou najati energetičtí kouči z místní komunity a místních společností /studentů/. Energetičtí kouči mají odborné znalosti o postupech pro snižování spotřeby energie a znalosti inkorporace chytrých výstupů do možných stanovisek. Konkrétní odborné znalosti interakce nájemníků v kombinaci s didaktickými zkušenostmi práce s lidmi z dané oblasti nemá partner projektu k dispozici a měly by být tedy nabrány. Plánovány budou následující aktivity:*
   - *Organizace sezení energetického koučinku s nájemníky ve fyzické okresní oblasti /najmutí trenéra / poskytovatele/*
   - *Koučování s poradenstvím jeden na jednoho na úrovni domácností na základě personalizovaných dat /organizace/koučování nájemníků korporace Bo-Ex sociálního bydlení/*
   - *Implementace této dílčí smlouvy ve spolupráci mezi třemi zapojenými korporacemi sociálního bydlení Bo-Ex, Mitros. Rozpočet se dělí mezi oba partnery, protože každá bytová korporace má své vlastní nájemníky, kterým poradenství bude poskytovat.*
   - *Struktura výdajů: (1) očekává se, že na sezení na energetický koučink bude vyžadován rozpočet 3 750 EUR. (2) očekává se, že na energetické poradenství pro každou domácnost bude vyžadován rozpočet 150 EUR. Očekává se, že pokryjí celkem 225 domácností v celkové částce 33 750 EUR"*
3. *30 000 EUR (očekávané výdaje) Ke zkrácení doby modernizace budovy Bo-Ex. Práce nemůže být provedena u partnerů konsorcia, protože odborné znalosti tam nejsou dostupné a práce je velmi specifická. Struktura výdajů*
   - *15 000 EUR na externího konzultanta logistiky ke zlepšení logistiky výstavby*
   - *15 000 EUR na externí sociální poradenskou společnost k provádění nezávislých studií spokojenosti nájemníků a navrhování řešení*
4. *50 000 EUR (očekávané výdaje) Z důvodu demonstrování služby proveditelnosti jsou zakoupeny inovativní úložné systémy baterií. Od partnerů konsorcia budou potřeba získat následující odborné znalosti a schopnosti:*
   - *50 000 EUR na další podsmlouvu na agregátní služby pro připojení systémů baterií do bidirektorálně napájeného ekosystému / chytrého solárního nabíjení.*
5. *15 000 EUR na implementaci malých studií, návrh postupuje s cílem zapojit do ARV externě dodavatele, kteří navrhují a implementují HeMuBo + Inside Out integrovaný přístup k modernizaci s odkazem na úkol 4.3*

Subdodavatel t.b.d. Subdodavatelské smlouvy se zakládají na postupech optimalizace zdrojů a absence

Je představa účastníka taková, že část práce budou provádět připojené třetí strany	N
Plánuje účastník využít příspěvky způsobem poskytovaným třetími stranami (článek 11 a 12 všeobecné modelové dohody o grantu)	N
Je představa účastníka taková, že část práce budou provádět mezinárodní partneři (článek 14a Modelové dohody o grantu)?	N

RC Panels

Plánuje účastník dále smluvně upravit některé úkoly (vezměte na vědomí, že hlavní úkoly projektu by neměly být dále smluvně přidělovány/	A
Subdodavatelé celkem: 35 000 EUR (očekávané výdaje) *Aby se zkrátil čas úprav & stavební komponenty se připravily s co nejmenším množstvím materiálu za účelem snížení spotřeby energie. Práce nemůže být provedena u partnerů konsorcia, protože odborné znalosti tam nejsou dostupné a práce je velmi specifická. Struktura ceny:35 000 EUR pro specialistu na integraci konkrétních stavebních komponentů fasády, konkrétně integrace balkónových prvků v panelech fasády. Subdodávky jsou spojeny s WP3, úkol 3.4.* *Subdodavatel t.b.d. Subdodavatelské smlouvy se zakládají na postupech optimalizace zdrojů a absence střetu zájmů, dle článku 10 a 13 AMGA.*	
Je představa účastníka taková, že část práce budou provádět připojené třetí strany	N
Plánuje účastník využít příspěvky způsobem poskytovaným třetími stranami (článek 11 a 12 všeobecné modelové dohody o grantu)	N
Je představa účastníka taková, že část práce budou provádět mezinárodní partneři (článek 14a Modelové dohody o grantu)?	N

Město Utrecht

Plánuje účastník dále smluvně upravit některé úkoly (vezměte na vědomí, že hlavní úkoly projektu by neměly být dále smluvně přidělovány/	A
Subdodavatelé celkem: 35 000 EUR *1. 35 000 EUR (očekávané výdaje) Externí podpora založení regionální radu Utrecht Exploitation Board v rámci úkolu 9.5. Regionální inovativní seskupení ARV Utrecht kolem energie a zdroje využívající modernizace se skládá z mnoha stran (státní instituce, bytové korporace, organizace ze stavebního odvětví, organizace z oblasti instalace, architekti), kteří mají zájem se podílet na řešeních ARV. Aby se tyto strany mohly podílet, organizují se schůze regionální rady pro zužitkování, kde jsou vyžadovány konkrétní odborné zkušenosti a znalosti v jejich obvodech. Tyto odborné znalosti nejsou v rámci konsorcia dostupné a jsou velmi specifické.* *Struktura výdajů: 7x 5 000 EUR na organizaci regionálních schůzí rady pro zužitkování ve spolupráci s partnery ARV, což bude zahrnovat návštěvy místa, hodnocení převoditelnosti a činnosti šíření (smlouva s externím poradcem, který těmito činnostmi regionálně zabývá) "* *Subdodavatel t.b.d. Subdodavatelské smlouvy se zakládají na postupech optimalizace zdrojů a absence střetu zájmů, dle článku 10 a 13 AMGA.*	
Je představa účastníka taková, že část práce budou provádět připojené třetí strany	N

Plánuje účastník využít příspěvky způsobem poskytovaným třetími stranami (článek 11 a 12 všeobecné modelové dohody o grantu)	N
Je představa účastníka taková, že část práce budou provádět mezinárodní partneři (článek 14a Modelové dohody o grantu)?	N

Mitros

Plánuje účastník dále smluvně upravit některé úkoly (vezměte na vědomí, že hlavní úkoly projektu by neměly být dále smluvně přidělovány/	A

Subdodavatelé celkem: 90 000 EUR

1. *37 500 EUR (očekávané výdaje): Kampaně pro komunitní výstavbu laboratoře Utrecht Living Lab zapojením místních agentů pro změny v souvislosti s úkolem 3.3. Utrechtská oblast Overvecht-Noord a Kanaleneiland má aktivní místní komunitní skupiny, které mají rozsáhlé odborné zkušenosti s prací v oblasti převádění energie a zapojením občanů a dalších subjektů. Tito členové komunity slouží jako nezávislí ´výměnní agenti´ v místní komunitě, protože nejsou napojeni na jednoho z institučních partnerů, jako je třeba korporace sociálního bydlení Mitros nebo obec Utrecht. Projekt ARV začlení, spolu vytvoří a umožní místním rezidentům a nájemníkům najmutím/díky smluvním členům a místním skupinám komunity řídit, expandovat a obohatit aktivity ARV kolem převodu energií a vybudovat komunitu, která bude dále fungovat i po skončení projektu. Plánovány budou následující aktivity:*
   - *Organizace a spoluvytváření sezení s místními rezidenty, nájemníky a členy komunity společně s ARV partnery /najmutí školitele/*
   - *Koordinace organizace kampaní kolem místního převádění energie (organizace/podpora zapojení pro korporaci sociálního bydlení Mitros)*
   - *Implementace této dílčí smlouvy ve spolupráci mezi dvěma zapojenými korporacemi sociálního bydlení Bo-Ex, Mitros. Rozpočet se dělí mezi oba partnery, protože každá bytová korporace má ve své oblasti vlastní podkomunitu.*
   - *Struktura výdajů: očekává se, že bude organizováno 6 kampaní s celkovým rozpočtem 6 250 EUR, každá bude implementována jedním agentem změny v dané oblasti a renovovaných budovách.*

2. *37 500 EUR (očekávané výdaje): Energetický koučing pro nájemníky modernizovaných budov Mitros za účelem snížení energetické chudoby, s odkazem na úkol 3.3. V rámci projektu ARV budou koučováni nájemníci modernizovaných budov, aby udržitelně snížili spotřebu energie a jejich účet za energii a bude jim poskytováno energetické poradenství. Pro projekt ARV budou najati energetičtí kouči z místní komunity a místních společností /studentů/. Energetičtí kouči mají odborné znalosti o postupech pro snižování spotřeby energie a znalosti inkorporace chytrých výstupů do možných stanovisek. Konkrétní odborné znalosti interakce nájemníků v kombinaci s didaktickými zkušenostmi práce s lidmi z dané oblasti nemá partner projektu k dispozici a měly by být tedy nabrány. Plánovány budou následující aktivity:*
   - *Organizace sezení energetického koučinku s nájemníky ve fyzické okresní oblasti /najmutí trenéra / poskytovatele/*
   - *Koučování s poradenstvím jeden na jednoho na úrovni domácností na základě personalizovaných dat /organizace/koučování nájemníků korporace pro sociální bydlení Mitros/*
   - *Implementace této dílčí smlouvy ve spolupráci mezi třemi zapojenými korporacemi sociálního bydlení Bo-Ex, Mitros. Rozpočet se dělí mezi oba partnery, protože každá bytová korporace má své vlastní nájemníky, kterým poradenství bude poskytovat.*
   - *Struktura výdajů: (1) očekává se, že na sezení na energetický koučink bude vyžadován rozpočet 3 750 EUR. (2) očekává se, že na energetické poradenství pro každou domácnost bude vyžadován rozpočet 150 EUR. Očekává se, že pokryjí celkem 225 domácností v celkové částce 33 750 EUR"*

Subdodavatel t.b.d. Subdodavatelské smlouvy se zakládají na postupech optimalizace zdrojů a absence střetu zájmů, dle článku 10 a 13 AMGA.

Je představa účastníka taková, že část práce budou provádět připojené třetí strany	N
Plánuje účastník využít příspěvky způsobem poskytovaným třetími stranami (článek 11 a 12 všeobecné modelové dohody o grantu)	N
Je představa účastníka taková, že část práce budou provádět mezinárodní partneři (článek 14a Modelové dohody o grantu)?	N

DTTN

Plánuje účastník dále smluvně upravit některé úkoly (vezměte na vědomí, že hlavní úkoly projektu by neměly být dále smluvně přidělovány/	N
Je představa účastníka taková, že část práce budou provádět připojené třetí strany [59]	A

[59] Třetí strana, která je přidruženým subjektem nebo je právně spojena s účastníkem, implikuje spolupráci neomezenou na úkoly. (článek 14 Modelové dohody o grantu).

***ARMALAM S.r.l**. Je zakládajícím členem HABITECH a jeden z jeho vlastníků je nyní součástí rady HABITECH. Jedna z hlavních silných stránek společnosti Armalam S.r.l. Jsou znalosti a schopnost řídit všechna stadia realizace práce se dřevem od intelektuálního konceptu až po nejpodrobnější fáze realizace. Společnost se podílí na všech fázích práce:*

- *i) Předběžné zpracování myšlenky, aby bylo možné společně s klientem zpracovat architektonické a funkční potřeby;*
- *ii) Příprava návrhů ke zjištění nejlepších technických řešení;*
- *iii) Organizace průmyslové výroby dřevěných struktur k zajištění kvality produktů;*
- *iv) Management prováděných prací na místě k zajištění bezchybné korespondence s projektem.*

Aplikovaná terminologie může být shrnuta v termínu „INTEGROVANÝ DESIGN" s využitím přístupu BMI – Stavební informační modelování. Armalam S.r.l. Je poté schopen poskytnout a řídit všechny aspekty návrhu: architektonický, strukturální a energetický návrh od počátečních stádií, v souladu s požadavky zákazníka, a zajistit certifikaci budovy s nejběžnějšími protokoly zelené ekonomiky. Z tohoto důvodu uskuteční ARMALAM S.r.l. Konkrétní činnosti v souvislosti s novou výstavbou a vybavením existujících budov.

Co se týká projektu ARV, ARMALAM S.r.l. se v něm bude podílet jako podpůrné těleso v rámci různých WP, kde je také přítomno DTTN, ale bude se většinou podílet provozní fázi italského demo případu v Trento - Piedicastello Destra Adige (WP4- WP5). Konkrétně bude zpracovávat návrhy a prototypovat úkoly spojené s novou budovou s pozitivní energií a modernizovat stávající budovy v této oblasti, jak je popsáno v projektu.

Klíčovou osobou ARMALAM S.r.l., která se účastní projektových akcí, je: Fabio Ferrario, partner ARMALAM S.r.l. A technický ředitel sektoru R&I.

***Fanti Legnami S.r.l.** byla založena roku 1956 jako malá rodinná řemeslná firma; v průběhu let se rozrostla díky adaptaci čím dál pokročilejších technik zpracování. Je členem HABITECH od roku 2017. V posledních letech se Fanti Legnami S.r.l. stal jednou z hlavních společností v oblasti práce se dřevem v italském regionu Trentino. S více než 50 lety zkušeností byla společnost Fanti Legnami S.r.l. Mělo možnost vybrat a vylepšit dřevo v Trentino jako nejlepší materiál na trhu, aby vyrobilo strukturální prvky a dřevěné střechy velké hodnoty a síly, které se v průběhu let vylepšovaly a stále více ustanovovaly požadavky na řemeslný trh.*
Podle programů využívání a péče o jedlové, modřínové a borovicové lesy vysokého přístupu je dřevo z lesů Trentino to jediné, které poskytuje válcovité kmeny s minimální konicitou a excelentní tenká vlákna, odolná, flexibilní a charakterizovaná růstovými prstenci dobrých rozměrů: důležitá podmínky pro výrobu velkých dřevěných struktur, dřevěných střech, chat a domů nejvyšší kvality. Fanti Legnami S.r.l. Se také zabývá návrhy a konstruováním energeticky úsporných dřevěných střech a domů. Společnost se nyní může opřít o 37 zaměstnanců včetně dřevorubců, pracovníků, úředníků a technickým zázemím. Navíc je také držitelem následujících certifikací:

UNI EN ISO 9001:2015;
- CE značení masívního dřeva;
- CE značení bilamelárního a lamerálního dřeva;
- Certifikace lesního managementu PEFC

Co se týká projektu ARV, Fanti Legnami S.r.l. Bude pracovat v provozní fázi v rámci WP4-WP5, a bude provádět výstavbu a instalační práce v rámci italského demo případu Trento – Piedicastello Destra Adige. Konkrétně se společnost bude podílet na stavební fázi nové budovy pozitivní energie a bude odpovídat za její ´obal´ a za instalaci nového prototypu prefabrikovaných, multifunkčních a modulárních fasád na bázi dřeva, spojených s úkoly modernizace, popsané v tomto projektu.

Klíčovou osobou Fanti Legnami S.r.l., která se účastní projektových akcí, je: Marino Fanti, administrátor a právní zástupce společnosti.

***X-Lam Dolomiti S.r.l. –** členem HABITECH od r. 2018 - přední italský výrobce strukturálních panelů XLAM-CLT a také jeden z nejvýznamnějších účastníků pro navrhování a konstrukce budov ze dřeva nebo ocelovo-dřevěných technologií. V provozu od roku 2010, s podílovým kapitálem 1,000,000 eury a obratem 15 miliónů eur, XLAM DOLOMITI má celkem 50 zaměstnanců a na trhu působí hlavně díky konstantnímu hledání kvality atestované četnými získanými certifikacemi: UNI EN ISO 9001: 2008, SALE, Management organizace a kontroly Model D.Lgs. 231/01, Cat 0G1 Class. VI, Cat 0S6 Class. III-BIS, Cat 0S32 Class. V, ARCA jako doplnění k CE, ETA-12/0347, PEFC certifikaci produktu. Navíc to, že patří do skupiny Paterno Group, která finguje od roku 1986 a má přes 500 zaměstnanců, poskytuje důležitou záruku finanční jistoty a stability.*

silnou stránkou společnosti je strojírenství a výroba strukturálních panelů XLAM (nebo CLT, příčně laminované dřevo), což jsou velké montované panely (až do 13.5 mx a 3.5 m), vyrobené z lepených příčně laminovaných desek, které jsou dodávány na místo stavby, tvarované a číslované, připravené k montáži, která je rychlá a přesná.

Technickp-strojírenské oddělení využívá metodu kolaborativního designu BMI (informační modelování budov), které umožňuje integrovat do jednoho modelu užitečné informace v každé fázi designu: architektonické, strojní inženýrství, strukturální, energetické a management.

Pro velmi komplexní projekty, které vyžadují velmi rychlou realizaci a intenzívní činnost projektového managementu, se XLAM DOLOMITI prezentuje jako generální dodavatel. Znamená to, že XLAM DOLOMITI může operovat poskytováním klíčových služeb a stává se referenčním bodem pro realizaci hotelů, rezidenčních prostor, vícepatrových, prázdninových vesnic a rezidenčních komplexů s kompletním zajištěním nábytku. *Co se týká projektu ARV, společnost bude pracovat v provozní fázi v rámci WP4-WP5, a bude provádět výstavbu a instalační práce v rámci italského demo případu Trento – Piedicastello Destra Adige. Konkrétně se společnost bude podílet na stavební fázi nové budovy pozitivní energie a bude odpovídat za její ´obal´ a za instalaci nového prototypu prefabrikovaných, multifunkčních a modulárních fasád na bázi dřeva, spojených s úkoly modernizace, popsané v tomto projektu.* *Klíčovou osobou X-Lam Dolomiti S.r.l., která se účastní projektových akcí, je: Albino Angeli, právní zástupce a technický ředitel společnosti.*

Plánuje účastník využít příspěvky způsobem poskytovaným třetími stranami (článek 11 a 12 všeobecné modelové dohody o grantu)	N

Má účastník v plánu, že část práce bude prováděna mezinárodními partnery[60] (článek 14a obecné modelové dohody o grantu)?	N
Pokud ano, popište, prosím, mezinárodní partnery a jejich přispívání	

[60] 'Mezinárodní partner' je právnická osoba založená v zemi, která není členem EU, která není oprávněna čerpat finance dle článku 10 Nařízení o pravidlech účasti č. 1290/2013.

ČÁST 5: Etika a bezpečnost

5.1 Etika

V průběhu aktivit a konceptu ARV jsou dodržována národní i evropská nařízení. V průběhu všech fází projektu ARV budou dodržovány národní a mezinárodní nařízení etických i společenských rozměrů. Všechny navržené úkoly ARV jsou povolitelné dle platné legislativy a nařízení a při jejich navrhování byl brán potaz na požadavky. Projektový management a příjemci podniknou všechny nezbytné kroky, aby vždy postupovali v souladu s evropskými a národními nařízeními a profesionálních kodexů, souvisejících s ochranou osobních údajů. To zahrnuje především vyhlášku 95/46/EC o shromažďování a zpracovávání dat, obecné nařízení o ochraně údajů (GDPR, 2016/679), které je platné od května 2018, a příslušných národních požadavků, řešící právní i regulační dodržování.

Abychom se mohli plně řídit etickými požadavky na výzkum, v prvním stadiu projektu (DMP) bude vytvořen plán managementu dat (v WP1, T1.6/D1.8). Společně s dohodou o konsorciu obsáhne plán managementu dat etické aspekty relevantní pro plánované výzkumné aktivity, spojené s etickými požadavky na ochranu osobních údajů.

Tento projekt nezahrnuje aktivity a není spojován s následujícími:

- Lidská embrya a zárodky
- Lidské buňky a tkáně
- Zvířata
- Životní prostředí, zdraví a bezpečnost
- Dvojí použití
- Exkluzívní fokus na stavební aplikace
- Potenciální zneužití výsledků výzkumu

Etické hodnocení bude vloženo do dvou etických tabulek v administrativní formě návrhu, které budou zahrnovat dvě otázky: 1) lidská účast a 2) shromažďování a/nebo zpracovávání osobních údajů. Ty jsou popsány dále v sekcích 5.1.1 a 5.1.2.

- Zapojení lidských účastníků
- Shromažďování a zpracovávání osobních údajů

5.1.1 Lidé

ARV zapojí **dospělé dobrovolníky'** (účast občanů). (Viz také 5.1.2 Osobní údaje). V minimálně třech demonstračních projektech je naplánována dobrovolná účast dětí školou povinných / nezletilých ve věku 16 - 19 let. Informace žádané od školních dětí budou soustředěny na téma energie a jejího využití a energetické spotřebě. Nezletilí a jejich zákonní zástupci budou informováni o plánovaném průzkumu, metodách a postupech. Dodržuje se postup pro informovaný souhlas. Bude rozeslán informační dopis a účastníci a/nebo jejich rodiče musí podepsat informovaný souhlas. Účastníci budou anonymizováni. Konkrétní zákony dané země o zapojení nezletilých (16 let a starších), které se mohou mezi zúčastněnými zeměmi lišit, budou dodržovány.

V kontextu demonstračních aktivit ARV budou data shromažďována prostřednictvím:

- Dotazníky / online formuláře;
- Digitální systémy (například chytré měřiče, IOT monitoring, Městská informační platforma apod.);
- Aktivity s účastí občanů, jako například workshopy, spoluvytváření aktivit a podobně.

Konsorcium zajistí, aby byly dodržovány všechny nezbytné postupy, konkrétně ve spojitosti s podepisováním, shromažďováním a ukládáním všech nezbytných formulářů s informovaným souhlasem, a to ještě před shromažďováním dat. Tyto formuláře s informovaným souhlasem se budou týkat také anonymního/online shromažďování osobních údajů, například dotazníků. Všechny zúčastněné strany a uživatelé budou podrobně informováni o účelu shromažďování údajů, opatřeních a konsorcium obdrží plně informovaný souhlas zdarma. Podrobnosti o kritériích navrhování, zahrnování a vyjímání a postupy informovaných souhlasů budou připravovány před začátkem navrhovaných opatření. Dospělé osoby, které nemohou poskytnout informovaný souhlas, se nebudou tohoto projektu účastnit. Citlivé skupiny/jedinci se nebudou účastnit projektových aktivit.

