AEGIR project:
DigitAl and physical incrEmental renovation packaGes/systems enhancing envIronmental and energetic behaviour and use of Resources.

AEGIR

Incremental Renovation Package

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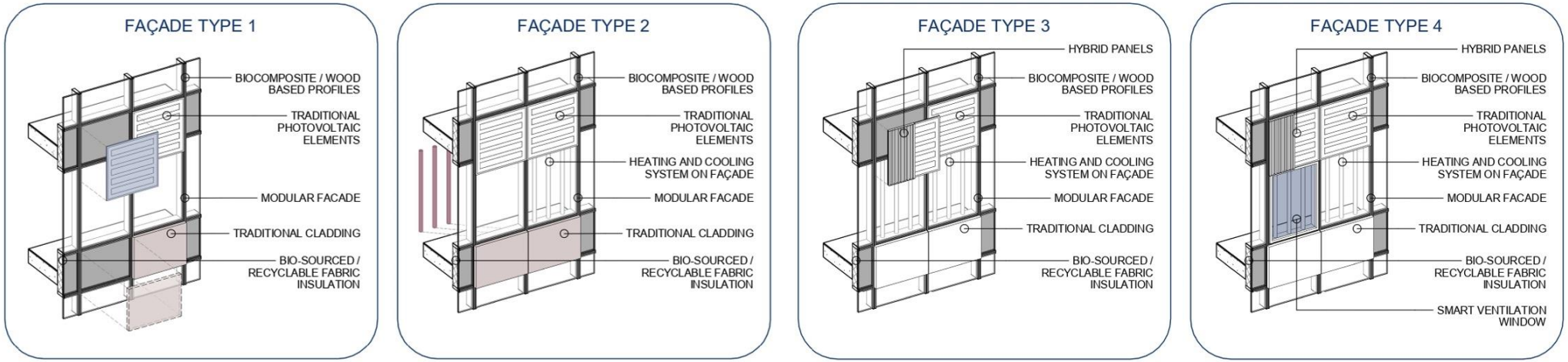
aegirproject.eu

AEGIR Project objectives

Develop modular, renewable, and industrialized building envelopes for energy renovation



1. Design multifunctional (passive & active) scalable building energy renovation envelope packages to answer to a different range of need.
2. Develop and implement an ecosystem of digital services in a common data environment.
3. Demonstrate AEGIR technical solution through its implementation and monitoring in four different building typologies (residential, office and educational) located in different climatic zones.

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AEGIR Contribution to B4P partnership

B4P Specific Objectives from the AEGIR project:

A. Develop holistic solutions in a systemic approach

B. Demonstrate overall performance in the life-cycle perspective

E. Demonstrate sustainable, circular business and value chain

GO1	**Generate holistic innovation in the built environment towards sustainability**
GO2	**Revitalise the sector through decarbonisation and sustainability transition**

1. R&I investment in the sustainable built environment area catalysed by the partnership
2. # innovative products/services/processes linked to sustainability that are catalysed by the partnership and number of jobs created — **2.- Innovative products: around 10**
3. Contribution to the successful deployment of relevant EU instruments and frameworks
4. # training programmes developed for the sustainable built environment — **4.- Training programmes: 4 (one per demo)**
5. Energy savings (MWh) — **5.- Nearly Zero Energy building characteristics for the demo buildings**
6. GHG emission reduction (tCO2e) / Pollution reduction — **6.- Emission savings between 18.000 to 46.000 kilotons CO2 equiv**
7. Share of reused/recycled materials used in construction (%) — **7.- Cladding materials**
8. Share of buildings designed and constructed based on a life cycle approach. — **8.- 100% if AEGIR approach is used**
9. # buildings with on-site RES production — **9.- 100% if AEGIR approach is used. Market impact still not defined**
10. # of workers trained on working methods and tools in the fields covering the B4P objectives — **10.- Under definition. At least 4 groups around the demo buildings**

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AEGIR Contribution to B4P partnership

SO1	13. # demonstrated innovative solutions and packages for sustainable construction and renovation	**13.- Under definition. At least 4 based in the demo buildings**
SO2	14. # demonstrated innovative solutions for the sustainability of the built environment value chain	**14.- Under definition. At least 4 based in the demo buildings**
SO3	15. # innovative services developed and demonstrated	**15.- 8 innovate services**
	16. # living labs established and involved in the partnership's projects	**16.- Monitoring of the demo buildings (4). Not living labs**
SO4	17. Total floor area and # buildings (residential or non-residential) directly involved in the partnership's projects demonstration activities	**17.- 4 demo buildings. 8.743m2**
SO5	18. # and type of heritage buildings involved in/enhanced by the partnership's projects, in line with the safeguarding of the historical environment and architectural values of the building stock	
SO6	19. # building occupants and users involved in the partnership's projects demonstration activities	**19.- More than 100 families and 200-300 students in the school**
SO7	20. # people trained across the whole value chain in the deployment of innovative sustainable technologies, systems and methods	

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AEGIR key results

AEGIR will improve...	& How?
1 **The way we DESIGN building renovations**	Using **new digital services to collect the data to reduce time, ease and improve efficiency of design step** . Increase of the percentage of retrofitting actions due to the system.
2 **ENERGETIC AND SUSTAINABLE BEHAVIOR and investments**	**Using industrialized and modular systems, digital tools and new materials, renewable technologies, and systems.** Based in simulations AEGIR project could contribute to trigger an additional 370 M€ in sustainable energy investments on the period 2025-2030.
3 **Operational behaviour during LIFETIME**	Based on **digital twin models allowing the management of the energy generated** at dwelling and building level.
4 **DECREASE of on-site construction / renovation WORK TIME.**	**Reduction of time achieved by the AEGIR process can be around 50%** compared with the initial time (from 19 Months to 9).
5 **Improved AFFORDABILITY of sustainable renovation and RES systems in buildings**	**Reduction of 50% in the costs** of retrofitting the building
6 **Improvement of indoor environment and USER COMFORT and satisfaction**	**CO_2 level in the spaces can be significantly decreased** from values around 2000 ppm to 500 ppm after the retrofitting. Minimum indoor temperatures rising from 17°C to 19°C in winter and maximal indoor temperatures staying below 26°C after retrofit.
7 **Reduction of EMBODIED ENERGY**	**From 10% to 53% depending on the strategy**. Higher buildings' performance with lower environmental impacts through increased rates of holistic renovations -> Long term: Emission savings between 18.000 to 46.000 kilotons CO2 equiv.
8 **Use of RECYCLED AND BIOSOURCED MATERIALS**	Replacing traditional materials for the structure (metals) by **biocomposites** components and for the insulations with **recycled and biosourced insulations** (using fabrics and biobased insulations)
9 **CIRCULAR ECONOMY**	**Designing the use and installation** of the different components of the system considering all the phases of the construction process (**Material production, Design, Construction, Use, End of life/Recyclability**)

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AEGIR demonstrators

SPAIN: Educational building

France: Residential homes for elderly people

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AEGIR demonstrators

Denmark: Social housing

Romania: Single family house

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AEGIR challenges

1. Properties of eco innovative materials and active technologies to comply with fire regulations (it is necessary in many cases to protect them with other materials with better properties).
2. Request of higher insulation and use of active technologies implies thicker facades (lighting problems, increased cost due to increased building size, problems related to local regulations).
3. Perception of high-tech systems = complicated and problematic to manage
4. As active technologies in facades are relatively new and innovative, they outpace existing regulations, leading to challenges in compliance.
5. Requirement to fulfil additional requirements in some countries in Europe (it is not possible to apply only European standards)
6. Insurance and Liability: Incorporating active technologies impact the building's insurance policies. Insurers can require additional safeguards or inspections to cover potential risks associated with these technologies.
7. Maintenance is a key point in relation to the use of eco-materials and active technologies.

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AEGIR potential sinergies

1. **Increased Visibility and Dissemination Reach:** Join forces in dissemination and outreach efforts to broaden audience reach, maximize visibility, and highlight collective contributions to EU sustainable building objectives.
2. **Collaborative Knowledge Sharing:** Facilitate cross-project knowledge sharing sessions to leverage diverse expertise and innovative solutions, accelerating problem-solving and project advancement..
3. **Enhanced Networking Opportunities:** Create networking platforms and events to foster relationships between teams, expanding access to expertise within the EU project network.
4. **Mutual Support in Regulatory Compliance:** Share insights and strategies to address regulatory challenges, particularly for emerging technologies, enhancing each project's ability to meet compliance standards effectively.

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AEGIR consortium

MATERIALS	COMPONENTS	SYSTEMS	DIGITAL	DESIGN	CONSTRUCTION	DEMOS	ASSOCIATIONS / DISSEMINATION	RTOS
COMSA CORPORACIÓN, SOPREMA, OMIKRONDOKK	BePlanet factory, DUALSUN, westaflex, GEZE	uXAMA FACHADAS SINGULARES, CHAZELLE	IDP ingeniería · medio ambiente · arquitectura, ICM INGENIERIA	UNS UNSTUDIO, ENAR envolventesarquitectónicas architecturalenvelopes	COMSA CORPORACIÓN	BOËN SUR LIGNON, domea.dk, Ajuntament de Malgrat de Mar, TermoLine	INNOVAWOOD, ICLEI, oteis GREEN & DIGITAL ENGINEERING, territoire d'énergie, tenerrdis	tecnalia, CSTB le futur en construction, cea, ines, Fraunhofer ISE, UNIVERSITY OF CAMBRIDGE, TUDelft, DANISH TECHNOLOGICAL INSTITUTE

- **WebPage:** https://aegirproject.eu/
- Partners: 29; Countries: 9
- Duration: 48 Months
- Start: 01/10/2022; End: 30/09/2026

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AEGiR

Incremental Renovation Package

Thank you for your attention!

Julen Astudillo

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Built4People

B4P 2ND CLUSTERING EVENT - SOLUTIONS FOR RENOVATION AND LOW-EMISSION BUILDINGS -

REHOUSE

CARTIF

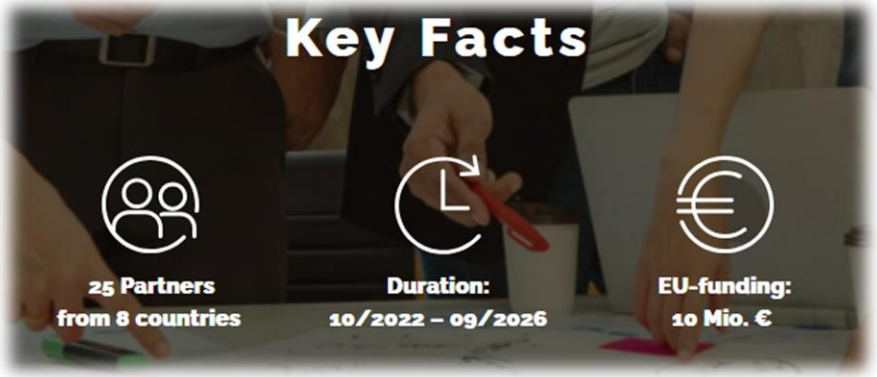
RUBÉN GARCÍA PAJARES (CARTIF)

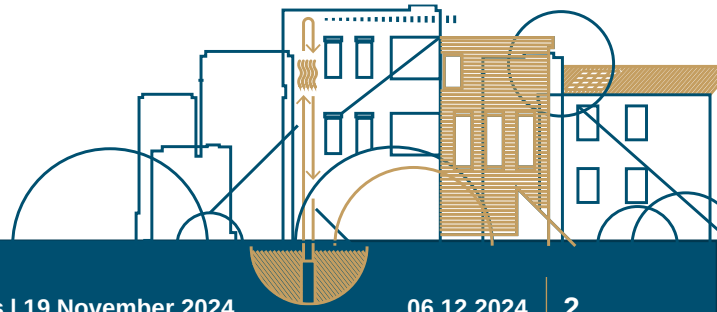
ON BEHALF OF JAVIER ANTOLÍN

INTRODUCTION

- Project name: **R**enovation packag**E**s for **HO**listic improvement of EU's b**U**ilding**S** **E**fficiency, maximizing RES generation and cost-effectiveness.

Main objective: To develop fully-functional prototypes and demonstrate in operational environment [TRL7] 8 Renovation Packages (RPs) of promising technology innovations designed for a wide range of building renovation actions, including deep renovation, that overcome the main barriers that slow down the current EU renovation ratios.





REHOUSE OBJECTIVES

- Implement a **people-centric social engagement strategy** (Social Task Force).
- Upgrading **8 renovation packages (RPs) from TRL4/5 to TRL6** integrating bio-sourced/reused/recycled materials, multi-functional designs and onsite RES valorisation.
- Application of a **BIM-based workflow and deploy an Integrated Project Delivery (IPD) methodology** during the renovation activities including design, construction and building operation phases.
- Deployment of **4 buildings renovations in Kimmeria (GR), Budapest (HU), Saint-Dié-des-Vosges (FR) and Margherita di Savoia (IT),** including detailed design, pilot set-up, demonstration and evaluation **to validate in operational conditions (TRL7) the 8 renovation packages**.
- Definition and demonstration of several **renovation business cases**, and **novel business models**. Definition of a clear and robust **pathway to the market** per RP.
- Boost **market uptake, scalability and replicability** of REHOUSE RPs towards TRL9. **Standardization** of the RP through a set of guidelines.
- Deployment of **dissemination and communication** channels and synergies with other relevant projects and EU level initiatives.

