RINNO: Transforming Deep Renovation through an Open Renovation Platform

O. Doukari, T. Lynn, P. Rosati, A. Egli, S. Krinidis, K. Angelakoglou, V. Sougkakis, D. Tzovaras, M. Kassem, D. Greenwood

Omar Doukari
Faculty of Engineering & Environment
Northumbria University Newcastle

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Dr. Omar Doukari

Senior Research Fellow
Department of Mechanical and Construction Engineering
Northumbria University Newcastle

Northumbria University NEWCASTLE

CESI Ecole d'Ingénieurs

Head Specialised Master Project Management with BIM and Digital Twins Programme

ESTP Paris

AI, BIM, GIS, and other modelling systems

IRSTEA

ActiSurTT Project: Vehicle safety for off-road environments. AI and Human-Machine Interfaces.

PNR MINnD

Interoperable Information Model for Sustainable Infrastructures

GeoFuse

Multi-Source Geo-Information Fusion

ACCLIMAT

Adapting cities to climate change: A systemic modelling approach

The RINNO Project

A €5m Horizon 2020 project that aims to accelerate the rate of deep renovation in energy inefficient buildings around Europe, resulting in:

- **Significant primary energy savings**
- **Decreased time and cost of deep renovation efforts**
- **Reduced environmental impact**

The RINNO Consortium

RINNO is a join effort of 17 partners from 10 countries, including 10 industrial partners, 6 academic and research partners, and 4 project end-users:

Basic / Applied Research	Technology Providers	Construction Methods	Business Modelling	Dissemination & Communication	End Users
CERTH-ITI, CIRCE, VTT, Northumbria University	Pink, K-FLEX, Ekolab, Greenstruct	Bouygues, RINA-C	REGENERA, RINA-C	Dublin City University, European Green Cities	Bouygues, Avedøre Boligselskab, HPHI, NAPE

Energy Consumption in EU Buildings

The EU building stock currently accounts for a major portion of energy consumption and greenhouse gas emissions:

40% of the EU's energy consumption and 36% of greenhouse gas emissions can be attributed directly to the EU building stock.

11% of Europe's population still experiences energy poverty due to poor building quality and thermal inefficiency.

The European Commission estimates that approx. 75% of the EU's existing building stock has poor energy performance.

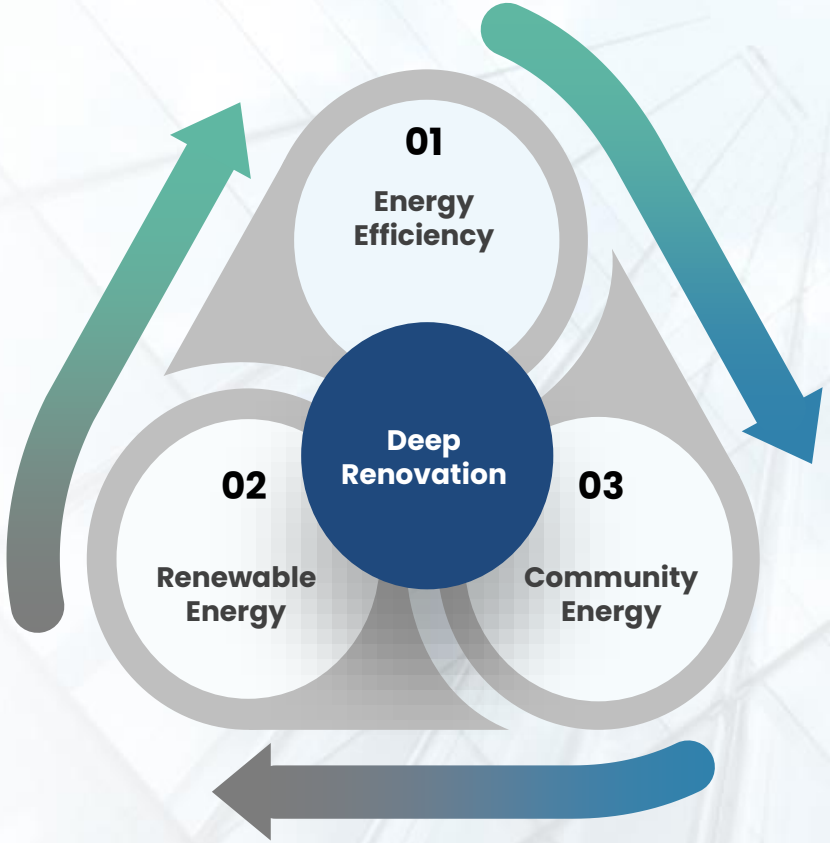
What is deep renovation?