5.1.2 Ochrana osobních údajů

Osobní údaje příjemců ARV

Konsorcium potvrzuje, že pozadí, výsledky, citlivé informace a/nebo jakákoliv a všechna data a/nebo informace, které jsou poskytovány, předávány nebo jinak zveřejňovány mezi příjemci v průběhu implementace činnosti a/nebo využívání ("Sdílené informace"), nebudou zahrnovat osobní údaje, jak je definuje Obecné nařízení o ochraně osobních údajů 2016/679, na které bude dále odkazováno jako na legislativu na ochranu osobních údajů. Výjimkou k výš uvedenému je, že příjemci mohou sdílet osobní informace jedinců pracujících na projektu za účelem plnění Dohody o konsorciu nebo Dohody o grantu, včetně ale bez omezení na; jména, pracovní tituly, emailové adresy a další související tele-kontaktní informace ("Informace o obchodních kontaktech"). Každý příjemce potvrzuje, že informace o obchodních kontaktech budou zpracovávány pouze v omezeném rozsahu k řízení obchodních vztahů mezi jednotlivými členy. Každý příjemce, k němu přidružené entity a jeho dodavatelé mohou, kdekoliv podnikají, uchovávat a dále zpracovávat tyto informace o obchodních kontaktech. Kde se vyžaduje notifikace nebo souhlas jedinců s tímto zpracováním, každý příjemce, jak je aplikovatelné, pošle upozornění nebo si vyžádá souhlas, jak je potřeba.

Osobní údaje třetích stran

V projektu se bude konat několik aktivit spojených se shromažďováním osobních informací. Všech 6 demonstrativních projektů v ARV bude vyžadovat zpracovávání dat a evaluaci, která bude obsahovat zkoumání lidských subjektů a sběr osobních údajů. Protože projekt bude obsahovat účast 6 skutečných demo projektů, vyžadujících v rámci každého projektu různá data, aktuální příjemci projektu a zapojení uživatelé se budou v rámci jednotlivých úkolů lišit. ARV DMP (D.1.8) bude rafinovat všechny právní a regulační požadavky, aplikovatelné pro tento typ dat, která budou shromažďovány a zpracovávány. V souladu s DMP bude vytvořen postup a formuláře Informovaného souhlasu a v rámci jednotlivých úkolů v pracovních balíčcích budeme specifikovat a implementovat přístupy ke shromažďování dat, managementu a opatření pro zpracovávání, které jsou nejvhodnější pro vymazání dat, především s ohledem na identifikovatelné aspekty souborů dat osob. S individuálními soubory dat budou nakládat partneři v pracovních balíčcích, data budou zpracovávána blízko zdroje a v rámci původních partnerských organizací.

Při projektu bude respektováno soukromí zúčastněných stran a uživatelů a při shromažďování a zpracovávání osobně identifikovatelných údajů bude požadován plný informovaný souhlas, budou aplikovány příslušné postupy nakládání s těmito údaji, aby se předešlo potencionální identifikaci osob. To se bude týkat i údajů o zúčastněných v rámci aktivit využívajících techniky jako dotazníky, interview, workshopy nebo poštovní seznamy, včetně automatického shromažďování stavebních či energetických údajů. Kde to bude nutné, data budou anonymizována a mapování a identifikace osoby budou zabezpečeny a nebudou dostupné jiným osobám než těm, které s těmito daty pracují. Výsledky mohou být využívány anonymně nebo ve sjednocené formě analýzy a mohou být následně uváděny ve zprávách o projektu nebo odborných pracích. Všichni příjemci budou nakládat s materiály s maximální péčí o ochranu dat a soukromí v souladu s právními a regulačními požadavky a účastníkům, příjemcům či třetím stranám nevznikne žádná škoda.

Konsorcium ARV bere v potaz potenciální otázky vyplývající ze shromažďování dat z různých zdrojů, škál, oběhů a zařízení. Data shromážděná v projektu budou anonymizována a agregována co nejblíže zdroji. V určitých případech může vyhýbání či minimalizace osobních údajů eliminovat nebo snížit možnost identifikace. Například spotřeba energie v časovém rozlišení může být využito k identifikaci osobních denních vzorců a rutin, když jsou shromažďovány na úrovni jednotlivých domácností. Souhrnná data buďto sníží časové rozložení (např. jednou denně) nebo budou s nižším geografickým rozložením (např. Spotřeba energie na úrovni okresu, jak je přímo dostupná pro poskytovatele energií), snižují toto riziko. Přímé převádění dat mezi příjemci bude plánováno na omezeném základě, povede k omezenému přítoku a odtoky osobních dat do/ze zemí, které nejsou členy EU a do EU. Důvodem je, že je Norsko považováno za přidruženou zemi v rámci programu Horizon 2020.

Konsorcium potvrzuje, že etické standardy a zásady v rámci Horizon 2020 budou pečlivě dodržovány bez ohledu na zemi, ve které práce probíhá, a převádění dat bude povolitelné v souladu se všemi právními a regulačními požadavky. Cílem projektu je vytvoření anonymizovaných veřejných databází, ale cílem je i nastavení rovnováhy mezi publikováním dat, soukromím a otázkami mlčenlivosti. V případě pochybností nebude konsorcium publikovat soubory informací, ale pouze zprávy o celkových opatřeních. Rozhodnutí budou činěna případ od případu zaměstnanci seniory, aby se publikováním souborů informací nebo jiných publikací neporušilo soukromí, anonymita a mlčenlivost. Navíc se zajistí průběžné konzultování s Národním úřadem na ochranu osobních údajů po celou dobu trvání tohoto projektu.

Projekt ARV v rámci implementace projektu zahrnuje shromažďování různých osobních údajů jedinců. V rámci projektu budou shromažďována osobní data včetně kontaktních informací (jméno, pracovní email, který už je k dispozici online), což bude děláno za účelem organizace komunitní sítě, kterou chceme v rámci tohoto projektu vybudovat. Tyto informace budou používány pouze ke kontaktování účastníků a nebudou využívány ve výzkumu a žádné další osobní informace nebudou shromažďovány. Konsorcium se bude řídit evropskými i národními vyhláškami o ochraně osobních údajů i jejich aktualizacemi, které může dostat během doby trvání projektu. Vědecké práce se budou zcela zakládat na veřejně dostupných informacích. Se všemi daty bude nakládáno a budou sdílena dle otevřené zdrojové filosofie a za spolupráce mezi jednotlivými partnery (efektivní plán managementu dat).

Primární data:

Všichni partneři odpovídající za budování sítě a identifikaci odborníků na workshopy, události nebo pozvané na jiné aktivity potvrzují, že nebudou shromažďovat osobní údaje mimo veřejně dostupných kontaktních informací. Pokud budou osobní údaje potřeba k úspěšnému dokončení výzkumu, budou respektována případná etická pravidla a komise všech zúčastněných zemí a Evropské Unie.

Sekundární využití některých údajů:

Potvrzujeme, že se budeme řídit evropskými i národními vyhláškami o ochraně osobních údajů i jejich aktualizacemi, které může dostat během doby trvání projektu. Rovněž potvrzujeme, že budeme dodržovat všechny etické standardy a nařízení bez ohledu na zemi, ve které projekt probíhá. Co se týká managementu dat, odkazujeme na plán managementu dat.

Management dat:

Všechna data budou v rámci projektu dostupná s využitím nemajetkových formátů a budou dokumentována s využitím extensivních popisů metadat a standardních konvencí pro pojmenovávání. Popis metadat bude obsahovat požadované prvky k zajištění snadného hledání informací. Metadata budou obsahovat informace jako ID, titul, shrnutí, proměnnou, jednotku, činnost, tagy, frekvenci, dobu/reference, instituci, kontakt apod. Cílem projektu ARV je jasnost a přehlednost informací. Toho lze dosáhnout pouze, pokud bude mít každý možnost

porozumět práci a najít zdroje všech dat, která budou využívána. Z důvodu rychlého přísunu informací je důležité mít přehled o verzích. A nakonec každý učiněný předpoklad/hypotéza bude mít vliv na konečný výsledek analýzy. Budou dále trasovány a dobře vysvětleny. Pro více podrobností se podívejte do sekce 2.2 o managementu dat výzkumu (2.2.3.) a o IPR / erudovaném managementu a ochraně (2.2.4.)

Anonymizace údajů: Konsorcium ARV bere v potaz potenciální otázky vyplývající ze shromažďování dat z různých zdrojů, škál, oběhů a zařízení.

V rámci projektu bude respektováno soukromí zúčastněných stran a uživatelů a při shromažďování a zpracovávání osobně identifikovatelných údajů bude požadován plný informovaný souhlas, budou aplikovány příslušné postupy nakládání s těmito údaji, aby se předešlo potencionální identifikaci osob. To se bude týkat i údajů o zúčastněných v rámci aktivit využívajících techniky jako dotazníky, interview, workshopy nebo poštovní seznamy. Kde to bude nutné, data budou anonymizována a agregovaná co nejblíže zdroji a mapování a identifikace osoby budou zabezpečeny a nebudou dostupné jiným osobám než těm, které s těmito daty pracují. Výsledky mohou být využívány anonymizovaně nebo ve sjednocené formě analýzy a mohou být následně uváděny ve zprávách o projektu nebo odborných pracích. Všichni příjemci budou nakládat s materiály s maximální péčí o ochranu dat a soukromí v souladu s právními a regulačními požadavky a účastníkům, příjemcům či neznámým třetím stranám tak nevznikne žádná škoda.

Minimalizace dat: Shromažďovaná data jsou pro ARV projekt relevantní a budou omezena výhradně pro účely úspěšné implementace činnosti. Typ shromažďovaných dat a postupy shromažďování informací jsou v souladu s **principem minimalizace dat.** Sběr informací a jejich zpracování budou sloužit zájmům úzce zapojených účastníků a společnosti celkově.

NTNU potvrzuje, že byl jmenován úředník na ochranu dat (DPO) a kontaktní údaje DPO budou zpřístupněny všem subjektům dat, kteří se účastní průzkumu. Pro příjemce, u kterých se nepožaduje ustanovení DPO dle GDPR bude politika ochrany osobních údajů pro tento projekt uložena ve složce a předložena na vyžádání službám EC. Každý příjemce zašle potvrzení v tomto ohledu koordinátorovi.

Popis technických a organizačních opatření implementovaných za účelem ochrany práv a svobod subjektů dat/účastníků výzkumu a popis bezpečnostních opatření, které budou implementovány k zamezení neoprávněného přístupu k osobním údajům nebo vybavení pro zpracování bude poskytnut NTNU. Budou implementována následující opatření:

- jasná definice rolí a odpovědností vzhledem k operacím zpracovávání dat (včetně shromažďování, uchovávání, přístupu, sdílení, ochrany, likvidace) jako součást managementu dat;
- jasná definice účelu zpracovávání a žádné další zpracování bez výslovného opětovného souhlasu subjektů dat nebo jejich právních zástupců;
- Upozorňování relevantní národní ochranné úřady na zpracovávání dat, pokud aplikovatelné;
- Ochrana dat a jejich zpracování (hardware, sítě a ochrana fyzického podnikání, dohody o mlčenlivosti, pomocí kterých se ověřené osoby zaváží používat data striktně pro účely projektu, kontroly přístupu a záznamy o přihlášení);
- Jasné oddělení, kdykoliv to bude možné, jednotlivých kategorií dat podle jejich stupně přesnosti nebo spolehlivosti, zejména mezi daty založenými na faktech a daty založenými na osobním či technologickém hodnocení.
- Zvýšená ochrana citlivých dat;
- Mechanismy zajišťující mazání dat, pokud už nebudou nezbytné k účelům, pro které jsou zpracovávány;
- Nepřevádění osobních dat jiné straně bez konkrétního souhlasu subjektů dat a jejich právních zástupců; nepředávání dat třetím stranám, které nezajišťují stejnou úroveň ochrany osobních údajů;
- Nastavení postupů pro zajištění účinnosti práv subjektů dat, včetně jejich práva přístupu, komunikace, rektifikace, vymazání a namítání.

5.1.3 Vlastní hodnocení etických otázek

V rámci ARG byly díky sebehodnocení identifikovány následující potenciální etické otázky:

- Zapojení lidských účastníků
- Shromažďování a zpracovávání osobních údajů

Podrobnosti o každém ze šesti demonstrativních projektů shrnuje následující tabulka:

Identifikované demonstrační projekty	**Lidští účastníci**	**Shromažďování osobních údajů**
Rezidenční, terciární a vzdělávací budovy, s činnostmi zahrnujícími jak novou výstavbu, tak renovování, Palma, Španělsko [Demo 1]	X	X
Energetická data, úroveň budovy, [Demo 1]	X	X
Energetická data, úroveň čtvrti, [Demo 1]	X	X
Účast komunity, [Demo 1]	X	X
Demo případ v Trento, Itálie, se skládá ze čtyř oblastí: 1) bývalá průmyslová oblast Italcementi; 2) sociální a soukromá bytová oblast od 50–70. let; 3) galerie Piedicastello Galleries (bývalé dálniční tunely); a 4) parkovací místo. Projekt zahrnuje novou výstavbu i renovaci stávajících budov a struktur, [Demo 2]	X	X
Energetická data, úroveň budovy, [Demo 2]	X	X
Energetická data, úroveň čtvrti, [Demo 2]	X	X
Účast komunity, [Demo 2]	X	X
Holandský demo případ se skládá ze dvou seskupení rezidenčních budov v oblasti Overvecht-Noord a oblasti Kanaleneiland-Zuid ve městě Utrecht [Demo 3]	X	X
Energetická data, úroveň budovy, [Demo 3]	X	X
Energetická data, úroveň čtvrti, [Demo 3]	X	X
Účast komunity, [Demo 3]	X	X
Český demo případ zahrnuje renovaci zdravotního střediska Karviná Mizerov ve městě Karviná. [Demo 4]. Living lab bude vzdělávat občany, jako například studenty, v efektivním způsobu vytváření energie a zdroje účinně využívající	X	X

čtvrti, které zvyšuje povědomí občanů a účastníků a zapojení		
Energetická data, úroveň budovy, [Demo 4]	X	X
Energetická data, úroveň čtvrti, [Demo 4]	X	X
Účast komunity, [Demo 4]	X	X
Rezidenční budovy. Dánský demo případ se nazývá SAB Department 22, Kløvermarken/Hvedemarken a nachází se v centrální části města Sønderborg. To zahrnuje 19 bytových domů o 3 podlažích, s celkovým počtem 432 bytů [Demo 5]	X	X
Energetická data, úroveň budovy, [Demo 5]	X	X
Energetická data, úroveň čtvrti, [Demo 5]	X	X
Účast komunity, [Demo 5]	X	X
Norský demo případ ve škole Voldsløkka a kulturní oblasti. Projekt zahrnuje výstavbu střední školy, nové kulturní haly, taneční haly a tréninkového místa. Projekt zahrnuje výstavbu nových budov a renovaci stávajících budov uvedených na seznamu [Demo 6]	X	X
Energetická data, úroveň budovy, [Demo 6]	X	X
Energetická data, úroveň čtvrti, [Demo 6]	X	X
Účast komunity, [Demo 6]	X	X

5.1.4 Třetí země (= nejsou členy EU)

V ARV projektu se neúčastní žádné třetí země.

5.2 Bezpečnost[61]

Všechny aktivity budou probíhat v souladu se současnými nařízeními a legislativou EU. Cílem je vytvořit otevřený a transparentní vědeckou modelovou komunitu, která sdílí svá data a modely s otevřeným přístupem a otevřeným průvodcem zdroji harmonickým a strukturovaným způsobem.

[61] (Viz článek 37 Modelové dohody o grantu). Pro informace o klasifikaci informací se, prosím, podívejte do průvodce Horizon 2020: .https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/secur/h2020-hi-guide-classif_en.pdf

Projekt nebude zahrnovat aktivity či výsledky vyvolávající otázky bezpečnosti.

Projekt nebude obsahovat ´informace klasifikované EU´ jako pozadí nebo výsledky.

ODHADOVANÝ ROZPOČET AKCE

	Estimated eligible[1] costs (per budget category)										Příspěvek EU			Další informace		
	A. Přímé osobní náklady				B. Přímé náklady subdodavatelů	*[C. Přímé náklady fin. podpory]*	D. Ostatní přímé náklady		E. Nepřímé náklady[2]	Celkové náklady	Sazby pro náhradu %	Maximální příspevek EU[3]	Maximální hodnota grantu[4]	Informace o nepřímých nákladech	Informace pro auditory	Ostatní informace:
	A.1 Zaměstnanci (nebo ekvivalent) A.2 Fyzické osoby s přímou smlouvou A.3 Poskytnuté osoby *[A.6 Personál k poskytnutí přístupu k výzkumné infrastruktuře]*		A.4 Vlastníci středně velkých podniků bez platu A.5 Příjemci grantu, kteří jsou fyzickými osobami bez platu				D.1 Cestovní D.2 Vybavení D.3 Další zboží a služby *[D.4 Nákaldy rozsáhlé výzkumné infrastruktury]*	D.5 Náklady vnitřně fakturovaného zboží a služeb						Odhadované náklady věcných příspěvků nepoužitých v prostorách	Prohlášení nákladů pod bodem D.4	Odhadované náklady příjemců grantu/třetích stran nezískávajících finanční podporu/mezinárodních partnerů
Forma nákladů[6]	Skutečné	Jednotkové[7]	Jednotkové[8]		Skutečné	Skutečné	Skutečné	Jednotkové[9]	Paušální[10] 25%							
	a	Úplné b	Žádné hodiny	Úplné c	d	*[e]*	f	Úplné g	h = 0,25 x (a +b+c+f+g +*[i1]*[13]+*[i2]*[13]-n)	j = a+b+c+d +*[e]*+f+g+h +*[i1]*+*[i2]*	k	l	m	n	Ano/Ne	
1. NTNU	1 552 004.00	0.00	0.00	0.00	0.00	0.00	111 041.00	0.00	415 761.25	2 078 806.25	100.00	2 078 806.25	2 078 806.25	0.00	Ne	nedostupné
2. ACE	189 428.00	0.00	0.00	0.00	0.00	0.00	52 000.00	0.00	60 357.00	301 785.00	100.00	301 785.00	301 785.00	0.00	Ne	nedostupné
3. CVUT	599 319.00	0.00	0.00	0.00	0.00	0.00	443 500.00	0.00	260 704.75	1 303 523.75	100.00	1 303 523.75	1 303 523.75	0.00	Ne	nedostupné
4. DTU	631 843.00	0.00	0.00	0.00	0.00	0.00	19 000.00	0.00	162 710.75	813 553.75	100.00	813 553.75	813 553.75	0.00	Ne	nedostupné
5. DANFOSS A/S	209 700.00	0.00	0.00	0.00	0.00	0.00	106 750.00	0.00	79 112.50	395 562.50	70.00	276 893.75	276 893.75	0.00	Ne	nedostupné
6. ENFOR	308 770.00	0.00	0.00	0.00	30 000.00	0.00	6 250.00	0.00	78 755.00	423 775.00	70.00	296 642.50	296 642.50	0.00	Ne	nedostupné
7. PROJECTZERO	290 250.00	0.00	0.00	0.00	20 000.00	0.00	27 000.00	0.00	79 312.50	416 562.50	100.00	416 562.50	416 562.50	0.00	Ne	nedostupné
8. EURAC	285 600.00	0.00	0.00	0.00	0.00	0.00	30 000.00	0.00	78 900.00	394 500.00	100.00	394 500.00	394 500.00	0.00	Ne	nedostupné
9. SINTEF	1 263 220.00	0.00	0.00	0.00	0.00	0.00	78 000.00	0.00	335 305.00	1 676 525.00	100.00	1 676 525.00	1 676 525.00	0.00	Ne	nedostupné
10. PALMA	827 631.00	0.00	0.00	0.00	130 000.00	0.00	138 600.00	0.00	241 557.75	1 337 788.75	100.00	1 337 788.75	1 337 788.75	0.00	Ne	nedostupné
11. IBAVI	239 776.00	0.00	0.00	0.00	229 173.00	0.00	74 130.00	0.00	78 476.50	621 555.50	100.00	621 555.50	621 555.50	0.00	Ne	nedostupné
12. IREC	761 173.00	0.00	0.00	0.00	40 000.00	0.00	47 450.00	0.00	202 155.75	1 050 778.75	100.00	1 050 778.75	1 050 778.75	0.00	Ne	nedostupné
13. MET	160 230.00	0.00	0.00	0.00	0.00	0.00	70 250.00	0.00	57 620.00	288 100.00	70.00	201 670.00	201 670.00	0.00	Ne	nedostupné
14. UAS Utrecht	607 500.00	0.00	0.00	0.00	0.00	0.00	95 250.00	0.00	175 687.50	878 437.50	100.00	878 437.50	878 437.50	0.00	Ne	nedostupné
15. HOUSING EUROPE	205 804.00	0.00	0.00	0.00	0.00	0.00	63 550.00	0.00	67 338.50	336 692.50	100.00	336 692.50	336 692.50	0.00	Ne	nedostupné
16. Buro de Haan	117 500.65	0.00	271.50	9 999.35	0.00	0.00	41 250.00	0.00	42 187.50	210 937.50	70.00	147 656.25	147 656.25	0.00	Ne	nedostupné
17. Center Denmark	469 986.00	0.00	0.00	0.00	0.00	0.00	10 250.00	0.00	120 059.00	600 295.00	100.00	600 295.00	600 295.00	0.00	Ne	nedostupné
18. SAB	151 725.00	0.00	0.00	0.00	0.00	0.00	57 250.00	0.00	52 243.75	261 218.75	100.00	261 218.75	261 218.75	0.00	Ne	nedostupné
19. GDFA	559 482.00	0.00	0.00	0.00	0.00	0.00	37 000.00	0.00	149 120.50	745 602.50	100.00	745 602.50	745 602.50	0.00	Ne	nedostupné
20. BOEX	150 000.00	0.00	0.00	0.00	170 000.00	0.00	545 250.00	0.00	173 812.50	1 039 062.50	100.00	1 039 062.50	1 039 062.50	0.00	Ne	nedostupné
21. Rc Panels B.V.	189 960.95	0.00	35.00	1 289.05	35 000.00	0.00	6 250.00	0.00	49 375.00	281 875.00	70.00	197 312.50	197 312.50	0.00	Ne	nedostupné
22. UU	360 000.00	0.00	0.00	0.00	0.00	0.00	35 250.00	0.00	98 812.50	494 062.50	100.00	494 062.50	494 062.50	0.00	Ne	nedostupné
23. CITY OF UTRECHT	157 500.00	0.00	0.00	0.00	35 000.00	0.00	6 250.00	0.00	40 937.50	239 687.50	100.00	239 687.50	239 687.50	0.00	Ne	nedostupné
24. BOSGROEP	307 500.00	0.00	0.00	0.00	0.00	0.00	6 250.00	0.00	78 437.50	392 187.50	70.00	274 531.25	274 531.25	0.00	Ne	nedostupné
25. iwell	165 000.00	0.00	0.00	0.00	0.00	0.00	6 250.00	0.00	42 812.50	214 062.50	70.00	149 843.75	149 843.75	0.00	Ne	nedostupné
26. MEX	165 000.00	0.00	0.00	0.00	0.00	0.00	6 250.00	0.00	42 812.50	214 062.50	70.00	149 843.75	149 843.75	0.00	Ne	nedostupné
27. Mitros	127 500.00	0.00	0.00	0.00	90 000.00	0.00	186 250.00	0.00	78 437.50	482 187.50	100.00	482 187.50	482 187.50	0.00	Ne	nedostupné
28. KARV	90 801.00	0.00	0.00	0.00	0.00	0.00	5 000.00	0.00	23 950.25	119 751.25	100.00	119 751.25	119 751.25	0.00	Ne	nedostupné
29. DOL	87 330.00	0.00	0.00	0.00	0.00	0.00	258 000.00	0.00	86 332.50	431 662.50	70.00	302 163.75	302 163.75	0.00	Ne	nedostupné
30. DTTN	126 240.00	0.00	0.00	0.00	0.00	0.00	5 000.00	0.00	32 810.00	164 050.00	100.00	164 050.00	164 050.00	0.00	Ne	nedostupné
- Armalam	0.00	0.00	3 817.23	136 007.90	0.00	0.00	0.00	0.00	34 001.98	170 009.88	70.00	119 006.92	119 006.92	0.00	Ne	nedostupné

