

Building renovation WORKSHOP

Organised by:

LIST

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY

**Unlocking the Renovation Wave** Deep-renovation solutions developed by EU-funded projects













Solutions developed by EU-funded projects to decarbonize the building stock and improve its resilience









NEBULA brings transdisciplinary support to innovators in the construction sector







NEBULA: a Coordination and Support Action funded under Horizon Europe to support the Built4People partnership to:







## What we offer to the B4P Innovation Clusters and their ecosystems

2



Peer learning activities on NEB

- ✓ A Handbook to guide innovators on NEB concepts, activities and opportunities
- Webinars to share more specific knowledge on NEB-related topics
- A network of NEB
   Advisors to support and promote our events & material towards clusters members and innovators

Open Innovation support to clusters

- ✓ Dedicated clusters
   module on the
   METABUILDING platform
- ✓ Support to the frontrunner B4PIC Aquitaine-Euskadi and follower clusters
- Identification and promotion of EC-funded innovations

Improved access to finance

3

- A finance toolbox both on public and private funding of innovation
- ✓ Match-making sessions
- Capacity building workshops for clusters
- ✓ 'On demand' financing
   help desk to clusters

## Meet our network of B4P Innovation Clusters



## A network of local clusters from the Built Environment value chain



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Solutions developed by EU-funded projects to decarbonize the building stock and improve its resilience



### **Our speakers today**





Integrated renovation solutions, with energy performance guarantee

Alejando Alonso (Valencia Clima i Energia) Vivi Plagaki (European Dynamics)



Energy performance assessment and certification - George Giannakis (QUE TECHNOLOGIES)

REHOUSE ACCELERATING THE EUROPEAN RENOVATION RATE

Holistic renovation packages, with a circular approach - Javier Antolín Gutiérrez (CARTIF)



Industrialisation of deep-renovation workflow - José Luis Alapont (UPV)



Smarter historical buildings for better energy performance - Matteo Porta (RINA-C)



Beyond energy performance: improving resilience, preparedness & responsiveness - Łukasz Wilczyński (ASM)





# 

Energy efficiency Building Enhancement through performance guarantee Tools



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## EBENTO at a glance



### Consortium

- ETRA: Coordinator
- 11 Partners (7 countries)
- 4 Pilots (Spain, Estonia, Greece and UK)
- Total Budget 5,6 M€ (Funding 4,8 M€)
- Duration 36 Months





**Development of a one-stop-shop** platform for all actors involved in the building and renovation sector



Focuses on citizens as key players in the energy transition



Increase the **involvement of public institutions and energy communities** by helping them to identify potential buildings for improvement.





Explore the **best financing for users** by studying the type of support available.



Include **new savings in EnPC** coming from user comfort, energy efficiency and demand response mechanisms creating new business models

### DEVELOPMENTS FOR THE OSS: TOOLS



## ELEMENTS ON THE OSS

Dynamic Map: EPC for buildings in cities







#### 15

## **ELEMENTS ON THE OSS**

Monitoring (energy, comfort, CO2..) and user clustering



One	e-St	op-Shop	
	EB	ENTO	
First name		Last name	
Username		Email	
Password	Ø	Confirm password	
user type * Citizen	•	Country* United Kingdom	
Dwelling cadastral reference		Building cadastral reference	
] I agree to the terms a	and condi	tions	





### Common space for citizens and companies

#### Match between users and companies

=	Renovation scenario		Helena Papadolis 2 tačiou 47, Aθήνα 105 59	
€	Flat 3 rooms          Image:	Possible builders Builder 1 Builder 2 Builder 3	Complete renovation Windows Insulations	

### EnPC management, control and definition

≡	EPC Composition	2	EPC manager FEMOSA
C	Create from template OR O Compose from scratch		
	Current home Your current home is: Three rooms, 1 kilchen, 2 balhs, HVACs in living room, Central boller,		
	Requirements and poods		Modify
	You do not have included any information yet		
			Modify
			Search template



## NEW EnPC FOR EBENTO OSS

### EnPC model

### **Technical & financial aspects (relevant for the digital platform)**

- 1. Design and installation of energy efficiency and RES measures
  - Renovation works specification
  - Contract and installation schedule

### 2. Performance Guarantee

- Annual Guaranteed Energy Savings and Consumption NEW: Demand Responsiveness and Flexibility
- NEW: Guaranteed Quality and Comfort
- 3. Project implementation
- 4. Monitoring and energy savings calculation
- 5. Financial compensation
- 6. Notification and management of significant changes and delays

### Legal & contractual aspects (outside OSS)

EnPC template fit-for-EBENTO OSS

- Define basic skeleton for all type of EnPCs
- Cover the most important elements
- Adding new parameter: COMFORT and DEMAND RESPONSE
- Focus on residential buildings

EBENTO OSS platform will suggest suitable solutions and useful tips for various elements of the contract, and it could also facilitate the management of the contract.