Deep Renovation is a renovation that captures the full economic energy efficiency potential of all improvement works to existing residential buildings that leads to a very high energy performance and significant energy savings

Deep renovation assumes the use and combination of multiple simultaneous renovation measures

- Fabric measures
- Windows
- Heating, Ventilation and Air Conditioning (HVAC) plant

- Air infiltration
- Lighting
- Appliances



- Solar Hot Water
- Solar Photovoltaic (PV)
- Passive Solar
- Shading
- Wind
- Heat Pumps
- Biomass
- Biogas

- Co-generation
- District Heating Systems

There are a wide range of rationales and benefits associated with deep renovation

Economic

Deep renovation may act as an economic stimulus across the deep renovation value chain

Societal

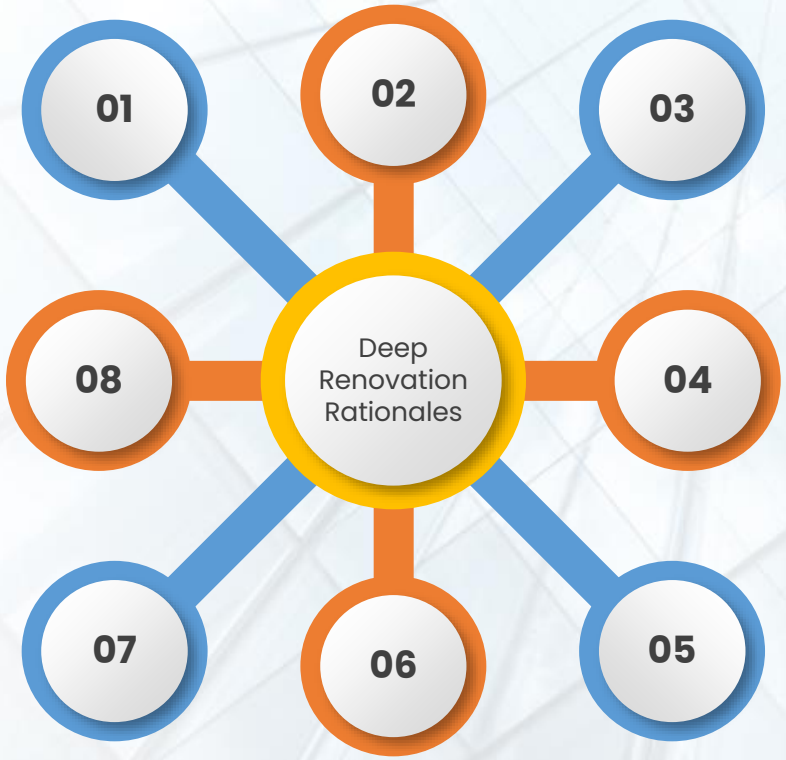
Deep renovation may help citizens participate in a more resilient, greener and digitalised society and function more fully in society

Energy Security

Deep renovation may contribute to greater energy security

Catalytic

Deep renovation may act as a catalyst for other innovations, substitute technologies or processes and improved control techniques in direct and indirect sectors



Environmental Sustainability

Deep renovation may contribute to mitigating adverse environmental impacts and building a resilient habitat for existing and future residents

Opportunistic

Deep renovation may differentiate a building and may make it a more attractive place to live, work or visit, when compared to other buildings

Quality

Deep renovation may improve building quality and increased range, quality and efficiency of service delivery

