

August 2024

2023
2024

ARV magazine



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Green Deal ARV - Climate Positive Circular Communities

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The overall aim of the EU-funded ARV project is to demonstrate and validate attractive, resilient, and affordable solutions that significantly speed-up deep energy renovations and deployment of energy and climate measures in the construction and energy industries. The project is working towards the implementation of climate-positive circular communities in Europe, focusing on net zero-emission buildings and neighbourhoods.

The ARV project consists of 35 partners from 8 countries in Europe, and is coordinated by the Norwegian University of Science and Technology (NTNU). At the core of the project are six large-scale demonstration projects located in six European cities, showcasing a range of innovations related to the whole value chain of the industry. Please visit our website to find out more.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 101036723.

ARV

CLIMATE POSITIVE
CIRCULAR COMMUNITIES





Oslo, Norway



Sønderborg, Denmark



Utrecht, the Netherlands



Karviná, Czechia



Palma de Mallorca, Spain



Trento, Italy

LETTER FROM THE COORDINATOR

Inger Andresen

Professor, NTNU

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.

However, fast and disruptive changes are challenging to achieve, given the conservative nature of the industry, and the multitude of stakeholders that need to be addressed. In particular, deep energy renovation of the existing building stock, remains a major challenge.

The ARV project is addressing these challenges by employing 35 partners along the value chain of the building and energy sectors, to design and demonstrate innovative solutions in 6 large-scale climate positive circular communities around Europe.

In this magazine, we present some highlights from the 2 first years of the ARV project.

Enjoy the read!



Wishing you all the best of luck in your continuous efforts towards achieving Climate Positive and Circular Communities!

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Disclaimer

*Most background
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Jesus Daniel Garcia Melo,
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project



Opening of Voldsløkka school in Oslo
Source: Oslobygg



Renewal Wall panel installation
Source: UNITN.

2023

Opening of the Voldsløkka School and Cultural Area in Oslo

Dutch Partner Inside-Out is disseminating their solutions

Seminar in the European Cities and Regions week in Brussels

Residential Renovation in Trento with application of the Renew Wall timber-based panel

Guidelines on descriptions of smartness and flexibility

highlights



Installation and testing of PV in Palma
Source: Metrovacesa



4th Consortium meeting - Trento, Italy
Source: Habitech

2024

Development of ARVs super hero to fight for sustainability!

Plus energy buildings by METROVACESA in Palma de Mallorca are in operation.

ECTP conference participation on the potential of circularity in district renovation

Student workshop in Karvina organized by CVUT and Karvina municipality.

Installation and testing of PV façade panels in the cultural heritage building in Palma de Mallorca

4th Consortium meeting on April in Trento, Italy

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Our Climate Positive Circular Communities

Innovation and sustainability has converged in the ARV project, where we explore the implementation of Climate Positive Circular Communities. We showcase six interactive demos, each offering a glimpse into transformative activities during the last year. Dive into this section to explore the breakthroughs and collaborative efforts that are shaping a greener, more resilient future.

Sønderborg, Denmark



Receiving the EU Mission Label community

Sønderborg, a leader in climate action, is part of the ARV project for carbon-neutral communities by 2029 and has earned the EU Mission Label. The EU appointed 100 cities, including Sønderborg, to develop green transition methods, requiring them to create Climate City Contracts. This label signifies approval by the European Commission and enables access to funding for sustainability efforts.



EU Mission Label logo. Source EU



German journalists visited ARV's demo site in Sønderborg



Eight German journalists recently toured the Kløver-/Hvedemarken housing association in Sønderborg, where they observed how innovative technical installations enhance district heating efficiency. By using hot return water to preheat domestic water for 400 apartments, the system demonstrates a more sustainable approach to energy management.

This visit, part of a 3-day energy press tour organized by the Danish Embassy in Berlin, State of Green, and the Danish Energy Agency, highlighted Denmark's advanced district heating solutions. With Germany planning a heat planning law in 2024 aimed at climate-neutral heating by 2045, this exposure could influence German strategies for sustainable energy development.

German journalists visited ARV's demo site in Sønderborg. Source: DTU



Oslo, Norway



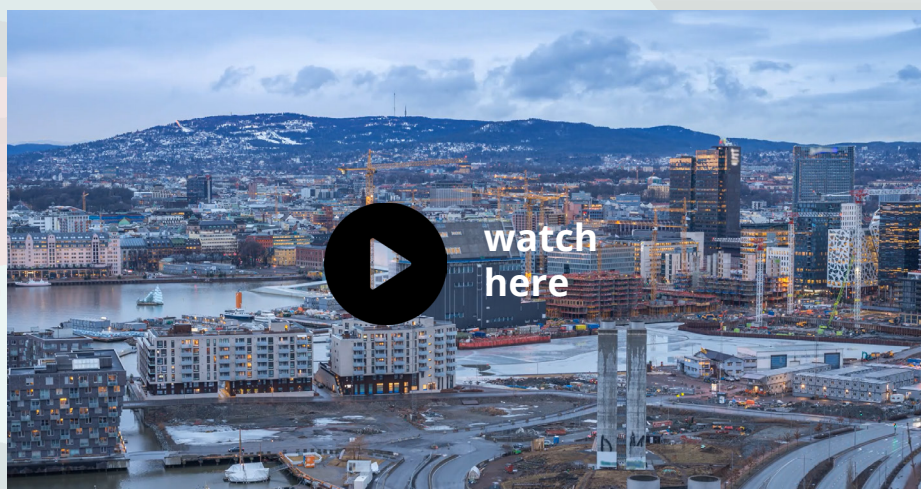
ARV Voldsløkka living lab and board game design

The collaboration between ARV researchers and 120 ninth-grade students at Voldsløkka School in Oslo generated 32 unique board games centered on sustainable cities. These student-created games offer a valuable resource for developing a prototype that could be integrated into ARV's broader sustainability education initiatives, potentially serving as an innovative tool to engage young people in climate action and urban planning.