The legal decisions and the actual contract will be signed outside of the platform's environment.

## **Pilots Overview**

### **Pilots**

Different renovation and monitoring stages to enhance energy efficiency and comfort of users

Valencia





Tallin





Athens

Manchester



## VALENCIA

## Valencia Pilot

### **Objectives**

Measure and **monitor** the previous and the renovated state of the buildings – **energy consumptions and comfort** (24 dwellings)

**Engage homeowners properly** during the whole renovation process – clarify their implications, benefits and steps to be followed.

**Engage ESCOs and construction companies** in the process so they can offer attractive renovation solutions.



Deep renovation Façade















🥖 València Clima i Energia

**Sa** Ingeniería y Control



## THANKS

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/Connect with us:

www.ebentoproject.eu



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## FORTESIE

"Central Bank Digital Currency (CBDC) powered Smart PerFORmance contracTs for Efficiency, Sustainable, Inclusive, Energy use" 24 September 2024











Digitisatisation and automation enablers



Real demonstrators targeting several different stakeholders



Integrated EPC packages to raise overall EPC value proposition



New business models for original and replicated packages serving, immediate market take up



**Boosting renovation wave with performance guaranties** 







Integrated EPC packages to raise overall EPC value proposition





## ) Digitisation and automation enablers





### **Objectives and Expected Results**





### Real demonstrators Various building types



### **Driving Necessity**

- High energy builds due wastage and outdated systems
- Outdated Building
   Envelope: Materials like
   windows and potentially
   insulation (old regulations).
- Air Quality: High CO2 levels, limited natural ventilation.
- Visitor and Worker Comfort and Awareness: Outdated design and internal comfort conditions impacting visitor & worker comfort



### **Objectives and Expected Results**







### **Driving Necessity**

- High energy builds due wastage and outdated systems
- Outdated Building Envelope: Materials like windows and potentially insulation (old regulations).
- Air Quality: High CO2 levels, not monitored.
- Low living Conditions
- Lack of trust to ECP contracts
- Housing and Energy Poverty criteria -Economic deprivation associated with poor housing condition (including, energy discomfort).







### **Comfort Price**

Introduction of the concept of "comfort price" to raise awareness of the cost of comfort and the impact of better renovations. Supports users engagement and decision making.



### **Integration Complexity**

- common data model and
- Facilitating integration with tools (Esthisis Edge and
- Esthisis Agent)







### **Collaborative Business Models**

Diverse stakeholders interests->create scalable, replicable renovation solutions.



### **Renovation Complexity**

Many suppliers cause delays. -> Renovation marketplace to streamline collaboration and reduce delays.



**Bureaucratic Delays** Public authority processes and bureaucratic hurdles significantly slow down energy

renovations.



### **OSS Marketplace Adoption**

Create traction and show value to local networks ->need many suppliers and dessimation to becuse useful and sustainable.







### What is FORTESIE Project?

### FORTESIE Marketplace







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Luxembourg

# Building renovation WORKSHOP

**Unlocking the Renovation Wave** Energy Performance Assessment and Certifications

### George Giannakis





LIST 🥏

BRANCH TO MARTER SOLUTION

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User & Market Engagement Objectives

- > Deliver User-Friendly tools of true value through a co design process
- > Design Compound Service
   Offerings & Flexible Business
   Models

Technical & Technological Objectives



Business & Replication Objectives



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Engagement Objectives User & Market



Technical & Technological Objectives

- Holistic Energy Performance
   Framework for Building Lifecycle
- > BIM based tools for monitoring decision making support
- Standards-Based, Interoperable
   Building Performance
   Framework

**Business & Replication** Objectives



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#### **CHRONICLE – Objectives**