Accessibility

Deep renovation may contribute to improved accessibility

A number of factors contribute to non-adoption and resulting under-performance, unnecessarily high energy use levels and costs

Human

- Social norms and habits
- Lack of information on alternatives
- Split incentives
- Lack of instruction
- Short termism
- Disturbance

Organisation

- Top management commitment
- Finance
- Competent people
- Fit-for-purpose infrastructure

Technology

- Feasibility or technical suitability of specific technologies
- Integration of technologies

External Environment

- Building and environmental standards, policies and regulations
- Borrowing capacity
- Market barriers

RINNO

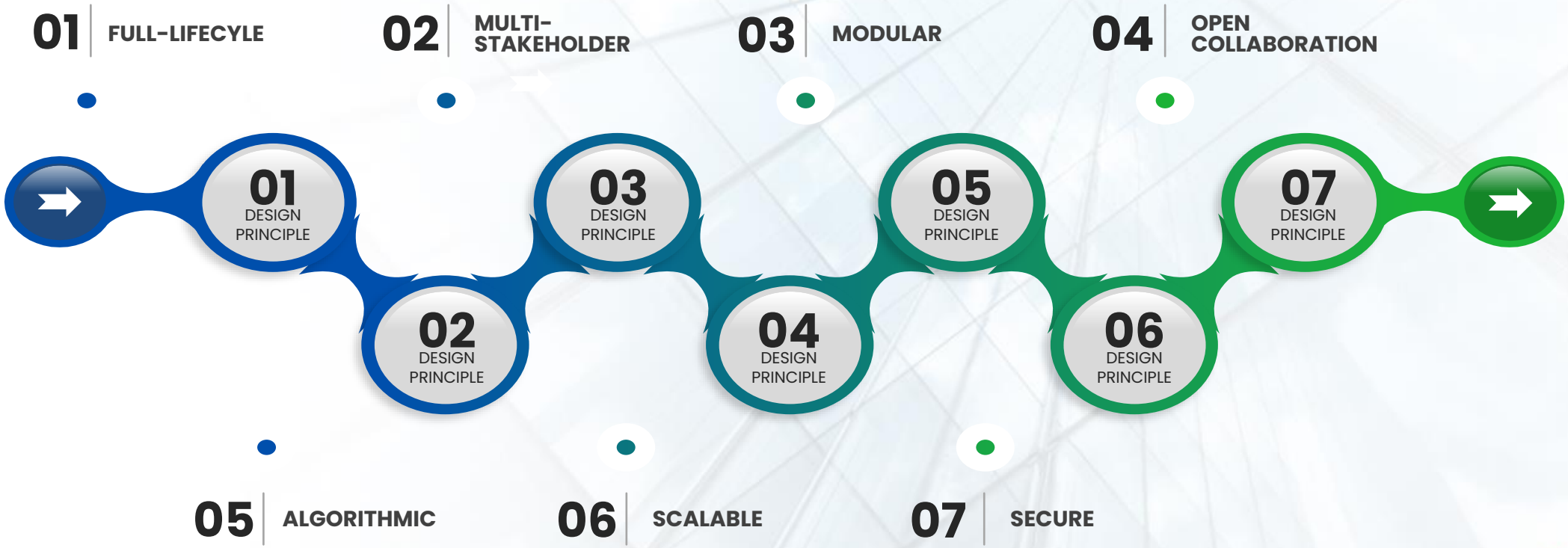
Project Overview

RINNO will deliver a set of processes that when working together provide a system, repository, marketplace and enabling workflow process for managing deep renovation projects from inception to implementation.