ODHADOVANÝ ROZPOČET AKCE

	Estimated eligible[1] costs (per budget category)										Příspěvek EU			Další informace		
	A. Přímé osobní náklady				B. Přímé náklady subdodavatelů	*[C. Přímé náklady fin. podpory]*	D. Ostatní přímé náklady		E. Nepřímé náklady[2]	Celkové náklady	Sazby pro náhradu %	Maximální příspevek EU[3]	Maximální hodnota grantu[4]	Informace o nepřímých nákladech	Informace pro auditory	Ostatní informace:
	A.1 Zaměstnanci (nebo ekvivalent) A.2 Fyzické osoby s přímou smlouvou A.3 Poskytnuté osoby *[A.6 Personál k poskytnutí přístupu k výzkumné infrastruktuře]*		A.4 Vlastníci středně velkých podniků bez platu A.5 Příjemci grantu, kteří jsou fyzickými osobami bez platu				D.1 Cestovní D.2 Vybavení D.3 Další zboží a služby *[D.4 Nákaldy rozsáhlé výzkumné infrastruktury]*	D.5 Náklady vnitřně fakturovaného zboží a služeb						Odhadované náklady věcných příspěvků nepoužitých v prostorách	Prohlášení nákladů pod bodem D.4	Odhadované náklady příjemců grantu/třetích stran nezískávajících finanční podporu/mezinárodních partnerů
Forma nákladů[6]	Skutečné	Jednotkové[7]	Jednotkové[8]		Skutečné	Skutečné	Skutečné	Jednotkové[9]	Paušální[10] 25%							
	a	Úplné b	Žádné hodiny	Úplné c	d	*[e]*	f	Úplné g	h = 0,25 x (a +b+c+f+g +*[i1]*[13]+*[i2]*[13]-n)	j = a+b+c+d +*[e]*+f+g+h +*[i1]*+*[i2]*	k	l	m	n	Ano/Ne	
- X-LAM DOLOMITI	64 825.00	0.00	0.00	0.00	0.00	0.00	454 000.00	0.00	129 706.25	648 531.25	70.00	453 971.88	453 971.88	0.00	Ne	nedostupné
- FANTI LEGNAMI	41 126.00	0.00	0.00	0.00	0.00	0.00	285 000.00	0.00	81 531.50	407 657.50	70.00	285 360.25	285 360.25	0.00	Ne	nedostupné
Total beneficiary	232 191.00	0.00	3 817.23	136 007.90	0.00	0.00	744 000.00	0.00	278 049.73	1 390 248.63		1 022 389.05	1 022 389.05	nedostupné	nedostupné	0.00
31. UNITN	308 000.00	0.00	0.00	0.00	0.00	0.00	5 000.00	0.00	78 250.00	391 250.00	100.00	391 250.00	391 250.00	0.00	Ne	nedostupné
32. POLITO	248 000.00	0.00	0.00	0.00	0.00	0.00	28 750.00	0.00	69 187.50	345 937.50	100.00	345 937.50	345 937.50	0.00	Ne	nedostupné
33. OBF	644 115.00	0.00	0.00	0.00	30 000.00	0.00	19 000.00	0.00	165 778.75	828 893.75	100.00	828 893.75	828 893.75	0.00	Ne	nedostupné
34. NANO	58 596.00	0.00	0.00	0.00	20 000.00	0.00	35 000.00	0.00	23 399.00	116 995.00	70.00	81 896.50	81 896.50	0.00	Ne	nedostupné
35. AIGUASOL	144 130.00	0.00	0.00	0.00	0.00	0.00	14 850.00	0.00	39 745.00	198 725.00	70.00	139 107.50	139 107.50	0.00	Ne	nedostupné
Total consortium	12 866 565.60	0.00		147 296.30	779 173.00	0.00	3 416 121.00	0.00	4 107 495.73	21 316 651.63		19 998 408.55	19 998 408.55			0.00

[1] Viz článek 6 o podmínkách způsobilosti.
[2] Nepřímé náklady již pokryté operačním grantem (získaným od finančního programu EU nebo Euratomu; viz čánek 6.5.(b)) jsou nezpůsobilé v rámci grantové dohody. Proto příjemce grantu/třetí strana, které získá operační grant během doby akce nemůže vykázat náklady v roční zprávě pokryté operačním grantem, nedokáže-li, že operační grant nepokrývá žádné náklady na akci (viz článek 6.2.E).
[3] Toto je teoretická částka příspěvku EU, kterou systém vypočítá automaticky (násobením rozpočtovaných nákladů sazbou pro náhradu). Tato teoretická částka může dosáhnout pouze "maximálního příspěvku EU" (který se Agentura rozhodla pro akci poskytnout) (viz článek 5.1).
[4] "Maximální hodnota grantu" je rozhodnuta Agenturou. Běžně odpovídá výši vyžádaného grantu, ale může být nižší.
[5] V závislosti na typu, tato specifická kategorie nákladů bude nebo nebude pokrývat nepřímé náklady. Specifické jednotkové náklady, které zahrnují nepřímé náklady, jsou: náklady na měření energetické efektivnosti v budovách, cena přístupu za poskytnutí mezinárodní přístup k výzkumné infrastruktuře a náklady na klinické studie.
[6] Viz článek 5 pro formu nákladů.
[7] Jednotka: hodiny odpracované na akci; náklady za jednotku (hodinová sazba): vypočítaná podle obvyklých účetních zvyklostí příjemce grantu.
[8] Viz příloha 2a "Doplňující informace o odhadovaném rozpočtu" pro detaily (náklady za hodinu (hodinová sazba)).
[9] Jednotka a náklady za jednotku: vypočítáno podle obvyklých účetních zvyklostí příjemce grantu.
[10] Paušální sazba: 25 % uplatnitelných přímých nákladů, ze kterých jsou vyloučeny: přímé náklady subdodavatelů, nákaldy věcných příspěvků neužité v prostorách, přímé náklady finanční podpory a jednotkové náklady vykázané pod rozpočtovou kategorií F, pokud zahrnují nepřímé náklady (viz článek 6.2.E).
[11] Viz příloha 2a "Doplňující informace o odhadovaném rozpočtu" pro detaily (jednotka, náklady na jednotku).
[12] Viz příloha 2a "Doplňující informace o odhadovaném rozpočtu" pro detaily (jednotka, náklady na jednotku, odhadovaný počet jednotek atd.).
[13] Pouze specifické jednotkové náklady, které nezahrnují nepřímé náklady.
[14] Viz článek 9 pro příjemce daru nepřijímající financování.
[15] Pouze pro třetí strany, které přijímají financování.

Příloha 2a

Jednotkové náklady pro vlastníky MSP/fyzické příjemce bez platu

1. Náklady pro majitele malých a středních podniků, který nedostává plat

Jednotky: hodiny odpracované na akci

Částka na jednotku (‘hodinová sazba): vypočítá se podle následujícího vzorce

{měsíční příspěvek na živobytí pro výzkumné pracovníky v akcích MSCA-IF / 143 hodin}

vynásobeno

{opravný koeficient pro konkrétní kraj v zemi, kde je příjemce usazen}

Měsíční příspěvek na živobytí a korekční koeficienty pro konkrétní kraj jsou stanoveny v Pracovním programu (oddíl 3 MSCA) platný v době výzvy:

- pro výzvy v rámci pracovního programu 2018-2020:
- měsíční příspěvek na živobytí: 4 880 EUR
- korekční koeficienty pro jednotlivé země: viz pracovní program na období 2018–2020 (k dispozici na stránce referenčních dokumentů portálu pro účastníky)

U následujících příjemců/propojených třetích stran jsou částky na jednotku (hodinová sazba) stanoveny takto:

Příjemce/propojená třetí strana	Měsíční příspěvek na živobytí	Opravný koeficient	Hodinová sazba po aplikaci opravného koeficientu
16. Buro de Haan	4 880 EUR	1,079 (NL)	36,83 EUR
21. RC Panels	4 880 EUR	1,079 (NL)	36,83 EUR
30. DTTN/Armalam	4 880 EUR	1,044 (IT)	35,63 EUR

Odhadovaný počet jednotek: viz příloha 2

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

CONSEIL DES ARCHITECTES D'EUROPE (ACE), se sídlem v RUE PAUL EMILE JANSON 29, BRUXELLES 1050, Belgie, DIČ: BE0464884970, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('2')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

CESKE VYSOKE UCENI TECHNICKE V PRAZE (CVUT), se sídlem JUGOSLAVSKYCH PARTYZANU 1580/3, PRAHA 160 00, Česká republika, DIČ: CZ68407700, („Příjemce"), zastoupeno za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('3')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřuje

koordinátora, aby jeho jménem a v jeho zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

DANMARKS TEKNISKE UNIVERSITET (DTU), se sídlem ANKER ENGELUNDSVEJ 1 BYGNING 101 A, KGS LYNGBY 2800, Dánsko, DIČ: DK30060946, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('4')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

DANFOSS A/S (DANFOSS A/S), se sídlem Nordborgvej 81, NORDBORG 6430, Dánsko, DIČ: DK20165715, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('5')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

ENFOR AS (ENFOR), se sídlem LYNGSO ALLE 3, HORSHOLM 2970, Dánsko, DIČ: DK29421633, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('6')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

PROJECT ZERO A/S (PROJECTZERO), se sídlem Alsion 2, Sonderborg 6400, Dánsko, DIČ: DK29215642, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('7')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

ACCADEMIA EUROPEA DI BOLZANO (EURAC), se sídlem VIALE DRUSO 1, BOLZANO 39100, Itálie, DIČ: IT01659400210, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('8')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

SINTEF AS (SINTEF), se sídlem STRINDVEGEN 4, TRONDHEIM 7034, Norsko, DIČ: NO919303808MVA, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('9')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

AYUNTAMENT DE PALMA DE MALLORCA (PALMA), se sídlem PLAZA DE CORT 1, PALMA DE MALLORCA 07001, Španělsko, DIČ: ESP0704000I, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('10')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

INSTITUTO BALEAR DE LA VIVIENDA (IBAVI), se sídlem CALLE MANUEL AZANA 9 BAJOS, PALMA DE MALLORCA 07006, Španělsko, DIČ: ESQ5750001I, („Příjemce“), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. (‘11’)

v Grantové smlouvě č. 101036723 („Smlouva”)

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura“), v rámci pravomocí svěřených Evropskou komisí („Komise“),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)“.

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

FUNDACIO INSTITUT DE RECERCA DE L'ENERGIA DE CATALUNYA (IREC), se sídlem C/ JARDINS DE LES DONES DE NEGRE 1, SANT ADRIA DE BESOS 08930, Španělsko, DIČ: ESG64946387, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('12')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

METROVACESA, SA (MET), se sídlem C QUINTANAVIDES 13 PARQUE EMPRESARIAL VIA NORTE ED 1 PLANTA 1, MADRID 28050, Španělsko, DIČ: ESA87471264, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('13')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

Stichting Hogeschool Utrecht (UAS Utrecht), se sídlem PADUALAAN 99, UTRECHT 3584 CH, Nizozemsko, DIČ: NL806163185B01, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('14')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

COMITE EUROPEEN DE COORDINATION DE L'HABITAT SOCIAL AISBL (HOUSING EUROPE), se sídlem SQUARE DE MEEUS 18, BRUXELLES 1050, Belgie, DIČ: BE0473324762, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('15')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

BURO DE HAAN INFORMATIE TECHNOLOGIE BV (Buro de Haan), se sídlem ACHTHOEVENWEG 34, STAPHORST 7951 SK, Nizozemsko, DIČ: NL857548773B01, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('16')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

CENTER DANMARK DRIFT APS (Center Denmark), se sídlem VENDERSGADE 74, FREDERICIA 7000, Dánsko, DIČ: DK40868399, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('17')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

SONDERBORG ANDELSBOLIGFORENING (SAB), se sídlem BYGTOFTEN 2, SONDERBORG 6400, Dánsko, DIČ: DK45569810, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('18')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

GREEN DIGITAL FINANCE ALLIANCE (GDFA), se sídlem CHEMIN DES ANEMONES 11-13, CHATELAINE 1219, Švýcarsko, DIČ: CHE496481826TVA, („Příjemce“), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. (‘19’)

v Grantové smlouvě č. 101036723 („Smlouva”)

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura“), v rámci pravomocí svěřených Evropskou komisí („Komise“),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)“.

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

STICHTING BO-EX 91 (BOEX), se sídlem JAN CORNELISZ MAYLAAN 18, UTRECHT 526GV, Nizozemsko, DIČ: NL800519085B01, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('20')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

RC PANELS BV (Rc Panels B.V.), se sídlem CONSTRUCTIEWEG 1, LEMELERVELD 8152 GA, Nizozemsko, DIČ: NL856857270B01, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('21')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

UNIVERSITEIT UTRECHT (UU), se sídlem HEIDELBERGLAAN 8, UTRECHT 3584 CS, Nizozemsko, DIČ: NL001798650B01, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('22')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

GEMEENTE UTRECHT (CITY OF UTRECHT), se sídlem STADSPLATEAU 1, UTRECHT 521 AZ, Nizozemsko, DIČ: NL002220647B01, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('23')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

BOS INSTALLATIEWERKEN BV (BOSGROEP), se sídlem TENNESSEEDREEF 17, UTRECHT 3565 CK, Nizozemsko, DIČ: NL801071197B01, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('24')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

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PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

IWELL BV (iwell), se sídlem ATOOMWEG 7-9, UTRECHT 3542 AA, Nizozemsko, DIČ: NL856333268B01, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('25')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

ME X ARCHITECTS BV (MEX), se sídlem SPOORLAAN 18, BILTHOVEN 3721 PB, Nizozemsko, DIČ: NL809748253B01, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('26')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

STICHTING MITROS (Mitros), se sídlem KONINGIN WILHELMINALAAN 9, UTRECHT 3527 LA, Nizozemsko, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('27')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

STATUTARNI MESTO KARVINA (KARV), se sídlem FRYSTATSKA 72 1, KARVINA FRYSTAT 733 24, Česká republika, DIČ: CZ00297534, („Příjemce"), zastoupeno za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('28')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřuje

koordinátora, aby jeho jménem a jeho zastoupením předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

DOLOMITI ENERGIA RINNOVABILI SOCIETA A RESPONSABILITA' LIMITATA (DOL), se sídlem VIA FERSINA 23, TRENTO 38123, Itálie, DIČ: IT01840970220, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('29')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

DISTRETTO TECNOLOGICO TRENTINO SCARL (DTTN), se sídlem PIAZZA MANIFATTURA 1, ROVERETO 38068, Itálie, DIČ: IT01990440222, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('30')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

UNIVERSITA DEGLI STUDI DI TRENTO (UNITN), se sídlem VIA CALEPINA 14, TRENTO 38122, Itálie, DIČ: IT00340520220, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('31')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

POLITECNICO DI TORINO (POLITO), se sídlem CORSO DUCA DEGLI ABRUZZI 24, TORINO 10129, Itálie, DIČ: IT00518460019, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('32')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

OSLO KOMMUNE (OBF), se sídlem RADHUSET, OSLO 0037, Norsko, DIČ: NO958935420MVA, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('33')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

NANO POWER AS (NANO), se sídlem TISKARSKA 599/12, PRAHA 108 00, Czech Republic, DIČ: CZ01719041, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('34')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

a pověřují

koordinátora, aby jejich jménem a v jejich zastoupení předložil a podepsal veškeré **dodatky** ke Smlouvě, v souladu s článkem 55.

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Podpisem tohoto Přístupového formuláře Příjemce přijímá grant a souhlasí s jeho implementací v v souladu se Smlouvou, se všemi závazky a podmínkami, které stanoví.

PODPIS

Za Příjemce

PŘÍLOHA 3

PŘÍSTUPOVÝ FORMULÁŘ PRO PŘÍJEMCE

SISTEMES AVANCATS D ENERGIA SOLAR TERMICA SCCL (AIGUASOL SAEST), se sídlem CALLE ROGER DE LLURIA 29 3R 2E, BARCELONA 08009, Španělsko, DIČ: ESF62787692, („Příjemce"), zastoupeni za účelem podpisu tohoto Přístupového formuláře níže podepsaným,

tímto souhlasí

stát se příjemcem č. ('35')

v Grantové smlouvě č. 101036723 („Smlouva")

mezi NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU **a** Evropskou výkonnou agenturou pro klima, infrastrukturu a životní prostředí (CINEA) („agentura"), v rámci pravomocí svěřených Evropskou komisí („Komise"),

pro akci nazvanou „Klimaticky pozitivní cirkulární komunity (ARV)".

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PODPIS

Za Příjemce

i tiskový formát A4
na šířku

VZOR PŘÍLOHA 4 PRO H2020 OBECNÉ MGA — MULTI

FINANČNÍ VÝKAZ ZA [PŘÍJEMCE [název]/ PROPOJENÁ TŘETÍ STRANA [název]] ZA VYKAZOVANÉ OBDOBÍ [vykazované období]

	Způsobilé[1] náklady (podle kategorie rozpočtu)													Příjmy	Příspěvek EU			Dodatečné informace
	A. Přímé osobní náklady				B. Přímé náklady na subdodávky	*[C. Přímé náklady na fin. podporu*	D. Další přímé náklady			E. Nepřímé náklady	*[F. Náklady na …]*		Celkové náklady	Příjmy	Sazba náhrady %	Maximální příspěvek EU[3]	Požadovaný příspěvek EU	Informace o nepřímých nákladech:
	A.1 Zaměstnanci (popř. ekvivalent) A.2 Fyzické osoby na základě přímé smlouvy A.3 Vyslané osoby *[A.6 Personál pro poskytování přístupu k výzkumné infrastruktuře]*		A.4 Majitelé MSP bez platu A.5 Příjemci, kteří jsou fyzickými osobami bez platu			*[C.1 Finanční podpora]* *[C.2 Ocenění]*	D.1 Cesta D.2 Vybavení D.3 Další zboží a služby	*[D.4 Náklady na velkou výzkum-nou infrastrukt.]*	D.5 Náklady na interně fakturované zboží a služby		*[F.1 Náklady na…]*	*[F.2 Náklady na…]*		Příjmy z akce, které mají být vykazovány v posledním vykazovacím období, podle článku 5.3.3				Náklady na věcné příspěvky nevyužité v prostorách
Forma nákladů[4]	Skutečné	Jednotka	Jednotka		Skutečné	Skutečné	Skutečné	Skutečné	Jednotka	Paušální sazba **5** 25%	Jednotka		*[Jednotka][Paušál]*					
	a	Celkem b	Žádné hodiny	Celkem c	d	*[e]*	f	*[g]*	Celkem h	i=0,25 x (a+b+ c+f+*[g]* + h+ *[j 1]* **6** +*[j2]* **6** -p)	Žádné jednotky	Celkem *[j1]*	Celkem *[j2]*	k = a+b+c+d+*[e]* +*f* + *[g]* +h+ i + *[j1]* +*[j2]*	l	m	n	o	p
[zkrácený název příjemce/propojené třetí strany]																		

Příjemce/propojená třetí strana tímto potvrzuje, že:
Poskytnuté informace jsou úplné, spolehlivé a pravdivé.
Vykázané náklady jsou způsobilé (viz článek 6).
Náklady lze doložit odpovídajícími záznamy a podpůrnou dokumentací, které budou předloženy na vyžádání nebo v souvislosti s kontrolami, přezkumy, audity a vyšetřováním (viz články 17, 18 a 22).
Za poslední vykazované období: že byly deklarovány všechny příjmy (viz článek 5.3.3).

i Uveďte prosím všechny způsobilé náklady, i když přesahují částky uvedené v odhadovaném rozpočtu (viz příloha 2). Později lze zohlednit pouze částky, které byly deklarovány ve vaší individuální účetní závěrce, aby se nahradily ostatní náklady, u nichž se zjistí, že jsou nezpůsobilé.