#### **CHRONICLE – Concept**



> Building Performance Digitalisation and Dynamic Logbooks for Future Value-Driven Services





#### **CHRONICLE – Concept**



> Building Performance Digitalisation and Dynamic Logbooks for Future Value-Driven Services





#### **CHRONICLE – Concept**



> Building Performance Digitalisation and Dynamic Logbooks for Future Value-Driven Services





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> Semantic interoperability



#### > From Concept to Practice – Actual Development and Integration

Applications Digital Building Logbook Performance Evaluator Performance Evaluator Panner Phanner P
KPIs calculation services   Whole Life Carbon KPIs   Sustainability   KPIs   Sustainability   KPIs   Muman Centric   Social KPIs   Economic KPIs   Simulation, predicting & forecasting services   Occupancy   Assets Usage   Comfort /   Weil-Being   Simulation Engines   Machine Learning Algorithms
Data Sources IoT data Verter data





#### > From Concept to Practice – Actual Development and Integration









> From Concept to Practice – Actual Development and Integration



















#### > CHRONICLE DBL: Digital Building Logbook

OHRONICLE			↓ Help ∨ H	Building Workspace > Record > HYPERTECH Test Building-RCRD-00039	↓ Help ∨ H
$\equiv$ DBL				⊟ HYPERTECH Test Building-RCRD	🖨 … Save
V PUBLIC	Portfolio	Last Modified Records		Details Authorized Users	& Assigned To +
DBL	HYPERTECH Test Building Address: 13 Avenue 1	HYPERTECH Test Building-RCRD-00050	>	General Information	N Tage +
Edit sidebar		HYPERTECH Test Building-RCRD-00039		Type * Energy performance certificates Uploaded By Administrator	(°t Share +
Latonobal		3 months ago		Building (Select to display Files Section) HYPERTECH Test Building Upload Date 07/05/2024	
				Issued Date	АН
		View List		Expiring Date	
	Add Building			Related Files	
	Timeline			Files Number 1	
Records ordered by: Issued Date			File 1 A		
				File 1 /private/files/Sample_Standardised EPC Template.pdf	
		Upload Record		File 1 Details	



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ChroViewRen: App for Renovation Studies

R Re	novation anner		Home • Title	e • About us	· catta	RO	NIC
	Baseline KPIs Post-renovation KPIs	BRP					
	Check the KPIs for your project. Explain what they see.						
	KPI 1	Value	KPI 8		Value		
	KPI 2	Value	KPI 9		Value		
	KPI 3	Value	KPI 10		Value		
	KPI 4	Value	KPI 11		Value		
	KPI 5	Value	KPI 12		Value		
	KPI 6	Value	KPI 13		Value		
	KPI 7	Value	KPI 14		Value		













#### > Reducing the Gap between Simulated and Measured Performance







#### > Reducing the Gap between Simulated and Measured Performance







> Reducing the Gap between Simulated and Measured Performance









- > Integrated Data Quality Consistency, Completeness, Correctness
- > Guidelines for OpenBIM (IFC 4 ADD2 TC1) model creation
   > CHRONICLE IDS for BEP simulation and SRI calculation



- > Common Data Model Brick and BOT ontologies
- > KPIs, BIM and IoT data fusion







This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101069722





#### Thank you!



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#### BUILDING RENOVATION WORKSHOP - UNLOCKING THE RENOVATION WAVE -

HOLISTIC RENOVATION PACKAGES, WITH A CIRCULAR APPROACH

nnnnn

24. September 2024



JAVIER ANTOLÍN GUTIÉRREZ (CARTIF)

# INTRODUCTION

Project name: Renovation packagEs for HOlistic improvement of EU's bUildingS Efficiency, maximising 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.





Co-funded by the European Union



CARTIF Javier Antolín Gutiérrez | Luxembourg | 23-25 September 2024

# **REHOUSE OBJECTIVES**

Co-funded by

the European Union

REHOUSE

- Implement a people-centric social engagement strategy (Social Task Force).
- Upgrading 8 renovation packages (RPs) from TRL4/5 to TRL6 integrating ٠ 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. ٠ 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**



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



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# **RENOVATION PACKAGES – RP#1 & RP#2**



REHOUSE

- **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.





- 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.

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# **RENOVATION PACKAGES – RP#3 & RP#4**



- 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.





REHOUSE

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- **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**: Centralised heating and cooling.