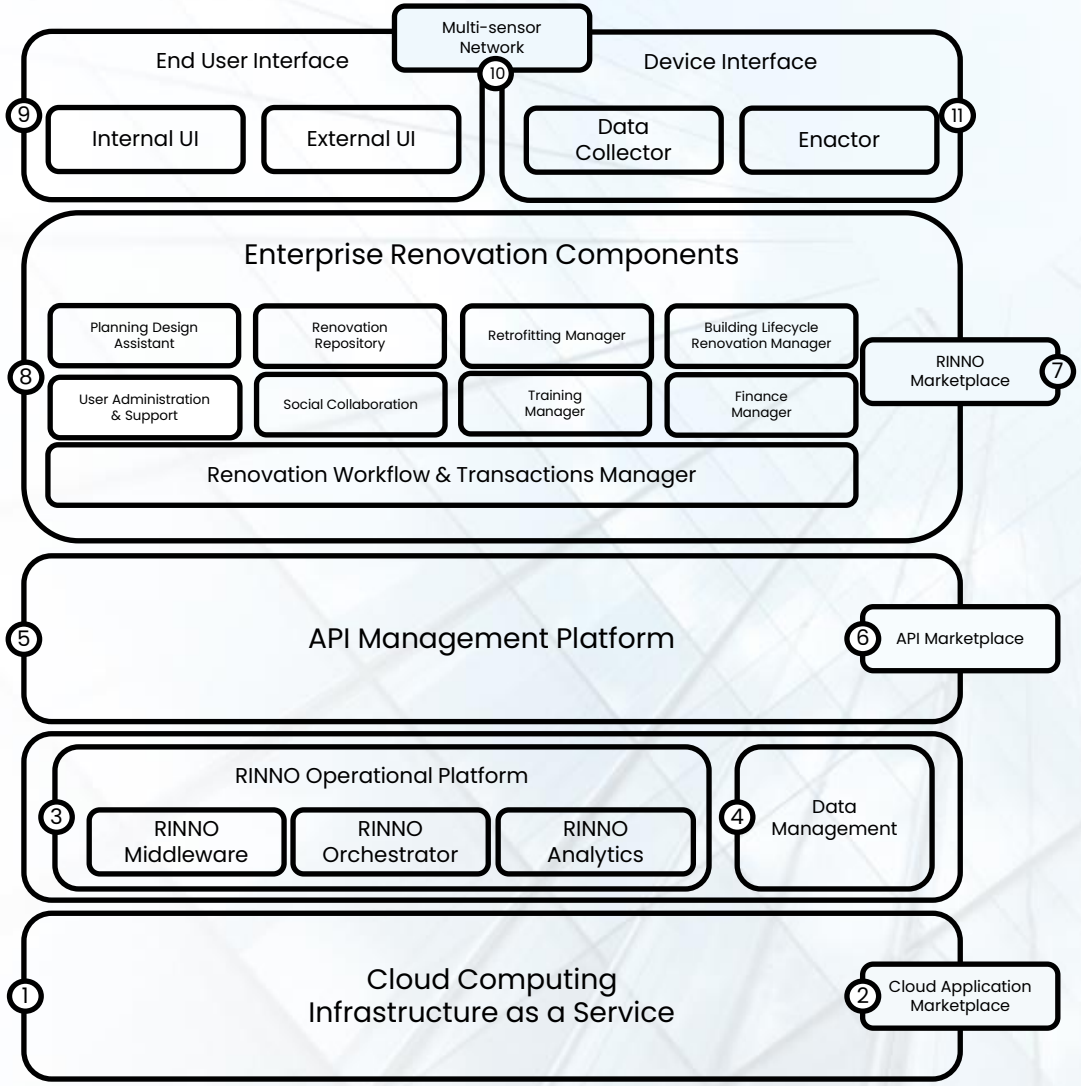
To deliver these processes, RINNO will employ:

- **Innovative technologies**, including building envelope solutions, reusable energy sources, hybrid and storage solutions;
- **Novel processes**, including off- and on-site industrialization and optimization;
- **Collaborative financing business models** based on crowd equity, crowdlending, and energy performance contracting.