The project also demonstrated the power of creative, hands-on learning to deepen students' understanding of sustainability goals and climate change within a neighborhood context. By encouraging teamwork and creativity, the initiative not only educated but also empowered students to think critically about real-world challenges. The energy and enthusiasm captured in a film of the week's activities highlight the project's potential to shape future educational strategies, amplifying ARV's impact on sustainability awareness and engagement.

The prototype of the game is now in development and is set to be released soon.

Stay tuned on ARV social media for its release date!



Oslo Living Lab video. Source: NTNU - SINTEF



ARV Climate Bootcamp ideas for energy saving. Source: NTNU-SINTEF

Following the success of the ARV Climate Bootcamp, the innovative energy-saving ideas presented by 10th-grade students inspired the creation of a new superhero character: El-Moose, the Sustainability Advocate. This character, armed with eco-friendly tools and knowledge, is designed to teach families and communities about energy-efficient practices and sustainability.

El-Moose will be a powerful tool for the ARV project, helping to disseminate important sustainability messages in an engaging and relatable way. By incorporating El-Moose into educational campaigns and community outreach, the project aims to enhance public understanding of energy efficiency and foster more widespread adoption of sustainable practices.

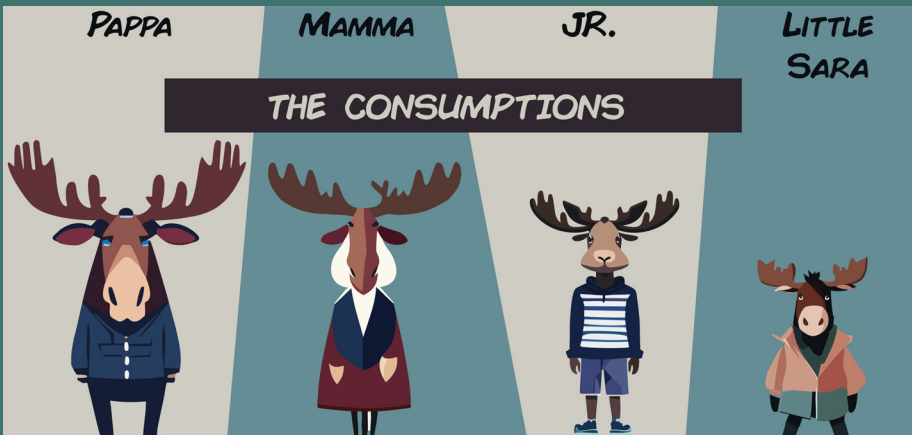
El-Moose - The creation of a hero!

The ARV Climate Bootcamp at Voldsløkka School was an event focused on educating students about energy use at home and school. They learned ethical data collection methods and gathered data on energy usage within the school and community.

A highlight was creating mood boards, where students visually presented their findings and reflections, showcasing their understanding and perspectives on energy use and sustainability.



El-Moose Illustration
Source: Jesus Daniel Garcia Melo, NTNU



Inspired by students' ideas, El-Moose's adventures are transformed into an engaging animated video. This animation, reflecting the students' suggestions, showcases our commitment to energy efficiency.

Stay tuned for the upcoming release of the El-Moose animated video and join us in embracing the lessons and inspiration it offers!

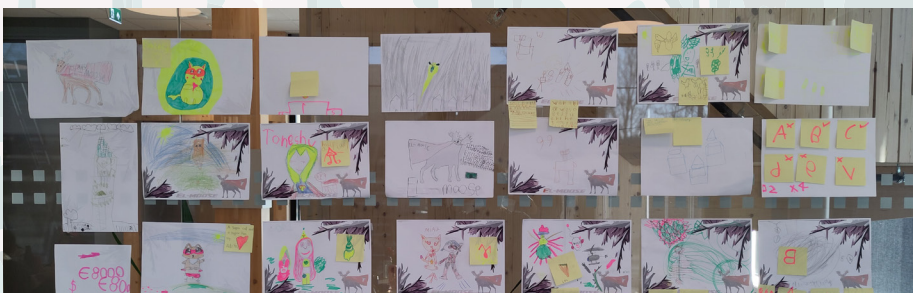


El-Moose animation sections. Source: Jesus Daniel Garcia Melo, NTNU

El-Moose children workshop

The ZEB Lab at NTNU Gløshaugen in Trondheim, Norway, hosted an impactful activity for twenty-two enthusiastic first-grade pupils from Trondheim International School. The young learners were introduced to the concept of a plus-energy building, exploring features like solar panels, energy production, and sustainable materials.

A highlight of the event was the premiere of the El-Moose animation, providing insights about energy conservation to the children. The event included a film screening and an interactive drawing session where children depicted heroes and villains inspired by the animation. The event engaged students, sparking creativity and discussions that will inform future efforts to enhance sustainability education.