RENOVATION PACKAGES OVERVIEW

RP#1 Multi-sourced heat pump

RP#2 Adaptable/dynamic building envelope (ADBE)

RP#3 SmartWall

RP#4 Centralised Holistic H&C Renovation Kit

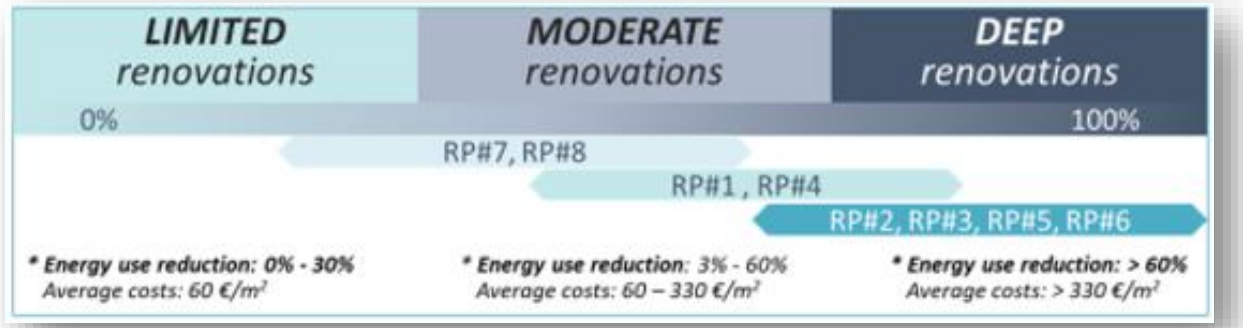
RP#5 Multipurpose façade system with bio-based insulation and BIPV

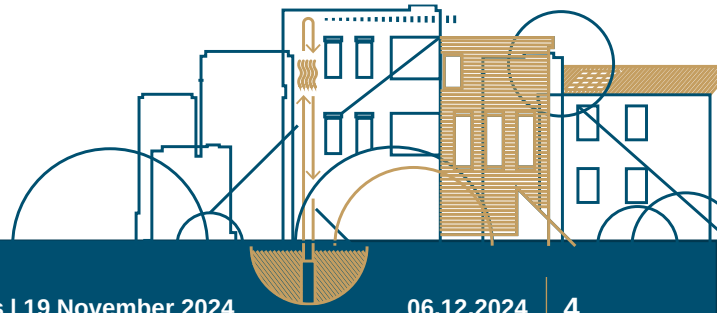
RP#6 PanoRen

RP#7 Activated cellulose thermal insulation made of wood waste

RP#8 Intelligent window system

REHOUSE Renovation principles	RP applying to principles
High use of **recycled and/or bio-sourced materials** and components, together with high rations of recycability to promote enhanced circularity within the construction value chain	**RP#2, #3, #4, #5, #6, #7**
Prefabrication and industrialisation of construction works to improve productive, competitiveness of the construction companies, reduce renovation times and avoid resident disturbance	**RP#2, #3, #6, #8**
Multi-functionality of envelope solutions to foster built-in RES and HVAC components	**RP#2, #3, #5, #6**
Affordable renovation components directly integrating or enabling the **integration of onsite RES**	**RP#1, #2, #3, #4, #5, #6**
Smart management of energy transfers for more efficient and comfortable building performance	**RP#1, #4, #8**





RENOVATION PACKAGES – RP#1 & RP#2

RP 01
Multi-sourced heat pump

PSYCTOTHERM
MARINE REFRIGERATION & AIR CONDITIONING

- **Multi-source operation:** Utilizes a combination of natural heat sources, including solar, geothermal and air. Control strategies to select the source or combination of them to increase the efficiency of the system.
- **Functions**: Provides efficient space heating, cooling and domestic hot water (DHW).
- **Performance**: Achieves a COP of up to 4.5 surpassing traditional heat pump systems.
- **Refrigerant**: Uses HFO known for its lower environmental impact.

RP 02
Adaptable/dynamic building envelope (ADBE)

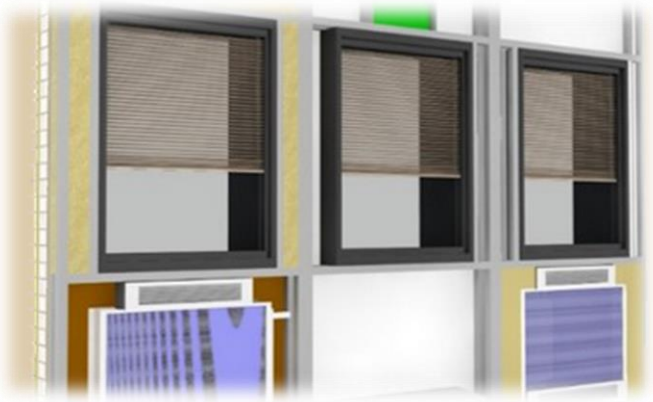
Renel

- **Sustainable materials:** Constructed with recyclable aluminium and glass.
- **Modular and prefabricated:** Accelerates renovation with quick assembly.
- **Adaptable design:** Customizable for various architectural geometries.
- **Integration ready:** Compatible with bio-based insulation, PV panels, electric batteries and HVAC units.
- **Full control and monitoring**: Integration of sensors and actuators.

RENOVATION PACKAGES – RP#3 & RP#4

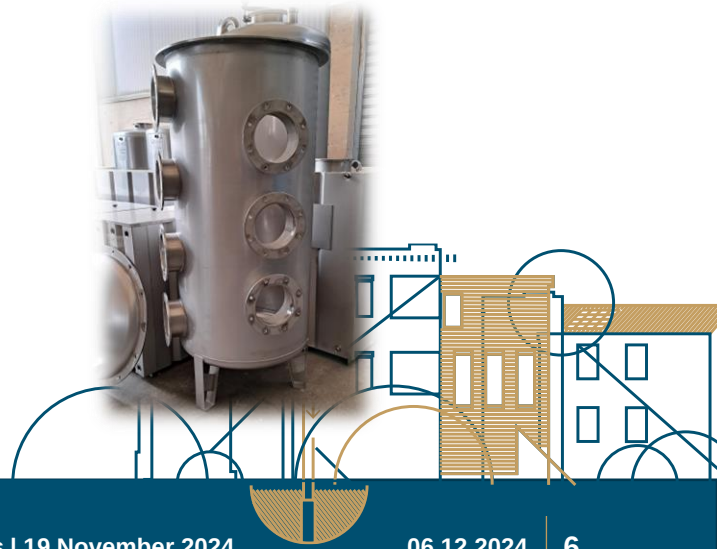
RP 03
SmartWall
ams ADVANCED MANAGEMENT SOLUTIONS

- **Multi-functional wall system:** Combines eco-friendly insulation, fan-coils, mechanical ventilation with energy recovery, batteries, PV panels, and high-performance windows.
- **Customization:** Tailored to meet specific project needs and preferences.
- **Prefabrication**: Efficiently produced and assembled to reduce installation time.
- **Functionality**: Heating, cooling, ventilation and energy generation.



RP 04
Centralized Holistic
H&C Renovation Kit
Steeltech PURA EVOLUZIONE

- **Reversible Heat Pump System**: Utilizes an air-water heat pump, powered by on-site BIPV, and connected to a PCM-integrated thermal energy storage tank (TES).
- **Functionality**: Centralized heating and cooling.
- **Sustainable materials**: Incorporates recycled and bio-sourced materials with high recyclability.
- **Efficient Energy Management**: Smart management for optimal energy transfers and improved building performance.



RENOVATION PACKAGES – RP#5 & RP#6

RP 05
Multipurpose façade system with bio-based insulation and BIPV.

- **Bio-based insulation & BIPV**: Features bio-based insulation combined with Building-Integrated Photovoltaics (BIVP) for sustainable energy use.
- **Prefabricated panels**: Modular panels integrating thermal sound absorption, photovoltaics, and vertical greening.
- **Modular substructure**: Anchors to existing building walls, enabling easy installation and flexibility.
- **Enhanced efficiency and aesthetics**: Provides energy efficiency and architectural enhancement.

RP 06
PanoRen

- **Multi-functional wall system:** Enhanced existing Panobloc® panels based on recycled wood material with additional components and functionalities. Upgrade panels integrating ventilation and second-life photovoltaic panels.
- **Industrialized construction**: Advances prefabrication and on-site installation processes for efficiency.
- **Sustainability focus**: Emphasized recycling, reuse of components, and creating a fully passive building.

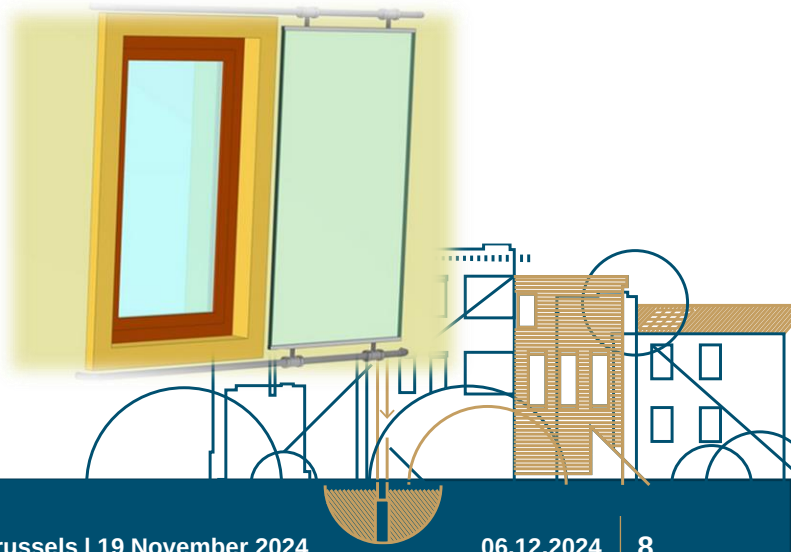
RENOVATION PACKAGES – RP#7 & RP#8

RP 07
Activated cellulose thermal insulation made of wood waste
WOODSPRING

- **100% Natural composition**: Made from activated cellulose without synthetic additives, ensuring an eco-friendly product.
- **Circular economy-friendly**: Easily recyclable, with no harmful components, supporting sustainable life cycles.
- **Waste-to-value**: Coverts waste cellulose into a durable insulation material, used for decades in construction.
- **Eco-friendly alternative**: Replaces artificial insulation, reducing environmental impact during production and retrofitting.

RP 08
Intelligent window system
WOODSPRING

- **Reduce heat loss by 50%**: The IWS significantly reduces heat loss through windows, minimizing energy consumption for heating and cooling.
- **Smart management**: Equipped with sensors and controllers, the system optimizes solar gain, improving energy efficiency throughout the building.
- **Adaptable for all buildings**: IWS can be integrated into both existing or renewed windows in any type of buildings.



DEMO-SITES


- **Type**: Residential building block.
- **Date**: 1959
- **RPs**: RP#6
- **Area**: 2,260 m^2

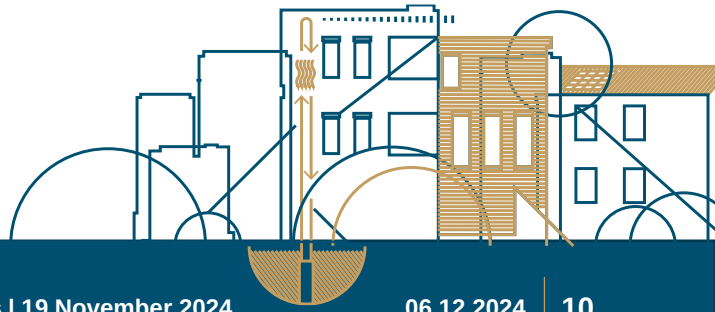

- **Type**: Student residence building
- **Date**: Second half to 18th century.
- **RPs**: RP#2, RP#7 and RP#8
- **Area**: 1,027 m^2


- **Type:** Student residence building.
- **Date**: 1997
- **RPs**: RP#1, RP#2 and RP#3
- **Area**: 1,371 m^2

- **Type:** Social housing building.
- **Date**: 1986
- **RPs**: RP#4 and RP#5
- **Area**: 880 m^2


CHALLENGUES AND GOOD PRACTICES

- Stakeholder Engagement and Social Integration
- Technological Integration and Digitalization
- Economic Viability of Renovation Packages
- Environmental and Circularity Goals
- Scaling to TRL9 for Market Entry
- People-Centric Renovation Approach
- Structured Evaluation Framework with KPIs
- Adoption of a Circular Economy Mindset
- Efficient Dissemination and Communication Strategy
- Innovative Use of Prefabrication and Off-Site Assembly



CONTRIBUTION TO THE B4P PARTNERSHIP

Select 1 to 3 B4P *Specific Objectives* addressed by your project (by order of priority)

7 B4P Specific Objectives:

A. Develop **holistic solutions** in a systemic approach ☑

B. Demonstrate **overall performance in the life-cycle** perspective ☑

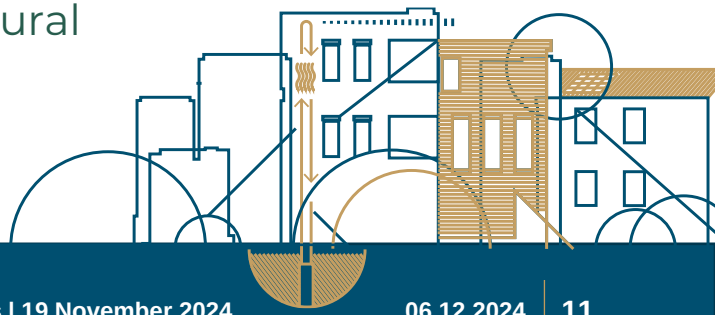
C. Demonstrate **clean energy transition** potential ☑

D. Demonstrate sector **decarbonization pathways** ☑

E. Demonstrate **sustainable, circular** business and value chain ☑

F. Demonstrate **affordability and cost-effectiveness** ☑

G. Demonstrate **no trade-offs** on economy, comfort, health, functions, cultural heritage



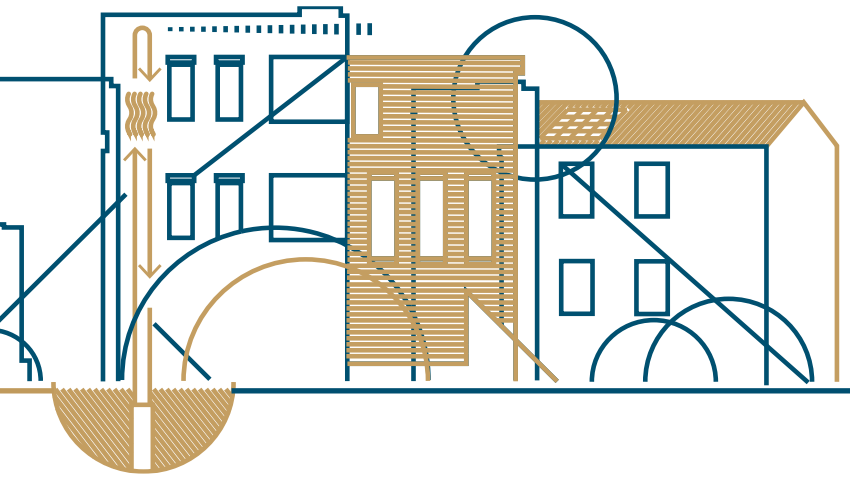
EXPECTED OUTCOMES ▸ REHOUSE IMPACTS

Expected Outcome	REHOUSE Impacts
EO1.	**Reduction of the renovation work time** demonstrated against current practices in average of 30-40% for the proposed RPs.
EO2.	**Improvement** in a range of 30-80% **on insulation and air tightness** against standards.
EO3.	**Improvement** of user **comfort levels and satisfaction** (Thermal comfort, Acoustic comfort and Indoor air quality). **Reduction of the investment costs** around 15-40% respect to similar solutions.
EO4.	**Reduction of the energy demand** in an average of around 50%. **Increase in %RES** against regulation requirements.
EO5.	**Reduction of the embodied energy compared** to conventional renovation solutions. **Reduction of the GHG across the lifecycle** of the innovation compared to best performing solutions in the market.
EO6.	**Increase the RES power installed** against regulation requirements.
EO7.	High content of **circularity materials and components** in the development of the innovative solutions. In average, more than 50% of the elements and materials will be recycled or reused. Recyclability potential higher than 50%.
EO8.	All the **Renovation Packages** will be **fully certified** during the next 3 years after the project finalization.

Network of building renovation projects

- Initiated beginning of 2024
- Different approaches on digitalisation, renovation solutions and services
- Array of demonstration-sites EU-wide
- Pool of interdisciplinary experts
- Network of projects with synergies
- Collaborations leading to wider reach

THANK YOU FOR YOUR ATTENTION.