[1] Podmínky způsobilosti viz článek 6

[2] Deklarované nepřímé náklady musí být prosté veškerých částek krytých z provozního grantu (získaného v rámci jakéhokoli finančního programu EU nebo Euratomu; viz článek 6.2.E). Pokud jste během tohoto vykazovaného období obdrželi provozní grant, nemůžete si nárokovat nepřímé náklady, pokud neprokážete, že provozní grant nepokrývá žádné náklady na akci.

[3] Toto je *teoretická* částka příspěvku EU, kterou systém vypočítá automaticky (vynásobením míry náhrady celkovými vykázanými náklady). Částka, kterou požadujete (ve sloupci „požadovaný příspěvek EU“) může být nižší,

[4] Formy nákladů viz článek 5

[5] Paušální sazba: 25% způsobilých přímých nákladů, z nichž jsou vyloučeny: přímé náklady na subdodávky, náklady na věcné příspěvky nepoužité v prostorách, přímé náklady na finanční podporu a jednotkové náklady vykázané v rozpočtové kategorii F, pokud zahrnují nepřímé náklady (viz článek 6.2.E)

[6] Pouze specifické jednotkové náklady, které nezahrnují nepřímé náklady.

PŘÍLOHA 5

VZOR PRO OSVĚDČENÍ FINANČNÍCH VÝKAZŮ

- **Pro možnosti psané [kurzívou v hranatých závorkách]: zvolte odpovídající možnost. Nezvolené možnosti by měly být smazány.**
- **Pro pole v [šedých hranatých závorkách]: vepište odpovídající údaje.**

OBSAH

Zadávací podmínky nezávislé zprávy zjištění o nákladech vykázaných v rámci grantové dohody financované rámcovým programem Horizont 2020

Tento dokument stanovuje 'Zadávací podmínky', za kterých

[MOŽNOST 1: [vložte jméno příjemce grantu] (*dále jako 'příjemce '*)] [MOŽNOST 2: [vložte jméno třetí strany] (dále jako'*třetí strana'*), třetí strana vázaná na příjemce grantu [vložte jméno příjemce] (dále jako '*příjemce'*)]

souhlasí, že zaměstná

[**vložte název společnosti auditora**] (dále jako'auditor')

aby vypracoval nezávislou zprávu o věcných zjištěních (dále jako'zpráva') týkající se finančních/finančního výkazu/ů vypracovaného/ých [*příjemce grantu*] [*třetí strana*] pro grantovou dohodu programu Horizont 2020 [*vložte číslo grantové dohody, název opatření, zkratku a trvání od/do*] (dále jako 'dohoda'), a

aby vydal Osvědčení o finančních výkazech podle Článku 20.4 dohody na základě povinného standardizovaného vzoru stanoveného Komisí.

Dohoda byla uzavřena v rámci programu Horizont 2020 mezi příjemcem grantu a [MOŽNOST 1: Evropskou unií, zastoupenou Evropskou komisí (dále jako 'komise')][MOŽNOST 2: *Evropským společenstvím pro atomovou energii* (Euratom) zastoupeným *Evropskou komisí* (dále jako 'Komise')] [MOŽNOST 3: [Výkonnou agenturou pro výzkum (REA)] [Výkonnou agenturou Evropské rady pro výzkum (ERCEA)] [Výkonnou agenturou pro inovace a sítě (INEA)] [Výkonnou agenturou pro malé a střední podniky (EASME)] (dále jako 'agentura'), v rámci pravomocí udělených Evropskou komisí (dále jako 'komise').]

[Komise] [agentura] je vedena jako signatář dohody pouze s příjemcem grantu.
[Evropská unie][Euratom][agentura] není součástí tohoto závazku.

1.1 Předmět zapojení

Koordinátor musí *[Komisi] [Agentuře]* odevzdat závěrečnou zprávu během 60 dnů od posledního vykazovaného období, která by kromě dalších dokumentů měla zahrnovat Osvědčení o finančních výkazech pro každého příjemce grantu a všechny zapojené třetí strany, které vyžádají celkový příspěvek 325 tisíc euro a výše jako náhradu skutečných nákladů a jednotkových nákladů vypočítaných na základě obvyklých nákladů účetních zvyklostí (viz Článek 20.4 dohody). Osvědčení o finančních výkazech musí zahrnout všechna vykazovaná období příjemce grantu nebo připojených třetích stran zmíněných výše.

Příjemce grantu musí za sebe a zapojené třetí strany odevzdat koordinátorovi Osvědčení o finančních, pokud fmusí Osvědčení být zahrnuto v závěrečné zprávě podle Článku 20.4 dohody.

Osvědčení o finančních výkazech se skládá ze dvou samostatných dokumentů:

- Zadávací podmínky podepsané [příjemcem grantu] [zapojená třetí strana] a auditorem;

[1] By which costs under the Agreement are declared (see template 'Model Financial Statements' in Annex 4 to the Grant Agreement).

- Nezávislá zpráva věcných zjištění auditora (‘zpráva’) vydaná na auditorově hlavičkovém papíře, datována, orazítkovaná a podepsaná auditorem (nebo způsobilým úředníkem veřejné správy), která obsahuje smluvené procedury (dále jako ‘procedury’) provedené auditorem a standardní věcná zjištění (‘zjištění’) potvrzená auditorem.

Musí-li být Osvědčení o finančních výkazech zahrnuto v závěrečné zprávě podle Článku 20.4 dohody, požadavek na vyplacení zůstatku podle dohody nemůže být proveden bez Osvědčení o finančních výkazech. Nicméně proplacení nákladů krytých Osvědčením o finančních výkazech nezabraňuje Komisi [agentura], Evropskému úřadu pro boj proti podvodům a Evropskému účetnímu dvoru, aby provedly kontroly, revize, audity a šetření v souladu s Článkem 22 dohody.

1.2 Povinnosti

[Příjemce grantu] [zapojená třetí strana]:

- musí sestavit finanční výkaz(y) pro aktivity financované dohodou v souladu s povinnostmi stanovenými dohodou. Finanční výkaz(y) musí být sestaveny podle účetních systémů a hlavních účtů a záznamů [příjemce grantu] [zapojená/é třetí strana/y];
- musí poslat finanční výkaz(y) auditorovi;
- je zodpovědný a ručí za přesnost finanční(ch) výkazu(ů);
- je zodpovedný za úplnost a přesnost poskytnutých informací, aby umožnil auditorovi provádět procedury. Musí auditorovi poskytnout písemný dopis o zastoupení podporující tato prohlášení. Písemný dopis o zastoupení musí uvádět dobu, po kterou jsou prohlášení platná, a musí být datován;
- přijímá, že auditor nemůže provádět procedury, pokud mu není poskytnut plný přístup k personálu a účetnictví [příjemce grantu] [zapojená třetí strana], stejně jako další relevantní záznamy a dokumentace.

Auditor:

- *[Standardn*ě možnost 1*:* je kvalifikován k provádění statutárních auditů účetních dokumentů v souladu se směrnicí 2006/43/EC Evropského parlamentu a Rady ze dne 17. května 2006 o statutárních auditech účetních závěrek a konsolidovaných účtech, upravující směrnici Rady 78/660/EEC a 83/349/EEC a rušící směrnici Rady 84/253/EEC či podobná národní regulace*.]*.

- *[Mo*žnost *2, pokud p*říjemce nebo třetí strana mají nezávislého veřejného činitele: je kompetentní a nezávislý veřejný činitel, kterému k provedení auditu příjemce grantu poskytly právní způsobilost relevantní státní úřady.

- *[Mo*žnost *3, pokud* je příjemce grantu nebo třetí strana mezinárodní organizace*:* je [interní] [externí] auditor v souladu s vnitřními finančními směrnicemi a procedurami dané mezinárodní organizace].

Auditor:

- musí být nezávislý na příjemci grantu [a třetí straně], konkrétně nesměl být zapojen do přípravy finančních výkazů [příjemce grantu] [třetí strany];

- musí si naplánovat práci tak, aby mohly být provedeny procedury a zhodnocena zjištění;
- musí dodržovat stanovené procedury a daný formát zprávy;
- musí vypracovat audit v souladu s těmito zadávacími podmínkami;
- musí zdokumentovat záležitosti, které jsou důležité a podporují zprávu;
- musí svou zprávu založit na získaných důkazech;
- musí odevzdat zprávu [příjemci grantu] [třetí straně].

Komise stanovuje procedury, které mají být provedeny auditorem. Auditor není zodpovědný za jejich vhodnost či relevantnost. Jelikož není tento audit ověřovací zakázkou, auditor neposkytuje auditní stanovisko ani prohlášení o věrohodnosti.

1.3 Příslušné normy

Auditor se musí řídit temito zadávacími podmínkami a[2]:

- Mezinárodními normami příbuzných služeb ('ISRS') 4400 Závazky provádět smluvené procedury týkající se finančních informací vydanými Radou pro mezinárodní auditorské a ověřovací standardy (IAASB);
- Etickým kodexem profesionálních účetních vydaným Radou pro mezinárodní etické standardy pro účetní (IESBA). Ačkoliv ISRS 4400 říká, že nezávislost není požadavkem pro provedení dohodnutých procedur, [komise] [agentura] vyžaduje, aby auditor také dodržoval Kodexem stanovené požadavky na nezávislost.

Auditní zpráva musí uvádět, že neexistuje střet zájmu vytvořením této zprávy mezi auditorem a příjemcem grantu [a třetí stranou], a musí specifikovat - pokud je služba fakturována - celkový poplatek, který byl auditorovi zaplacen za vypracování zprávy.

1.4 Podávání zpráv

Zpráva musí být napsána jazykem dohody (viz Článek 20.7).

Podle článku 22 dohody, Komise *[, Agentura],* Evropský úřad pro boj proti podvodům a Evropský účetní dvůr mají právo auditovat jakoukoliv práci, která je vykonávána v rámci a jejíž náklady jsou vykázány z rozpočtu [*Evropské* unie] [*Euratomu*]. Toto zahrnuje práci vztahující se k tomuto auditu. Auditor musí poskytnout přístup ke všem pracovním materiálům (např. přepočet hodinových sazeb, potvrzení času vykázaného pro aktivitu) týkajícím se tohoto úkolu, pokud si je Komise *[, Agentura]*, Evropský úřad pro boj proti podvodům či Evropský účetní dvůr vyžádají.

1.5 Termín

Zpráva musí být poskytnuta do *[*den Měsíc rok*]*.

1.6 Další podmínky

*[P*říjemce grantu*] [t*řetí strana*] a auditor mohou tuto sekci použ*ít k dohodnutí *dal*ších specifických podmínek, odměny auditora, závazky a povinnosti, *platn*ých právních předpisů apod. Tyto specifické podmínky nesmí odporovat podmínkám daným výše.

[právní název auditora]	[právní název *[p*říjemce grantu*]/[t*řetí strany*]*]
[jméno a funkce zplnomocněného zástupce]	[jméno a funkce zplnomocněného zástupce]
[den měsíc rok]	[den měsíc rok]
podpis auditora	Podpis *[p*říjemce grantu*]/[t*řetí strany*]*

[2] Nejvyšší kontrolné instituce aplikující n o r m y INTOSAI mohou provádět procedury podle odpovídajících Mezinárodních Standardů Nejvyšších kontrolních institucí a etického kodexu vydaného INTOSAI místo Mezinárodních standardů příbuzných služeb ('ISRS') 4400 a Etického kodexu profesionálních účetních vydaného IAASB a IESBA.

Nezávislá zpráva o věcných zjištěních týkajících se nákladů vykázaných v rámci rámcového programu Horizont 2020

(Vytištěno na hlavičkovém papíře auditora)

Pro
[jméno kontaktní osoby], [pozice]
[jméno [příjemce grantu] [třetí strany]]
[adresa]
[den měsíc rok]

Vážený/á [jméno kontaktní osoby],

V souladu s podmínkami ze dne [den měsíc rok]

s *[MO*ŽNOST *1: [vlo*žte jméno příjemce grantu*] (d*ále jako *'p*říjemce grantu*')] [MO*ŽNOST *2: [vlo*žte jméno třetí strany*] (d*ále jako *'t*řetí strana*'), t*řetí strana spojená s příjemcem grantu *[vlo*žte jméno příjemce grantu*] (d*ále jako *'p*říjemce grantu*')],*

jsme my, [jméno auditora] (dále jako 'auditor'),

se sídlem v [úplná adresa/město/stát/provincie/země],

v zastoupení [jméno a funkce zodpovědného zástupce],

vykonali procedury s vámi smluvené týkající se nákladů vykázaných ve finančním(ch) výkazu(ech) [3] *[p*říjemce grantu*] [t*řetí strany*]* týkající se grantové dohody [vložte údaje o grantové dohodě: číslo, název a zkratku] (dále jako 'dohoda')

s úplnými vykázanými náklady with a total cost declared
v částce [úplná částka] euro,

a úplné náklady a jednotkové náklady vypočítané podle obvyklých účetních praktik [*p*říjemce grantu] [*t*řetí strany] pro výpočet nákladů ve výši

[souhrn úplných skutečných nákladů a úplných přímých osobních nákladů vykázaných jako jednotkové náklady vypočítané v souladu s obvyklými účetními praktikami *[p*říjemce grantu*] [t*řetí strany*]*] euro

a tímto poskytujeme svou **Nezávislou zprávu o věcných zjištěních (dále jako 'zpráva')** v povinném formátu s vámi smluveném.

Zpráva

Náš audit byl proveden v souladu s podmínkami zadání přiloženými k této smlouvě.
Zpráva obsahuje předem domluvené a realizované procedury (dále jako 'procedury') a standardní věcná zjištění (dále jako 'zjištění').

[3] Kterými příjemce grantu vykazuje náklady v rámci dohody (viz 'Vzor finančního výkazu' v příloze 4 dohody).

Procedury byly realizovány pouze za účelem asistence [*Komise*] [*Agentura*] při evaluaci, zda náklady [*příjemce grantu*] [*třetí strany*] v přiložených finančních výkazech byly vykázány v souladu s dohodou. [*Komise*] [*Agentura*] dochází k závěrům na základě zprávy a jakýchkoliv dalších informací, které budou potřebné.

Rozsah procedur byl stanoven Komisí. Z tohoto důvodu není auditor zodpovědný za jejich vhodnost či relevantnost. Jelikož relizované procedury netvoří ani audit, ani revizi uskutečněnou v souladu s Mezinárodními auditními standardy nebo Mezinárodními Standardy auditních revizí, auditor nepodává prohlášení o věrohodnosti týkající se finančních výkazů.

Pokud auditor realizoval dodatečné procedury nebo audit finančních výkazů [*příjemce grantu*] [*třetí strany*] v souladu s Mezinárodními auditními standardy nebo Mezinárodními standardy auditních revizí, další záležitosti mohly vejít v jeho patrnost a byly by zahrnuty ve zprávě.

Nepoužitelná zjištění

Analyzovali jsme finanční výkaz(y) zmíněné výše a následující zjištění považujeme za nepoužitelná:

Vysvětlení (bude ze zprávy odstraněno):

Pokud je zjištění nepoužitelné, musí být označeno 'N.A.' ('Not applicable') v odpovídající řádce v pravém sloupci tabulky a znamená, že zjištění nemuselo být potvrzeno auditorem a k němu se vztahující procedury nemusely být realizovány.
Důvody pro nepoužitelnost určitého zjištění musí být jasné, tj.

i) pokud nebyly v dané kategorii vykázány žádné náklady, pak jsou daná zjištění nepoužitelná; not applicable;

ii) pokud nejsou podmínky realizace dané procedury splněny, dané procedury a k nim se vztahující zjištění jsou nepoužitelná. Například pro příjemce grantu s účty vedenými v jiné měně než euro nejsou procedury a zjištění vztahující se k příjemcům s účty vedenými v jiné měně než euro použitelná.

Zde uveďte všechna zjištění považována za nepoužitelná pro současný audit a vysvětlete důvody jejich nepoužitelnosti.

….

Výjimky

Kromě výjimek uvedených níže, [*příjemce grantu*] [*třetí strana*] poskytla auditorovi veškerou potřebnou dokumentaci a informace o účetnictví za účelem realizace požadovaných procedur a zhodnocení zjištění.

Vysvětlení (bude ze zprávy odstraněno)

- *Pokud nebyl auditor schopen úspěšně dokončit vyžádanou proceduru, musí být označena '**E**' ('Exception') v odpovídající řádce v pravém sloupečku tabulky. Důvod, jako například neschopnost sladit klíčové informace nebo nedostupnost dat, která znemožňuje auditorovi realizovat proceduru musí být uvedeny níže.*

- *Pokud auditor nemůže potvrdit standardní zjištění po realizaci odpovídající procedury, musí být také označeno '**E**' ('Exception') a, kde je to možné, musí být uvedeny důvody, proč nebylo zjištění splněno a možný dopad tohoto nesplnění musí být vysvětlen níže.*

Zde uveďte jakékoliv výjimky či přidejte jakékoliv informace týkající se důvodu a možných dopadů každé výjimky označené 'E', jsou-li známy. Pokud je výjimka vyčíslitelná, uveďte odpovídající částku.

…

Příklad (bude odstraněn ze zprávy)

1. *Příjemce grantu nebyl schopen podpořit důkazy zjištění číslo 1 týkající se… protože…*
2. *Zjištění číslo 30 nebylo splněno, protože metodologie použitá příjemcem grantu pro výpočet jednotkových nákladů byl jiný než předepsaný Komisí. Rozdíly byly následující: …*
3. *Po realizaci procedur pro potvrzení zjištění číslo 31 zjistil auditor rozdíl _____ euro. Rozdíl může být vysvětlen…*

Další poznámky

Kromě podání zprávy o výsledcích konkrétních relaizovaných procedur by auditor také rád poskytnul tyto další obecné poznámky:

Příklad (bude ze zprávy odstraněn)

1. *Co se týče zjištění číslo 8, podmínky pro dodatečnou odměnu byly považovány za splněné protože…*
2. *Aby bylo možné potvrdit zjištění číslo 15, realizovali jsme následující dodatečné procedury: …*

Užití této zprávy

Tato zpráva může být použita pouze pro účely popsané ve výše uvedeném cíli. Byla vypracována pouze pro důvěrné užití [příjemcem grantu] [třetí stranou] a [Komisí] [Agenturou] a bude pouze odevzdána [Komisí] [Agentuře] ve spojitosti s požadavky stanovenými v Článku 20.4 dohody. Zpráva nemůže být použita [příjemcem grantu] [třetí stranou] nebo [Komisí] [Agenturou] za jiným účelem ani nemůže být šířena jiným stranám.

[Komise] [Agentura] může zprávu šířit pouze oprávněným stranám, zvláště pak Evropskému úřadu pro boj proti podvodům a Evropskému účetnímu dvoru.

Tato zpráva se vztahuje pouze k finančním výkazům odevzdaným [Komisi] [Agentuře] [příjemcem grantu] [třetí stranou] za účelem dohody. Z tohoto důvodu se nevztahuje na žádné jiné finanční výkazy [příjemce grantu] [třetí strany]

Mezi auditorem a příjemcem grantu [a třetí stranou] nebyl žádný střet zájmu[4] v rámci vytvoření této zprávy. Celková odměna zaplacená auditorovi za poskytnutí této zprávy bylo _____ euro (včetně _____ eur odpočitatelné DPH)

Těšíme se na prodiskutování naší zprávy s vámi a rádi vám poskytneme další informace či pomoc.

[právní název auditora]
[jméno a funkce oprávněného zástupce]
[den rok měsíc]
Podpis auditora

[4] Konflikt zájmu může vyvstat, když je auditorova objektivita k vydání osvědčení věcně či zdánlivě kompromitována, když auditor například:

- byl zapojen do přípravy finančních výkazů;
- bude mít přímý zisk, pokud bude osvědčení přijato;
- má blízký vztah k jakékoliv osobě zastupující příjemce grantu;
- je ředitelem, členem dozorčí rady či partnerem příjemce grantu nebo
- je v jaikékoliv jiné situaci, která kompromituje jeho nebo její nezávislost či schopnost vystavit osvědčení nezaujatě.