Childrens work after the workshop at the ZEB-Lab. Source: NTNU - Patricia Schneider-Marin

Utrecht, the Netherlands

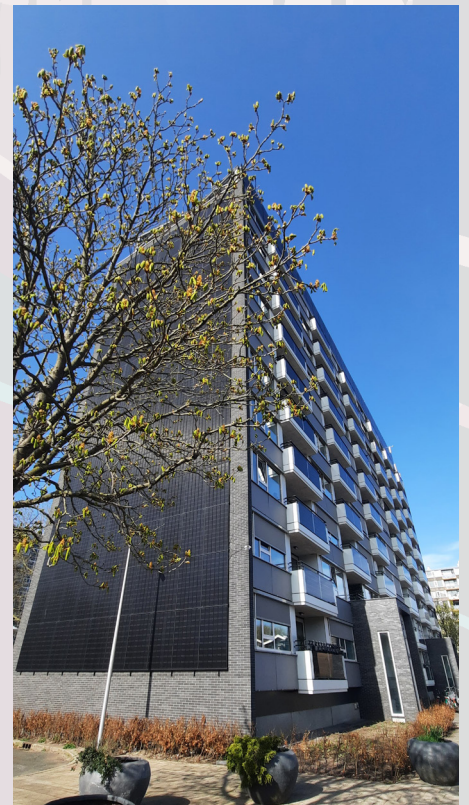


Workshop in Utrecht explores urban renewal in post-war social housing estates



*Top left: Peer to Peer session at Oproer Brouwerij (Utrecht)
Right side: Guided tour of the Henriëtterdreef project (Utrecht)*

Hosted in Utrecht as part of the ARV project, this workshop explored how building renovations can boost social inclusion and engagement in underserved housing estates. By highlighting innovative methods from the Overvecht Noord district, the event provided actionable strategies that could enhance ARV's efforts to integrate climate-positive renovations with community development, potentially accelerating the project's impact across Europe.



Karviná, Czechia



School workshops on Energy, Architecture, and Sustainability in Karviná

Workshops on Energy, Architecture and Sustainability took place in Karviná focused on school students. Youth involvement is a key element of the Czech CPCC, supporting the ARV project's goals by engaging students in workshops on renewable energy, sustainable architecture, and the circular economy.

These workshops, featuring expert insights from Czech Technical University and UCEEB, enhance students' knowledge and innovation. Awarding the best projects motivates further creative solutions, aligning with ARV's mission to promote sustainability and drive impactful change.



Students results after the Energy, Architecture and Sustainability workshop
Source: CVUT





Palma de Mallorca, Spain



ARV Living Lab Workshop in Palma

The ARV Living Lab workshop in Palma de Mallorca aimed to enhance climate awareness, particularly among younger generations, to foster long-term environmental stewardship. By collaborating with local organizations, schools, and civic centers in the Nou Llevant and La Soledat neighborhoods, the workshop effectively integrated community efforts with the Balearic Islands Energy Transition Office.

This approach supports the ARV project's goal of cultivating a more climate-conscious population, potentially leading to greater community engagement and long-term sustainability outcomes. The collaborative activities not only raise awareness but also build a foundation for future environmental initiatives within the local context.



*Workshop in Palma de Malloca for raising awareness
Source: Palma City Council*



IREC investigates different solutions of integrated photovoltaics in the GESA building in Mallorca

The installation of Building Integrated Photovoltaics (BIPV) by the Catalonia Institute for Energy Research (IREC) in Palma's GESA building represents a key advancement for the ARV Climate Positive Circular Communities (CPCC) initiative. By integrating both opaque and transparent technologies, this project modernises the building and boosts its energy efficiency. These experimental solutions will provide valuable data on BIPV performance, aiding ARV's goal of advancing climate-positive building practices and supporting the development of scalable, innovative solutions for future projects.



The GESA building during the works (Palma de Mallorca) Source: IREC.

The public-private partnership collaboration for energy retrofitting in Palma is just starting

The Palma City Council's energy retrofitting initiative, part of the ARV project, is enhancing building efficiency and integrating renewable energy in Nou Llevant and La Soledat (Sud). This public-private partnership, supported by Tramiteco, is crucial for improving energy performance and promoting widespread retrofitting.

By providing funding guidance and administrative support, Tramiteco helps ensure the project's success, improving residents' quality of life. This initiative not only aligns with ARV's goals but also serves as a model for other communities, advancing ARV's mission of climate-positive urban development.