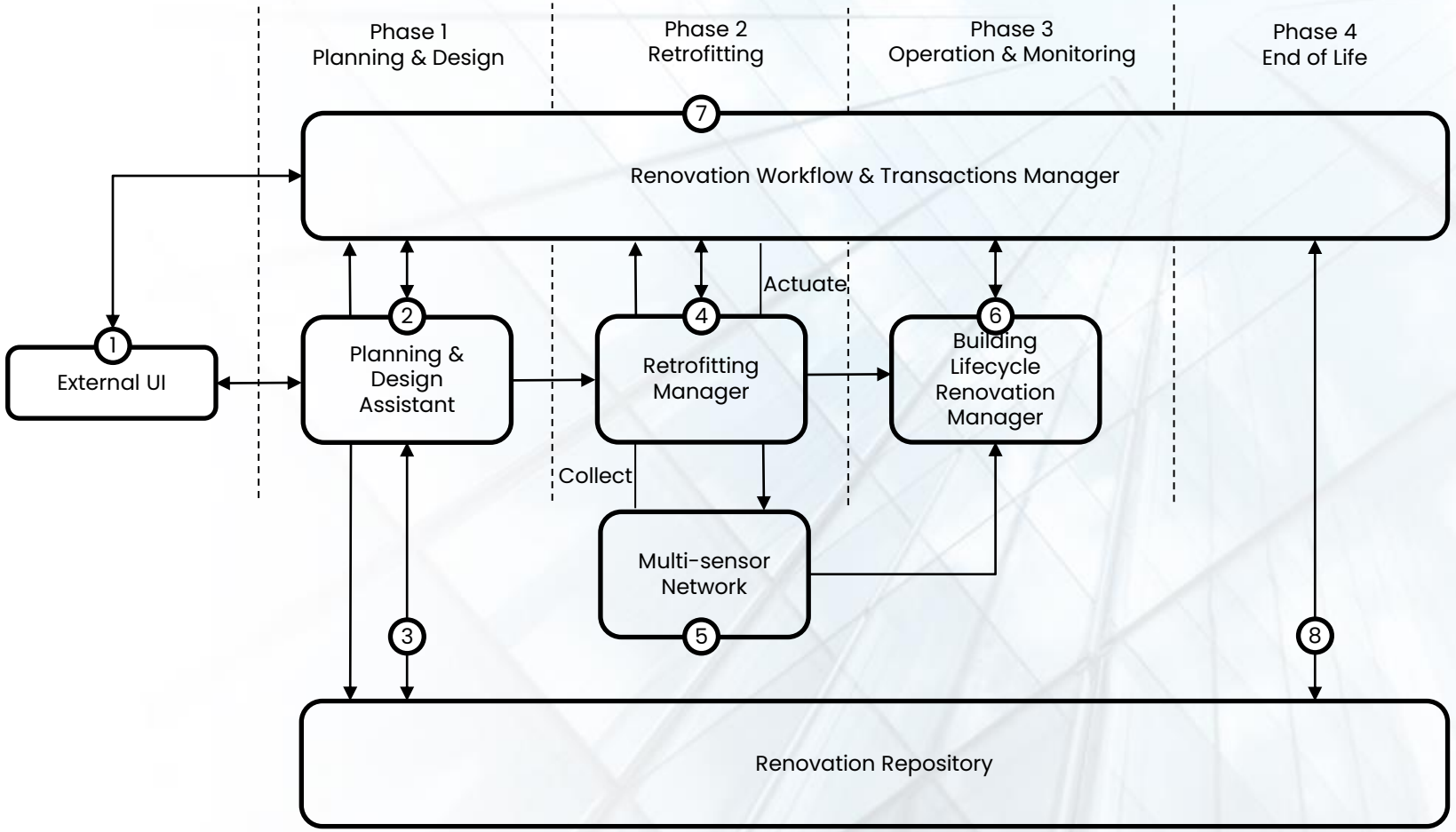
Deep renovation projects require an integrated design and delivery software-based platform