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https://rehouse-project.eu/

https://twitter.com/REHOUSE_Project

https://www.linkedin.com/company/rehouse-eu/

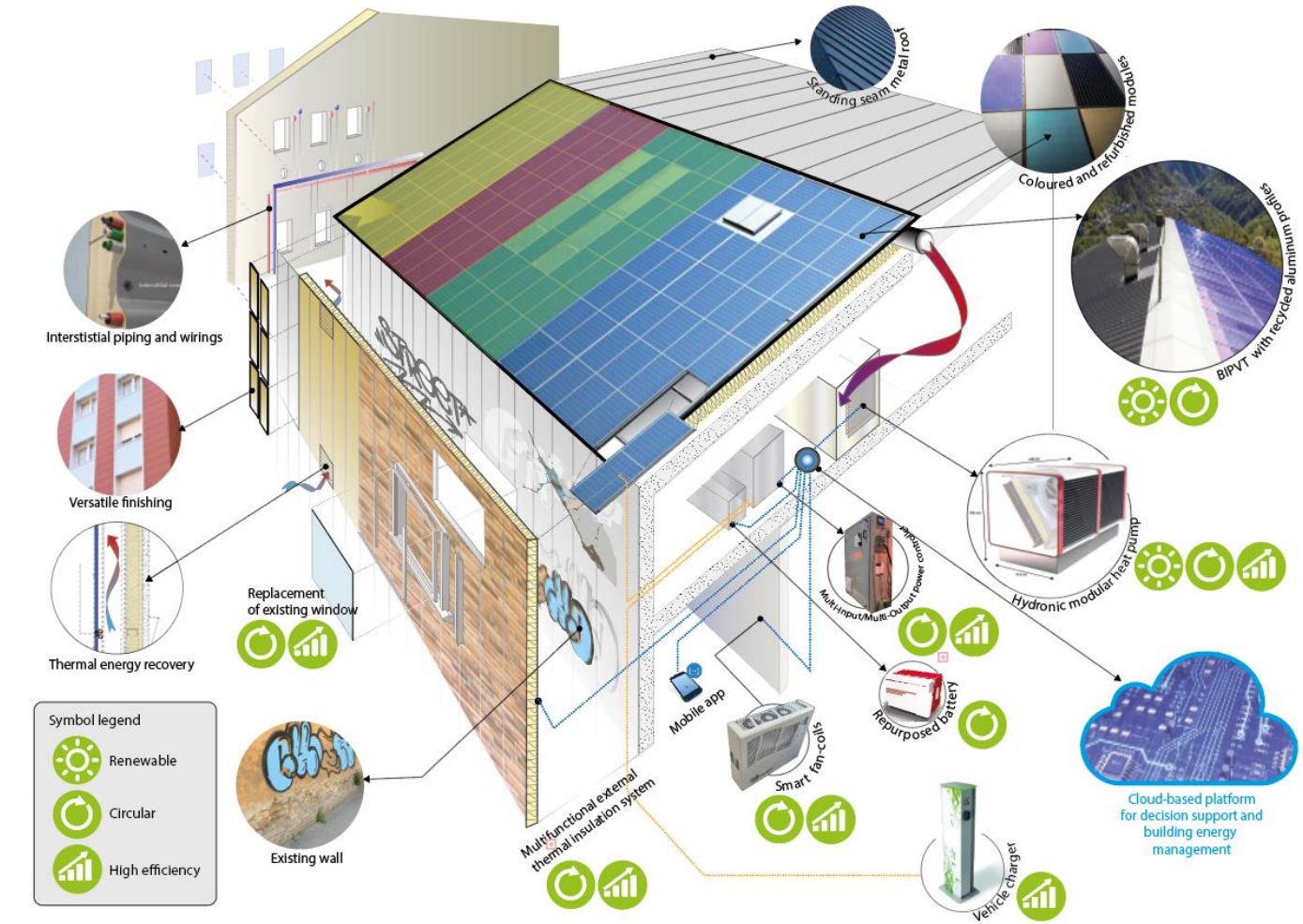
RE-SKIN

Renewable and Environmental-Sustainable Kit for building Integration

Funded by the European Union

Goals

1. Reduction of building's **primary energy consumption** of about 90% after retrofit.
2. Reduction of **CO_2 emissions** by about 90% in operation, 60% in construction and 30% in decommissioning phase (compared to the existing building and common renovation practices).
3. Development of streamlining and fast-tracking **procedures** for energy retrofit.
4. Enforcement of **Circular Economy** application in the building sector.



Technologies

1. **Hybrid prefabricated photovoltaic-thermal roof**, with refurbished PV modules, recycled aluminium profiles, sustainable steel and biosourced insulation.
2. **Back-insulated standing seam metal roofing**, with sustainable steel and biosourced insulation.
3. **Multifunctional prefabricated façade** with self-supporting panels and biosourced insulation.
4. **Techniques/components for** partial or total **window substitution**.
5. **Multi-Input/Multi-Output power controller** to optimize interconnection among generation, storage and electric loads.
6. **DC modular heat pump**.
7. **Battery pack** made with recycled EV batteries.
8. **Smart DC fan-coils** for heating/cooling.
9. **Cloud-based platform** with DSS and BEMS functions.
10. **Smart charger** for electric vehicles.

Built4People – Specific objectives

7 B4P Specific Objectives:

A. Develop **holistic solutions** in a systemic approach

B. Demonstrate **overall performance in the life-cycle** perspective

C. Demonstrate **clean energy transition** potential

D. Demonstrate sector **decarbonization pathways**

E. Demonstrate **sustainable, circular** business and value chain

F. Demonstrate **affordability and cost-effectiveness**

G. Demonstrate **no trade-offs** on economy, comfort, health, functions, cultural heritage

RE-SKIN

Built4People - KPIs

KPI's on general objectives			KPI's on specific objectives
GO1 **Generate holistic innovation in the built environment towards sustainability**	1. R&I investment in the sustainable built environment area catalysed by the partnership	SO1	13. # demonstrated innovative solutions and packages for sustainable construction and renovation
	2. # innovative products/services/processes linked to sustainability that are catalysed by the partnership and number of jobs created	SO2	14. # demonstrated innovative solutions for the sustainability of the built environment value chain
	3. Contribution to the successful deployment of relevant EU instruments and frameworks	SO3	15. # innovative services developed and demonstrated
	4. # training programmes developed for the sustainable built environment	SO4	16. # living labs established and involved in the partnership's projects
GO2 **Revitalise the sector through decarbonisation and sustainability transition**	5. Energy savings (MWh)	SO5	17. Total floor area and # buildings (residential or non-residential) directly involved in the partnership's projects demonstration activities
	6. GHG emission reduction (tCO2e) / Pollution reduction	SO6	18. # and type of heritage buildings involved in/enhanced by the partnership's projects, in line with the safeguarding of the historical environment and architectural values of the building stock
	7. Share of reused/recycled materials used in construction (%)	SO7	19. # building occupants and users involved in the partnership's projects demonstration activities
	8. Share of buildings designed and constructed based on a life cycle approach.		20. # people trained across the whole value chain in the deployment of innovative sustainable technologies, systems and methods
	9. # buildings with on-site RES production		
	10. # of workers trained on working methods and tools in the fields covering the B4P objectives		
GO3 **Induce lasting behavioural change towards sustainable living**	11. Share of the EU population living and working in green neighbourhoods		
	12. # of private and public building owners with sustainable behaviour in their building stock		

RE-SKIN

The direct target market of RE-SKIN is about **5-6% of the total stock** of EU buildings

Built4People - KPIs

2. # innovative products/services/processes linked to sustainability that are catalysed by the partnership and number of jobs created
5. Energy savings (MWh)
6. GHG emission reduction (tCO2e) / Pollution reduction
7. Share of reused/recycled materials used in construction (%)
9. # buildings with on-site RES production
13. # demonstrated innovative solutions and packages for sustainable construction and renovation

In the mid to long term, thanks to the RE-SKIN package it is possible to retrofit around **3.5 – 4 million m²/year of buildings**, corresponding to a 1.4-1.7% share of the current yearly total in EU.

- RE-SKIN deployment brings about **20-25,000 jobs yearly in the construction industry.**
- RE-SKINned buildings will guarantee **40,000-47,000 tons of CO_2/year** avoided emissions and **200-240 GWh/year** of energy savings in respect of “standard” renovations.
- The additional savings in terms of embodied energy related to RE-SKIN application are estimated in **300,000-340,000 tons of CO_2/year** .
- RE-SKIN application will ensure a saving of **40-45,000 tons/year of waste** at end of life.

RE-SKIN

Technologies and prototyping (Key results)

1. **Component's Prototyping**
2. **Reduction of 80% of operative energy + provide cooling**
3. **To reduce of 30% the CO2** (it should be improved at 60%)

RE-SKIN

Case-studies

DEMO CASE ITALY

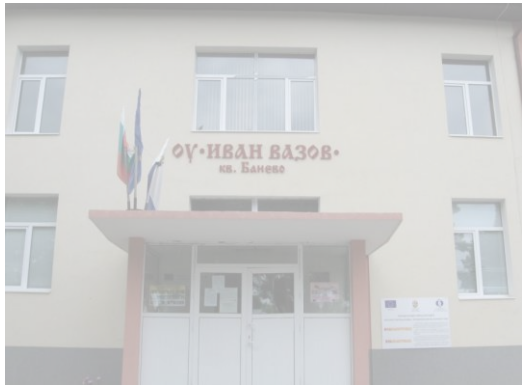
Location: Milan, Italy, continental climate.
Owner: Municipality of Milan
Year of construction: 1965.
Destination: non-profit reception center.
Description and features: small-size building (290 m^2), 2 storeys.
HVAC: gas boiler with radiators, no A/C.

DEMO CASE FRANCE

Location: Lille, France, temperate oceanic climate.
Owner: VILOGIA social housing company
Year of construction: 1962
Destination: dwellings
Description and features: medium-large building (1330 m^2), 4 storeys + ground floor.
HVAC: centralized gas boiler, no A/C.

DEMO CASE BULGARIA

Location: Burgas, Bulgaria, humid subtropical climate.
Owner: Municipality of Burgas
Year of construction/retrofit: 1938/1995.
Destination: public school
Description and features: medium-size building (500 m^2), 2 storeys + basement.
HVAC: gas boiler, no A/C.



DEMO CASE SPAIN

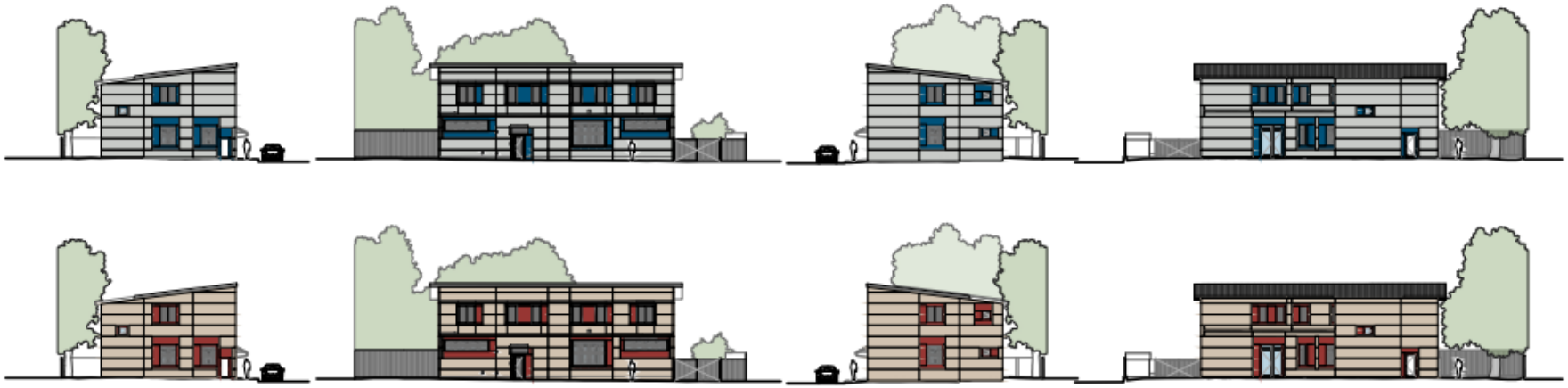
Location: Langreo, Spain, temperate climate.
Owner: Viviendas del Principado de Asturias (VIPASA)
Year of construction: 1997.
Destination: dwellings
Description and features: large building (1700 m^2), 4 storeys.
HVAC: single gas boilers, room A/C.

RE-SKIN

Challenges and barriers

Case studies selection, bureaucratic barriers, main issues

1. The selection of the case studies carried out in the proposal writing phase, often do not take into account of several constrains
2. The Horizon call requires to develop solution to be installed quickly and easily. However, during the testing phase the installation procedure required more time than expected, causing a delay in the GANTT.
3. The cost prediction carried out in the proposal writing phase, often do not taking into account the extra cost due to the tailoring of the technologies in the different context



RE-SKIN

Potential synergies

- The system is based on an **open architecture**, in which also subcomponents alternative and/or additional to those developed by Consortium partners in the project (e.g., heat pumps, storage systems, appliances, etc.) can be adapted and integrated in a future phase by companies not involved in the RE-SKIN Consortium, ensuring full compatibility with the developed system.
- To share values regarding LCA data of the case study which can be adopted as benchmarks

RE-SKIN

RE-SKIN

Thanks for the attention!

fabrizio.leonforte@polimi.it

www.reskinproject.eu

The RE-SKIN project is developing an advanced, integrated and multifunctional retrofit system targeting the renovation of the European building stock by combining energy efficiency, smart readiness, sustainability and circular economy.

RE-SKIN

About Drastic

Michiel Ritzen, Joana Gonçalves, Steven Claes
(coordinators - VITO)

The Drastic project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101123330.

Demonstrating **R**eal and **A**ffordable **S**ustainable Building Solutions with **T**op-level whole life cycle performance and **I**mproved **C**ircularity.

Drastic
Demonstrating affordability, sustainability and circularity

The Drastic project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101123330.

vito

Co-funded by the European Union

Drastic: supported by the EU (v/B4P)

23 partners

8 European countries

4 years

grant number: **101123330**

Drastic
Demonstrating affordability, sustainability and circularity

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Drastic partners:

Drastic
Demonstrating affordability, sustainability and circularity

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Showcasing solutions

To **reduce operational and embodied carbon** by engaging five Demonstrator projects with specific drivers and challenges.

To **improve the life cycle performance of construction solutions**, targeting the most representative building typologies in the EU.

To **promote innovative circular economy practices**, reducing waste and environmental burdens across the construction industry at a pan-European level.

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Drastic Demonstrators

5 ‘Demonstrator’ pilot projects

most impactful **building layers**

entire construction **value chain**

varied **geographical contexts**

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Demonstrators – Lleida, Spain

- **Partners:** Celsa Group, Lezama Demoliciones, Polytechnic University of Catalonia, Sorigué
- **Objective:** Reduce the environmental impact of cement and steel in building structures.
- **Current Situation:** No established system for disassembling and reusing structural steel; white slag from steelmaking is mostly waste.
- **Opportunity:** Reuse structural steel and repurpose white slag in concrete to lower environmental impact.