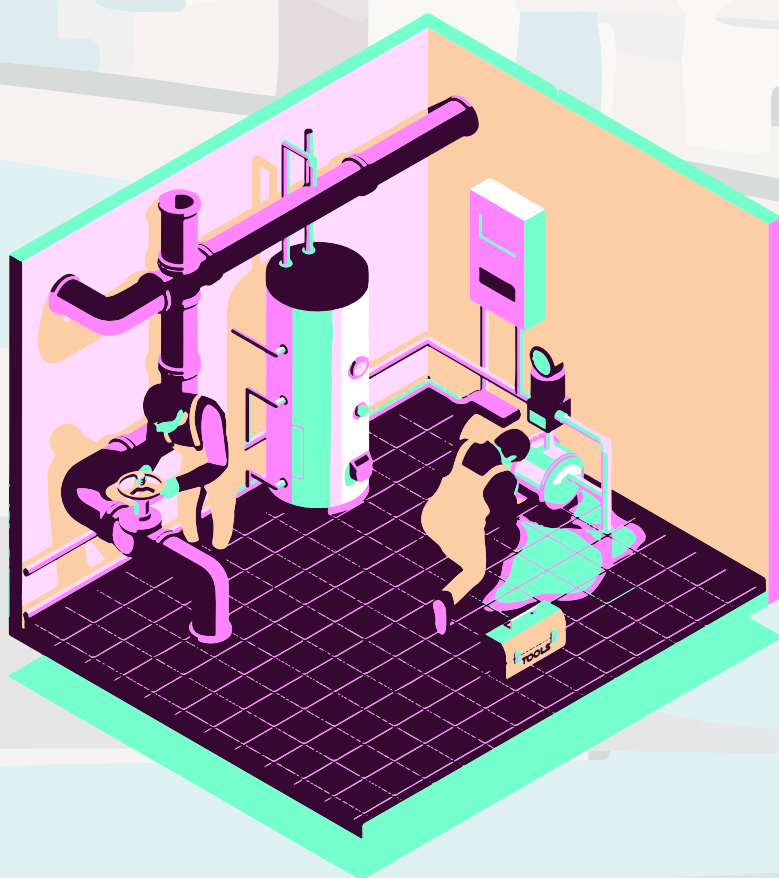
Source: Palma City Council

Palma hosts workshop on publicly owned shared self-consumption energy model

The workshop hosted by the Palma City Council and the Regional Government's Office for Energy Transition on June 6th significantly benefits the ARV project by promoting a new shared energy self-consumption model. Residents gained insights into photovoltaic energy generation and practical strategies for optimising household energy use. This initiative not only enhances community awareness and engagement with renewable energy but also supports ARV's goals of fostering cost savings and sustainability. By optimising local energy consumption, the workshop contributes to a more sustainable neighborhood, aligning with ARV's mission of advancing climate-positive practices.



Source: Regional Government's Office for Energy Transition



Exploring technical details of the Spanish CPCC

Metrovacesa and IREC's technology demonstration at Jardins de Llevant, part of the Spanish Climate Positive Circular Communities project, provides key benefits to ARV. The building's advanced monitoring system tracks temperature, energy, and water use, yielding valuable data to optimize resource efficiency.

This initiative advances ARV's goals by delivering economic and environmental benefits to the community, enhancing scientific knowledge, and showcasing effective climate-positive technologies. The insights gained will guide future projects and promote sustainable practices across the ARV network.

Source: Freepik - Edit: Jesus Daniel Garcia Melo, NTNU

Trento, Italy



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Workshop in Trento explores One-Stop-shops for sustainable integrated renovation

Housing Europe, the European Federation of Public, Cooperative and Social Housing representing the sector in Brussels, and HABITECH, held a public event as part of the ARV project at Le Gallerie Museum in Trento (Italy) to explore the potential of one-stop shops for integrated renovation in the region. This event highlighted the One-Stop Shop (OSS) approach as a pivotal strategy for accelerating the transition to a circular built environment.

By integrating local supply chains and providing tailored renovation services, OSS addresses key barriers like material uncertainty and process fragmentation, thereby improving renovation efficiency and sustainability. The event showcased successful examples, such as the "Renew Wall" system in the Povo district, and underscored the role of OSS in facilitating coordination among stakeholders, streamlining renovation processes, and supporting district-scale upgrades. The approach promises to enhance the ARV project's goals of boosting renovation rates and advancing climate-positive building practices.



*Presentation of the one-stop shop strategy in Trento
Source: Habitech*



Lessons, strategy and gathering inspiration: partners meeting in Trento

In 2024, ARV held its annual consortium meeting and General Assembly in Trento, Italy. It was a three-day symposium filled with sharing, innovation, and collaboration. The works began on the first day with the visit to the demonstrator building located in the uphill Povo District. Here, we witnessed the renovation of a residential building carried out through the innovative, timber-based prefab-kit called “Renew Wall”. The visit provided also the opportunity for face-to-face exchange with some homeowners. Partners also visited the University of Trento’s facilities to learn about sustainable energy research.

The fascinating “Le Gallerie” museum in Piedicastello District, located in two former highway tunnels which are part of the Trento demo as well, was the perfect venue for the consortium to start officially the project meeting, by discussing the progress achieved in all 6 CPCCs. The last two days of the meeting at the University of Trento’s Department of Sociology featured project updates and interactive workshops on technical and cross-cutting topics. The interactive workshops and project updates helped align strategies, ensuring that ARV continues to advance its mission of promoting effective and sustainable renovation practices.



Source: Habitech

Construction and renovation activities in Trento

The new Plus Energy building with integrated services in the “Ex Zuffo” parking lot

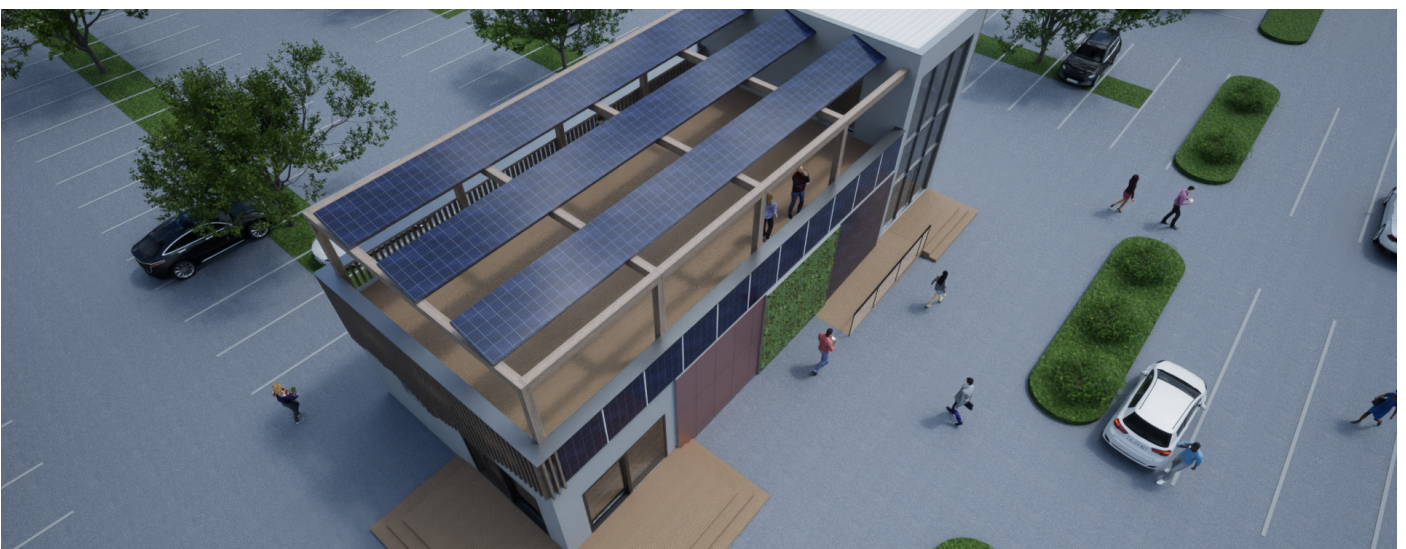
Four innovative solutions for the south façade of the ARV-Hub New Building integrate nature-based solutions, cutting-edge technologies, and pioneering materials.