Procedury sjednané k realizaci a standardní věcná zjištění k potvrzení auditorem

- Evropská komise si vyhrazuje právo i) poskytnout auditorovi dodatečé vedení týkající se procedur či faktů, která mají být zjištěná, a způsob, jakým budou prezentovány (toto může zahrnovat vzor pokrytí a zjištění) nebo ii) změnit procedury oznámením příjemci grantu písemně. Procedury relalizované auditorem za
- účelem potvrzení standardních věcných zjištění jsou zavedeny v tabulce níže.
- Pokud se toto osvědčení vztahuje i na třetí stranu, jakýkoliv odkaz na příjemce grantu níže musí být považován za odkaz na třetí stranu.
- Sloupec "výsledek"má tři různé možnosti: ‘C’, ‘E’ a ‘N.A.’:
  - ‘C’ znamená ‘confirmed’ (potvrzeno) a znamená, že auditor může potvrdit ‘standardní věcné zjištění’, a proto není nutno zaznačit výjimku,
  - ‘E’ znamená ‘exception’ (výjimka) a znamená, že auditor realizoval procedury, ale nemůže potvrdit "standardní věcné zjištění", nebo že auditor nebyl schopen realizovat danou proceduru (např. z důvodu nemožnosti sladění klíčových informací nebo byly údaje nedostupné,
  - ‘N.A.’ znamená ‘not applicable’ (nepoužitelné), což znamená, že zjištění nemuselo být auditorem přezkoumáno a k němu se vztahující procedura(y)) nemusel(a) být realizována(y). Důvody pro nepoužitelnost daného zjištění musí být jasné, tj. i) pokud nebyl vykázán žádný náklad v dané kategorii, pak jsou k němu se vztahující zjištění a procedury neplatné; ii) pokud nejsou splněny podmínky k aplikování daných procedur, pak jsou k nim se vztahující zjištění a procedury neplatné. Například, pro "příjemce grantu s účty vedenými v jiné měně než euro" je procedura vztahující se k "příjemcům grantu s účty vedenými v euru" nepoužitelná. Podobně také, pokud není zaplacena žádná dodatečná odměna, k ní se vztahující zjištění a procedury nejsou použitelné.

Ref	Procedury	Standardní věcná zjištění	Výsledek (C / E / N.A.)
A	**SKUTEČNÉ OSOBNÍ NÁKLADY A JEDNOTKOVÉ NÁKLADY VYPOČÍTANÉ PŘÍJEMCEM GRANTU V SOULADU S JEHO OBVYKLÝMI ÚČETNÍMI ZVYKLOSTMI**		
	Auditor vybere vzorek osob, jejichž náklady byly vykázány ve finančním(ch) výkazu(ech), aby realizoval procedury zaznačené v za sebou jdoucích bodech této sekce A. *(Vzorek by měl být vybrán náhodně, aby byl reprezentativní. Je vyžadováno plné pokrytí, pokud je méně než 10 lidí (včetně zaměstnanců, fyzických osob pracujících na přímou smlouvu a personálu přiděleného třetí stranou), jinak by měl mít vzorek minimálně 10 lidí, nebo 10 % z celkového počtu, v závislosti na tom, které číslo je vyšší.)* Auditor vybral vzorek _____ lidí z celkového počtu _____ lidí.		

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
A.1	**OSOBNÍ NÁKLADY** <u>Pro osoby zahrnuté ve vzorku a pracující na přímou pracovní smlouvu nebo její ekvivalent (obecné procedury pro individuální skutečné osobní náklady a osobní náklady vykázané jako jednotkové náklady)</u> Pro osoby zahrnuté ve vzorku a pracující na přímou pracovní smlouvu nebo její ekvivalent (obecné procedury pro individuální skutečné osobní náklady a osobní náklady vykázané jako jednotkové náklady): o seznam osob zahrnutých ve vzorku s vyznačeným obdobím, ve kterém pracovali, jejich pozici (klasifikace nebo kategorie) a druh smlouvy; o výplatní pásky zaměstnanců zahrnutých ve vzorku; o sladění osobních nákladů vykázaných ve finančních výkazech s účetním systémem (účetnictví projektu a hlavní účetní kniha) a mzdový systém; o informace týkající se zaměstnaneckého statusu a podmínek, podmínky personálu zahrnutého ve vzorku, zvláště pak jejich smlouvy nebo jiné ekvivalenty; o obvyklé zásady příjemce grantu týkající se záležitostí vyplácení mezd (tj. platová politika, politika přesčasů, proměnné složky platu; o oplatné daňové zákony, zákoník práce a zákon upravující sociální zabezpečení o jiné dokumenty podporující vykázané osobní náklady. Auditor také potvrdil způsobilost všech součástí odplaty (viz Článek 6 dohody) a přepočítal osobní náklady zaměstnanců zahrnutých ve vzorku.	1) Zaměstnanci byli i) přímo najati příjemcem grantu v souladu s vnitrostátní legislativou, ii) pod výhradním technickým dozorem příjemce grantu a na jeho zodpovědnost a iii) odměněni v souladu s obvyklými praktikami příjemce grantu.	
		2) Osobní náklady byly zaznamenány v účetním/mzdovém systému příjemce grantu.	
		3) Náklady byly adekvátně podpořeny a v souladu s účty a záznam o mzdách.	
		4) Osobní náklady neobsahovaly žádné neuplatnitelné části.	
		5) Nebyly žádné nesrovnalosti mezi vyúčtovanými osobními náklady a náklady přepočítanými auditorem.	
	Další procedury, pokud je zaplacena "dodatečná odměna" Pro potvrzení standardních věcných zjištění 6-9 vedených v dalším sloupci auditor: o revidoval relevantní dokumenty poskytnuté příjemcem grantu (právní forma, právní/statutární	6) Příjemce grantu platící "dodatečnou odměnu" byl neziskovou právnickou osobou.	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	povinnosti, politika příjemce grantu týkající se dodatečných odměn, kritéria užívaná pro jejich výpočet, obvyklé odměňovací praktiky příjemce grantu pro projekty pod vnitrostátním financováním...); o přepočítaný počet dodatečných odměn způsobilých k akci podle získaných podpůrných dokumentů (celý nebo částečný úvazek, výlučná nebo nevýlučná dedikace akci, obvyklá odměna za projekty podporované vnitrostátním plánem) přijatých v poměru pracovníků v přepočteném stavu za rok (viz data získaná v průběhu realizace procedur v části A.2 "produktivní hodiny" a A.4 "záznamový systém". *"DODATEČNÁ ODMĚNAL JE JAKÁKOLIV ČÁST ODMĚNY, KTERÁ PŘEKRAČUJE ČÁSTKU, KTEROU BY OSOBA BYLA ZAPLACENA Z VNITROSTÁTNÍCH PROJEKTŮ..* *POKUD JAKÁKOLIV ČÁST ZAPLACENA ZAMĚSTNANCI SPLŇUJE PODMÍNKY PRO "DODATEČNOU ODMĚNU" A JE NA NI NÁROK PODLE ČLÁNKU 6.2.A.1, MŮŽE BÝT NAÚČTOVÁNA JAKO ZPŮSOBILÝ NÁKLAD NA AKCI AŽ DO VÝŠE:* *(A) POKUD DANÁ OSOBA PRACUJE NA PLNÝ ÚVAZEK A VÝLUČNĚ NA AKCI BĚHEM CELÉHO ROKU: AŽ DO VÝŠE 8 000 EURO/ROK;* *(B) POKUD DANÁ OSOBA PRACUJE VÝLUČNĚ NA AKCI, ALE NE NA PLNÝ ÚVAZEK NEBO NE CELÝ ROK: AŽ DO ODPOVÍDAJÍCÍ ČÁSTKY PRO-RATA 8 000 EURO, NEBO* *(C) POKUD OSOBA NEPRACUJE VÝLUČNĚ NA AKCI: AŽ DO VÝŠE ČÁSTKY PRO-RATA VYPOČÁTANÉ PODLE ČLÁNKU 6.2.A.1.*	7) Objem dodatečných odměn odpovídal obvyklým praktikám příjemce grantu a byl konzistentně vyplácen, kdykoliv bylo potřeba stejné práce nebo expertízy. 8) Kritéria použitá k výpočtu dodatečných odměn byla objektivní a obecně aplikovaná příjemcem grantu bez ohledu na zdroj financí. 9) Objem dodatečných odměn zahrnutých v osobních nákladech naúčtovaných akci byl omezen na 8 000 euro na přepočteného pracovníka za rok (až po ekvivalent množství pro-rata, pokud osoba nepracovala na akci na plný úvazek během roku nebo nepracovalaa výlučně na akci).	
	Dodatečné procedury pro případ, že je užito "jednotkových nákladu vypočítaných příjemcem grantu v souladu s jeho obvyklými účetními praktikami": Kromě realizace procedur vyznačených výše k potvrzení standardních věcných zjištění 1-5 a - pokud jsou použitelné - také 6-9, auditor provedl následující procedury, aby potvrdil věcná	10) Osobní náklady zahrnuté ve finančním výkazu byly vypočteny v souladu s obvyklými účetními praktikami nákladů příjemce grantu. Tato metodologie byla použita	

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	zjištění 10-13 vypsaná ve vedlejším sloupci: o obdržel popis obvyklých účetních praktik nákladů pro výpočet jednotkových nákladů; o revidoval, zda obvyklé účetní praktiky příjemce grantu byly aplikovány pro finanční výkazy, které jsou předmětem předkládaného osvědčení; o ověřil, zda byli zaměstnanci zahrnutí ve vzorku účtování ve správné katergorii (v souladu s kritérii užívanými příjemcem grantu pro zavedení personálních kategorií) revidováním smlouvy/záznamu osobního oddělení nebo analytických účetních záznamů; o ověřil, že neexistuje rozdíl mezi úplným objememe osobních nákladů užitých ve výpočtu nákladů za jednotku a úplným objemem osobních nákladůzaznamenaných na statutárních účtech; o ověřil, zda skutečné skutečné osobní náklady byly přizpůsobeny na základě rozpočtových nebo odhadovaných prvků, a pokud ano, ověřil, zda tyto užité prvky jsou skutečně relevantní pro výpočet, jsou objektivní a podpořeny dokumenty.	ve všech akcích H2020.	
		11) Zaměstnanci byli účtováni ve správných kategoriích.	
		12) Úplné osobní náklady užité ve výpočtu jednotkových nákladů odpovídaly záznamům o výdajích na statutárních účtech.	
		13) Všechny odhadované nebo rozpočtované prvky užité příjemcem grantu v kalkulaci jednotkových nákladů byly relevantní pro výpočet osobních nákladů a odpovídaly objektivním a ověřitelným informacím.	
	<u>Pro fyzické osoby zahrnuté ve vzorku a pracující pro příjemce grantu na přímou smlouvu jinou než pracovní smlouvu, jako např. konzultanti (ne subdodavatelé).</u> Pro potvrzení standardních věcných zjištění 14-17 uvedených v dalším sloupci auditor revidoval následující informace/dokumenty poskytnuté příjemcem grantu: o smlouvy, hlavně náklady, délka smluv, popis práce, místo výkonu práce, vlastnictví výstupů a povinnost podávat zprávy příjemci grantu; o podmínky zaměstnání personálu ve stejné kategorii pro porovnání nákladů a o jakýkoliv další dokument, který podporuje vykázané náklady a jejich záznam (např. faktury, účetní záznamy apod.).	14) Fyzické osoby pracující za podmínek blízkých podmínkám zaměstnance, zvláště co do organizace práce, úkolů, které byly provedeny a prostor, kde byly provedeny.	
		15) Výstupy práce náleží příjemci grantu nebo, pokud ne, obdržel příjemce grantu všechna potřebná práva pro dodržení svých povinností, jako by byly výsledky generovány jím samotným.	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
		16) Jejich náklady nebyly zvláště odlišné od těch týkajících se personálu, který prováděl úkoly na podobnou smlouvu jako pracovní smlouva s příjemcem grantu.	
		17) Náklady byly podpořeny auditními důkazy a zaneseny na účtech.	
	<u>Pro personál poskytnutý třetí stranou a zahrnutý ve vzorku (bez subdodavatelů)</u> Pro potvrzení standardních věcných zjištění 18-21 vypsaných ve vedlejším sloupci auditor revidoval následující informace/dokumenty poskytnuté příjemcem grantu: o smlouva(y) o přidělení zaměstnanců, zvláště týkající se nákladů, doby trvání, popisu práce, místa výkonu práce a vlastnictví výsledků; o opokud existuje náhrada příjemcem grantu třetí straně za dostupné zdroje (věcné příspěvky proti zaplacení): jakákoliv dokumentace podporující vykázané náklady (např. smlouva, faktura, bankovní převod, a důkaz zavedení v účetnictví/mzdovém účetnictví, atd.) a sladění finančního výkazu s účetním systémem (projektové účetnictví a hlavní účetní kniha) stejně jako jakýkoliv důkaz, že částka fakturovaná třetí stranou nezahrnovala žádný zisk; o pokud neexistuje žádná náhrada příjemcem grantu třetí straně za poskytnuté zdroje /věcné příspěvky zdarma): důkaz skutečných nákladů nesených třetí stranou a důkaz o zaznamenání v účetnictví/mzdovém účetnictví třetí strany;	18) Poskytnutý personál podával zprávy příjemci grantu a pracoval v jeho prostorách (pokud nebylo s příjemcem grantu smluveno jinak).	
		19) Výsledky vykonané práce náleží příjemci grantu, a pokud ne, příjemce grantu obdržel nezbytná práva k naplnění povinností, jako by byly výsledky vytvořeny jím samotným.	
		Pokud je personál poskytnut proti platbě: 20) Vykázané náklady byly podpořeny dokumentací a zaneseny do	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	○ jakýkoliv další dokument podporující vykázané náklady (např. faktury apod.).	účtů příjemce grantu. Třetí strana nezahrnula žádný zisk.	
		Pokud je personál poskytnut zdarma: 21) Vykázané náklady nepřekročily náklady třetí strany zaznamenané na účtech třetí strany a byly podpořeny dokumentací.	
A.2	**PRODUKTIVNÍ HODINY** Pro potvrzení standardních věcných zjištění 22-27 uvedených ve vedlejším sloupci auditor revidoval relevantní dokumenty, zvláště pak vnitrostátní právní úpravu, pracovní dohody a smlouvy a časové záznamy osob zahrnutých ve vzorku, aby potvrdil, že: ○ užité roční produktivní hodiny byly vypočteny v souladu s jednou z metod popsaných níže, ○ byly řádně vypočítány poměry ekvivalentu plného pracovního úvazku pro zaměstnance nepracující na plný pracovní úvazek. Pokud příjemce grantu použil metodu B, auditor potvrdil správnost výpočtu celkového počtu odpracovaných hodin a že smlouvy specifikovaly roční odpracovatelné hodiny. Pokud příjemce grantu použil metodu C, auditor ověřil, že "roční produktivní hodiny" použité při výpočtu hodinové sazby byly ekvivalentem alespoň 90 % standardních ročních odpracovatelných hodin. Auditor může toto udělat, pouze může-li být výpočet standardních ročních odpracovatelných	22) Příjemce grantu použil metodu [*vyberte jednu a zbytek smažte*] [**A**: 1720 hodin] [**B**: "celkový počet odpracovaných hodin"] [**C**: použité "standardní roční produktivní hodiny" odpovídaly obvyklým účetním praktikám]	
		23) Produktivní hodiny byly vypočítány ročně.	
		24) Pro zaměstnance nepracující na plný úvazek byl ekvivalent plného pracovního úvazku správně použit.	

Ref	Procedury	Standardní věcná zjištění	Výsledek (C / E / N.A.)
	hodin podpořen záznamy, jako např. vnitrostátní legislativou, pracovními dohodami a smlouvami. *PRODUKTIVNÍ HODINY PŘÍJEMCE GRANTU PRO OSOBY PRACUJÍCÍ NA PLNÝ PRACOVNÍ ÚVAZEK BUDOU VYPOČTENY JEDNOU Z NÁSLEDUJÍCÍCH METOD:* ***A.** 1720 ROČNÍCH PRODUKTIVNÍCH HODIN (PRO-RATA PRO OSOBY NEPRACUJÍCÍ NA PLNÝ ÚVAZEK)* ***B.** CELKOVÝ POČET HODIN ODPRACOVANÝCH OSOBOU PRO PŘÍJEMCE GRANTU V TOMTO ROCE (TATO METODA SE TAKÉ NAZÝVÁ "CELKOVÝ POČET ODPRACOVANÝCH HODIN" V DALŠÍM SLOUPCI). VÝPOČET CELKOVÉHO POČTU ODPRACOVANÝCH HODIN BYL PROVEDEN NÁSLEDOVNĚ: ROČNÍ ODPRACOVATELNÉ HODINY OSOBY PODLE PRACOVNÍ SMLOUVY, POUŽITELNÉ PRACOVNÍ DOHODY NEBO VNITROSTÁTNÍHO PRÁVA PLUS ODPRACOVANÝ PŘESČAS MÍNUS ABSENCE (NAPŘ. NEMOCENSKÁ NEBO MIMOŘÁDNÉ VOLNO).* ***C.** BĚŽNÝ POČET ROTNÍCH HODIN POUŽITÝCH PŘÍJEMCEM GRANTU PRO JEHO PERSONÁL V SOULADU S JEHO OBVYKLÝMI ÚČETNÍMI ZVYKLOSTMI PRO ÚČETNICTVÍ NÁKLADŮ (TATO METODA SE TAKÉ NAZÝVÁ "STANDARDNÍ ROČNÍ PRODUKTIVNÍ HODINY" V DALŠÍM SLOUPCI). TOTO ČÍSLO MUSÍ BÝT ALESPOŇ 90 % STANDARDNÍCH ROČNÍCH ODPRACOVATELNÝCH HODIN.* *'"ROČNÍ ODPRACOVATELNÉ HODINY" OZNAČUJÍ DOBU, BĚHEM KTERÉ PERSONÁL MUSÍ PRACOVAT, BÝT ZAMĚSTNAVATELI K DISPOZICI A VYKONÁVAT JEHO/JEJÍ AKTIVITU NEBO POVINNOSTI DANÉ PRACOVNÍ SMLOUVOU, POUŽITELNOU PRACOVNÍ KOLEKTIVNÍ SMLOUVOU NEBO VNITROSTÁTNÍ LEGISLATIVOU UPRAVUJÍCÍ PRACOVNÍ DOBU.*	*Pokud příjemce grantu použil metodu B.* 25) Výpočet počtu "ročních odpracovatelných hodin", přesčasů a absencí byl ověřen podle dokumentů poskytnutých příjemcem grantu. 25.1) Příjemce grantu počítá hodinové sazby za celý fiskální rok podle procedury A.3 (metoda B není povolena pro příjemce grantů, kteří počítají hodinovou sazbu měsíčně). *Pokud příjemce grantu použil metodu C.* 26) Výpočet počtu "standardních ročních odpracovatelných hodin" byl ověřen podle dokumentů poskytnutých příjemcem grantu.	

Ref	Procedury	Standardní věcná zjištění	Výsledek (C / E / N.A.)
		27) "Roční produktivní hodiny" použité pro výpočet hodinové sazby byly konzistentní s obvyklými účetními praktikami nákladů příjemce grantu a byly ekvivalentní alespoň 90 % "ročních odpracovatelných hodin".	
A.3	**HODINOVÉ OSOBNÍ SAZBY** I) Pro jednotkové náklady vypočítané v souladu s obvyklými účetními zvyklostmi příjemce grantu (jednotkové náklady): Pokud má příjemce grantu "Osvědčení o metodologii pro výpočet jednotkových nákladů" (CoMUC) schválený Komisí, příjemce grantu poskytne auditorovi popis schválené metody a dopis o přijetí od Komise. Auditor ověřil, že příjemce grantu skutečně použil schválenou metodologii. Pokud tak tomu je, žádné další potvrzení není nutné. Pokud příjemce grantu nemá "Osvědčení o metodologii" (CoMUC) schválené Komisí, nebo pokud nebyla schválená metodologie použita, pak auditor: o revidoval dokumentaci poskytnutou příjemcem grantu včetně manuálů a vnitřních směrnic, které vysvětlují, jak vypočítat hodinové sazby; o přepočítal jednotkové náklady (hodinové sazby) personálu zahrnutého ve vzorku v návaznosti na výsledky procedur provedených v A.1 a A.2. II) Pro individuální hodinové sazby: Auditor: o revidoval dokumentaci poskytnutou příjemcem grantu včetně manuálů a vnitřních směrnic, které vysvětlují, jak vypočítat hodinové sazby;	28) Příjemce grantu použil [*vyberte jednu možnost a druhou smažte*]: [Možnost I: "Jednotkové náklady (hodinové sazby) byly vypočítány v souladu s obvyklými účetními praktikami nákladů příjemce grantu"] [Možnost II: Byly použity individuální hodinové sazby] *Pro možnost I týkající se jednotkových nákladů a pokud příjemce grantu použije metodologii schválenou Komisí (CoMUC):* 29) Příjemce grantu použil metodologii schválenou Komisí pro výpočet. Odpovídalo to obvyklým účetním zvyklostem nákladů organizace a bylo použito konzistentně pro	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	○ přepočítal hodinové sazby personálu zahrnutého ve vzorku (přepočítal všechny hodinové sazby, pokud příjemce grantu používá roční sazby, přepočet tří náhodně vybraných měsíců v každém roce, pokud příjemce grantu používá měsíční sazby) v návaznosti na procedury provedené v A.1 a A.2; ○ (jen v případě měsíčních sazeb) potvrdil, že čas strávený na rodičovské dovolené není odečten, a že pokud jsou části základních odměn produkovány za delší dobu než měsíc, příjemce grantu zahrnul jen tu část, která byla generována v daném měsíci.	všechny aktivity bez ohledu na zdroj financování.	
	"JEDNOTKOVÉ NÁKLADY VYPOČÍTANÉ PŘÍJEMCEM GRANTU V SOULADU V OBVYKLÝMI ÚČETNÍMI ZVYKLOSTMI NÁKLADŮ": *JE VYPOČÍTÁNO VYDĚLENÍM CELKOVÝCH OSOBNÍCH NÁKLADŮ V KATEGORII, DO KTERÉ ZAMĚSTNANEC SPADÁ V SOULADU S PROCEDUROU A.1 POČTEM PRACOVNÍKŮ NA PLNÝ ÚVAZEK A ROČNÍMI CELKOVÝMI PRODUKTIVNÍMI HODINAMI STEJNÉ KATEGORIE VYPOČÍTANÝMI PŘÍJEMCEM GRANTU V SOULADU S PROCEDUROU* *HODINOVÁ SAZBA PRO INDIVIDUÁLNÍ SKUTEČNÉ OSOBNÍ NÁKLADY: JE VYPOČÍTÁNA PODLE JEDNÉ ZE DVOU MOŽNOSTÍ NÍŽE:* *A) [STANDARDNÍ MOŽNOST] VYDĚLENÍM SKUTEČNÝCH ROČNÍCH OBJEMŮ OSOBNÍCH NÁKLADŮ ZAMĚSTNANCE OVĚŘENÉHO V SOULADU S PROCEDUROU A.1 POČTEM ROČNÍCH PRODUKTIVNÍCH HODIN OVĚŘENÝCH V SOULADU S PROCEDUROU A.2 (HODINOVÁ SAZBA CELÉHO FISKÁLNÍHO ROKU)* *B) VYDĚLENÍM SKUTEČNÉHO MĚSÍČNÍHO OBJEMU OSOBNÍCH NÁKLADŮ ZAMĚSTNANCE OVĚŘENÉHO V SOULADU S PROCEDUROU A.1 DVANÁCTINOU ČÍSLA POČTU ROČNÍCH PRODUKTIVNÍCH HODIN OVĚŘENÝCH V SOULADU S PROCEDUROU A.2 (MĚSÍČNÍ HODINOVÁ SAZBA).*	*Pro možnost I týkající se jednotkových nákladů a pokud příjemce grantu použije metodologii neschválenou Komisí:* 30) Jednotkové náklady přepočítané auditorem byly stejné jako sazby použité příjemcem grantu. *Pro možnost II týkající se individuálních hodinových sazeb:* 31) Individuální sazby přepočítané auditorem byly stejné jako sazby užité příjemcem grantu. 31.1) Příjemce grantu použil pouze jednu možnost (za celý fiskální rok nebo měsíc) za každý zkoumaný fiskální rok. 31.2) Hodinové sazby nezahrnují dodatečnou odměnu.	