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Demonstrators – Düsseldorf, Germany

- **Partners:** Saint-Gobain Weber, Saint-Gobain Isover
- **Objective:** Showcase a circular solution to improve thermal insulation in German apartment buildings.
- **Current Situation:** Many buildings lack proper insulation, and existing ETICS materials are non-reusable and non-recyclable.
- **Opportunity:** Develop a circular ETICS to boost energy efficiency in both new and existing buildings.

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Demonstrating affordability, sustainability and circularity

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Demonstrators – Hønefoss, Norway

- **Partners:** Omtre, Produktif, Tallinn University of Technology (TalTech)
- **Objective:** Prove the viability of a multi-cycle, easy-fix building frame using reclaimed wood.
- **Current Situation:** Norway has a historic timber tradition, but timber reuse has shifted to recycling and incineration, with no cohesive ecosystem for multi-cycle reclamation.
- **Opportunity:** develop and validate a modular building frame with reclaimed wood, focusing on multi-cycle design, easy assembly, and disassembly, promoting sustainable timber construction.

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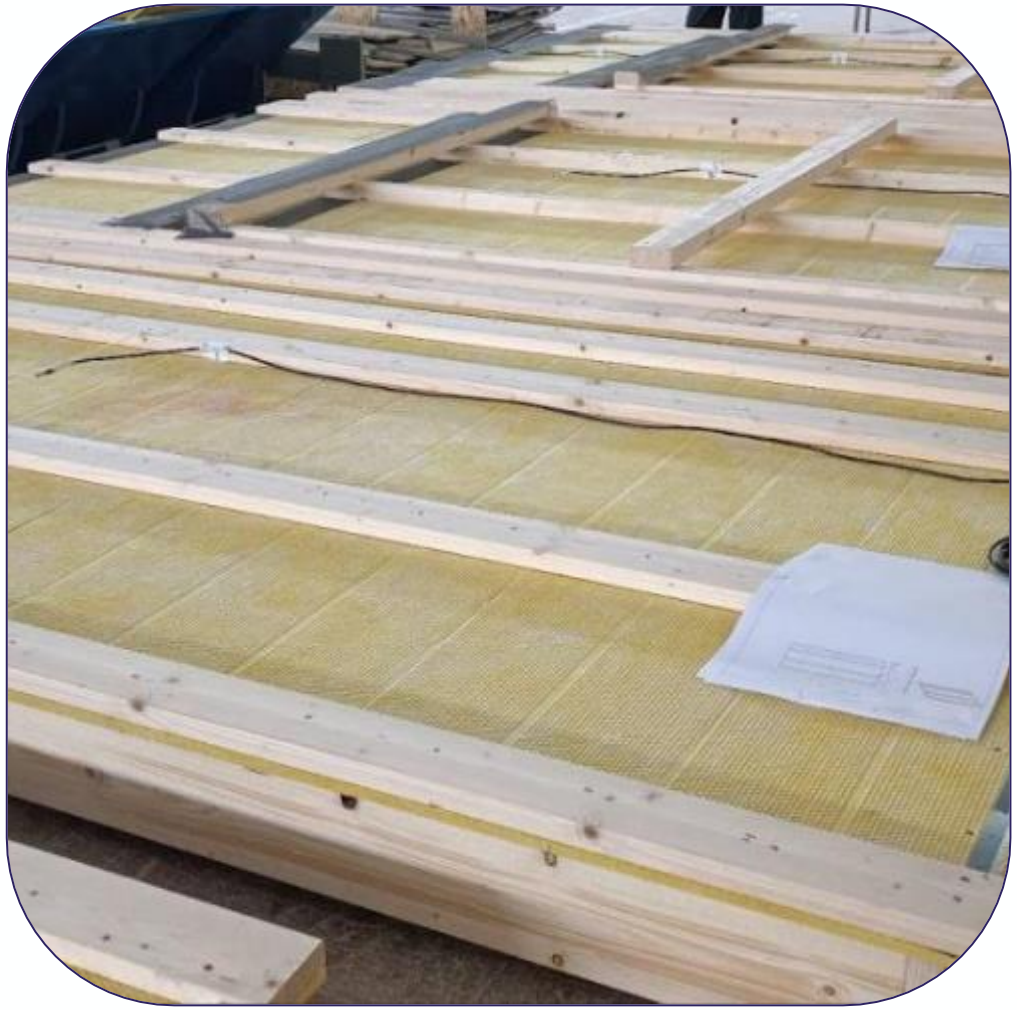
Demonstrators – Rapla, Estonia



- **Partners:** Timbeco, Tallinn University of Technology (TalTech)
- **Objective:** Validate a deep energy renovation using circular principles in a multistorey apartment building.
- **Current Situation:** 82% of Estonian dwellings are privately owned, have low energy performance, and lack large-scale circular solutions.
- **Opportunity:** Develop and validate biobased, multi-cycle panels with energy generation to reduce energy use and scale circular solutions.

Drastic
Demonstrating affordability, sustainability and circularity

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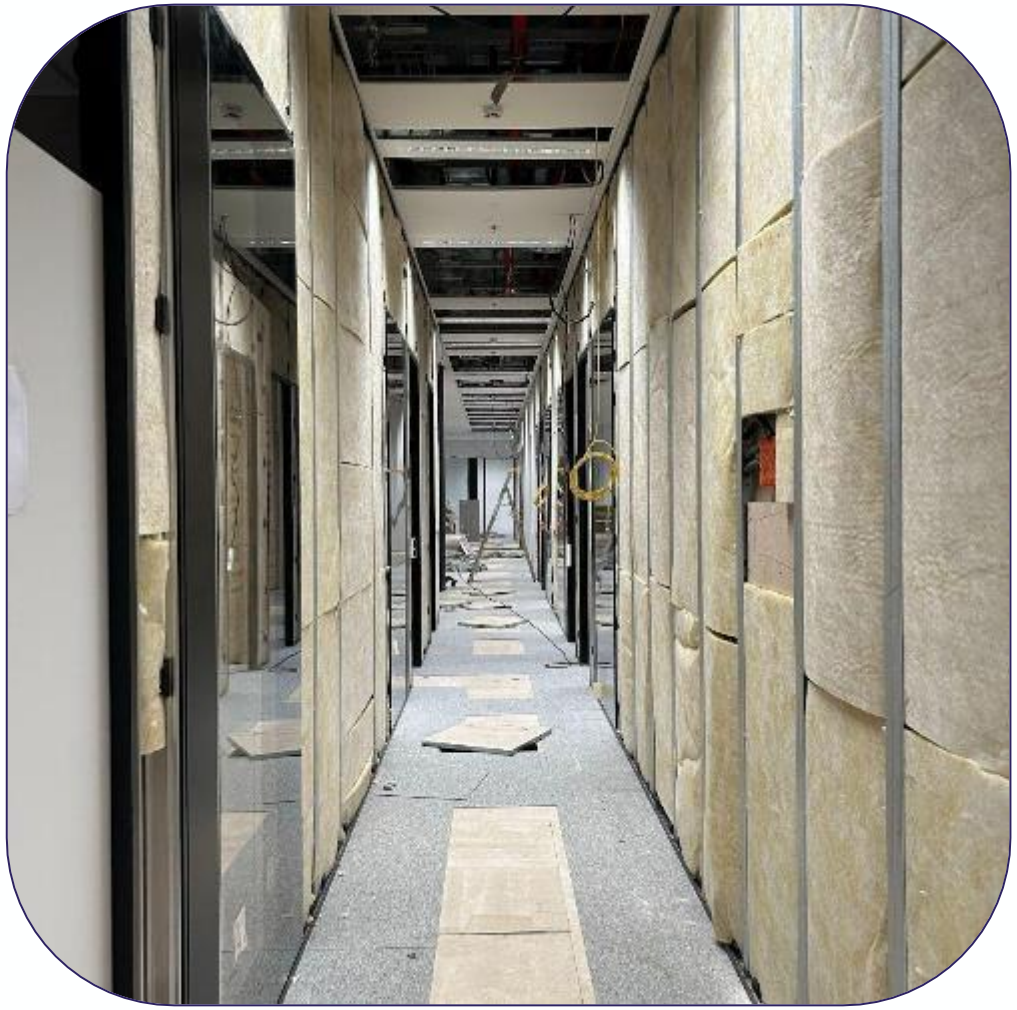
Demonstrators – Saint Denis, France



- **Partners:** Saint-Gobain, Clipper Coramine, Ecophon
- **Objective:** Prove the potential for reusing interior space products (e.g., ceiling tiles, partition walls) in office retrofits.
- **Current Situation:** Limited reuse of modular office walls and ceilings in France and Europe; most are incinerated or landfilled..
- **Opportunity:** Large-scale reuse could drive decarbonization and promote circular practices in the office retrofit sector.

Drastic
Demonstrating affordability, sustainability and circularity

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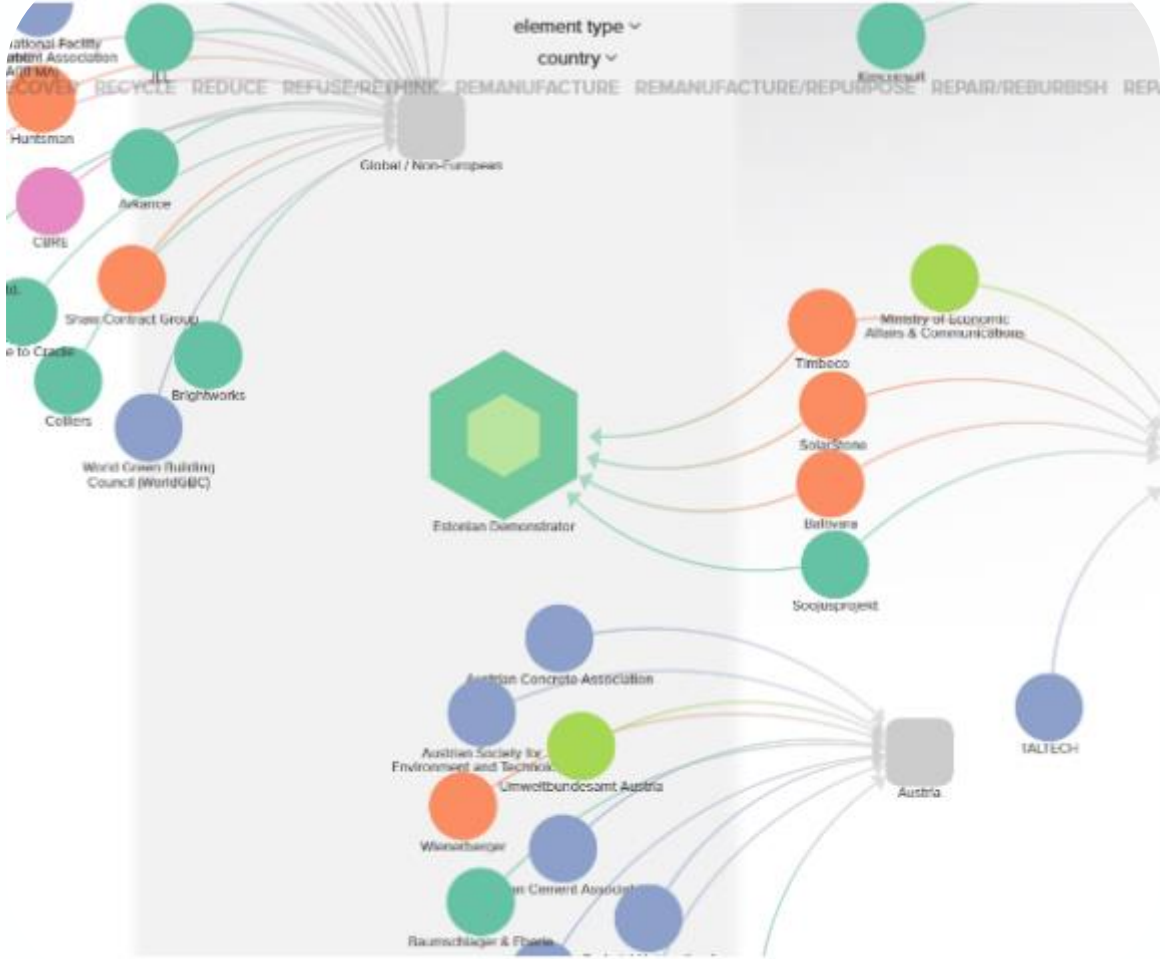
Ecosystem creation: Drastic Stakeholder map

Free, crowd-sourced map of **businesses and organizations** involved in circular and sustainable construction.

Dynamic tool for visualizing relationships, guiding decisions, and **enhancing project outcomes**.

Available online: [Stakeholder map | Drastic (drasticproject.eu)]



Drastic
Demonstrating affordability, sustainability and circularity

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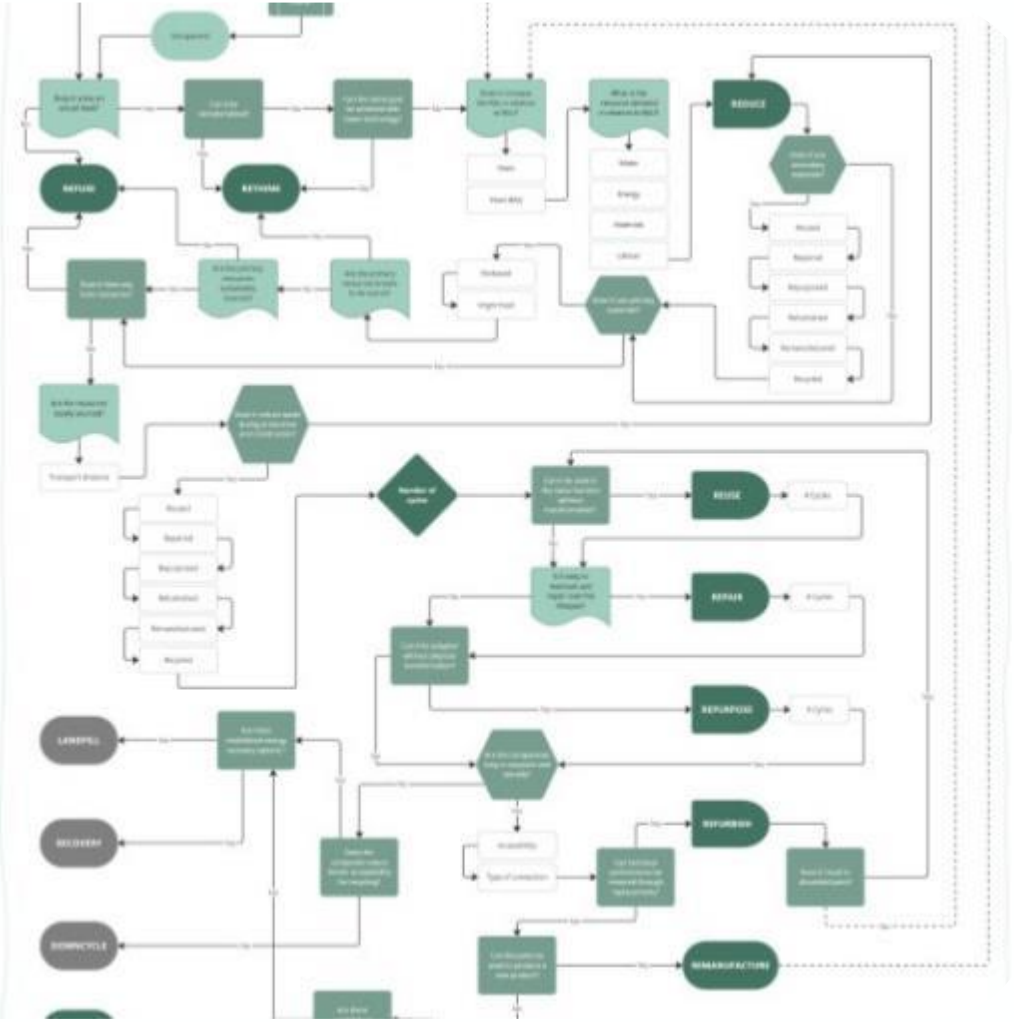
Guidance and performance assessment: Drastic Decision Tree

Primary **guidance tool** in the decision-making processes of product design.