They'll be compared via LCA analysis and monitoring to gauge performance.

- | | |
|--|---|
| 1. <i>Renew Wall panel with plaster finish and nature-based insulation</i> | 3. <i>Renew Wall with ventilated wooden façade.</i> |
| 2. <i>Renew Wall panel with BIPV opaque coating and experimental thermal PV-T panel.</i> | 4. <i>Renew Wall panel with green wall solution, including rooted plants and irrigation system.</i> |



A new energy wall system utilizing ground-contact heat exchange pipes is proposed. Three photovoltaic systems, including rooftop and transparent modules, will be installed alongside an innovative PV-T panel. This panel not only generates electricity but also pre-heats primary air for HVAC efficiency. Monitoring will validate its effectiveness for retrofitting existing buildings. The Municipality of Trento has approved the ARV-Hub's detailed design, with construction procedures underway.



Exterior 3D renders of the New Building in ex Zuffo parking lot.
Source: Armalam Srl

The refurbishment of a residential existing building in Povo district



The Existing Building renovation for the Trento demo project to NZEB standards took place from August to December 2023. It involved EPS insulation, Renew Wall panels, window and door replacements, roof PV panels, and heating upgrades. Sensors monitored envelope performance, comparing EPS-insulated façades with Renew Wall panels. Four apartments' IEQ conditions and energy use were tracked, along with acoustic tests assessing construction noise impact.



Installation phases of the Renew Wall panels on the residential Existing Building in Povo District. Source: UNITN.



Putting the demonstration communities in the spotlight

This section shines a light on the ARV project's groundbreaking work in Utrecht and Karviná, where innovative demo communities are leading the way toward climate-positive living. Explore how these two cities are pioneering sustainable practices, transforming vision into reality, and setting new standards for circular communities.

UTRECHT KANALENEILAND & OVERVECHT

The Netherlands

 238

 63600m²

Building owner:

Housing association Bo-Ex WoonIn

Design team:

Bos Installatiewerken, Rc Panels, Mex Architects, iWell

Research:

University of Applied Sciences Utrecht, Utrecht University

report **2022**

Construction
Establishment of the actual area
1960-1970

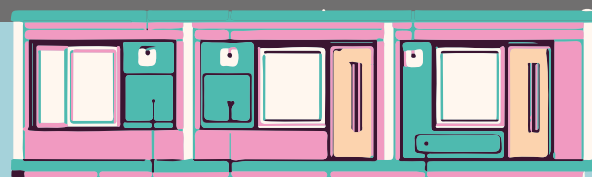
MODULAR
compact
*lower impact
intervention*

Planning
Intervention
2022 - 2023

**retrofitting of
apartment buildings**

Retrofit
Intervention
2022 - 2024

**Positive Energy
Buildings**



Make energy transition scalable and affordable

Inside Out modular concept

Cost reduction
GHG reduction



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Graphical design by  NTNU

ARV

Graphics: Jesus Daniel Garcia Melo, NTNU

UTRECHT KANALENEILAND & OVERVECHT

The Netherlands

report 2022

architectural qualities

The rhythm windows and PV panel gives a clear structure inspired by the architectural character of the 1960s

Smart facades mimic the appearance of masonry volumes

Adapt a new module to accommodate a fully freestanding balcony

social qualities

PV installation
Save costs, reduce inconvenience, and distribute power more fairly among tenants

Minimal inconvenience for residents while renovating

All consumption is monitored according to the applicable requirements and can be viewed by residents

environmental sustainability

All-electric climate module as a sustainable alternative to district heating

900 PV panels integrated into building elements

New coat to minimise heat demand and improve comfort

key performance indicators

	new construction	renovated buildings
energy 	Positive energy level	NZEB
IEQ 	EU standard	EU standard
noise dust 	EU standard	EU standard

embodied emissions 	construction time 
life cycle costs 	construction costs 

Modular installation design which allows different types of heating & ventilation



innovations

Design for Integrated Plug & Play installation solutions to link multiple facades



InsideOut Installations taken from the inside and integrated at the outside



Architectural and aesthetic plug-and-play integration of BIPV/BAPV solutions



ARV

Graphical design by NTNU

Graphics: Jesus Daniel Garcia Melo, NTNU

KARVINÁ MIZEROV

HEALTH CENTRE

Karviná, Moravian-Silesian Region,
Czech Republic

report 2022

n/a 

11130,3m² 

Building owner:
Karviná Municipality

Design:
**Atris, s.r.o, Lukáš Ehl, ARCHCON
atelier, s.r.o.**

Research contributors:
ČVUT
Czech Technical
University in
Prague

3D SIMULATIONS

pilots of resilient solutions

*indoor-outdoor green
infrastructure*

positive energy district

**9 municipality
buildings**

schools, sports facilities, nursing home, and
Karviná healthcare centre

Karviná town
Establishment of the actual town
1948

Karviná healthcare centre
Completion date
1993

Donation of the building for renovation
Donated to the City of Karviná
2021



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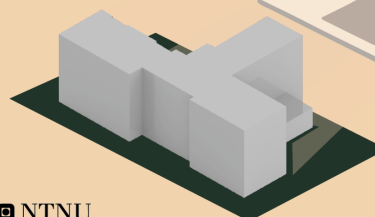