Ref	Procedury	Standardní věcná zjištění	Výsledek (C / E / N.A.)
A.4	**SYSTÉM ZAZNAMENÁVÁNÍ ČASU** Pro ověření toho, že systém zaznamenávání času zajišťuje naplňování všech minimálních požadavků a že hodiny vykázané pro akci byly správné, přesné a řádně schváleny a podpořeny dokumentací, auditor uskutečnil následující kontroly pro osoby zahrnuté ve vzorku, které vykazují čas odpracovaný pro akci na základě časových záznamů: o popis systému zaznamenávání času poskytnutý příjemcem grantu (záznam, autorizace, zpracování v personálním systému); o jeho skutečné zavedení; o časové záznamy byly podepsány zaměstnanci alespoň jednou měsíčně (na papíře nebo elektronicky) a autorizovány projektovým nebo jiným manažerem; o vykázané hodiny byly odpracovány v období realizace projektu; o neobjevily se žádné hodiny vykázané jako odpracované pro akci, pokud personální záznamy ukazovaly absenci z důvodu svátku nebo nemoci (další přezkoumání s cestami jsou vykonána v B.1 níže); o hodiny naúčtované akci odpovídaly těm v systému zaznamenávání času. *NAÚČTOVANÉ MOHOU BÝT POUZE HODINY ODPRACOVANÉ NA AKCI. VŠECHEN ČAS K NAÚČTOVÁNÍ BY MĚL BÝT ZAZNAMENANÝ BĚHEM TRVÁNÍ PROJEKTU, ADEKVÁTNĚ PODPOŘEN DŮKAZY POTVRZUJÍCÍ JEJICH SKUTEČNOST A SPOLEHLIVOST (VIZ SPECIFICKÉ ZAOPATŘENÍ NÍŽE PRO OSOBY PRACUJÍCÍ VÝLUČNĚ PRO AKCI BEZ ČASOVÝCH ZÁZNAMŮ).* <u>Pokud osoby pracují výlučně pro akci a bez časových záznamů</u> Pro vybrané osoby, které pracovaly výlučně na akci bez časových záznamů, auditor ověřil dostupné důkazy prokazující, že ve skutečnosti výlučně věnovali akci a že příjemce grantu podepsal prohlášení potvrzující, že pracovali výlučně pro akci.	32) Všechny osoby zaznamenaly svůj čas věnovaný akci na **denní/týdenní/měsíční** bázi za použití **papírového / elektronického** systému. (vymažte neplatné odpovědi)	
		33) Jejich časové záznamy byly autorizovány minimálně měsíčně projektovým manažerem či jiným nadřízeným.	
		34) Vykázané hodiny byly odpracovány během doby trvání projektu a byly konzistentní se záznamy o přítomnosti/absenci v osobních záznamech.	
		35) Nebyly žádné nesrovnalosti mezi počtem účtovaných hodin akci a počtem zaznamenaných hodin.	
		36) Výlučné věnování se je podpořeno prohlášením podepsaným příjemcem grantu a dalšími získanými důkazy.	

Ref	Procedury	Standardní věcná zjištění	Výsledek (C / E / N.A.)
B	**NÁKLADY NA SUBDODAVATELE**		
B.1	**Auditor obdržel detail/rozbor nákladů na subdodavatele a použil náhodně vybraných nákladových položek** (*je potřeba plné pokrytí, pokud je méně než 10 položek, jinak by měl vzorek mít minimálně 10 položek nebo 10 % z celkového počtu, v závislosti na tom, které číslo je vyšší).* Pro potvrzení standardních věcných zjištění 37-41 vypsaných ve vedlejším sloupci auditor revidoval následující položky zahrnuté ve vzorku: o použití subdodavatelů bylo předesláno v Příloze 1; o náklady na subdodavatele byly vykázány v kategorii subdodavatelů ve finančním výkazu; o podpůrné dokumenty týkající se procesu výběru a zvolení byly dodržovány; o příjemce grantu zajistil co nejvyšší protihodnotu (klíčové elementy ke zhodnocení dodržování této zásady jsou udělení subdodávky nabídce s nejlepším poměrem cena-kvalita za podmínek transparentnosti a rovného zacházení. V případě, že byla použita existující rámcová smlouva, příjemce grantu se ujistil, že byla uzavřena na základě principu co nejvyšší protihodnoty za podmínek transparentnosti a rovného zacházení). Zvláště pak, i. pokud příjemce grantu vystupoval jako zadavatel smlouvy podle směrnice 2004/18/EC (nebo 2014/24/EU) nebo směrnice 2004/17/EC (nebo 2014/25/EU), auditor ověřil, že použitelné vnitrostátní zákony upravující zadávání veřejných zakázek byly dodrženy a že subdodávka odpovídala podmínkám této dohody. ii. pokud příjemce grantu nespadal do výše uvedené kategorie, auditor ověřil, že se příjemce grantu řídil svými obvyklými pravidly pro veřejné zakázky a respektoval podmínky této dohody.	37) Použití vykázaných nákladů na subdodavatele bylo předesláno v Příloze 1 a náklady byly vykázány ve finančních výkazech v kategorii subdodavatelů. 38) Objevily se žádosti o jiné poskytovatele, jiné nabídky a and zhodnocení nabídek před výběrem poskytovatele v souladu s vnitřními procedurami a pravidly. Subdodavatelé byli oceněni v souladu s principem co nejvyšší protihodnoty. *(Pokud nebyly obdrženy jiné nabídky, auditor vysvětlí důvody poskytnuté příjemcem grantu ve zprávě v části "Výjimky". Komise zanalyzuje tyto informace, aby zhodnotila, zda mohou tyto náklady být užity jako uznatelné.)* 39) Subdodavatelé nebyli nasmlouváni jiným příjemcům grantu.	

Ref	Procedures	Standard factual finding	Result (C / E / N.A.)
	Pro položky zahrnuté ve vzorku auditor také ověřil, že: ○ Subdodavatelé nebyli nasmlouváni jiným příjemcům grantu konsorcia; ○ byly podepsány dohody mezi příjemcem grantu a subdodavatelem; ○ byl důkaz o tom, že byly služby poskytnuty subdodavatelem.	konsorcia.	
		40) Všechny smlouvy se subdodavateli byly podpořeny podepsanými dohodami mezi příjemcem grantu a subdodavatelem.	
		41) Byl důkaz o tom, že služby byly poskytnuty subdodavateli.	
C	**NÁKLADY NA POSKYTNUTÍ FINANČNÍ PODPORY TŘETÍM STRANÁM**		
C.1	**Auditor obdržel detaily/rozbor nákladů na poskytnutí finanční podpory třetím stranám a náhodně vybral vzorek _____ nákladových položek** (*plné pokrytí je vyžadováno, pokud je méně než 10 položek, jinak by měl vzorek mít minimálně 10 položek, případně 10 % z celkového počtu, v závislosti na tom, které číslo je vyšší).* Auditor potvrdil, že byly dodrženy následující minimální podmínky: a) maximální objem finanční podpory pro každou třetí stranu nepřesáhl 60 000 euro, pokud nebylo výslovně jinak uvedeno v Příloze 1; b) finanční podpora třetím stranám byla odsouhlasena v Příloze 1 dohody a další zajištění týkající se finanční podpory třetím stranám v Příloze 1 byla respektována.	42) Byly dodrženy všechny minimální podmínky.	

D	**DALŠÍ SKUTEČNÉ PŘÍMÉ NÁKLADY**		
D.1	**NÁKLADY NA CESTOVÁNÍ A S NÍM SPOJENÉ DENNÍ PŘÍSPĚVKY** **Auditor vybral vzorek _____ náhodných nákladových položek** (*je vyžadováno plné pokrytí, pokud je méně než 10 položek, v opačném případě by měl vzorek mít alespoň 10 položek, nebo 10 % z celkového počtu, v závislosti na tom, které číslo je vyšší).* Auditor prozkoumal vzorek a potvrdil, že: o cestovní výdaje a výdaje na pobyt byly konzistentní s obvyklými pravidly příjemce grantu pro cestování. V tomto kontextu poskytl příjemce grantu důkaz svých běžných pravidel pro cestovní výdaje (např. užití jízdenek pro první třídu, proplacení příjemcem grantu na základě skutečných nákladů, paušální částka nebo denní diety), aby umožnil auditorovi porovnat vyúčtované cestovní náklady s jeho vnitřními pravidly; o cestovní náklady byly správně identifikovány a přiděleny k akci (např. pracovní cesty se přímo vztahovaly k akci) revidováním relevantních podpůrných dokumentů, jako např. časový záznam o schůzkách, workshopech a konferencích, jejich zavedení na správném projektovém účtě, souhlas s časovými záznamy nebo s daty/dobou trvání workshopu/konference; o nebyly vykázány žádné neuplatnitelné náklady nebo nadměrné či lehkomyslné výdaje (viz Článek 6.5 modelové grantové dohody).	43) Náklady vznikly, byly schváleny a proplaceny v souladu s obvyklými pravidly příjemce grantu pro pracovní cesty.	
		44) Mezi cestou a akcí byla souvislost.	
		45) Podpůrné dokumenty byly vzájemně konzistentní, co se týče předmětu pracovní cesty, dat, doby trvání a souhlasil s časovými záznamy a účetnictvím.	
		46) Nebyly vykázány žádné neuplatnitelné náklady nebo nadměrné či lehkomyslné výdaje.	
D.2	**ODPISOVÉ NÁKLADY, INFRASTRUKTURA A DALŠÍ AKTIVA** **Auditor vybral náhodný vzorek _____ nákladových položek** (*je vyžadováno plné pokrytí, pokud je méně než 10 položek, v opačném případě by měl vzorek mít alespoň 10 položek, nebo 10 % z celkového počtu, v závislosti na tom, které číslo je vyšší*). Pro vybrané "vybavení, infrastrukturu a další aktiva" [dále jako "majetek"] ve vzorku auditor potvrdil, že: o majetek byl získán v souladu s vnitřními směrnicemi a procedurami příjemce grantu;	47) Byla dodržena pravidla, principy a směrnice pro pořízení.	
		48) Mezi grantovou dohodou a majetkem naúčtovaným akci byla spojitost.	
		49) Majetek naúčtovaný akci byl dohladatelný v účetních záznamech a podkladových dokumentech.	

	○ byly správně přiděleny k akci (s podpůrnými dokumenty, jako např. dodacím listem, fakturou nebo jiným důkazem prokazujícím spojitost s akcí); ○ byly zavedeny do účetního systému; ○ rozsah, ve kterém byl majetek použit v akci (v procentech) byl podpořen spolehlivou dokumentací (např. tabulka přehledu užívání); Auditor přepočítal odpisové náklady a potvrdil, že byly v souladu s relevantními pravidly v zemi příjemce grantu a s obvyklými účetními zásadami příjemce grantu (např. amortizace počítaná podle pořizovací ceny). Auditor potvrdil, že nebyly vykázány žádné neuplatnitelné náklady, jako např. odpočitatelné DPH, ztráty z měnových kurzů, nadměrné či lehkomyslné výdaje (viz Článek 6.5 grantové dohody).	50) Metoda amortizace užita k naúčtování majetku akci byla v souladu s použitelnými pravidly země příjemce grantu a jeho obvyklými účetními zvyklostmi. 51) Naúčtovaný objem odpovídal obvyklému použití pro akci. 52) No ineligible costs or excessive or reckless expenditure were declared.	
D.3	**NÁKLADY NA DALŠÍ ZBOŽÍ A SLUŽBY** **Auditor vybral náhodně vzorek _____ nákladových položek** (*je vyžadováno plné pokrytí, pokud je méně než 10 položek, v opačném případě by měl vzorek mít alespoň 10 položek, nebo 10 % z celkového počtu, v závislosti na tom, které číslo je vyšší*). Na nákup zboží, práce nebo služeb zahrnutých ve vzorku auditor potvrdil, že: ○ smlouvy nepokryly úkoly popsané v Příloze 1; ○ byly správně identifikovány, přiřazeny ke správné akci, zavedeny do účetního systému (dohledatelné k základním dokumentům, jako jsou objednávky, faktury a účetnictví); ○ zboží nebylo umístěno do inventáře předmětů dlouhodobé spotřeby; ○ náklady naúčtované akci byly naúčtovány v souladu s obvyklými účetními praktikami příjemce grantu; ○ nebyly vykázány žádné neuplatnitelné náklady, nadměrné či lehkomyslné výdaje (viz Článek 6 grantové dohody). Auditor navíc potvrdil, že toto zboží a služby byly získány v souladu s vnitřními směrnicemi a procedurami příjemce grantu, zvláště pak:	53) Smlouvy na práci a služby nekryly úkoly popsané v Příloze 1. 54) Náklady byly přiděleny správné akci a zboží nebyly umístěno do inventáře předmětů dlouhodobé spotřeby. 55) Náklady byly naúčtovány v souladu s účentími zvyklostmi příjemce grantu a byly adekvátně podpořeny. 56) Nebyly vykázány žádné neuplatnitelné náklady nebo nadměrné či lehkomyslné výdaje. Pro interní faktury/účtování byl naúčtován jen prvek nákladů bez jakýékoliv marže.	

	○ pokud příjemce grantu jednal jako zadavatel v rámci Směrnice 2004/18/EC (nebo 2014/24/EU) nebo směrnice 2004/17/EC (nebo 2014/25/EU), auditor potvrdil, že relevantní vnitrostátní právo upravující zadávání veřejných zakázek a smlouva o zakázce byly v souladu s podmínkami dohody. ○ pokud příjemce grantu nespadal do kategorie zmíněné výše, auditor potvrdil, že se příjemce grantu řídil svými obvyklými pravidly pro zadávání zakázek a respektoval podmínky dohody. Pro položky zahrnuté ve vzorku auditor také potvrdil, že: ○ příjemce grantu zajistil ekonomickou výhodnost (klíčové prvky k zajištění dodržování tohoto principu jsou získání kontraktu nabídce, která nabízí nejlepší poměr mezi cenou a kvalitou, za podmínek transparentnosti a rovného zacházení. V případě, že byla použita existující rámcová smlouva, auditor také potvrdil, že příjemce grantu zajistil, že byla uzavřena na základě principu ekonomické výhodnosti za podmínek transparentnosti a rovného zacházení); *TAKOVÉ ZBOŽÍ A SLUŽBY ZAHRNUJÍ NAPŘÍKLAD SPOTŘEBNÍ MATERIÁL A ZÁSOBY, ŠÍŘENÍ (VČETNĚ VOLNÉHO PŘÍSTUPU), OCHRANU VÝSTUPŮ, SPECIFICKÉ ZHODNOCENÍ AKCE, POKUD TO VYŽADUJE DOHODA, OSVĚDČENÍ O FINANČNÍCH VÝKAZECH, POKUD JE VYŽADUJE SMLOUVA, A OSVĚDČENÍ O METODOLOGII, PŘEKLADECH A REPRODUKCI.*	57) Pravidla a principy veřejných zakázek byly dodrženy. Existují žáfosti různým poskytovatelům, různé nabídky a zhodnocení nabídek před výběrem poskytovatele v souladu s vnitřními procedurami a pravidly pro zakázky. Nákupy byly učiněny v souladu s principem ekonomické výhodnosti. *(Když nebyly získány různé nabídky, auditor vysvětluje důvody poskytnuté příjemcem grantu ve zprávě v části "Výjimky". Komise zanalyzuje tyto informace, aby zhodnotila, zda mohou být tyto náklady přijaty jako uplatnitelné).*	
D.4	**AGREGOVANÉ KAPITALIZOVANÉ A PROVOZNÍ NÁKLADY VÝZKUMNÉ INFRASTRUKTURY** Auditor se ujistil, že existuje pozitivní ex ante posouzení (vydané EC Services) metodologie účtování nákladů příjemce grantu, která mu umožňuje aplikovat pravidla přímých nákladů na velké výzkumné infrastruktury v programu Horizont 2020.	58) Náklady vykázané jako přímé náklady rozsáhlých výzkumných infrastruktur (v odpovídajícím řádku finančního výkazu) jsou v souladu s metodologií popsanou v kladné hodnotící zprávě ex-ante.	

	V případě, že bylo vydané kladné ex-ante hodnocení *(viz standardní věcná zjištění 58-59 ve vedlejším sloupci)**,***	59) Jakýkoliv rozdíl mezi použitou metodologií a tou kladně	

	auditor se ujistil, že příjemce grantu použil konzistentně metodologii, která je vysvětlena a schválena v kladném ex ante hodnocení;	hodnocenou byl rozsáhle popsán a vhodně upraven.	
	V případě, že nebylo vydané kladné ex-ante hodnocení issued *(viz standardní věcné zjištění 60 ve vedlejším sloupci,* auditor ověřil, že žádné náklady rozsáhlé výzkumné infrastruktury nebyly účtovány jako přímé náklady v žádné kategorii nákladů; ***V případě, že byl vydán návrh ex-ante hodnotící zprávy s doporučeními pro další změny*** *(viz standardní věcné zjištění 60 ve vedlejším sloupci),* • Auditor se řídil stejnou procedurou jako výše (pokud kladné ex-ante hodnocení ještě nebylo vydáno) a zvláště věnoval pozornost (podpořeno testováním) těm nákladovým položkám, které kterým návrh ex-ante hodnocení buď odmítl zahrnout do přímých nákladů, nebo vydal doporučení.	60) Vykázané přímé náklady byly prosty jakýchkoliv položek nepřímých nákladů vztahujících se k rozsáhlé výzkumné infrastruktuře.	
D.5	**Náklady na vnitřně fakturované zboží a služby** **Auditor vybral náhodný vzorek nákladových položek** (*je vyžadováno plné pokrytí, pokud je méně než 10 položek, v opačném případě by měl vzorek mít alespoň 10 položek, nebo 10 % z celkového počtu, v závislosti na tom, které číslo je vyšší*).	61) Náklady vnitřně fakturovaného zboží a služeb zahrnutých ve finančním výkazu byly vypočítány v souladu s obvyklými účetními praktikami příjemce grantu.	
	Pro potvrzení standardních věcných zjištění 61-65 vypsaných ve vedlejším sloupci auditor: o obdržel popis obvyklých účetních praktik příjemce grantu pro výpočet nákladů vnitřně fakturovaného zboží a služeb (jednotkové náklady); o revidoval, zda byly použity obvyklé účetní zvyklosti příjemce grantu ve finančním výkazu, který je předmětem předkládaného osvědčení; o se ujistil, že metodologie pro výpočet jednotkových nákladů je používána konzistentně a je založena na objektivních kritériích bez ohledu na zdroj financování; o ověřil, že jakékoliv uplatnitelné jednotky či náklady vykázané v jiných rozpočtových kategoriích, zvláště nepřímých nákladech, nebyly vzaty v úvahu při výpočtu nákladů na	62) Nákladové účetní praktiky pro výpočet nákladů vnitřně fakturovaného zboží a služeb byly použity příjemcem grantu konzistentním způsobem podle objektivních kritérií v závislosti na zdroji financování.	
		63) Jednotkový náklad je vypočítán za použití skutečných nákladů za zboží a služby zaznamenaných v účtech příjemce grantu s výjimkou jakýchkoliv neuplatnitelných nákladů či těch zahrnutých v jiných	

	vnitřně fakturované zboží a služby (viz Článek 6 dohody); ○ ověřil, zda byly skutečné náklady vnitřně fakturovaného zboží a služeb upraveny na základě rozpočtovaných nebo odhadem určených prvků, a pokud ano, ověřil, zda jsou tyto prvky skutečně relevantní pro výpočet a odpovídají objektivním a ověřitelným informacím. ○ ověřil, že jakékoliv náklady položek, které nejsou přímo spojeny s výrobou fakturovaného zboží či služeb (např. podpůrné služby jako úklid, obecné účetnictví, administrativní podpora, atd. nepoužité přímo k pvýrobě zboží či služby) nebyly vzaty v úvahu při výpočtu nákladů vnitřně fakturovaného zbožé a služeb. ○ ověřil, že jakékoliv náklady položek použité k výpočtu nákladů vnitřně fakturovaného zboží a služeb jsou podpořeny auditními důkazy a zavedeny v účetnictví.	rozpočtových kategoriích. 64) Jednotkový náklad vylučuje jakékoliv náklady na jednotky, které nejsou přímo vázány na výrobu fakturovaného zboží či služeb. 65) Jednotkové náklady použité při výpočtu skutečných nákladů vnitřně fakturovaného zboží a služeb byly relevantní, opodstatněné a odpovídaly objektivním a ověřitelným informacím.	
E	**UŽITÍ MĚNOVÝCH KURZŮ**		
E.1	a) Pro příjemce grantu s účty vedenými v jiné měně než euro **Auditor vybral náhodně vzorek _____ nákladových položek a ověřil, že měnové kurzy použité pro konverzi jiných měn na euro byly v souladu s následujícími pravidly sjednanými v dohodě** (*je vyžadováno plné pokrytí, pokud je méně než 10 položek, v opačném případě by měl vzorek mít alespoň 10 položek, nebo 10 % z celkového počtu, v závislosti na tom, které číslo je vyšší)*: *NÁKLADY ZAZNAMENANÉ NA ÚČTECH V MĚNĚ JINÉ NEŽ EURO BUDOU PŘEVEDENY NA EURO PODLE PRŮMĚRNÉHO DENNÍHO KURZU ZVEŘEJNĚNÉHO V SÉRII C ÚŘEDNÍHO VĚSTNÍKU EVROPSKÉ UNIE (https://www.ecb.int/stats/exchange/eurofxref/html/index.en.html), URČENÉHO BĚHEM ODPOVÍDAJÍCÍ VYKAZOVANÉHO OBDOBÍ.* *POKUD NEBYLY ZVEŘEJNĚNY MĚNOVÉ KURZY V ÚŘEDNÍM VĚSTNÍKU EVROPSKÉ UNIE PRO DANOU MĚNU, KONVERZE BUDE PROVEDENA MĚSÍČNÍM ÚČETNÍM PRŮMĚREM ZVEŘEJNĚNÝM NA STRÁNKÁCH KOMISE (http://ec.europa.eu/budget/contracts_grants/info_contracts/inforeuro/inforeuro_en.cfm), URČENÝM ZA ODPOVÍDAJÍCÍ VYKAZOVANÉ OBDOBÍ.*	66) Měnové kurzy použité pro konverzi jiných měn na euro byly v souladu s pravidly ustanovenými v grantové dohodě a v konečných částkách nebyl žádný rozdíl.	

	b) pro příjemce grantu s účty vedenými v eurech **Auditor vybral náhodně vzorek _____ nákladových položek a ověřil, že měnové kurzy použité pro konverzi měn na euro byly v souladu s následujícími pravidly sjednanými v dohodě** (*je vyžadováno plné pokrytí, pokud je méně než 10 položek, v opačném případě by měl vzorek mít alespoň 10 položek, nebo 10 % z celkového počtu, v závislosti na tom, které číslo je vyšší)*: *NÁKLADY VZNIKLÉ V JINÉ MĚNĚ BUDOU PŘEVEDENY NA EURO POUŽITÍM OBVYKLÝCH ÚČETNÍCH PRAKTIK PŘÍJEMCE GRANTU.*	67) Příjemce grantu použil své obvyklé účetní zvyklosti.	