Using qualitative, quantitative, and evidence-based indicators to **raise awareness, collect data, and ensure traceability**.

Available online: Miro board



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Drastic

Demonstrating affordability, sustainability and circularity

Thank you

Visit the Drastic website to learn more:

www.drasticproject.eu

Get in touch:

Joana.goncalves@vito.be / michiel.ritzen@vito.be / steven.claes@vito.be

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Demonstrating affordability, sustainability and circularity

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November 19th 2024

Nebula

A Built4People Project

INBUILT project

Maria Paola SANTISI D'AVILA

Funded by the European Union

UNIVERSITÉ CÔTE D'AZUR

Objectives of the INBUILT project

Nebula
A Built4People Project

For new building construction and existing building renovation :

- **Increase building performance preserving climate and environment**
- **Increase resource efficiency, circularity, climate neutrality**
- **Propose recycled materials, geo-sourced material, bio-sourced materials**

Funded by
the European Union

How INBUILT contributes to B4P specific objectives

B4P Specific Objectives:

A. Develop **holistic solutions** in a systemic approach

B. Demonstrate **overall performance in the life-cycle** perspective

C. Demonstrate **clean energy transition** potential

D. Demonstrate sector **decarbonization pathways**

E. Demonstrate **sustainable, circular** business and value chain

F. Demonstrate **affordability and cost-effectiveness**

G. Demonstrate **no trade-offs** on economy, comfort, health, functions, cultural heritage

Funded by
the European Union

B4P KPIs to which INBUILT contributes

KPI's on general objectives		KPI's on specific objectives	
GO1	**Generate holistic innovation in the built environment towards sustainability**	1. R&I investment in the sustainable built environment area catalysed by the partnership	
		2. # innovative products/services/processes linked to sustainability that are catalysed by the partnership and number of jobs created	SO1
		3. Contribution to the successful deployment of relevant EU instruments and frameworks	SO2
		4. # training programmes developed for the sustainable built environment	SO3
GO2	**Revitalise the sector through decarbonisation and sustainability transition**	**5. Energy savings (MWh)**	SO4
		6. GHG emission reduction (tCO2e) / Pollution reduction	
		7. Share of reused/recycled materials used in construction (%)	SO5
		8. Share of buildings designed and constructed based on a life cycle approach.	SO6
		9. # buildings with on-site RES production	
		10. # of workers trained on working methods and tools in the fields covering the B4P objectives	SO7
GO3	**Induce lasting behavioural change towards sustainable living**	11. Share of the EU population living and working in green neighbourhoods	
		12. # of private and public building owners with sustainable behaviour in their building stock	
		13. # demonstrated innovative solutions and packages for sustainable construction and renovation	
		14. # demonstrated innovative solutions for the sustainability of the built environment value chain	
		15. # innovative services developed and demonstrated	
		16. # living labs established and involved in the partnership's projects	
		17. Total floor area and # buildings (residential or non-residential) directly involved in the partnership's projects demonstration activities	
		18. # and type of heritage buildings involved in/enhanced by the partnership's projects, in line with the safeguarding of the historical environment and architectural values of the building stock	
		19. # building occupants and users involved in the partnership's projects demonstration activities	
		20. # people trained across the whole value chain in the deployment of innovative sustainable technologies, systems and methods	

Funded by the European Union

Key results and innovation

Developing 10 innovative products integrating local resources and wastes

- New building construction and existing building renovation
- Load-bearing and non-load-bearing elements (insulation, facades, partition walls, photovoltaic panels)

Building Information Modeling (BIM) and Life Cycle Analysis (LCA)

Demonstrating the products

- Reduction of:

  fabrication cost, waste, energy demand, pollution, carbon balance, life cycle cost

- Improvement of:

  insulation, hygrothermal comfort, acoustic comfort

Funded by
the European Union

Real-scale demonstration buildings

Nebula
A Built4People Project

Demo 1: New industrial/office building in Southern France

- 2-floor building (1000 m^2) constructed by FILIATER company and used as technical test centre
- Construction materials: in-situ produced Compressed Earth Block masonry, timber floors
- Non-structural elements: smart windows with recycled glass and bio-pur frames
- Recycled materials: earth of the construction site, timber partition walls, photovoltaic panels in the roof

Demo 2: Three new tiny houses in Germany

- Reduced surface (20-27 m^2), transportable by truck in Nice, constructed by Leipfinger-Bader
- Construction materials: fired bricks, non-fired bricks
- Non-structural elements: bio-based insulation
- Recycled materials: bricks, timber partition walls, thermal/acoustic insulation

Funded by
the European Union

Real-scale demonstration buildings

Nebula
A Built4People Project

Demo 3: Existing building in Birmingham

- Early 1930s industrial building (788 m^2) are converted into a microfactory space by MaterialCultures
- Microfactory space where biobased materials can be both fabricated by the community and used for repairs
- Construction material: reinforced concrete
- Recycled materials: timber partition walls, thermal/acoustic insulation
- Refurbishment: concrete structure, windows, thermal upgrade

Demo 4: Neighborhood close to Stuttgart in Germany

- Huge area of 4.7 ha (300 residents, 3500 workers) constructed by IBA'27
- Housing and work, culture, trade and leisure will be combined through high-density mixed use
- Partly new, partly renovation
- Recycled materials: bricks, timber partition walls, concrete

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the European Union

Challenges

- **Confirmation of demonstration buildings: 3 over 4 buildings for real-scale demonstration**

- **Administrative documents** (buy the ground area, produce the plans, documents approval, coordination)

- **Modification of 1 demonstration building**

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Synergies with other projects

- **Learn from difficulties overcome by others**
- **Learn from results obtained by others**
- **Exchange contact and experience**
- **Dissemination and communication** (workshops, conferences, books)

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Consortium of INBUILT project

- Université Côte d'Azur, France
- University of Stuttgart, Germany
- Karlsruhe Institute of Technology, Germany
- University of Bath, UK
- CEA, France
- ITeC, Spain
- Leitat, Spain
- Eskilara, Spain
- Greenovate!, Belgium
- FILIATER, France
- Leipfinger Bader, Germany
- Feess, Germany
- Zrs, Germany
- Iba27, Germany
- Indresmat, Spain
- BalticFloc, Latvia
- Lfe, Luxembourg
- Mykor, UK
- Material Cultures, UK

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the European Union

SNUG Project Presentation

2nd B4P Clustering Event

19/11/2024

Co-funded by the European Union

UK Research and Innovation

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs, Education and Research EAER
State Secretariat for Education, Research and Innovation SERI

Our Goals

SUSTAINABLE MATERIALS

Develop sustainable and cost-effective building materials for optimised thermal insulation based on circular economy

ARTIFICIAL INTELLIGENCE

Empower architects and builders to make eco-friendly choices by leveraging the power of artificial intelligence

ENERGY EFFICIENCY

Alleviate energy poverty through enhanced building energy efficiency

DECARBONISATION

Reduce emissions from the construction industry while advancing the decarbonisation of EU's building stock

Our Contribution to the B4P Partnership

B4P Specific Objectives

A. Develop holistic solutions in a systemic approach

B. Demonstrate overall performance in the life-cycle perspective

C. Demonstrate clean energy transition potential

D. Demonstrate sector decarbonisation pathways

E. Demonstrate sustainable, circular business and value chain

F. Demonstrate affordability and cost-effectiveness

G. Demonstrate no trade-offs on economy, comfort, health, functions, cultural heritage

Our Contribution to the B4P Partnership

B4P KPIs

SNUG

KPIs on **general** objectives

GO1 — Generate holistic innovation in the built environment towards sustainability

1. R&I investment in the sustainable built environment area catalysed by the partnership
2. # innovative products/services/processes linked to sustainability that are catalysed by the partnership and number of jobs created
3. Contribution to the successful deployment of relevant EU instruments and frameworks
4. # training programmes developed for the sustainable built environment

GO2 — Revitalise the sector through decarbonisation and sustainability transition

5. **Energy savings (MWh)**
6. **GHG emission reduction (tCO2e) / Pollution reduction**
7. **Share of reused/recycled materials used in construction (%)**
8. Share of buildings designed and constructed based on a life cycle approach.
9. **# buildings with on-site RES production**
10. # of workers trained on working methods and tools in the fields covering the B4P objectives

GO3 — Induce lasting behavioural change towards sustainable living

11. Share of the EU population living and working in green neighbourhoods
12. # of private and public building owners with sustainable behaviour in their building stock

KPIs on **specific** objectives

SO1

13. **# demonstrated innovative solutions and packages for sustainable construction and renovation**

SO2

14. # demonstrated innovative solutions for the sustainability of the built environment value chain
15. # innovative services developed and demonstrated

SO3

16. **# living labs established and involved in the partnership's projects**

SO4

17. **Total floor area and # buildings (residential or non-residential) directly involved in the partnership's projects demonstration activities**

SO5

18. # and type of heritage buildings involved in/enhanced by the partnership's projects, in line with the safeguarding of the historical environment and architectural values of the building stock

SO6

19. **# building occupants and users involved in the partnership's projects demonstration activities**

SO7

20. **# people trained across the whole value chain in the deployment of innovative sustainable technologies, systems and methods**

Our Outcomes

DIGITAL TOOL ASSISTANT

Offer tailor-made options of thermal insulation materials and layouts, taking into account technical, environmental, and economic inputs

SUSTAINABLE-BY-DESIGN THERMAL INSULATION MATERIALS

Made of locally sourced renewable materials and bio-based components, with a focus on cost-effectiveness

THERMAL INSULATION MATERIALS DATABASE

Catalog both existing and new solutions, providing life cycle assessment details through an open data tool

DIGITAL BUILDING LOGBOOK

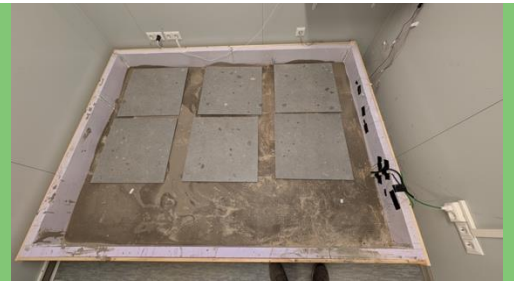
Facilitate decision-making and information sharing, connecting building owners, occupants, financial institutions and public authorities

Solutions in Development: a Sneak-Peek

Aerated concrete blocks
© CTCON

Renders and plasters with aerogels
© Keey Aerogel

Pureflex wastes as blow-in material
© AGITEC



Sustainable self-levelling mortars with PCMs
© Østfold University

Biomass based boards
© AIDIMME/CHIMAR

AI-driven Digital Tool Assistant
© LURTIS

Our Demos

SNUG's approach will be validated in three **real-life buildings**, targeting both renovation and new construction, across different climates:

Scandinavian climate
New construction residential building

Continental climate
Renovation residential heritage building

Mediterranean climate
Renovation office building

Compiling digitalised building information

Feeding digital tool assistant

Running digital tool assistant

Analysis of the several options proposed by the digital tool assistant

Selection of one option according to the end-user criteria/priorities

SNUG methodology in five steps

Our Challenges

Use of local biowaste wastes;

Find reliable and reusable open data base to feed our SNUG database (specially some environmental parameters);

Install new solutions (not certified) on housing buildings (more than one almost impossible);

Obtain products with a very low environmental impact at a similar cost to current commercial products. Competing with traditional solutions that have been optimised for years is not easy. Investments are required.

Our Potential Synergies

- Develop SNUG solutions with other wastes/species;
- Include thermal insulations materials from other projects in our database;
- Validate our methodology in other kind of demo sites/climatology;
- Joint dissemination activities to increase stakeholders' engagement.

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AUSTRIAN STANDARDS
Høgskolen i Østfold
KASTAMONU
TAKKENKAMP GROEP
AGITEC green efficiency
LURTIS AI Solving Your Tech Challenges

Thank you!