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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**



- Modular substructure: Anchors to existing building walls, enabling easy installation and flexibility.
- **Enhanced efficiency and aesthetics**: Provides energy efficiency and architectural enhancement.





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- Multi-functional wall system: Enhanced existing Panobloc<sup>®</sup> 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**





**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.





- **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 and user comfort throughout the building.

Adaptable for all buildings: IWS can be integrated in an easy way into both existing or renewed windows in any type of buildings.









#### **BUILDING RENOVATION WORKSHOP – UNLOCKING THE RENOVATION WAVE –**

## **DEMO-SITES**



- **Type**: Residential building block.
- **Date**: 1959
- **RPs**: RP#6
- **Area**: 2,260 m<sup>2</sup>



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





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



- Type: Student residence building.
- **Date**: 1997
- RPs: RP#1, RP#2 and RP#B
- Area: 1,371 m<sup>2</sup>





SUSTAINABLE PLACES 2024

CARTIF Javier Antolín Gutiérrez | Luxembourg | 23-25 September 2024

# **CICULAR PRINCIPLES IN REHOUSE**

- Use of Recyclable and Bio-Based materials: Many packages use sustainable, recyclable, or bio-sourced materials, contributing to resource efficiency and reducing waste.
- Modular Design and Prefabrication: Prefabricated and modular components accelerate installation, minimize material waste, and allow for easy disassembly or reuse, aligning with circular economy goals.
- Recycling and Reuse: Several Packages focus on recycling and reusing materials such as second-life photovoltaic panels and bio-based insulation, supporting the circular economy by extending material life cycles.
- Waste-to-Value conversion: Some solutions convert waste into valuable, durable insulation materials, demonstrating the potential of reusing waste for long-term applications.
- Energy efficiency and RES integration: Efficient energy management and the use of renewable energy sources help minimize energy use, reduce carbon emissions, and promote a circular approach by lowering overall resource consumption.







REHOUSE

# 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/



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# Image: Second state of the second state of



# INdustrialised and PErsonalised Renovation for Sustainable societies

Sustainable Places 2024 presentation 24.09 Luxemburg UNLOCKING THE RENOVATION WAVE



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hweizerische Eidgenossenschaft Federal Department of Economic Affairs Education and Research EAFR Confederazione Svizzera State Secretariat for Education Confederaziun svizra Research and Innovation SERI

Swiss Confederation

Confédération suisse

## Project concept



Smart Wall **Energy Pod BIPV** Solar window

Façade 3D printer



# 3 different pilots









#### Valencia (Spain)

- Kit synergies
- Indoor environment and ventilation.
- Adherence to the heritage status

#### Velp (Netherlands)

- Culturally heritageprotected
- Low-disruption & Lowpollution
- Energy-efficient retrofit

#### Vouliagmeni (Greece)

- Comparison with conventional retrofit
- Maximise indoor comfort and energy performance



## Good practices

- Important having a technical partner to support public administrations responsible for demo cases
- Invest time and effort in the first phase to understand synergies between technologies and how they can be integrated in demo cases



### Lessons Learnt

- Pay particular attention to the pilot's development risks (budget, licences, tenders, political changes, etc.)
- Stakeholder engagement: Implement an effective and flexible incentive system to avoid refusing or dropping out
- Great difficulty in maximising synergies between different independently developed technologies



🙆 inperso



- Complete workflow/holistic approach (pre-during-post-retrofit)
  - Fit the jigsaw puzzle of coordinating technologies and pilots into the right timing
  - Identify, classify and select KPIs valid for all processes and systems in impact assessment



https://www.entrekids.cl/producto/rompecabezas-3d-de-madera-6-pzas-1

- Industrialisated solutions for heritage buildings
  - Industrialisation of the built environment requires personalisation and adaptability: standardised and precise systems must be applied to handcrafted buildings.
  - Compatibility between heritage buildings and prefabricated systems requires common criteria for implementing industrialised processes



Gothic archecry – Simat de Valldigna (Spain) Contrafforte Restauro S.L., 2020 http://www.contrafforte.es/p2.html

- Industrialisated solutions for heritage buildings
  - Heritage: no universal criteria, must be interpreted and adapted to multiple factors: type of building, conservation, historical, architectural, economic, social, symbolic value...)
  - Some buildings or parts of historic buildings or sites have opportunities, but not everything is possible, it is important to recognise the limits