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digital twin model

Specialized parametric plugins
Transient system simulation tool TRNSYS

Graphical design by  NTNU



ARV

Graphics: Jesus Daniel Garcia Melo, NTNU

KARVINÁ MIZEROV HEALTH CENTRE

report 2022

Karviná, Moravian-Silesian Region,
Czech Republic

architectural qualities

Digital twin as the
baseline for further and
larger refurbishments

Improvement in
technical quality by
architectural updates

Implementation of thermal
insulation, window replacement,
heat pump installation

Maximising asset
utilisation: Co-location,
shared and flexible spaces

Green roof sample for
reducing heat islands,
rainwater management

social qualities

Designing user-friendly environment
Stakeholder outreach

Multi stakeholder co-creation,
monitoring and evaluation of
the process

environmental sustainability

Installation of mechanical
ventilation systems with heat recovery
combined with CO₂-VOC-humidity-
temperature sensors

Focusing on disassembly during
the design phase to increase the
chance of effective second use

key performance indicators

	new construction	renovated buildings	embodied emissions	construction time
energy	Positive energy level	NZEB	CO ₂	
IEQ	EU standard	EU standard	life cycle costs	construction costs
noise dust	EU standard	EU standard		

Digital design and 3D
simulations (digital twins)
for solar irradiation and
shading devices.

Small-scale pilots of
climate change
resilient solutions

LCA of HVAC
systems with focus
on carbon footprint

Installation of
swappable façade-
integrated RES



innovations

Graphical design by NTNU

ARV

Graphics: Jesus Daniel Garcia Melo, NTNU

Reading corner

Welcome to the ARV Reading Corner, where knowledge and inspiration meet. Here, you'll find a curated collection of reports, articles, and literature that delve into the work of all six ARV demo projects. Explore in-depth analyses, innovative ideas, and the latest research driving the future of Climate Positive Circular Communities.

1 Solutions and scenarios for Life Cycle Assessment (LCA) and Life-Cycle Cost Analysis (LCCA)

The ARV partners prepared a report on harmonising LCA/LCC methodology for ARV projects and applying it to renovations and new constructions with various design scenarios. Strategies include reducing operational energy, installing efficient energy generation systems, and integrating renewable energy systems.

The report's findings highlight approaches to mitigate life-cycle environmental burdens and enhance economic sustainability.

It address significant burden shifting, environmental benefits, challenges in cost benefits, and considerations like energy grid capacity and material reuse.

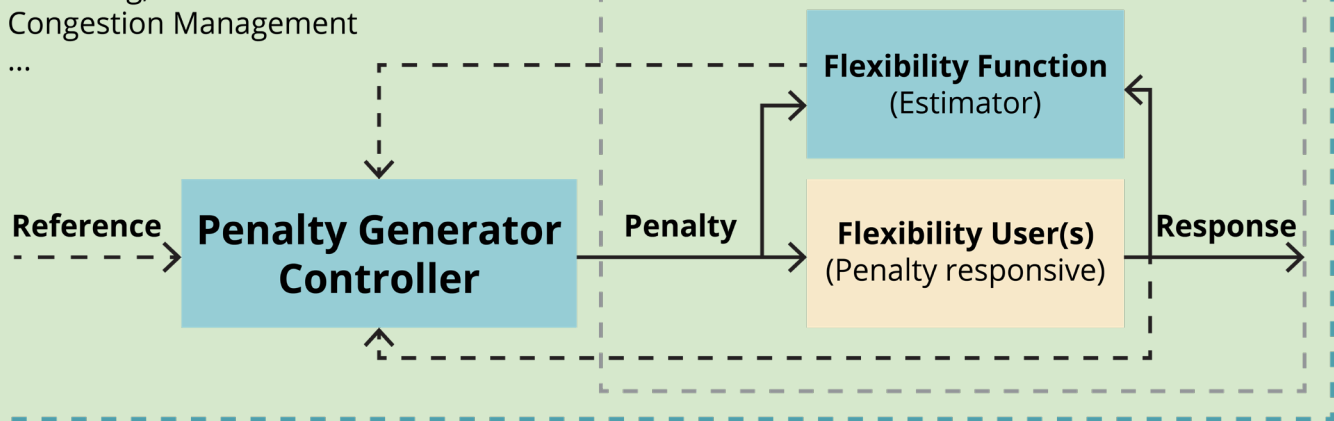


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Penalty Generator for, e.g.:

Voltage Control,
Balancing,
Congestion Management
...



Flexibility Function figure. Source NTNU

Practical tips for describing Smartness and Flexibility

In this upcoming ARV technical report, we aim at introducing the recent developments for the demand-side management by handling the flexibility potentials of building and HVAC systems and provide examples to demonstrate the efficiency of the employed methodologies. To this end, we introduced the stochastic dynamic relationship between price (penalty) and demand in energy systems, known as Flexibility Function (FF).