Michael O’Connor

Chief Executive & Commercial Director
Keey Aerogel

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CALECHE

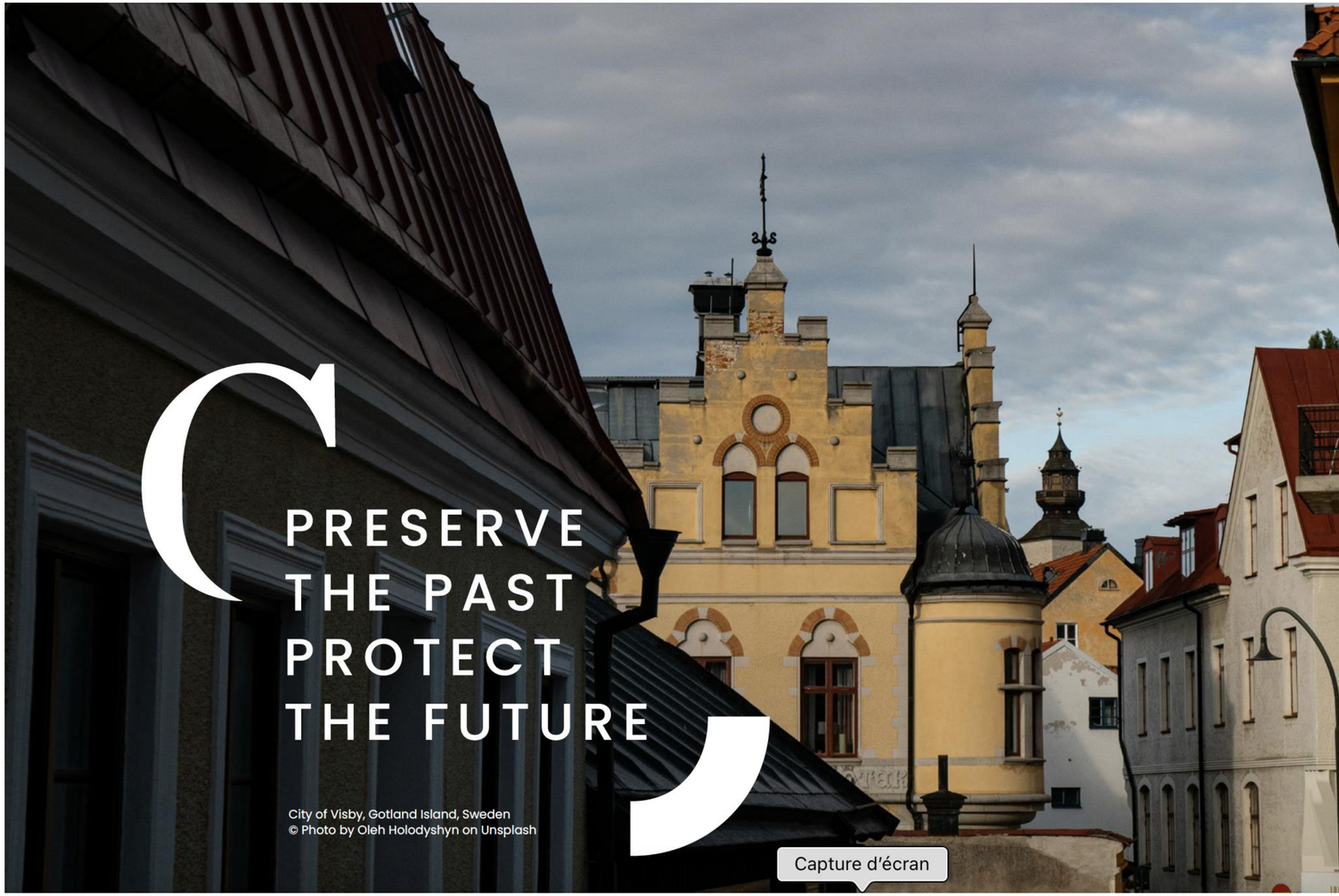
COHERENT
ACCEPTABLE
LOW
EMISSION
CULTURAL
HERITAGE
EFFICIENT RENOVATION

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON EUROPE RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N° 101123321

CARING FOR OUR BUILT HERITAGE
SUSTAINABLY PRESERVED

Our vision

CALECHE is a pioneering initiative under the Horizon Europe framework dedicated to redefining the renovation of Europe's historic buildings. Our project is at the forefront of blending the preservation of our rich built cultural heritage with cutting-edge sustainable practices.



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Objectives

➜ collect, analyse, and make a catalogue of existing solutions for the improvement of historic buildings' fabric and services that is comprehensive enough to cover the entire European built heritage

➜ develop decision support tool to increase stakeholders accessibility to existing solutions and support the adoption of suitable technologies

➜ develop new technological solutions for the improvement of windows assessment, interior insulation of walls and heritage compatible PV

➜ validate the newly developed solutions in relevant environments

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Contribution to B4P partnership

A. Demonstrate **no trade-offs** on economy, comfort, health, functions, cultural heritage

B. Demonstrate **overall performance in the life-cycle** perspective

C. Demonstrate sector **decarbonization pathways**

KPI CALECHE Contribution

1. Type of heritage buildings involved in/enhanced by the partnership’s projects, in line with the safeguarding of the historical environment and architectural values of the building stock

2. Building occupants and users involved in the partnership’s projects demonstration activities

3. People trained across the whole value chain in the deployment of innovative sustainable technologies, systems and methods

4. Demonstrated innovative solutions and packages for sustainable construction and renovation

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Use-case 1

SWEDEN, Visby - Donner house

Use-case 2

SWITZERLAND, Le Locle et
La Chaux-de-Fonds/ cities

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Use-case 3

ITALY, Ercolano - Villa Matarazzo

Use-case 4

FRANCE, Grenoble Museum of Natural History

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Key result and simulation tool development

Decision Support System (DSS) developed in CALECHE refers to a set of tools (computer-based or not) designed to assist decision-makers in the multi-criteria decision process of planning and executing renovation and retrofitting projects for historic buildings.

The goal of DSS is to provide relevant information, analysis, and support to aid decision-making at various stages of the renovation process, taking into account specific context.

DSS can significantly enhance and streamline the decision-making process by:

- providing comprehensive information,
- fostering collaboration among a wide range of stakeholders, and
- helping to balance the preservation of historical and cultural values with the practical requirements of renovation of sustainability, and economy.

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Developments and synergies

Innovative Renovation Approaches: Develop methods that respect the heritage value of buildings while enhancing their energy efficiency and reducing environmental impacts.

Multi-benefit Decision Making: Establish decision-making frameworks that balance cultural preservation with modern sustainability needs.

Community Engagement and Inclusivity: Ensure our renovated spaces resonate with communities, maintaining their historical essence and fostering a sense of shared heritage.

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CALECHE

Thank you for your attention

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CARING FOR OUR BUILT HERITAGE
SUSTAINABLY PRESERVED

A network of collaboration

CALECHE is a collaborative network of European partners and experts. We are architects, engineers, historians, scientists and industrials united by a common goal: to make Europe's historic buildings more livable, accessible, and environmentally sustainable.

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HERIT4AGES

User-centric and data-driven retrofitting solutions for a resilient, energy-efficient, low emission and inclusive cultural heritage.

Project Overview

Built4People Clustering Event

CINEA, Brussels, 19 November 2024

Presented by: Dr Carlos Ochoa

Tyndall National Institute – International Energy Research Centre (IERC)

Funded by the European Union

Project Objectives

Main:

Develop and validate **a set of technical and socially innovative sustainable energy and resource-efficient solutions** for cost effective **improvement and preservation of the built cultural heritage** increasing its **inclusiveness, accessibility, resilience, environmental and energy performance.**

Key objectives:

1. Increase occupant comfort in heritage buildings by **coordinating technologies that influence indoor environmental quality and energy performance** based on occupant needs.

2. Develop cost-effective **energy retrofit solutions with simplified integration methods for decreased installation time** with minimal-effort interventions.

3. Demonstrate **low-carbon solutions and decision-support tools for optimal renovation of the built heritage in 5 demonstration sites**.

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How Herit4ages contributes to the Built4People partnership

Contribution to B4P Specific Objectives:

A. Develop holistic solutions in a systemic approach

C. Demonstrate clean energy transition potential

G. Demonstrate no trade-offs on economy, comfort, health, functions, cultural heritage

Current contributions to B4P KPIs:

16. # living labs established and involved in the partnership's projects = **4**

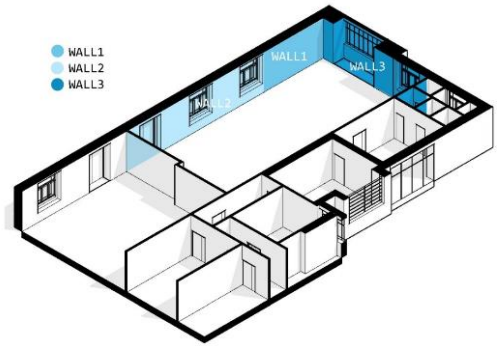
17. Total floor area and # buildings (residential or non-residential) directly involved in the partnership's projects demonstration activities = **Total floor area: 650m^2 ; Number of buildings: 5**

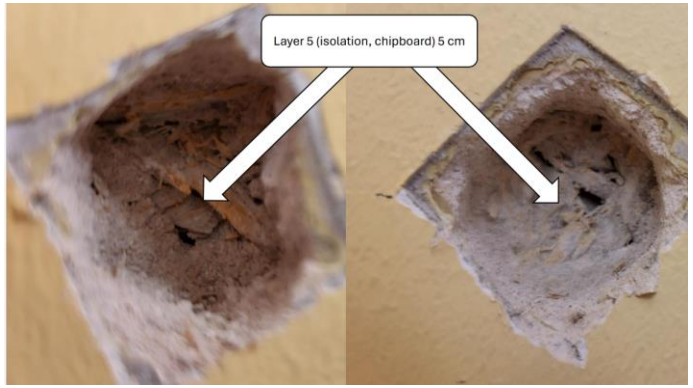
18. # and type of heritage buildings involved in/enhanced by the partnership's projects, in line with the safeguarding of the historical environment and architectural values of the building stock = **5 heritage buildings that include test facility, hotel, offices, educational and residential**

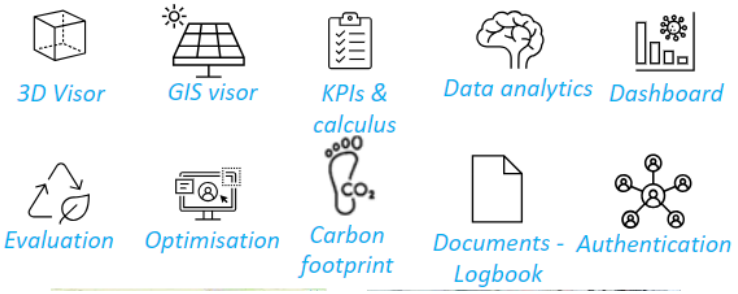
19. # building occupants and users involved in the partnership's projects demonstration activities = **+150 persons**

Key Results and Innovations to date

1. Co-creation toolkit:
    a) Policy mapping with barrier identification.
    b) Co-creation workshops.
2. Renovation solutions:
    a) Definition of solution placement in demonstrators.
    b) Material sampling and characterization of existing walls.
    c) Environmental monitoring installation underway.
3. Digital twin ecosystem platform:
    a) Survey of data sources and completeness at demonstrators.
4. Green environmental sensor:
    a) Methodology to specify measurement range and biodegradation.
5. Smart Energy router and nonintrusive load monitoring:
    a) Definition of renewable energy generation in demonstrator.





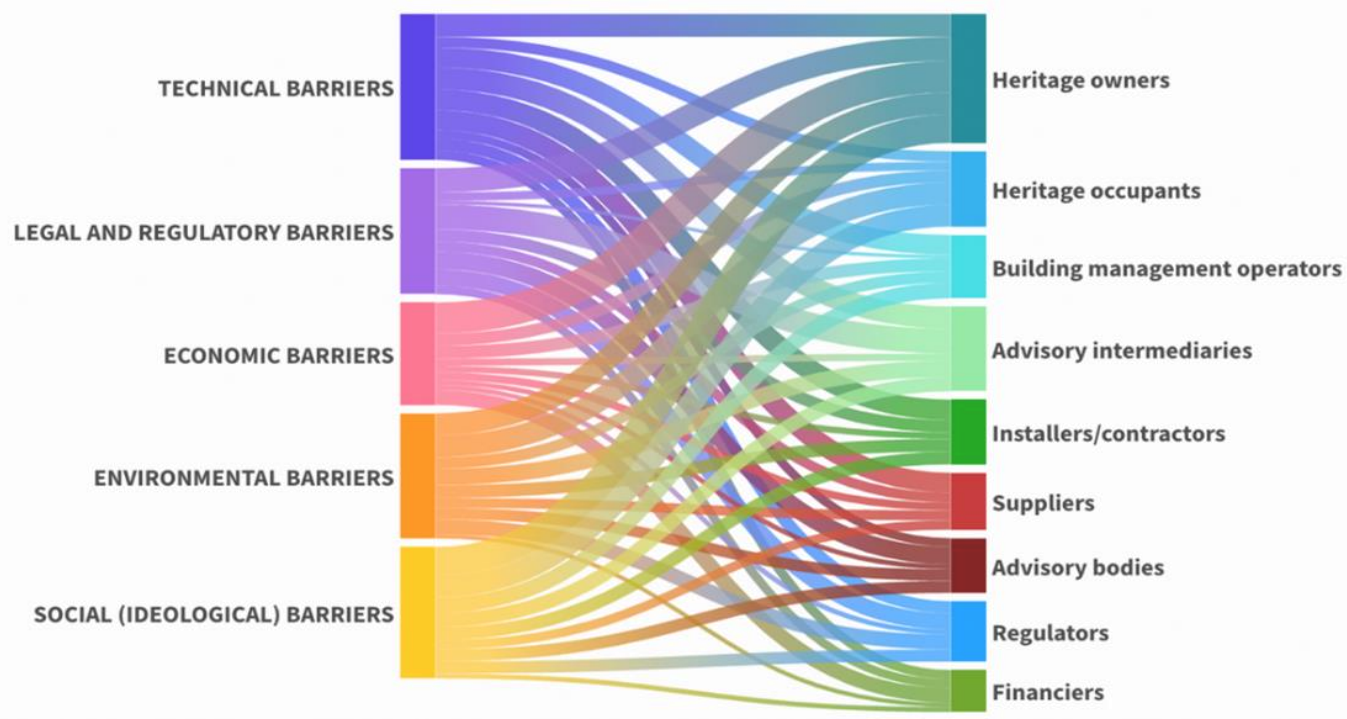


Project demonstrators

1. **Romanesque hermitage of Canduela (Spain):** Heritage lab, former church
2. **Posada Santa Maria La Real (Aguilar de Campoo, Spain):** Countryside hotel, former convent
3. **Korporatsioon Vironia (Tartu, Estonia):** Office building, former noble residence
4. **Engineering Building at University of Bologna (Italy):** Educational building, modernist icon
5. **Social housing (Funchal, Madeira, Portugal):** Social housing, traditional building

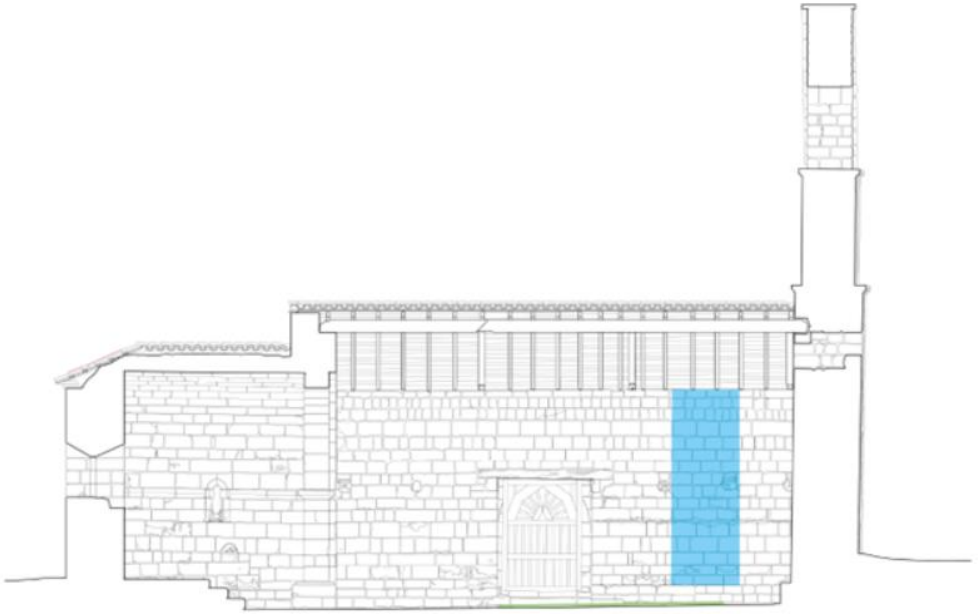
Challenges met and topics for sharing

1. Regulatory, technical and economic barriers.
2. Information availability at heritage sites and need for destructive tests.
3. Social attitudes to heritage renovation and approaching the right stakeholders.
4. Adapting existing infrastructure with a specific original aim into today's expectations.