- Industrialisated solutions for heritage buildings
  - Compared to traditional processes, how to develop high quality and cost effective industrialised solutions
  - Reversibility: key to convince certain stakeholders (administrations, owners, citizens) of the need to automate processes and systems




# Inperso

Project funded by

Schweizerische Eidgenossenschaft Confederation suisse Confederazione Svizzera Confederaziun svizza Swiss Confederation Federal Department of Economic Affairs, Education and Research EAER State Secretariat for Education, Research and Innovation SERI



# Thank you

More information in: https://www.inperso-project.eu/



# **Smarteestory**

Smarter historical buildings for better energy performance

**Matteo Porta** 

SMARTEE STOR ¥

RINA-C

24/09/2024



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# **Smarteestory main Objectives and scopes**

SMARTEESTORY is creating a **smart integrated building automation and control system** for **monitoring and optimizing historic non-residential buildings** energy performance integrating the **9 domains** proposed by SRI methodology, incorporating **human requirements** and **envisaging realtime and active user engagement**.



SMARTeeSTORY system automatically detects the building users' archetypes (via DRL algorithms) therefore informing the optimization and control services on their specific preferences

**SMARTEESTORY is developing and interoperable and cybersecure-bydesign software and hardware solution** fully enabling the three functionalities required for a building to become "smart":

- Optimization of operation of technical building systems,
- Adaption to the external environment;
- Changing conditions in relation to demands from building occupants





# **Smarteestory architecture**



# **SMARTeestory METHODOLOGY**

#### PHASE 1 - MAPPING REQUIREMENTS (WP1)

Mapping the needs and requirements to digitalize the historic non-residential buildings:

- Building structure and its history
- Energy efficiency of Technical Building Systems
- Building's occupants overall comfort

Perfom a **data collection** through: Desk analysis; Literature Review; Interviews, Codesign workshops with demo owners and occupants. PHASE 2A - MODELS & ALGORITHMS DEVELOPMENT (WP2, WP3)

Development of **models of buildings occupants** through a data base to detect users' preferences and energy demand (WP2)

Development of **physics and databased models** to evaluate building energy performance (WP3)

Development of **optimization and control algorithms** for each demo-site incorporating models and user requirements (WP3) PHASE 3 – DEMONSTRATION & IMPACT ASSESSMENT (WP5)

- Data acquisition for baseline characterization and other WPs developments
- Creation of **as-built digital models** for each demo site;
- **Executive design** of demos interventions
- **Deployment** of SMARTeeSTORY system and hardware installations;
- Monitoring and impact assessment for evaluate SMARTeeSTORY system effectiveness
- **TRL8** through real-life implementation in 3 real-scale demonstrators

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Translation of the collected information into:

- **Technical requirements** for the hardware and software solution composing the automation and control system (PHASE 2)
- SMARTeeSTORY KPIs framework (List of indicators and targets ) for the demonstration activities (PHASE 3)

Development of **software and hardware solutions**, according to the requirements identified in **PHASE 1**, to realize the building automation and control system.

> PHASE 2B- SOFTWARE & SYSTEM DEVELOPMENT (WP4)



#### Promotion of the project results and replication at EU level:

- C&D Plan
- Exploitation Strategy
- Replication
- Training Activities
- Certification Activities



P6)

# **SMARTeeSTORY PILOTS**

- 3 real-scale demonstration buildings (non-residential historic building) to reach TRL8:
  - **Riga City Hall** (Latvia) **[REA**, RTU, PELLINI, SE, TERA, RINA-C]
  - University building hosting the Faculty of Architecture and the Built Environment of the Technical University of Delft (The Netherlands) [TUD, TERA, SE, RINA-C]
  - Facilities of the High Court of Justice in Granada (Spain) [CUERVA, AAE CARTIF, TERA, SE]



Demo sites locations and EU climatic zones SUSTAINABLE



# **SMARTeeSTORY PILOTS**



University building hosting the Faculty of Architecture and the Built Environment of TUD

	Baseline	Future	
	scenario	scenario	
Method B SRI	21%, class F	78%, class C	
assessment			



*Facilities of the High Court of Justice in Granada* 



Riga City Hall

	Baseline	Future
	scenario	scenario
Method B		
SRI	12%, class F	72%, class C
assessment		