The RINNO Open Renovation Platform



The RINNO Stepwise Renovation Framework



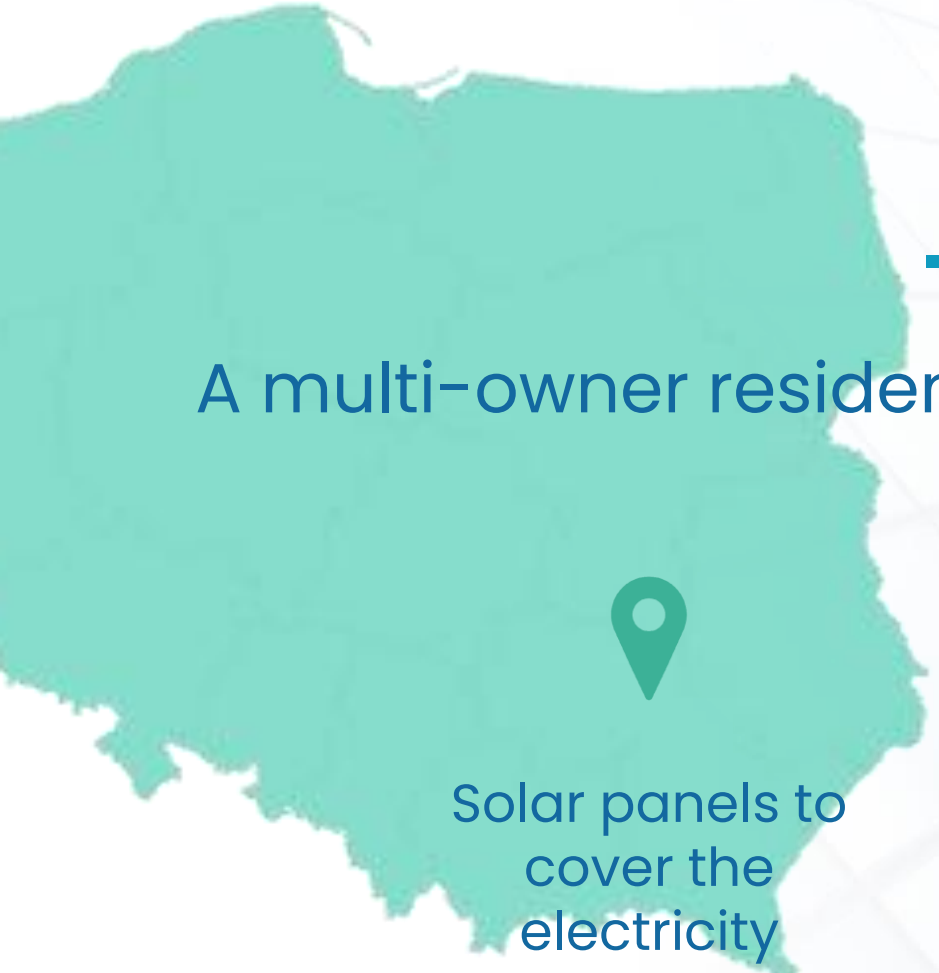
Pilot Sites

RINNO technologies and processes will be tested at four locations, each with different environmental, societal, technical, and financial parameters.

Success will be evaluated based on:

- Reduced energy consumption;
- The adoption and use of renewable energy sources;
- Thermal performance;
- Renovation time and effort and comparative cost;
- Stakeholder satisfaction measures.

Pilot Site: Rajszew, Poland



A multi-owner residential building constructed in 1949:

Solar panels to cover the electricity demand of common areas.

Hybrid ventilation and thermal insulation from recycled materials.

Improved thermal comfort, reduced energy use, and lower costs.

Pilot Site: Avedøre Stationsby, Denmark

2,500 multi-family flats and terraced houses built in 1976:

New roofs and insulation, fitted with electro mobility chargers.

National showroom for the best-in-breed deep renovation solutions.

Pilot Site: Moschato-Tavros, Greece

Multi-family residential building constructed in 1970:

Renovated according to Passive House Premium standards.

To become the first EnerPHit Premium building in South-Eastern Europe.

Pilot Site: Lille, France

30 multi-family residential apartments:

Optimisation of energy, indoor air quality and comfort monitoring.

Integration of renewable sources and efficient energy production systems.

Active involvement of tenants through votes on work amount and rent increases.

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@rinnoh2020.eu
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Thank You

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