Potential synergies with other projects

1. Sharing experiences with projects having similar theme related to built heritage renovation.
2. Collaborations for building monitoring data sharing and comparison.
3. Quantification of impact from LCA/LCC perspective in the context of built heritage.
4. Measurement of resilience and accessibility in specific use cases.
5. Methodologies and outcomes for co-creation and user engagement.



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Thank You!

Project partners:

Tyndall National Institute Institiúid Náisiúnta

Technological Centre

Alma Mater Studiorum Università di Bologna

Łukasiewicz Instytut Mechanizacji Budownictwa i Górnictwa Skalnego

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IDP

TESELA materiales | innovación | patrimonio

Santa María la Real fundación

Institute of Baltic Studies

Warsaw University of Technology

UNINOVA

FENIX.TNT tvořivost nad technologií

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HERIT4AGES

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Next Generation Solutions for Sustainable, Inclusive, Resource-efficient and Resilient Cultural Heritage

18/11/2024 B4P Clustering Event

Dr. Stamatia Rizou

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Inherit

INHERIT Objectives

Overall INHERIT Objectives

To **engage stakeholders** in a co-creation process for designing the INHERIT approach, enabling assessment, analysis and decision support for an open, accessible, inclusive, resilient, sustainable and low-emission CH

To propose a novel **framework** for inspecting, monitoring, assessing the CH and a catalogue of tailor-made cost-effective solutions across key thematic pillars (energy, resources, climate resilience and inclusiveness)

To design and build an **ICT-based platform**, enabling data sharing and data-driven **services** to support decision making and analysis from CH stakeholders, and promote sustainable renovation, efficient monitoring, management and maintenance of the heritage-built environment

To **test and evaluate** the services with the relevant stakeholders in 8 pilots across EU and pave the way for their exploitation and sustainability plans

To provide a **capacity building programme** and make it available to CH stakeholders, facilitating the replication and sustainability of the INHERIT solutions

To deliver an open and transparent promotion of the INHERIT results through a comprehensive **dissemination, communication and exploitation** strategy

Inherit

B4P Partnership

INHERIT contributions to B4P Partnership

B4P Specific Objectives

- **G: Demonstrate no trade-offs on economy, comfort, health, functions, cultural heritage**
- A: Develop holistic solutions in a systemic approach
- B: Demonstrate the overall performance in the life-cycle perspective

KPIs in Numbers

KPIs	Number
Innovative services developed and demonstrated	10 innovative services
Living labs established and involved in partnership's project	8 Social Labs, 1 Multi-stakeholder Forum
Total floor area and #buildings (residential or non-residential)	74013.5 sqm (7 non-residential, 1 residential)
# and type of heritage buildings involved	**8 CH sites**: 2 Public and 1 Private Office Buildings, 1 Private Commercial Building, 1 Church & 1 Monastery, 1 Public Residential Building, 1 Museum
#building occupants and users involved in the partnership's projects and demonstration activities	1952
#people trained across the whole value chain	300

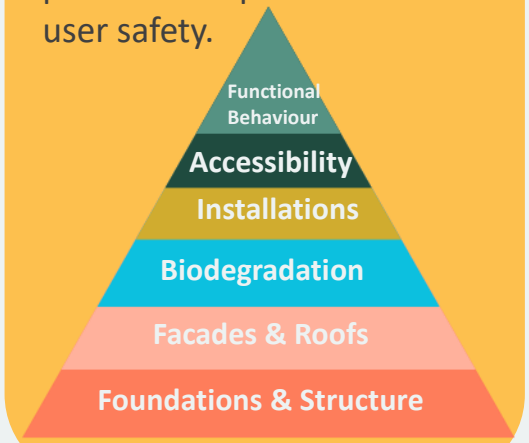
Inherit

Key Results & Innovations

Key Results During the First Year of INHERIT

TECHNICAL INSPECTION

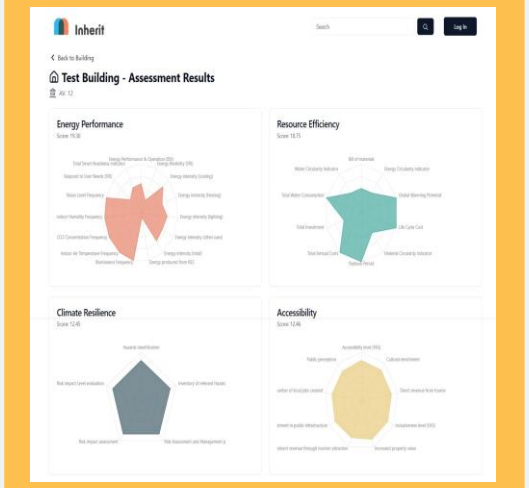
It emphasises the **structural safety and integrity of the building,** beginning with the foundations and structure to prevent collapse and ensure user safety.



FRAMEWORK

Assessment and monitoring framework for assessing the current status of CH buildings, structured in **four pillars**.

TOOL



HUB OF MEASURES

The INHERIT Hub of Measures offers a valuable resource for managing and modernizing the CH sites

83 measures have been collected

37 measures can be applied to **CH with high level protection**

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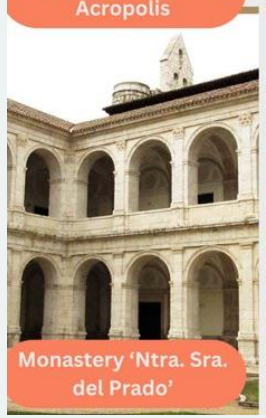
Pilot Demonstration

Pilots Demostration

	INHERIT pilots		Pilot 1	Pilot 2	Pilot 3	Pilot 4	Pilot 5	Pilot 6	Pilot 7	Pilot 8
Data collection and sharing	Smartification & Data Exchange Platform	s.0								
Design & Renovation	Interactive screen use & AR-VR interfaces	s.1								
	Modelling & simulation environment	s.2								
	Decision support tool for optimal renovation planning	s.3								
Monitoring, Operation & Management	Indoor environmental quality & comfort optimisation	s.4								
	Energy forecasting & data-driven intelligent management	s.5								
	Digital twin for heritage facilities' real-time monitoring	s.6								
	Real-time insights on activity and mobility patterns	s.7								
Preservation & Maintenance	Preventive maintenance with H-BIM	s.8								
	GIS-based solution for sustainable heritage maintenance	s.9								
	Heritage buildings environmental climate scenarios	s.10								

8 pilot sites



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Challenges

Challenges faced so far..

- Stakeholder Engagement – Workshops:
  - It is challenging to find a broader range of stakeholders
- Synchronization of Pre-pilot activities
  - Keep on time the pre-pilot activities (equipment installation etc.)
- Alignment among technical solutions to pilot needs
  - Focus on user-friendliness

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Synergies

Our Synergies and Future Synergies

- Participation with INHERIT at the Sustainable Places 2024 event in Luxembourg.
- INHERIT project was presented in 2 sessions
  - **Scalable and Resource-Efficient Solutions for Cultural Heritage** (with sister projects: HeriTACE, and CALECHE)
  - **Regeneration: Crafting Sustainable and Inclusive Neighbourhoods** (with REGEN, CALECHE, drop, VELIXIA, SNUG, REHOUSE, WeGenerate, Nbenefit$, greenpass, and SMARTeeSTORY)

- More synergies with sister projects during the project's lifespan
- Collaborate on developing connectors for data interoperability

Inherit

Expertise

Consortium

A consortium of 18 partners from all over Europe

Inherit

Built4People

Thank you!

INHERIT

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sincere
building stories

The Second Life of Modern Period Architecture

Resilient and adaptive renovation towards net-zero carbon heritage buildings

B4P clustering event
19 November, 2024
Brussels

Ioannis Karatasios
Project Coordinator

DEMOKRITOS

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SINCERE objectives

for renovation and low-emission buildings

01 - Transform CH buildings to a key actor and main stage for raising stakeholders' and citizens' awareness on renovation/reuse concept, as a circular economy element to tackle climate change.

02 - Development of a smart interoperable platform integrating H-BIM / H-DT and immersive XR technologies to provide the digital tools for sustainable renovation and retrofitting of CH buildings.

03 - Reduction of environmental impact during restoration and maintenance, by developing low-energy and low-carbon restoration mortars, with enhanced compatibility and service life.

04 - Reduction of energy demands during operation of the restored CH buildings due to enhancement of building thermal performance and enhancement of the service life of repair mortars and of heritage building.

05 - Enabling solar energy harvesting during building operation, with green, low-cost, large area fully sustainable building integrated photovoltaics (BIPVs).

06 - Understanding the multi-scale and multi-physics behaviour of high-performance repair mortars and developing fast-running numerical design tools to achieve whole-life carbon savings.

07 - Validation of SINCERE technologies at 4 demonstration sites - Pilots, in Spain, Greece, Israel and Czech Republic, and assessment of societal, economic, and scientific impact.

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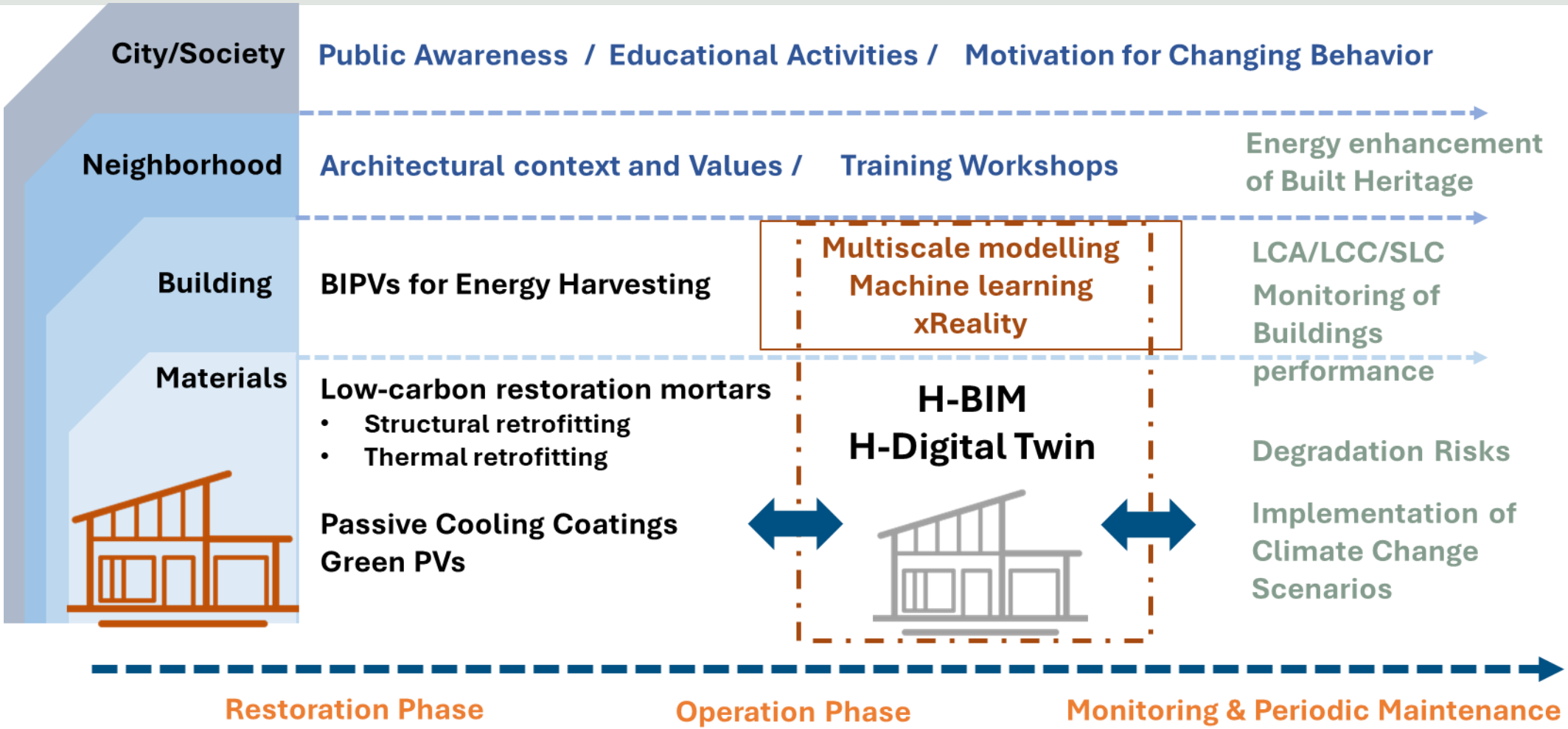
SINCERE concept & objectives



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B4P Specific Objectives addressed by SINCERE

A. Develop **holistic solutions** in a systemic approach

B. Demonstrate **overall performance in the life-cycle** perspective

D. Demonstrate sector **decarbonization pathways**

Multiscale (materials)/ multilevel (building)/ multiphase (R-U-M) approach,

Interdisciplinarity (materials, architecture and ICT tools),

Citizens' engagement & involvement (citizens science, training workshops)

Future climate change scenarios considering Shared Socioeconomic Pathways (SSPs),

Performance predictions (materials, buildings)

LCA/LCC/SLCA,

Risks predictions

Low-CO2 repair materials, enhanced durability,

low energy consumption for heating/cooling of buildings,

prediction scenarios for optimum materials selection and maintenance needs

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KPIs to which SINCERE contributes

KPI's on general objectives

GO1 — **Generate holistic innovation in the built environment towards sustainability**

1. # innovative products/services/processes linked to sustainability that are catalysed by the partnership and number of jobs created
2. Contribution to the successful deployment of relevant EU instruments and frameworks
3. # training programmes developed for the sustainable built environment

1. **8** innovative products, **3** services/processes
2. Industry and citizens engagement
3. **3** training schools with on-site applications, **4** open-day workshops

GO2 — **Revitalise the sector through decarbonisation and sustainability transition**

5. Energy savings (MWh)
6. GHG emission reduction (tCO2e) / Pollution reduction
7. Share of reused/recycled materials used in construction (%)
8. # buildings with on-site RES production

5. PVs with >20% efficiency, not quantified yet
6. not quantified yet
7. not quantified yet
8. 4 pilots at TRL4-6

KPI's on specific objectives

SO1 **SO2** **SO3** **SO4** **SO5** **SO6** **SO7**

13. # demonstrated innovative solutions and packages for sustainable construction and renovation
14. # demonstrated innovative solutions for the sustainability of the built environment value chain
15. Total floor area and # buildings (residential or non-residential) directly involved in the partnership's projects demonstration activities
16. # and type of heritage buildings involved in/enhanced by the partnership's projects, in line with the safeguarding of the historical environment and architectural values of the building stock
17. # building occupants and users involved in the partnership's projects demonstration activities
18. # people trained across the whole value chain in the deployment of innovative sustainable technologies, systems and methods