Furthermore, we described various versions of FF:

1. *Linear FF, which considers a linear demand dynamic in terms of price changes,*
2. *Nonlinear FF, which represents the price-demand dynamics more precisely using nonlinear functions, and*

3. *Adaptive FF, which takes care of price-demand dynamic changes and updates the price signal adaptively.*

Moreover, we utilized FF for demand predictions, penalty generator and energy flexibility characterisation. Finally, eight case studies for energy systems in Denmark, Norway, the Netherlands, Italy, and Czech Republic are provided to show the capabilities and variety of applications of flexibility management."



2

3 Following the journey of the Living Labs

The Living Labs (LL) activities from the ARV project focus on community involvement in sustainable innovation, with six demo sites for citizen engagement. A report on the first 18-month progress is being produced, including challenges and successes in engagement methods, recorded in logbooks and monitored through interviews.

Key activities included student workshops focused on sustainability in Karviná, creative circularity workshops in Oslo and the development of laboratories and One Stop Shop for citizen engagement and community-led retrofitting, promotion of energy communities, workshops and meetings for citizens in Palma. Sønderborg, focused on reducing return temperature

in district heating, combining technical solutions and resident behavior adaptation, while Trento established One Stop Shop supporting large-scale district renovation. Utrecht, combined physical and social renovation, linking tenants to welfare organizations and testing dynamic curricula for circular construction education.

Across all sites, initial months involved setting up activities, engaging communities, and learning from early experiences to refine future plans.



Workshop with students on the reuse of materials - Voldsløkka, Norway. Credit: Judith Thomsen, SINTEF.

Residential Renovation in Trento: First Application of the Renew Wall timber-based panel

4

By the end of 2023, the first Renew Wall (RW) was installed. This prefabricated wooden panel is produced by Fanti Legnami, a construction company from Trentino, that participates in the ARV project as a third party through Habitech – Distretto Tecnologico Trentino. The Italian

Demonstration community is primarily located in the Piedcastello neighbourhood, extending itself to the hilly area of Povo. This involves the application of the Renew Wall panel on a private apartment building, as part of a more comprehensive refurbishment project.

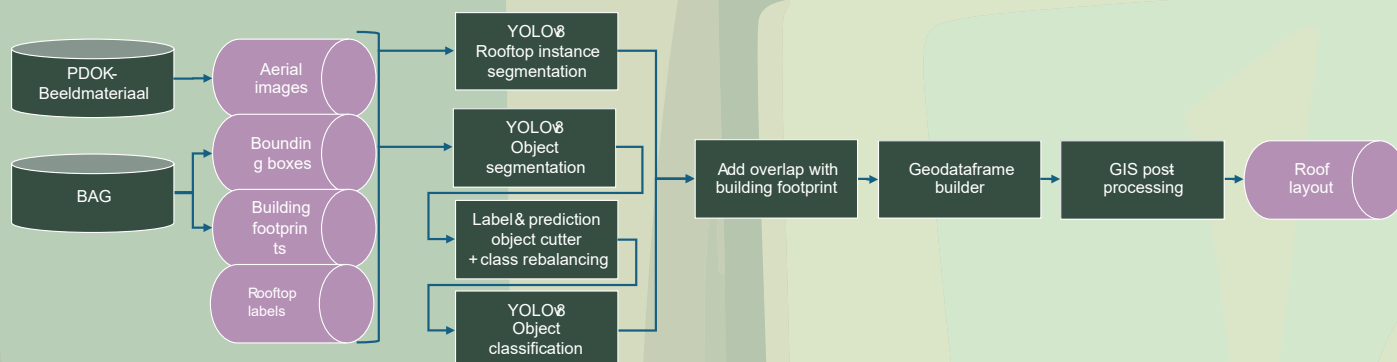


Installation phases of the Renew Wall panels on the residential Existing Building in Povo District. Source: UNITN.

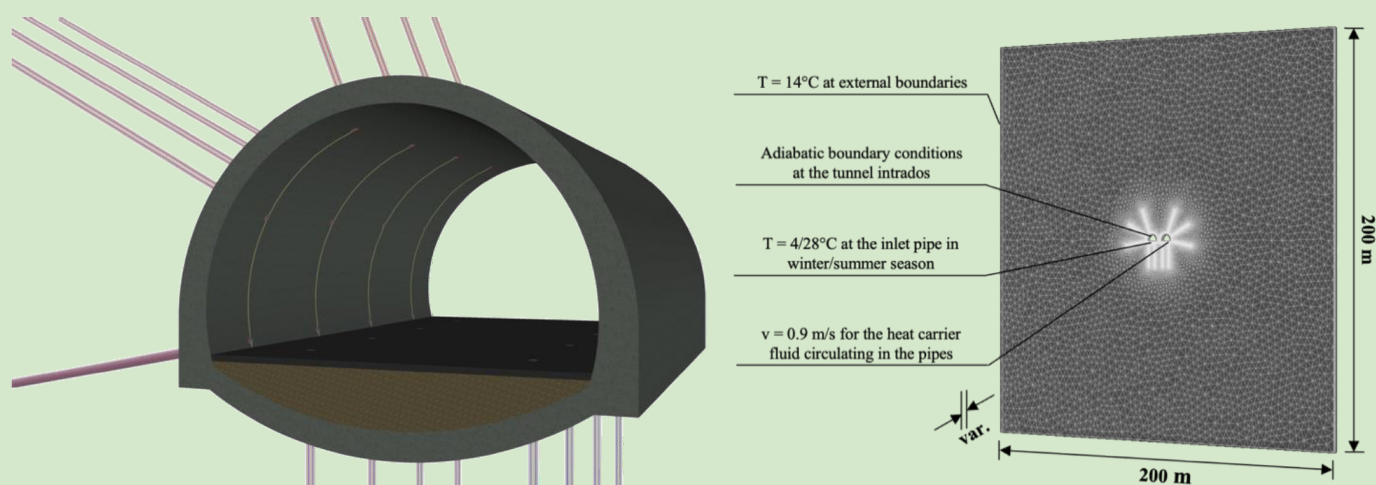
5 Pre-Manufacturing Workflow for industrialised renovation of buildings



To move towards a construction industry that is capable of renovating at the speed necessary for meeting the Paris Agreement on climate change (United Nations Framework Convention on Climate Change, 2015) an important field of Industry 4.0, also known as 'smart manufacturing' is emerging in the construction industry. In this report, a variety of digital processes have been developed considering Industry 4.0 digitalisation steps. These include tools to map potential projects, digitalise knowledge acquisition on projects, and co-design prefabricated retrofitting products in a data-driven manner.