[název společnosti auditorské firmy]
[jméno a funkce pověřeného zástupce]
[den měsíc rok]
<Podpis auditora>

PŘÍLOHA 6

MODEL CERTIFIKÁTU PRO METODIKU

- Pro možnosti [kurzívou a v hranatých závorkách]: vyberte příslušnou možnost. Nezvolené možnosti by měly být odstraněny.
- Pro pole [šedá v hranatých závorkách]: zadejte příslušná data.

OBSAH

Směrnice pro auditovou zakázky na metodický certifikát v souvislosti s jednou nebo více grantovými dohodami financovanými v rámcovém programu Horizont 2020 Výzkum a inovace

Tento dokument stanovuje "**směrnice (Sm.)**", podle nichž

[*MOŽNOST 1: [vložte název příjemce] ("příjemce")] [VARIANTA 2: [vložte název připojená třetí strana] ("připojená třetí strana"), třetí strana spojená s příjemcem [vložte jméno příjemce] ("příjemce")]*

souhlasí se zapojením

[**vložte právní jméno auditora**] ("auditor")

k vypracování nezávislé zprávy o faktických zjištěních (dále jen "zpráva") týkající se obvyklých účetních postupů [příjemce] (připojené třetí strany) pro výpočet a uplatňování přímých personálních nákladů deklarovaných jako jednotkové náklady (dále jen "metodika") v souvislosti s financovanými dohodami o grantu spadajícím do rámcového programu Horizont 2020 Výzkum a inovace.

Postupy, které je třeba provést při hodnocení metodiky, budou vycházet z níže uvedených dohod o grantu:

[název a číslo grantové smlouvy] (dále jen "dohoda")

Dohody byly uzavřeny mezi příjemcem a [*MOŽNOST 1: Evropská unie zastoupená Evropskou komisí (dále jen "Komise")] [VARIANTA 2: Evropské společenství pro atomovou energii (Euratom,) zastoupené Evropskou komisí (dále jen "Komise ')] [VARIANTA 3: [Výkonná agentura pro výzkum (REA)] [Výkonná agentura Evropské rady pro výzkum (ERCEA)] [Výkonná agentura pro inovace a sítě (INEA)] [Výkonná agentura pro malé a střední podniky (EASME)] (dále jen "agentura") v rámci pravomocí svěřených Evropskou komisí (dále jen "Komise")).].*

[Komise] [Agentura] je uvedena pouze jako signatář dohody s příjemcem. [Evropská unie] [Euratom] [agentura] není stranou této zakázky.

1.1 Předmět zakázky

Podle článku 18.1.2 Dohody mohou příjemci [a připojené třetí strany], kteří deklarují přímé osobní náklady jako jednotkové náklady vypočítané v souladu s jejich obvyklými postupy účtování nákladů, předložit [Komisi] [Agentuře] ke schválení osvědčení o metodice ("CoMUC") s uvedením, že existují odpovídající záznamy a dokumentace, které prokazují, že jejich použité postupy účtování nákladů splňují podmínky stanovené v čl. 6.2 bodě A.

Předmětem této zakázky je CoMUC, který se skládá ze dvou samostatných dokumentů:

- směrnice (dále jen " Sm."), které mají být podepsány [příjemcem] [připojenou třetí stranou] a auditorem;

- nezávislá zpráva auditora o věcných zjištěních (dále jen "Zpráva") vydaná na hlavičkovém papíře auditora, datovaná, opatřená razítkem a podepsaná auditorem, která obsahuje; standardní prohlášení ("prohlášení") vyhodnocená a podepsaná [příjemcem] [připojenou třetí stranou], dohodnuté postupy ("postupy") prováděné auditorem a standardní faktická zjištění

("zjištění") posouzené auditorem. Prohlášení, postupy a zjištění jsou shrnuty v tabulce, jež je součástí zprávy.

Informace poskytnuté prostřednictvím prohlášení, postupů a zjištění umožní Komisi vyvodit závěry týkající se existence obvyklých postupů účtování nákladů [příjemce] [připojené třetí strany] a jejich vhodnosti k zajištění toho, aby přímé náklady na zaměstnance požadované na tomto základě byly v souladu s ustanoveními Smlouvy. Komise vyvozuje ze zprávy a jakýchkoli dalších požadovaných informací své vlastní závěry.

1.2 Odpovědnosti

Stranami této dohody jsou [Příjemce] [Připojená třetí strana] a auditor.

Příjemce] [Připojená třetí strana]:

- odpovídá za sestavení účetní závěrky k Dohodám (dále jen "Účetní uzávěrka") v souladu s těmito Dohodami;
- odpovídá za poskytnutí Účetní závěrky auditorovi a umožnění auditorovi uvést ji do souladu s účetnictvím a účetním systémem [Příjemce] [Připojené třetí strany] a podkladovými účty a záznamy. Účetní závěrka bude použita jako základ pro postupy, které auditor provede podle těchto podmínek;
- odpovídá za svou metodiku a odpovídá za správnost Účetní závěrky;
- odpovídá za schválení nebo vyvrácení prohlášení uvedených pod nadpisem „Prohlášení, která má učinit příjemce/ připojená třetí strana" v prvním sloupci tabulky, která je součástí zprávy;
- musí auditorovi poskytnout podepsaný a datovaný dopis o prohlášení;
- uznává, že schopnost auditora účinně provádět postupy závisí na tom, že [Příjemce] [Připojená třetí strana] poskytne plný a bezplatný přístup k pracovníkům [Připojené třetí strany] [Příjemce] a k jeho účetním a dalším relevantním záznamům.

Auditor:

- [*• Možnost 1 ve výchozím nastavení: je způsobilý provádět statutární audity účetních dokumentů v souladu se směrnicí Evropského parlamentu a Rady 2006/43/ES ze dne 17. května 2006 o statutárních auditech ročních a konsolidovaných účetních závěrek, měnící Směrnici Rady 78/660/EHS a 83/349/EHS a rušící směrnici Rady 8 4/253/EHS a podobné národní předpisy].*
  • [Možnost 2, pokud má Příjemce nebo Připojená třetí strana nezávislého veřejného činitele: a příslušný a nezávislý veřejný činitel, u kterého příslušné vnitrostátní orgány prokázaly způsobilost k právním úkonům pro audit příjemce].
  • [Možnost 3, pokud je Příjemce nebo Připojená třetí strana mezinárodní organizací: je [interním] [externím] auditorem v souladu s interními finančními předpisy a postupy mezinárodní organizace].

Auditor:

- musí být nezávislý na příjemci [a Připojené třetí straně], zejména se nesmí podílet na přípravě Účetní závěrky příjemce [a Připojené třetí strany]
- musí naplánovat práci tak, aby bylo možné provádět postupy a hodnotit zjištění;
- musí dodržovat stanovené postupy a povinný formát zprávy;
- musí provést zakázku v souladu s těmito Sm.;
- musí zdokumentovat záležitosti, které jsou důležité pro podporu zprávy;
- musí svou zprávu založit na shromážděných důkazech;
- musí odeslat zprávu [Příjemci] [Připojené třetí straně].

Komise stanoví Postupy, které je třeba provést, a Zjištění, která má schválit auditor. Auditor neponese odpovědnost za jejich vhodnost nebo vhodnost. Protože tato zakázka není ověřovací zakázkou, auditor nepředloží výrok auditora ani prohlášení o věrohodnosti.

1.3 Platné standardy

Auditor musí dodržovat tyto směrnice a spolu s[1]:

- Mezinárodní standard pro související služby ("ISRS") 4400 *k provádění dohodnutých postupů týkajících se finančních informací* je vydán Radou pro mezinárodní standardy pro audit a ověřování (IAASB););
- *Etický kodex pro profesionální účetní* vydaný Radou pro mezinárodní účetní a auditorské standardy (IESBA). Přestože ISRS 4400 uvádí, že nezávislost není u zakázek k provádění dohodnutých postupů podmínkou, Komise požaduje, aby auditor také dodržoval požadavky nezávislosti Kodexu.

Zpráva auditora musí uvádět, že při sestavování této zprávy mezi Auditorem a Příjemcem [a Připojenou třetí stranou] nedošlo ke střetu zájmů, který by mohl mít na zprávu vliv, a musí specifikovat – pokud je služba fakturována – celkový poplatek zaplacený auditorovi za poskytnutí zprávy.

1.4 Hlášení

Zpráva musí být napsána v jazyce Smlouvy (viz článek 20.7 Smlouvy).

Podle článku Dohody č. 22 mají Komise, [Agentura], Evropský úřad pro boj proti podvodům a Účetní dvůr právo auditovat veškerou práci, která je v rámci činnosti prováděna a na kterou jsou deklarovány náklady od rozpočtu [Evropské Unie] [Euratomu]. To zahrnuje práci související s touto zakázkou. Auditor musí poskytnout přístup ke všem pracovním dokumentům souvisejícím s tímto úkolem, pokud o to Komise, [agentura], Evropský úřad pro boj proti podvodům nebo Evropský účetní dvůr žádá.

1.5 Načasování

Zpráva musí být poskytnuta [dd měsíc rrrr].

1.6 Další podmínky

[Příjemce] [Připojená třetí strana] a Auditor mohou pomocí této části odsouhlasit další konkrétní podmínky, jako jsou poplatky auditorovi, odpovědnost, platné zákony atd. Tyto konkrétní podmínky nesmí být v rozporu s výše uvedenými podmínkami

[právní jméno auditora]	[právní název [příjemce] [připojená třetí strana]]
[jméno a titul zplnomocněného zástupce]	[jméno a titul zplnomocněného zástupce]
[dd měsíc rrrr]	[dd měsíc rrrr]
Podpis auditora	Podpis [příjemce] [připojené třetí strany]

[1] Nejvyšší kontrolní instituce uplatňující standardy INTOSAI mohou provádět postupy podle odpovídajících mezinárodních standardů nejvyšších kontrolních institucí a etického kodexu vydaného INTOSAI namísto mezinárodního standardu pro související služby ("ISRS") 4400 a Etického kodexu profesionálních účetních vydaného IAASB a IESBA.

Nezávislá zpráva o věcných zjištěních o metodice týkající se grantových dohod financované v rámcovém programu Horizont 2020 Výzkum a inovace.

(*K vytištění na hlavičkový papír auditora*)

Adresováno

[jméno kontaktní osoby (osob)], [pozice]
[[Příjemce] [Název připojené třetí strany]]
[Adresa]
[dd měsíc rrrr]

Vážený [jméno kontaktní osoby],

Jak bylo dohodnuto podle referenčních podmínek ze dne [dd měsíc rrrr]

s [*MOŽNOST 1: [vložte název příjemce] ("příjemce")] [VARIANTA 2: [vložte název propojené třetí strany] ("připojená třetí strana"), třetí strana spojená s příjemcem [vložte název příjemce] ("příjemce*")],

my

[jméno auditora] ("Auditor"),

založena na [úplná adresa/město/stát/provincie/země,

zastoupený [jméno a funkce zplnomocněného zástupce],

provedli dohodnuté postupy (dále jen "postupy") a tímto poskytují naši nezávislou zprávu o věcných zjištěních (dále jen "zpráva") týkající se obvyklých účetních postupů [příjemce] [propojené třetí strany] pro výpočet a vykazování přímých osobních nákladů deklarovány jako jednotkové náklady (dále jen "metodika").

Požádali jste, aby byly v souvislosti s grantem provedeny určité postupy

[název a číslo grantové dohody] ("Dohoda (dohody)").

Hlášení

Naše zakázka byla provedena v souladu s podmínkami (" Sm.") připojenými k této zprávě. Zpráva obsahuje: standardní prohlášení ("prohlášení") učiněná [příjemcem] [propojenou třetí stranou], provedené dohodnuté postupy (dále jen "postupy") a potvrzená standardní věcná zjištění (dále jen "zjištění") námi.

Součástí zakázky bylo provedení postupů a posouzení nálezů a požadované dokumentace připojené k této zprávě, jejíž výsledky Komise používá k vyvození závěrů ohledně přijatelnosti metodiky uplatňované [příjemcem] [propojenou třetí stranou].

Zpráva pokrývá metodiku použitou od [dd měsíc rrrr]. V případě, že [Příjemce] Připojená třetí strana] tuto metodiku změní, nebude zpráva použita na žádnou Účetní závěrku[1].

Rozsah postupů a definice standardních prohlášení a zjištění byla stanovena výhradně Komisí. Auditor proto neodpovídá za jejich vhodnost nebo vhodnost.

Protože provedené Postupy nepředstavují ani audit, ani prověrku provedenou v souladu s Mezinárodními auditorskými standardy nebo Mezinárodními standardy pro prověrky, neposkytujeme prohlášení o věrohodnosti nákladů deklarovaných na základě metodiky [Příjemce] [Připojené třetí strany]. Pokud bychom provedli další postupy nebo bychom provedli audit nebo přezkoumání v souladu s těmito standardy, mohlo by se upozornit na další záležitosti, jež by byly zahrnuty do zprávy.

Výjimky

Kromě níže uvedených výjimek [Příjemce] [Připojené třetí strana] souhlasil se standardními prohlášeními a poskytl auditorovi veškerou dokumentaci a účetní informace, které auditor potřebuje k provedení požadovaných postupů a doložení standardních zjištění.

Zde uveďte všechny výjimky a přidejte jakékoliv informace o příčině a možných důsledcích každé výjimky, pokud je známa. Pokud je výjimka vyčíslitelná, uveďte také odpovídající částku.

…..

Vysvětlení možných výjimek ve formě příkladů (bude odstraněno ze zprávy):

i. [Příjemce] [Připojená třetí strana] nesouhlasila se standardním číslem prohlášení..., protože...;
ii. auditor nemohl provést postup... zavedený, protože .... (např. kvůli neschopnosti sladit klíčové informace nebo nedostupnosti či nekonzistenci dat);
iii. auditor nemohl potvrdit ani schválit standardní vyhledávací číslo..., protože ....

Poznámky

Rádi bychom přidali následující poznámky relevantní pro správné porozumění metodice používané [Příjemcem] [Připojenou třetí stranou] nebo oznámeným výsledkům:

Příklad (bude odstraněn ze zprávy):

Pokud jde o metodiku používanou pro výpočet hodinových sazeb…
Pokud jde o standardní nález 15, je třeba poznamenat, že…
[Příjemce] [Připojená třetí strana] vysvětlil odchylku od prohlášení o referenční hodnotě XXIV týkajícího se zaznamenávání času pro zaměstnance bez výhradního důrazu na akci následujícím způsobem:
…

Přílohy

Při předkládání této zprávy CoMUC Komisi auditorovi poskytněte následující dokumenty a přiložte je ke zprávě:

[1] Účetní závěrka v této souvislosti odkazuje pouze na přílohu Dohody č. 4, kterou příjemce deklaruje náklady podle Dohody.

1. Stručný popis metodiky pro výpočet personálních nákladů, produktivních hodin a hodinových sazeb;
2. Stručný popis zavedeného systému záznamu času;
3. Příklad časových záznamů použitých [Příjemcem] [Připojenou třetí stranou];
4. Popis všech použitých rozpočtovaných nebo odhadovaných prvků spolu s vysvětlením, proč jsou relevantní pro výpočet personálních nákladů a jak jsou založeny na objektivních a ověřitelných informacích;
5. Souhrnný list s hodinovou sazbou pro přímý personál deklarovaný [Příjemcem] [Připojenou třetí stranou] a přepočtený auditorem pro každého zaměstnance zahrnutého ve vzorku (jména není nutné hlásit);
6. Srovnávací tabulka shrnující pro každou osobu vybranou ve vzorku a) čas požadovaný [Příjemcem] [Připojenou třetí stranou] v účetních výkazech a b) čas podle časového záznamu ověřeného auditorem;
7. Kopie dopisu o zastupování poskytnutá auditorovi

Použití této zprávy

Tato zpráva byla sepsána výhradně za účelem uvedeným v bodě 1.1 Důvody pro zapojení.

Zpráva:

- je důvěrná a je určena k tomu, aby ji [Příjemce] [Připojená třetí strana] předložil Komisi v souvislosti s článkem 18.1.2 Dohody;
- nesmí být použit [Příjemcem] [Připojenou třetí stranou] nebo Komisí k žádnému jinému účelu, ani distribuován jiným stranám;
- může být Komisí zpřístupněna pouze oprávněným stranám, zejména Evropskému úřadu pro boj proti podvodům (OLAF) a Evropskému účetnímu dvoru.
- se týká pouze výše uvedených obvyklých postupů účtování nákladů a nepředstavuje zprávu o Účetní závěrce [Příjemce] [Připojené třetí strany].

Mezi auditorem a příjemcem [a Připojenou třetí stranou] neexistuje žádný střet zájmů[2], který by mohl mít na zprávu vliv. Celkový poplatek vyplacený auditorovi za vypracování zprávy činil _____ EUR (včetně _____ EUR odpočitatelné DPH)

Těšíme se na diskusi s Vámi o naší zprávě a rádi Vám poskytneme jakékoliv další informace nebo pomoc, kterou můžete vyžadovat.

S úctou

[právní jméno auditora]
[jméno a titul zplnomocněného zástupce]
[dd měsíc rrrr]

Podpis auditora

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[2] Ke střetu zájmů dochází tehdy, je-li objektivně nebo vzhledově ohrožena objektivita auditora při vytváření certifikátu, například když: -
- se podílel na přípravě Účetní závěrky;
- má přímý prospěch v případě přijetí certifikátu;
- má blízký vztah s jakoukoliv osobou zastupující příjemce;
- je ředitelem, správcem nebo partnerem příjemce; nebo
- je v jakékoliv jiné situaci, která ohrožuje jeho nezávislost nebo schopnost nezaujatě vystavit certifikát.

Prohlášení, která má učinit příjemce/připojená třetí strana (dále jen "Prohlášení") a postupy, které má provést auditor (dále jen "postupy"), a standardní faktická zjištění (dále jen "Zjištění"), která musí být potvrzena auditorem.

Komise má právo předat auditorovi pokyny týkající se Prohlášení, která mají být učiněna, Postupů, které mají být provedeny, nebo Zjištění, která mají být provedena způsob, jakým je předložit. Komise si vyhrazuje právo změnit Prohlášení, Postupy nebo Zjištění písemným oznámením Příjemci/Připojené třetí straně za účelem přizpůsobení postupů změněných v dohodách o grantu nebo z důvodu jakýchkoliv jiných okolností.

Pokud se tento metodický certifikát vztahuje k obvyklým účetním postupům Připojené třetí strany pro výpočet a nárokování přímých osobních nákladů deklarovaných jako jednotkové náklady, jakýkoliv níže uvedený odkaz na "Příjemce" je třeba považovat za odkaz na "Připojenou třetí stranu".