13. **10** innovative solutions for sustainable construction and renovation
14. **3** (low energy/low-CO2 cements, use of recycled aggregates, sustainable re-use of buildings)
15. 1500 m2
16. **3 buildings**: old school >> cultural centre, educational building/university, industrial heritage site >> museum
17. Architecture & engineering students: min. 50, renovation professionals: min. 20 (foreseen 150), heritage professionals: min. 20, local authorities and heritage professionals: min. 5, visitors/public: foreseen 150)
18. **0 so far…**

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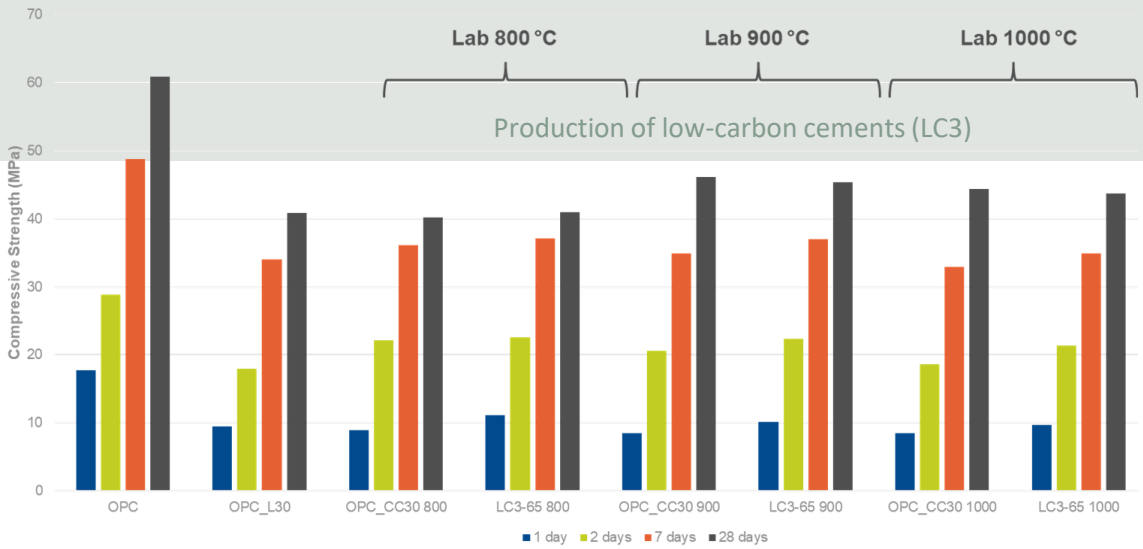
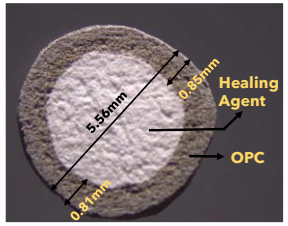
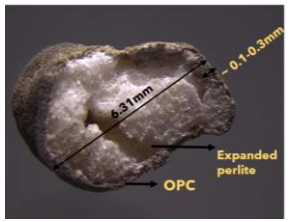
SINCERE key results and innovations

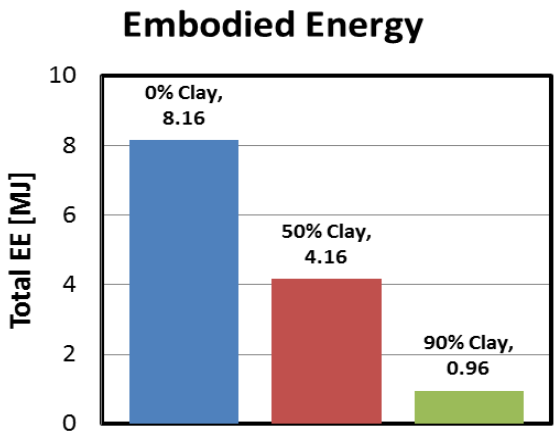


Production of low-carbon cements (LC3)

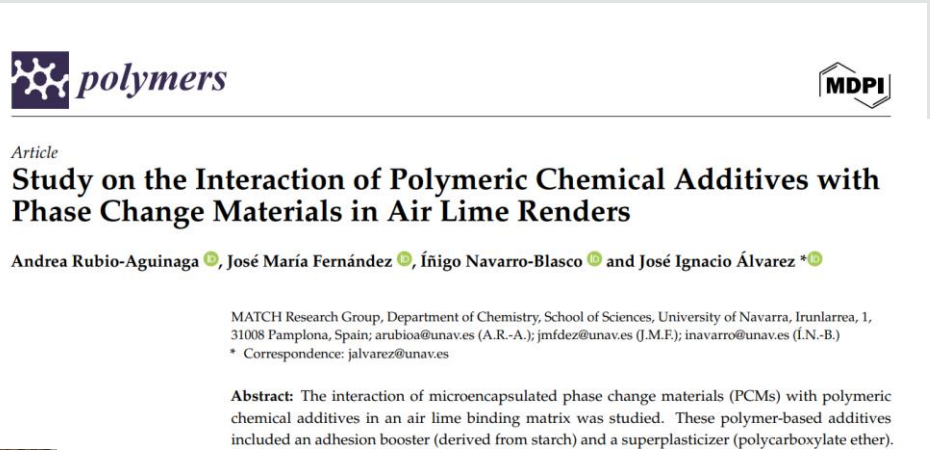




Self-healing admixtures and encapsulated corrosion inhibitors



Clay-based hempcrete



polymers

MDPI

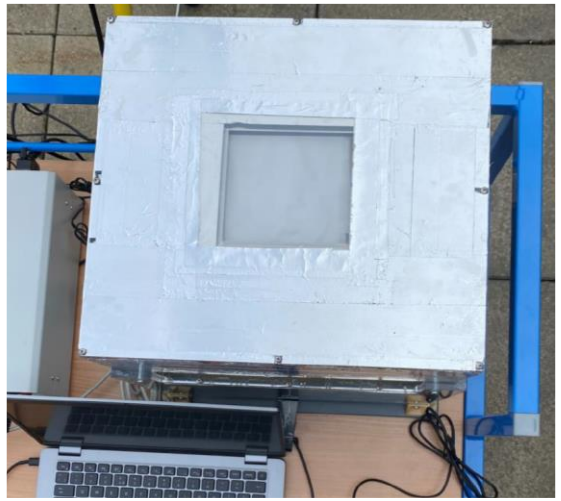
Article

Study on the Interaction of Polymeric Chemical Additives with Phase Change Materials in Air Lime Renders

Andrea Rubio-Aguinaga, José María Fernández, Íñigo Navarro-Blasco and José Ignacio Álvarez *

MATCH Research Group, Department of Chemistry, School of Sciences, University of Navarra, Irunlarrea, 1, 31008 Pamplona, Spain; arubioa@unav.es (A.R.-A.); jmfdez@unav.es (J.M.F.); inavarro@unav.es (Í.N.-B.)
* Correspondence: jalvarez@unav.es

Abstract: The interaction of microencapsulated phase change materials (PCMs) with polymeric chemical additives in an air lime binding matrix was studied. These polymer-based additives included an adhesion booster (derived from starch) and a superplasticizer (polycarboxylate ether).



Radiative cooling coatings

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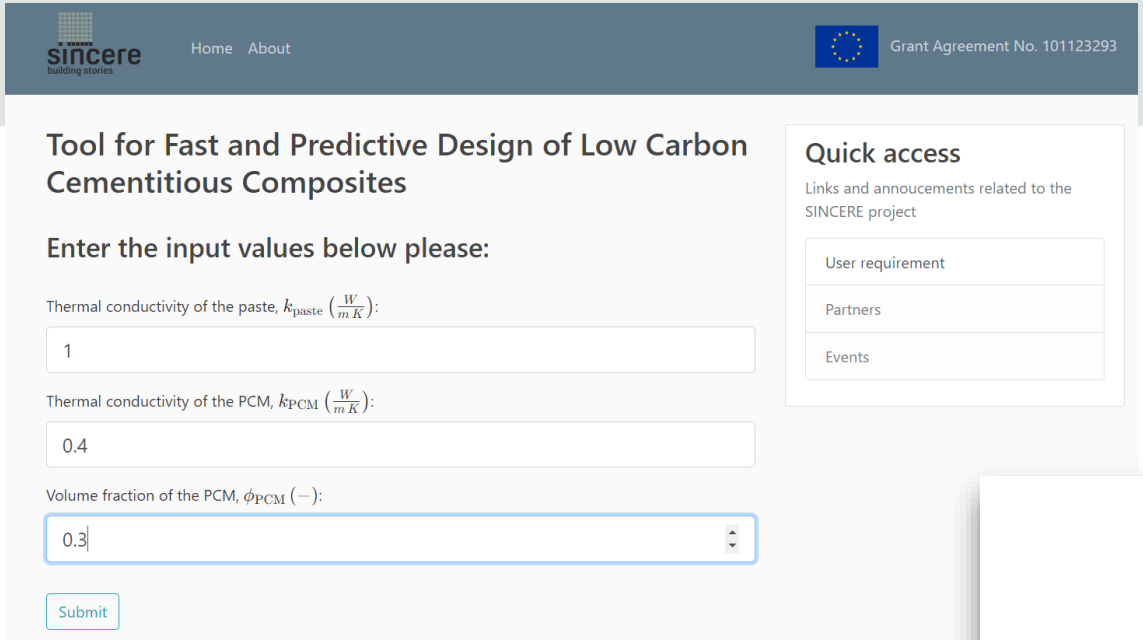
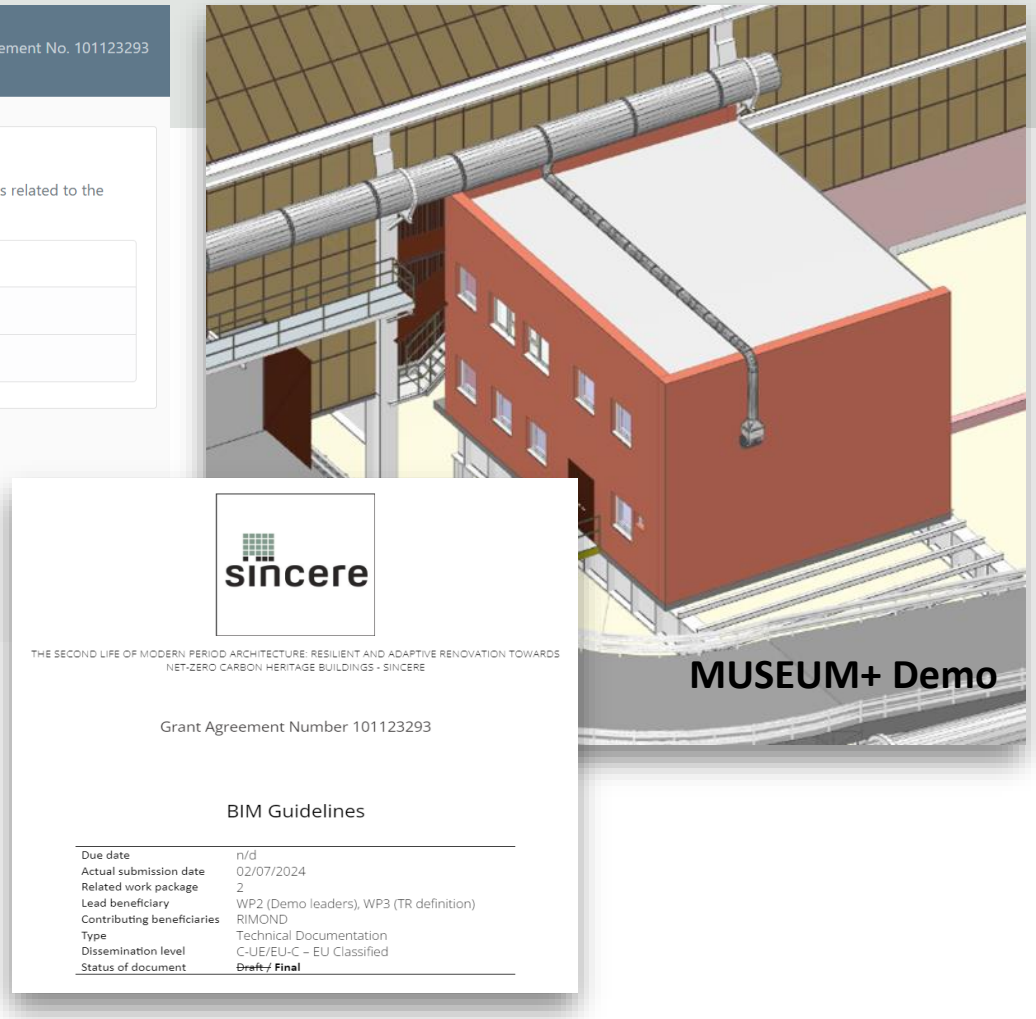
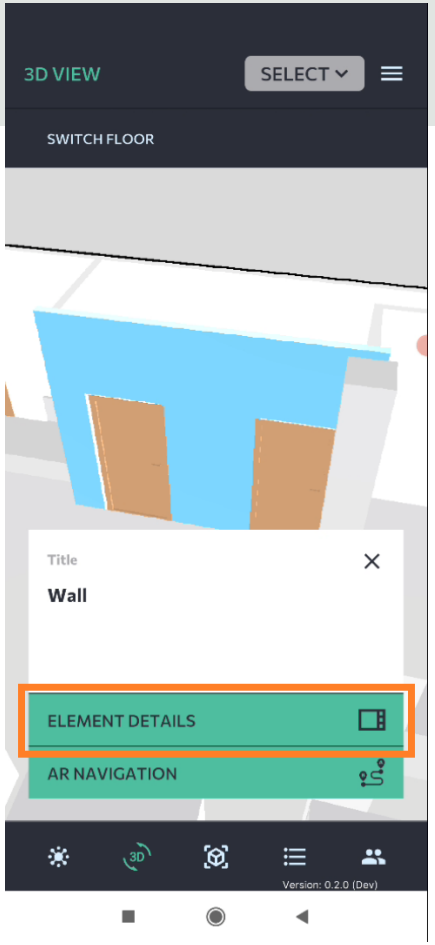
SINCERE key results and innovations



Fast predictive tool for materials' thermal performance



H-BIM development



MR mobile App

SINCERE pilots

Algete
Spain

Mockup buildings

Holon
Israel

University building

Rhodes
Greece

Cultural Centre

Ostrava
Czechia

Museum

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Challenges met so far…

- Geopolitical tensions & instability in Israel and Middle-East
- Different national legislation and codes for historic buildings (e.g. energy performance requirements/indices)
- Different notion, language and methodology among different disciplines
- Upscaling quantities of innovative materials for pilot applications
- Different concepts/perceptions of BIPVs

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SINCERE synergies foreseen with other projects

- Mention all projects of the same call in the posts' acknowledgements (e.g. track: Solutions for renovation and low-emission buildings)
- Common thematic training workshops, inviting the different audience of different projects
- Working groups for creating recommendations for standardization bodies (e.g. CEN TC 346 - Conservation of cultural property)
- Thematic sessions in materials science, digital technologies and architecture conferences
- Advertisement of other projects in *Building Stories platform (SINCERE)*

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Thank you for your attention!