	Baseline scenario	Future scenario
Method B SRI assessment	12%, class F	89%, class C





# **GOOD** practices and lessons learnt

Challenges	Good practices	Lessons learnt
Matching between SRI methodology and «standard» KPIs estimation (T)	Perform simulation on how SRI improvement could impact of energy/environmental/economic KPIs	This is still a field of investigation and innovation
Time needed to diagnosis and technical inspections to commission pre-intervention monitoring campaign (T)	Designers must meet Technology providers and collaborate closely since the beginning	Allocate enough time for diagnosis phase
Data availability for modelling activities (T)	Reliable data are fundamental when models are required for digital twinning	Close collaboration needed between modelling teams and optimized control logics developers
Time spent for public tendering processes or authorizations (A)	To have a clear vision of the bill of quantities	Try to plan in advance time required for tendering procedures mostly when public



# matteo porta

### RINA-C







SMARTeeSTORY.eu

@SMARTeeSTORY

SMARTeeSTORY Project

Date







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# **SUSTAINABLE** PLACES 2024

# **Beyond Energy Performance:** improving resilience, preparedness & responsivenes

MULTICARE



\* \* \* \* \* \* \* Funded by the European Unior

# Development of Low-Carbon, Resilient Technologies

MULTICARE focuses on creating lowcarbon, resilient solutions that cater to multiple hazards such as earthquakes, floods, and heat waves. These solutions are designed to be adaptable, scalable, and suitable for both new and existing buildings. The project emphasizes the use of modular, plug & play

**systems** that are easy to install, reduce construction time, and minimize disruption during renovations.



- Structural strenghtening (expensive, not low carbon) for the structure combined with energy retroftting for the envelope
- X Technical complexity and invasiveness
- X New design focusing on zero-emission only (no multi-hazard resilience)

#### MULTICARE



- Integrated holistic interventions made of low-carbon resilient facade-structure modules
- Low-invasiness of the double skin exoskeleton
- Standardized detailing for future-proof construction (new and existing)



This project has received funding from the European Union under the Horizon Europe Research & Innovation Programme (Grant Agreement no. 101123467 MultiCare). Views and opinions expressed are however those of author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

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### Multi-Hazard Approach



A multi-hazard approach is central to the project's methodology, considering the various natural threats buildings face. MULTICARE develops solutions that ensure buildings can withstand and recover from multiple types of hazards, including **seismic activity** and **extreme weather conditions**. This holistic approach is expected to enhance the long-term durability and safety of buildings across different environmental scenarios.



## Digital Tools for Decision Support

MULTICARE also aims to advance digital tools and services that support decision-making across multiple

scales, from materials to urban environments. These tools include a digital library of resilient technological solutions and a suite of services for resilience assessment, design,

and **management**. The digital solutions will help stakeholders make informed decisions by quantifying potential losses due to disasters and evaluating the resilience of different building materials and technologies.





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### **Real-Time Monitoring and Response Systems**



The project plans to develop and implement real-time digital monitoring systems to track the health and performance of buildings. These systems will include **predictive maintenance** tools, **early warning** systems, and **rapid response** mechanisms, enabling buildings to respond quickly to critical hazards and minimize damage.



## Large-Scale Demonstrations

To validate the effectiveness of these solutions, MULTICARE will conduct large-scale demonstrations in three European countries— **Italy, the Netherlands**, and **Romania**. These demonstrations will focus on different climatic zones and building types, ensuring the adaptability and resilience of the technologies in diverse contexts.















### Community Engagement and Social Innovation



A key aspect of MULTICARE is its commitment to involving communities in the design and implementation process. By fostering **co-participatory design** sessions and promoting **education on resilience**, the project aims to ensure that the solutions developed are inclusive, user-centered, and socially sustainable.





# THANK YOU

### SOCIAL SCIENE HUMANITIES

FOR YOUR PROJECT



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A Built**4People** Project

# **Q&A** session Pannel discussion







A Built**4People** Project

# **Future cooperation**



# 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





## **Opportunities for synergies**

 Clustering event with 30 B4P projects, organised with CINEA on 19/11/24



• SAVE THE DATE! Final event NEBULA on 6/03/25







# Thank you!

https://built4people.eu/nebula\_project

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the European Union

# Join us at the **B4P booth!**



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