Vysvětlete prosím případné nesrovnalosti v textu zprávy.	
Prohlášení, která má učinit příjemce	**Postupy, které je třeba provést, a zjištění, která musí potvrdit auditor**
A. **Využití metodiky** I. Níže popsaný postup nákladového účetnictví se používá od [dd měsíc rrrr] II. Další plánovaná změna metodiky používané příjemcem bude od [dd měsíc rrrr].	**Postup:** ✓ Auditor zkontroloval tato data podle dokumentace, již příjemce poskytl. **Věcné zjištění:** 1. Data uvedená příjemcem byla v souladu s dokumentací.
B. **Popis metodiky** III. Metodika výpočtu jednotkových nákladů je používána konzistentním způsobem a je zohledněna v příslušných postupech. [Popište prosím metodiku, kterou vaše účetní jednotka používá k výpočtu personálních nákladů, produktivních hodin a hodinových sazeb, předložte svůj popis auditorovi a přiložte jej k tomuto certifikátu] *Pokud výrok uvedený v oddíle "B. Popis metodiky" nemůže být schválen příjemcem nebo neexistuje žádná písemná metodika pro výpočet jednotkových nákladů, měl by být Auditorem uveden níže a vykazován jako výjimka v hlavní zprávě o faktických zjištěních:* - …]	**Postup:** ✓ Auditor přezkoumal popis, příslušné příručky a/nebo interní pokyny popisující metodiku. **Věcné zjištění:** 2. Stručný popis byl v souladu s příslušnými příručkami, interními pokyny a/nebo jinými listinnými důkazy, které auditor zkontroloval. 3. Tuto metodiku Příjemce obecně použil jako součást svých obvyklých postupů účtování nákladů.

Vysvětlete prosím případné nesrovnalosti v textu zprávy.	
Prohlášení, která má učinit příjemce	**Postupy, které je třeba provést, a zjištění, která musí potvrdit auditor**
C. Personální náklady Obecně IV. Jednotkové náklady (hodinové sazby) jsou omezeny na platy, a to i během rodičovské dovolené, příspěvky na sociální zabezpečení, daně a další náklady zahrnuté v odměně požadované vnitrostátním právem a pracovní smlouvou nebo obdobným ustanovovacím aktem; V. Zaměstnanci jsou najímáni přímo příjemcem v souladu s vnitrostátními právními předpisy a pracují pod jeho výhradním dohledem a zodpovědností; VI. Příjemce odměňuje své zaměstnance v souladu se svými obvyklými postupy. To znamená, že personální náklady jsou účtovány v souladu s obvyklou mzdovou politikou příjemce (např. mzdová politika, politika přesčasů, variabilní mzda) a pro zaměstnance přiřazené k úkolům týkajícím se Evropské unie nebo Euratomu neexistují žádné zvláštní podmínky, pokud to není výslovně stanoveno v grantových dohodách; VII. Příjemce alokuje své zaměstnance do příslušné skupiny/kategorie/nákladového střediska pro účely výpočtu jednotkových nákladů v souladu s obvyklými postupy účtování nákladů; VIII. Osobní náklady vycházejí ze mzdového systému a účetního systému. IX. Jakékoli výjimečné úpravy skutečných osobních nákladů vyplynuly z příslušných rozpočtovaných nebo odhadovaných prvků a vycházely z objektivních a ověřitelných informací. [*Popište prosím „rozpočtované nebo odhadované prvky" a jejich význam pro osobní náklady a vysvětlete, jak byly přiměřené a založené na objektivních a ověřitelných informacích, předložte své vysvětlení auditorovi a přiložte jej k tomuto osvědčení*]. X. Požadované personální náklady neobsahují žádné z následujících nezpůsobilých nákladů: náklady související s návratností kapitálu; dluh a poplatky za dluhovou službu; rezervy na budoucí ztráty nebo dluhy; dlužný úrok; pochybné dluhy; kurzové ztráty; bankovní náklady účtované bankou příjemce za převody od Komise/Agentury; nadměrné nebo neuvážené výdaje; odpočitatelná DPH nebo náklady vzniklé během pozastavení provádění akce. XI. Personální náklady nebyly vykázány v rámci jiného grantu EU nebo Euratomu	**Postup:** *Auditor odebere vzorek zaměstnanců k provedení postupů uvedených v jeho oddíle C a následujících oddílech D až F.* *[Auditor nakreslil náhodný vzorek 10 zaměstnanců zařazených do akcí Horizontu 2020. Pokud bylo k akci (akcím) Horizontu 2020 přiřazeno méně než 10 zaměstnanců, auditor vybral všechny zaměstnance přiřazené k akci (akcím) Horizontu 2020 doplněné dalšími zaměstnanci bez ohledu na jejich přiřazení, dokud nedosáhl 10 zaměstnanců.].* Pro tento vzorek: ✓ auditor zkontroloval všechny dokumenty týkající se personálních nákladů, jako jsou pracovní smlouvy, výplatní pásky, mzdová politika (např. mzdová politika, politika přesčasů, politika variabilních mezd), účetní a mzdové záznamy, příslušné vnitrostátní daňové, pracovní a sociální právo a veškeré další dokumenty potvrzující nárokované osobní náklady; ✓ auditor zejména zkontroloval pracovní smlouvy zaměstnanců ve vzorku, aby to ověřil: i. že byli zaměstnáni přímo příjemcem v souladu s platnými vnitrostátními právními předpisy; ii. pracovali pod výhradním technickým dohledem a odpovědností posledně jmenovaného; iii. byli odměňováni v souladu s obvyklými postupy příjemce; iv. byli přiděleny do správné skupiny/kategorie/nákladového střediska pro účely výpočtu jednotkových nákladů v souladu s obvyklými postupy účtování nákladů příjemce; ✓ auditor ověřil, že při výpočtu personálních nákladů nebyly vzaty v úvahu žádné nezpůsobilé položky nebo jakékoliv náklady nárokované v rámci jiných kategorií nákladů nebo nákladů krytých jinými druhy grantů nebo jinými granty financovanými z rozpočtu Evropské unie; ✓ auditor numericky odsouhlasil celkovou částku personálních nákladů použitých k výpočtu jednotkových nákladů s celkovou částkou personálních nákladů zaznamenanou na statutárních účtech a mzdovém systému.

Vysvětlete prosím případné nesrovnalosti v textu zprávy.	
Prohlášení, která má učinit příjemce	**Postupy, které je třeba provést, a zjištění, která musí potvrdit auditor**
(včetně grantů udělených členským státem a financovaných z rozpočtu EU a grantů udělených jinými orgány než Komisí/Agenturou za účelem plnění rozpočtu EU nebo Euratomu ve stejném období, pokud příjemce nemůže prokázat, že grant na provoz nepokrývá žádné náklady na akci). Pokud je vyplacena dodatečná odměna uvedená v Dohodách o grantu XII. Příjemce je nezisková právnická osoba; XIII. Dodatečná odměna je součástí obvyklých postupů odměňování příjemce a vyplácí se konzistentně, kdykoliv je požadována příslušná práce nebo odbornost; XIV. Kritéria použitá pro výpočet dodatečné odměny jsou objektivní a obecně se používají bez ohledu na zdroj financování; XV. Dodatečná odměna zahrnutá v osobních nákladech použitých pro výpočet hodinových sazeb u dohod o grantu je omezena na 8 000 EUR za ekvivalent plného pracovního úvazku (sníženo poměrně, pokud zaměstnanec není zařazen výlučně na akci). [*Pokud některá prohlášení v oddílu "C. Personální náklady "nemůže schválit příjemce, měly by být uvedeny níže a vykazovány jako výjimka auditorem v hlavní zprávě o faktických zjištěních*: - …]	✓ do té míry, že skutečné personální náklady byly upraveny na základě rozpočtovaných nebo odhadovaných prvků, auditor tyto prvky pečlivě prozkoumal a zkontroloval zdroj informací, aby potvrdil, že odpovídají objektivním a ověřitelným informacím; ✓ pokud byla požadována dodatečná odměna, ověřil auditor, že příjemce byl neziskovou právnickou osobou, že částka byla omezena na 8 000 EUR za ekvivalent plného pracovního úvazku a že byla úměrně snížena u zaměstnanců, kteří nebyli zařazeni výlučně na akci (s). ✓ auditor přepočítal personální náklady na zaměstnance ve vzorku. **Věcné zjištění:** 4. Všechny složky odměny, které byly nárokovány jako osobní náklady, jsou podloženy podkladovou dokumentací. 5. Zaměstnanci ve vzorku byli zaměstnáni přímo příjemcem v souladu s platnými vnitrostátními právními předpisy a pracovali pod jeho výhradním dohledem a zodpovědností. 6. Jejich pracovní smlouvy byly v souladu s obvyklou politikou příjemce; 7. Osobní náklady byly řádně zdokumentovány a sestávaly pouze z platů, příspěvků na sociální zabezpečení (příspěvky na důchod, zdravotní pojištění, příspěvky do fondu nezaměstnanosti atd.), daní a dalších zákonných nákladů zahrnutých v odměnách (výplaty za dovolenou, třináctý plat atd.); 8. Součty použité k výpočtu personálních jednotkových nákladů jsou v souladu s celkovými hodnotami evidovanými ve mzdových a účetních záznamech; 9. Pokud byly skutečné personální náklady upraveny na základě rozpočtovaných nebo odhadovaných prvků, byly tyto prvky relevantní pro výpočet personálních nákladů a odpovídaly objektivním a ověřitelným informacím. Použité rozpočtované nebo odhadované prvky jsou: - (uveďte prvky a jejich hodnoty). 10. Osobní náklady neobsahovaly žádné nezpůsobilé prvky; 11. Zvláštní podmínky způsobilosti byly splněny, když byla vyplacena dodatečná odměna:

Vysvětlete prosím případné nesrovnalosti v textu zprávy.	
Prohlášení, která má učinit příjemce	**Postupy, které je třeba provést, a zjištění, která musí potvrdit auditor**
	a) příjemce je registrován v grantových dohodách jako nezisková právnická osoba; b) byla vyplacena podle objektivních kritérií obecně uplatňovaných bez ohledu na použitý zdroj financování a c) odměna byla omezena na 8 000 EUR za ekvivalent plného pracovního úvazku (nebo až do výše ekvivalentní poměrné částky, pokud osoba nepracovala na akci v průběhu roku na plný úvazek nebo nefungovala výhradně na akci).
D. Produktivní hodiny XVI. Počet produktivních hodin na jednoho zaměstnance na plný úvazek je [*podle potřeby odstranit*]: A. 1720 produktivních hodin ročně pro osobu pracující na plný úvazek (odpovídající poměrná část pro osoby nepracující na plný úvazek). B. celkový počet hodin odpracovaných za rok osobou pro příjemce C. standardní počet ročních hodin, které příjemce obecně uplatňuje pro své zaměstnance v souladu s jeho obvyklými postupy účtování nákladů. Toto číslo musí být alespoň 90 % standardní roční pracovní doby. <u>Pokud se použije metoda B</u> XVII. Výpočet celkového počtu odpracovaných hodin byl proveden následovně: roční pracovní doba osoby podle pracovní smlouvy, příslušné pracovní dohody nebo vnitrostátního práva plus odpracované přesčasy mínus absence (například nemocenská a zvláštní dovolená)). XVIII. Roční pracovní doba představuje hodiny, během nichž musí být zaměstnanci v práci, k dispozici zaměstnavateli a musí vykonávat svou činnost nebo povinnosti podle pracovní smlouvy, příslušné kolektivní pracovní smlouvy nebo vnitrostátních právních předpisů o pracovní době. XIX. Smlouva (příslušná kolektivní smlouva o práci nebo národní legislativa o pracovní době) stanoví pracovní dobu, která umožňuje vypočítat roční pracovní dobu.	**Postup (stejný vzorek jako pro Sekci C: Personální náklady):** ✓ Auditor ověřil, že počet použitých produktivních hodin je v souladu s metodou A, B nebo C. ✓ Auditor zkontroloval, zda je počet produktivních hodin na zaměstnance na plný úvazek správný. ✓ Pokud je použita metoda B, auditor ověřil i) způsob, jakým byl proveden celkový počet odpracovaných hodin, a ii) že ve smlouvě byla stanovena roční pracovní doba, a to kontrolou všech příslušných dokumentů, vnitrostátních právních předpisů, pracovních dohod a smluv. ✓ Je-li použita metoda C, revidoval auditor způsob, jakým byl vypočten standardní počet pracovních hodin za rok, kontrolou všech příslušných dokumentů, vnitrostátních právních předpisů, pracovních dohod a smluv a ověřil, že počet produktivních hodin za rok použitých pro tyto výpočty činil alespoň 90 % standardního počtu pracovních hodin za rok. **Věcné zjištění:** <u>Obecně</u> 12. Příjemce použil řadu produktivních hodin v souladu s metodou A, B nebo C podrobně popsanou v levém sloupci. 13. Počet produktivních hodin za rok na jednoho zaměstnance na plný úvazek byl přesný. <u>Pokud se použije metoda B</u> 14. Počet "ročních pracovních hodin", přesčasů a absence byl ověřitelný na základě dokumentů

Vysvětlete prosím případné nesrovnalosti v textu zprávy.	
Prohlášení, která má učinit příjemce	**Postupy, které je třeba provést, a zjištění, která musí potvrdit auditor**
Pokud se použije metoda C XX. Standardní počet produktivních hodin za rok je ekvivalent plného pracovního úvazku. XXI. Počet produktivních hodin za rok, z nichž vychází hodinová sazba i) odpovídá obvyklým účetním postupům Příjemce; ii) je alespoň 90 % standardního počtu pracovních hodin za rok. XXII. Standardní pracovní doba představuje hodiny, během nichž jsou zaměstnanci k dispozici příjemci a plní úkoly popsané v příslušné pracovní smlouvě, kolektivní pracovní smlouvě nebo národní pracovní legislativě. Počet standardních ročních pracovních hodin, které příjemce uvádí, je podložen pracovními smlouvami, vnitrostátními právními předpisy a dalšími listinnými důkazy. *Pokud některá prohlášení v oddíle "D. Produktivní hodiny" nemohou být schválena příjemcem, měla by být uvedena níže a vykazována auditorem jako výjimka:* - *...]*	poskytnutých příjemcem a výpočet celkového počtu odpracovaných hodin byl přesný. 15. Ve smlouvě byla stanovena pracovní doba umožňující vypočítat roční pracovní hodiny. Pokud se použije metoda C 16. Výpočet počtu produktivních hodin za rok odpovídal obvyklým postupům účtování nákladů příjemce. 17. Výpočet standardního počtu zpracovatelných (pracovních) hodin za rok byl potvrzen dokumenty předloženými příjemcem. 18. Počet produktivních hodin za rok použitý pro výpočet hodinové sazby činil nejméně 90 % počtu pracovních hodin za rok.
E. **Hodinové sazby** Hodinové sazby jsou správné, protože: XXIII. Hodinové sazby jsou správně vypočítány, protože vyplývají z dělení ročních personálních nákladů produktivními hodinami daného roku a skupiny (např. kategorie zaměstnanců nebo oddělení nebo nákladové středisko v závislosti na použité metodice) a jsou v souladu s prohlášeními uvedenými v oddíle C a D. [*Pokud výrok v oddíle "E. Hodinové sazby" nemůže být schválen příjemcem, měl by být uveden níže a vykazován auditorem jako výjimka:* - *...]*	**Postup** ✓ Auditor získal seznam všech personálních sazeb vypočítaných příjemcem v souladu s použitou metodikou. ✓ Auditor získal seznam všech příslušných zaměstnanců, na základě něhož se vypočítávají osobní sazby. 10 zaměstnanců vybraných náhodně (stejný vzorek jako sekce C: Personální náklady): ✓ Auditor přepočítal hodinové sazby. ✓ Auditor ověřil, že použitá metodika odpovídá obvyklým účetním postupům organizace a je důsledně uplatňována u všech činností organizace na základě objektivních kritérií bez ohledu na zdroj financování. **Věcné zjištění:**

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	19. Z přepočtu hodinové sazby pro zaměstnance zařazené do vzorku nevznikly žádné rozdíly.
F. **Zaznamenávání času** XXIV. Záznam času je k dispozici pro všechny osoby bez výhradního věnování se jedné akci Horizon 2020. Nejméně všechny hodiny odpracované v souvislosti s dohodami o grantu jsou evidovány **denně/týdně/měsíčně** [*podle potřeby škrtněte*] pomocí **papírového/počítačového systému** [*podle potřeby škrtněte*]; XXV. V případě osob, které jsou výhradně zařazeny do jedné činnosti programu Horizont 2020, příjemce buď podepsal prohlášení v tomto smyslu, nebo zavedl opatření k zaznamenávání jejich pracovní doby; XXVI. Záznamy o odpracované době byly podepsány dotyčnou osobou (na papíře nebo elektronicky) a schváleny akčním manažerem nebo přímým nadřízeným nejméně jednou za měsíc; XXVII. Jsou zavedena opatření, která zamezují personálu: i. zaznamenávat stejných hodin dvakrát, ii. zaznamenávat pracovní dobu v době nepřítomnosti (např. svátky, nemocenské)), iii. zaznamenávat více než počet produktivních hodin za rok použitých pro výpočet hodinových sazeb iv. zaznamenávat odpracované hodiny mimo akční období. XXVIII. Mimo akční období nebyla zaznamenána žádná pracovní doba; XXIX. Nebylo požadováno více hodin, než kolik produktivních hodin bylo použito k výpočtu hodinových personálních sazeb. [Poskytněte prosím auditorovi stručný popis zavedeného systému záznamu času spolu s opatřeními použitými k zajištění jeho spolehlivosti a připojte jej k	**Postup** ✓ Auditor zkontroloval stručný popis, všechny příslušné příručky a/nebo interní pokyny popisující metodiku používanou k zaznamenávání času. Auditor zkontroloval časové záznamy náhodného vzorku 10 zaměstnanců uvedeného v oddíle C: Personální náklady a ověřil zejména: ✓ že časové záznamy byly k dispozici pro všechny osoby bez výhradního přiřazení k akci; ✓ že časové záznamy byly k dispozici pro osoby pracující výlučně pro akci Horizont 2020, nebo alternativně a že pro ně bylo k dispozici prohlášení podepsané Příjemcem, které potvrzuje, že pracovali výhradně pro akci Horizont 2020; ✓ aby byly včas podepsány a schváleny časové záznamy a aby byly splněny všechny minimální požadavky; ✓ že osoby pracovaly pro akci v požadovaných obdobích; ✓ že nebylo požadováno více hodin, než jsou produktivní hodiny použité pro výpočet hodinových personálních sazeb ✓ že byly zavedeny vnitřní kontroly, které zabraňují tomu, aby se tento čas zaznamenával dvakrát, během nepřítomnosti na dovolené nebo z důvodu nemoci; že na akce za rok 2020 je nárokováno více hodin na osobu za rok, než je počet produktivních hodin za rok použitých pro výpočet hodinových sazeb; že se pracovní doba zaznamenává mimo akční období; ✓ Auditor zkontroloval informace pomocí záznamů o lidských zdrojích, aby ověřil konzistenci a zajistil účinnost vnitřních kontrol. Auditor navíc ověřil, že na akce programu Horizont 2020 nebylo na osobu a rok účtováno více hodin, než je počet produktivních hodin za rok použitých pro výpočet hodinových sazeb, a ověřil, že

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aktuálnímu certifikátu[1]]. *[Pokud některá prohlášení v oddíle "F. Nahrávání času" nemohou být schválena příjemcem, měla by být uvedena níže a vykazováno auditorem jako výjimka:* - ...]	doba odpracovaná mimo akční období byla účtována do akce. **Věcné zjištění:** 20. Stručný popis, manuály a/nebo interní pokyny k zaznamenávání času poskytnuté příjemcem byly v souladu se zprávami/záznamy vedení a dalšími zkontrolovanými dokumenty a obecně byly příjemcem použity při sestavování účetní závěrky. 21. Pro náhodný výběr vzorku byl zaznamenán čas, nebo v případě zaměstnanců pracujících výhradně pro akci bylo k dispozici buď podepsané prohlášení, nebo časové záznamy; 22. U náhodného vzorku byly časové záznamy podepsány zaměstnancem a manažerem akcí/přímým nadřízeným nejméně jednou za měsíc. 23. K nárokované pracovní době akce došlo v požadovaných obdobích; 24. Nebylo požadováno více hodin, než je počet produktivních hodin použitých k výpočtu hodinových personálních sazeb; 25. Existuje důkaz, že příjemce zkontroloval, že pracovní doba nebyla nárokována dvakrát, že je v souladu se záznamy o absenci a počtem produktivních hodin za rok a že mimo pracovní dobu nebyla nárokována žádná pracovní doba. 26. Udávaná pracovní doba je v souladu se záznamem na oddělení lidských zdrojů.

[1] Popis systému záznamu času musí mimo jiné uvádět informace o obsahu časových záznamů, jeho pokrytí (úplné nebo akční zaznamenávání času, pro veškerý personál nebo pouze pro personál zapojený do akcí H2020), jeho stupeň podrobnosti (zda existuje odkaz na konkrétní splněné úkoly), jeho forma, periodicita registrace času a autorizace (papír nebo počítačový systém; na denní, týdenní nebo měsíční bázi; podepsaný a spolupodepsaný kým), ovládací prvky používané k zamezení dvojího - účtování času nebo zajištění souladu se záznamy HR, jako jsou absence a cesty a také tok informací až do jeho použití pro účely sestavení účetní závěrky.

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[oficiální název [příjemce] [připojená třetí strana] *[jméno a titul zplnomocněného zástupce]* *[dd měsíc rrrr]* *< **Podpis** příjemce [připojení třetí strany]>*	[*oficiální jméno auditora]* *[jméno a titul zplnomocněného zástupce]* *[dd měsíc rrrr]* *< **Podpis** auditora >*