Overview of Rooftop Recognition model. Source (UAS)



Left: 3D view of the thermal retrofitting solution. Right: numerical model. Source: Symposium on Energy Geotechnics

The Authors are developing investigations for the thermal retrofitting feasibility of existing tunnels. This conference paper highlights the potential of thermal retrofitting for existing tunnels to support climate goals, specifically through the use of radial borehole heat exchangers (rBHEs) in the Piedicastello tunnel in Trento.

This innovative approach leverages the tunnel's structure to improve energy efficiency, providing significant insights into optimizing heat exchange for both heating and cooling. For the ARV project, this research underscores the viability of integrating such retrofitting technologies into

An example of thermal retrofitting for the Piedicastello tunnel

existing infrastructure, potentially enhancing the project's efforts to promote sustainable renovation practices and reduce CO₂ emissions in urban environments.

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6

7 Report on Streamlined LCA-LCCA Comparing Alternative Solutions and Scenarios

This draft report tries to set up a streamlined Life Cycle Assessment-Life Cycle Cost assessment methodology specifically oriented to support and inform the designers of the ARV interventions in selecting sustainable solutions. This effort tries to overcome the limitation of the traditional methodologies to evaluate the sustainability of building interventions that are focusing only on improving energy efficiency or containing the initial investment.


Read more

Source: Freepik - Edit: Jesus Daniel Garcia Melo, NTNU

CPCC Living Labs Draft Report

8

CPCC Living Labs are real-world multi-stakeholder innovation environments where novel social and technical solutions and measures related to sustainable transformation of urban communities are designed and tested alongside and with citizens in different perspectives (such as building occupants, neighbourhood residents, green ambassadors, youth ambassadors). The objectives of this

report are:

- To report the developments in the LLs in the six demo sites
- To document the barriers and drivers encountered with the applied engagement methods in the first project period.



9

Implementation Plan of CPCC Living Labs per Demo Site – Demonstration of LLs

The aim of this draft report is to describe and identify energy flexibility. Further the aim was to formulate the Flexibility Functions (FFs) and Flexibility Index (FI) and their relation to Smart Readiness Indicator (SRI). The report is tailored based on local flexibility for demo projects and other case studies. It consists of two main parts, mathematical definition of flexibility and example show to achieve energy flexibility.



Source: Freepik - Edit: Jesus Daniel Garcia Melo, NTNU

ARV

Wrap Up!

From our sister projects

Building Energy Efficiency, Modular Renovation & Market Steering: Insights from oPEN Lab Experts



watch
here

A new video has been produced by the oPEN Lab project, that delves into the insights and experiences of some of its key experts, each shedding light on their roles, challenges faced, and remarkable highlights during the project's duration.



Social Aspects of Technological Innovation: How Digital Tools can Facilitate Citizen Engagement

The PROBONO project highlights the vital link between technology and social inclusion, stressing the importance of citizen engagement in driving change in smart-city frameworks. It emphasizes that successful climate transition and sustainable infrastructure depend on active citizen involvement.


PROBONO



Source: Freepik - Edit: Jesus Daniel Garcia Melo, NTNU

The OpenLab Toolbox

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This Toolbox is a repository of the most relevant and innovative methods and tools developed and used within the oPEN Lab project related to PENs. It is meant to provide policymakers and industry makers with insights and knowledge and help them select the right approach for their actions.

Source: Freepik - Edit: Jesus Daniel Garcia Melo, NTNU

Open call for Innovators

The oPEN Lab project is open to collaborate with European innovators interested in exploiting their innovative solutions around energy consumption and reduction within Positive Energy Neighbourhoods (PENs).

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ARV News

Talking about engaging local communities at EU Regions Week 2023



Presentation during the EU Regions Week workshop. Source: ACE

How can cities and housing providers reconcile the search for innovation and the necessity to include residents in the decision making? Group discussions around the topic of urban regeneration projects (ARV, syn.ikia, oPEN Lab) and social innovations and co-benefits of the fair energy transition followed the presentations. The workshop was attended by more than 100 participants from 32 countries, mainly coming from the cities, academia, research organisations, citizen organisations and EU institutions.



ARV joins the New European Bauhaus Alliance

ARV is a founding member of the NEB Alliance and participated in the New European Bauhaus Alliance Manifesto, which was presented in Amsterdam. This Manifesto aims to help society move towards strong, climate-positive cities and communities. It wants to bring together

people from different fields like engineering, economics, facility management, marine biology, industry, artificial intelligence, and others. It also wants to connect these groups with arts, culture, grassroots movements, design, and architecture. By doing this, the Manifesto seeks to find common

ground across various interests, sectors, and disciplines. It aims to improve the way we live, our economy, and the technology we use, ultimately preparing society better for the future."

Quote Source: CraFt



NEB alliance manifesto logo: Source - CraFt







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