

## THE CONTEXT

A big part of Europe's building stock is inefficient in terms of energy use, mainly as a consequence of:

- excessive heat losses through building envelopes
- lack of efficiency of the Heating, Ventilation and Air Conditioning systems

Deep renovation is often more expensive than initially foreseen.

Renewable energy production is still often underestimated, despite a big availability of Renewable Energy Sources.

## THE PROJECT GOALS

- Minimize failures in design and implementation
- Manage different stages of the deep renovation process, from the preliminary audit up to the end-of-life
- Provide information on energy, comfort, users' impact and investment performance.

The 4RinEU deep renovation strategy to encourage large scale renovation of existing buildings is based on

## 3 PILLARS



### ROBUST TECHNOLOGIES

#### TO REDUCE ENERGY DEMAND



Prefabricated Multi-functional Façade

#### TO IMPROVE ENERGY EFFICIENCY



Plug&Play Energy Hub (PPEH)



### USABLE METHODOLOGIES

#### TO UNDERSTAND RENOVATION ISSUES AND POTENTIALS



Cost-Optimal Energy Audit

#### TO ENSURE AN EFFECTIVE AND PARTICIPATED DESIGN



Investor and Building User-Oriented Design Platform based on BIM

#### TO REDUCE CONSTRUCTION TIME AND FAILURES



Deep Renovation Implementation Management



### RELIABLE BUSINESS MODELS

#### TO ENABLE WELL-FOUNDED INVESTMENTS



Cost-effectiveness Rating System

#### TO IMPROVE BUILDING OPERATIONS



Sensible Building Data Handler

#### TO REDUCE CONSTRUCTION WASTE



Strategies for Components End-Of-Life

## 10 RESULTS

combined in 6 tailored renovation packages, designed for 6 different geographical areas in Europe.

This approach aims to foster a broader application of the deep renovation strategy.

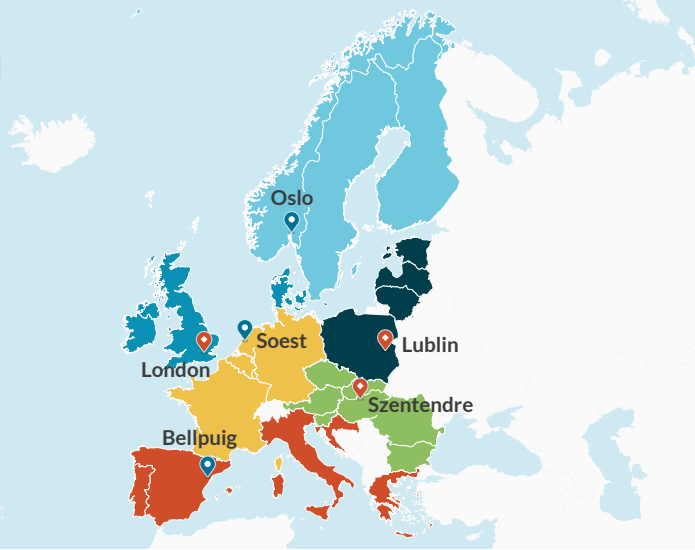
# STRATEGY VERIFICATION

3 Demo-Case buildings

3 Early Adopters

6 Geo-Clusters

- Northern
- North-East
- East
- Continental Central
- Mediterranean
- Atlantic



Oslo building

HAUGERUDSENTERET



## MAIN RENOVATION DRIVERS

- Being in line with the CO2 emissions reduction targets of the city of Oslo
- Providing a good Indoor Air Quality
- Improving the quality of the envelope

Soest building

MARIËNHEUVEL

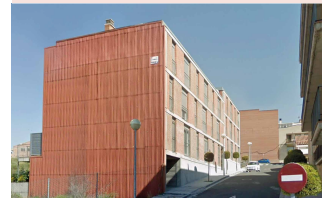


## MAIN RENOVATION DRIVERS

- Adapting the building according to the needs of the ageing users
- Solving functional and safety problems
- Improving the comfort of the occupants
- Having exemplary role in the energy saving as public institution

Bellpuig building

LA VALL 9



## MAIN RENOVATION DRIVERS

- Reducing energy consumption to mitigate the fuel poverty issue
- Improving the comfort and the Indoor Air Quality of the occupants
- High replication potential

Consortium

eurac  
research

SINTEF

adermalocattelli  
ADVANCED MATERIALS FOR CONSTRUCTION

Treccadome

AIGUASOL

gump & maier  
solutions made of timber

Thermics

BURCHAPPOD  
ENGINEERING

IES  
INTEGRATED ENVIRONMENTAL SOLUTIONS

acciona  
infraestructuras

R&M  
RESEARCH & MATERIAL SOLUTION

WOONZORG  
NEDERLAND

Agència de l'Habitatge  
de Catalunya

BOLIGBYGG

EUROPEAN  
COMMISSION

ÉMI



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