

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.

Very few buildings are undergoing deep renovation, and when it happens it results often more expensive than initially foreseen.

Renewable energy production is still often underestimated, even if there is throughout Europe a big availability of RES.

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

3 PILLARS

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.



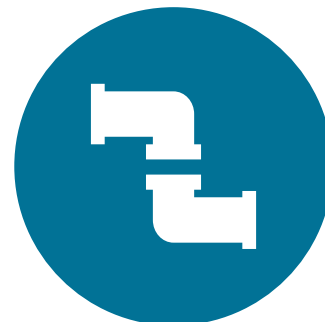
ROBUST TECHNOLOGIES

TO REDUCE ENERGY DEMAND



Prefabricated Multifunctional Façade

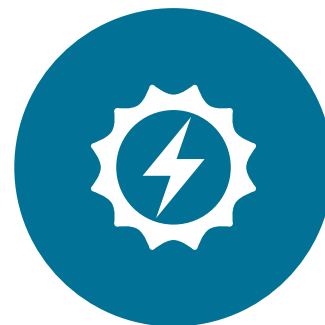
TO IMPROVE ENERGY EFFICIENCY



Plug&Play Energy Hub (PPEH)



Comfort Ceiling Fan Smart Operation



Early-RENo

TO IMPROVE BUILDING OPERATIONS



Sensible Building Data Handler

TO REDUCE CONSTRUCTION WASTE



Strategies for Components End-Of-Life



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 IDENTIFY RISKS AND TO ENABLE WELL-FOUNDED INVESTMENTS



Cost-effectiveness Rating System

10 RESULTS

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

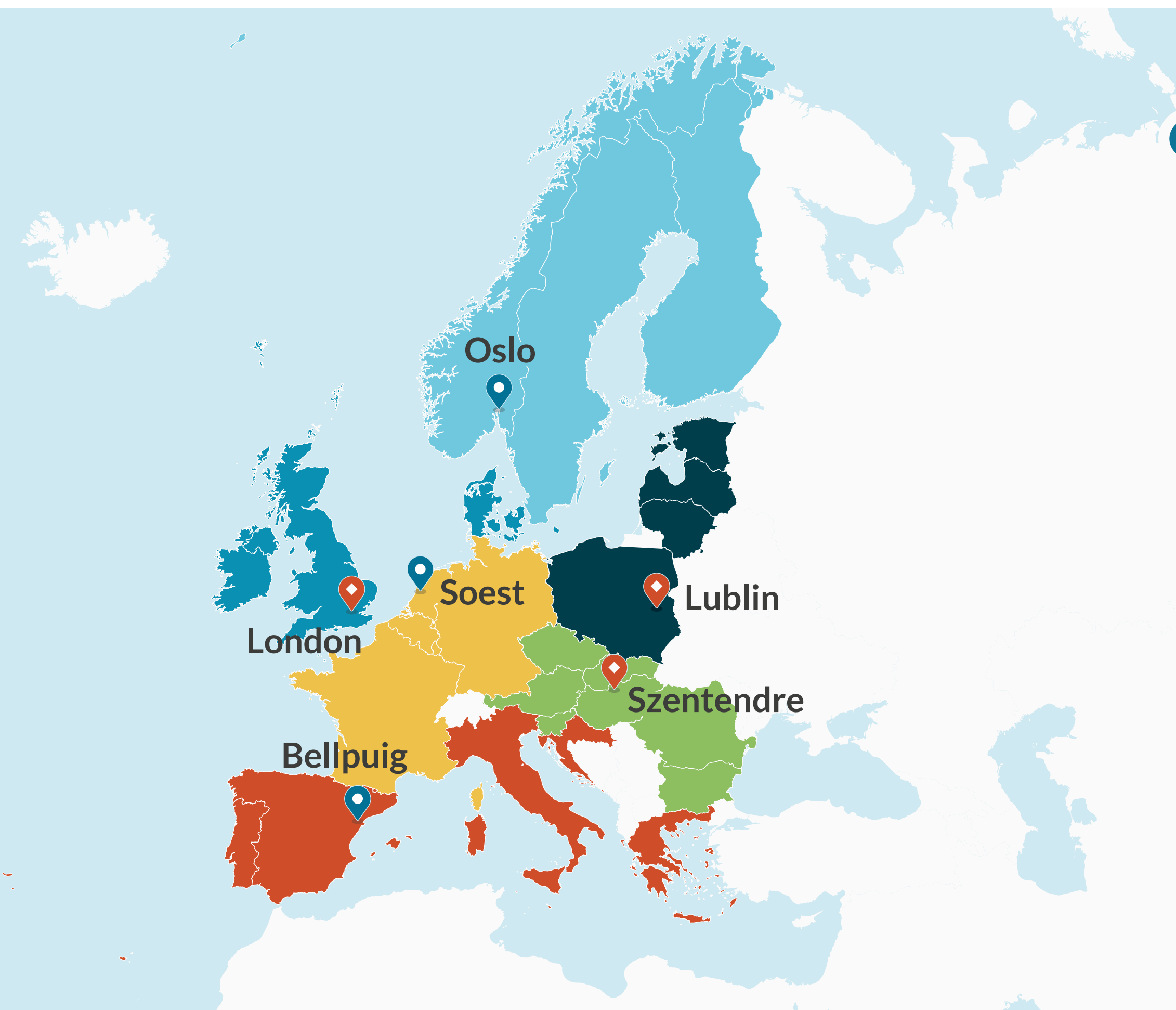
This approach aims to foster a broader application of the deep renovation strategy.

3 Demo-Cases

3 Early Adopters

6 Geo-Clusters

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



STRATEGY VERIFICATION

In order to ensure the broad applicability, 4RinEU approach and technologies will be completely implemented in 3 Demo-Case buildings and tested with 3 Early Adopter buildings, placed in 6 different Geo-Clusters throughout Europe.

PROJECT COORDINATOR

Eurac Research

CONTACT

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Oslo building

HAUGERUDSENERET

- Multi-family house in a complex of 6 buildings
- 2 floors and 8 dwellings
- Owned by Haugerud council housing estate, managed by **Boligbygg**

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

- Residential building with service for elderly people
- 3 floors and 72 dwellings
- Owned and managed by **Woonzorg Nederland**

MAIN RENOVATION DRIVERS

- Adapting the building according to the needs of the users that are getting older
- 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

- Multi-family building
- 3 floors and 15 dwellings
- Owned by the Catalan Government, managed by **Agència de l'Habitatge de Catalunya (AHC)**

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

Early Adopters