

Renovation Wave Programmes: Opportunities, Challenges, and Alignment with Sustainable Development Goals



Insights from the LOCALISED project

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Policy Brief

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Key Messages:

- LOCALISED investigation shows a **strong alliance between Renovation Wave programs and Sustainable Development Goals (SDGs)**, especially SDG7 (affordable and clean energy), SDG11 (sustainable cities and communities), and SDG13 (climate action).
- Implementation of Renovation Wave programs varies by region, reflecting diverse climate and socio-economic needs** across EU Member States.
- Renovation Wave programs in **Mediterranean countries prioritise cooling systems and renewable integration**, while in **colder countries they are more focused on heating efficiency**.
- Programs should **facilitate access to energy-efficient renovations for low-income households**, making energy savings accessible and equitable.
- Better implementation of Renovation Wave programmes requires improved data collection and curation in a harmonized and transparent fashion.**



Figure 1: NUTS-2 level regions considered in the analysis



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LOCALISED project overview

The Horizon 2020 Project LOCALISED disaggregated national decarbonisation plans, consistent with Europe's net-zero target, to NUTS3 (regional) and LAU (local) levels across the EU^[1]. It provides regions and municipalities with various climate action measure sets optimised for investment costs, emission reduction, climate vulnerability and social impacts, made accessible and customisable through the Climate Action Strategiser web application. Previously, this was possible only with great effort and detail for individual regions.

To achieve the LOCALISED targets, the project uses a mixture of disaggregated national plans, regional statistics, and a newly developed model approach. For this purpose, LOCALISED utilises a large measure database to calculate an optimal regional response to reach its national decarbonisation pathway. As a secondary goal, the project seeks to estimate the measures necessary to adapt to climate change effects on a local level, based on impacts of climate change. **For the building sector in particular, LOCALISED links this database of climate actions to the Renovation Wave programs at the national and regional levels in a harmonized and replicable framework.** Through the development of “Building Cards”, LOCALISED summarises and visualises the key characteristics of each program and helps local policy makers better understand the connections between the programs and their sustainability targets.

Background

As buildings account for 39% of global CO₂ emissions^[2], improving their energy performance is critical for meeting climate targets. Despite the EU's efforts in regulating fossil fuel emissions in the key economic sectors, reducing emissions from buildings remains a challenging task. This underscores the need for significant investments in building renovations*. The Renovation Wave initiative, introduced by the European Union (EU) in 2020, aimed at addressing the dual challenge of fostering economic growth and enhancing energy efficiency in the building sector. Its primary objectives included doubling the annual energy renovation rate across the EU by 2030 and encouraging deep energy renovations^[3]. A key motivation behind the Renovation Wave was improving outdated and inefficient EU housing stock, which contributes to high energy consumption and energy poverty. Household energy consumption accounts for 27% of the EU's total final energy use, primarily from electricity and natural gas, with heating comprising 62.8% of residential energy usage**. The initiative sets specific renovation targets to improve energy performance, categorised into new building efficiency levels (least efficient, medium efficient, and highly efficient) and renovation types (shallow, medium, and deep). Despite this, many EU countries, such as Italy, Germany, Poland, and Spain, are projected to continue having high percentages of unrenovated buildings by 2030.

* <https://homes4all.it/renovation-wave-che-cose-ristrutturazione-e-sostenibilita/>

** <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220617-1>

Evaluation of Selected Renovation Wave programmes

Data

The **LOCALISED** project evaluated 112 Renovation Wave programmes and strategies already implemented across six EU Member States: Italy, Spain, Germany, Austria, Belgium and Poland. Of these, 41 are at the national level, while 71 operate in regions shown in **Figure 1**. The countries selected for analysis in the Renovation Wave initiative represent a strategic mix of socioeconomic and energy profiles across the EU, ensuring that the diverse challenges and priorities within the block are effectively captured.

Method

The workflow of our assessment exercise is presented in **Figure 2**. First, for each country the list of national programs were extracted and reviewed^[2]. Then, some specific regions within these six countries were further selected to highlight distinctive regional renovation efforts. Detailed program information was obtained from official sources and compiled into standardised information cards, which include key data points such as program duration, funding structures, targeted demographics, and whether the initiatives are regional or national in scope. These detailed records were then integrated into the LOCALISED Climate Action Database^[3], allowing each program to be cross-referenced with the Sustainable Development Goals (SDGs) and Sustainable Energy and Climate Action Plans (SECAPs) through specific Key Performance Indicators (KPIs).

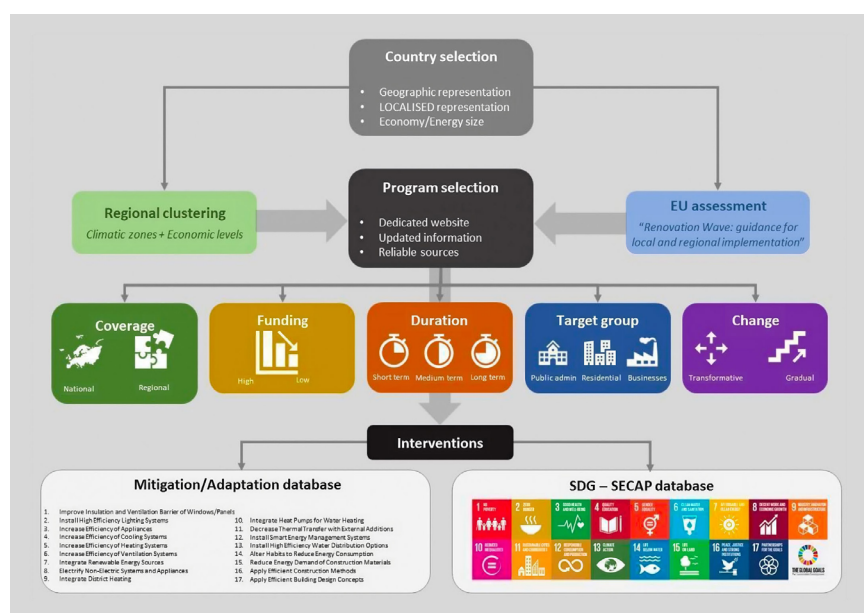


Figure 2: The Renovation Wave programmes assessment workflow ^[4]

This structured approach not only highlights the diversity within the Renovation Wave programs but also positions them within broader EU sustainability frameworks, enabling a cohesive understanding of their impact on climate goals across multiple levels. The outcome of this process was the **development of “Building Cards”, a set of harmonized infographics for Renovation Wave programs enabling cross-regional and cross-country comparisons (Figure 3).**

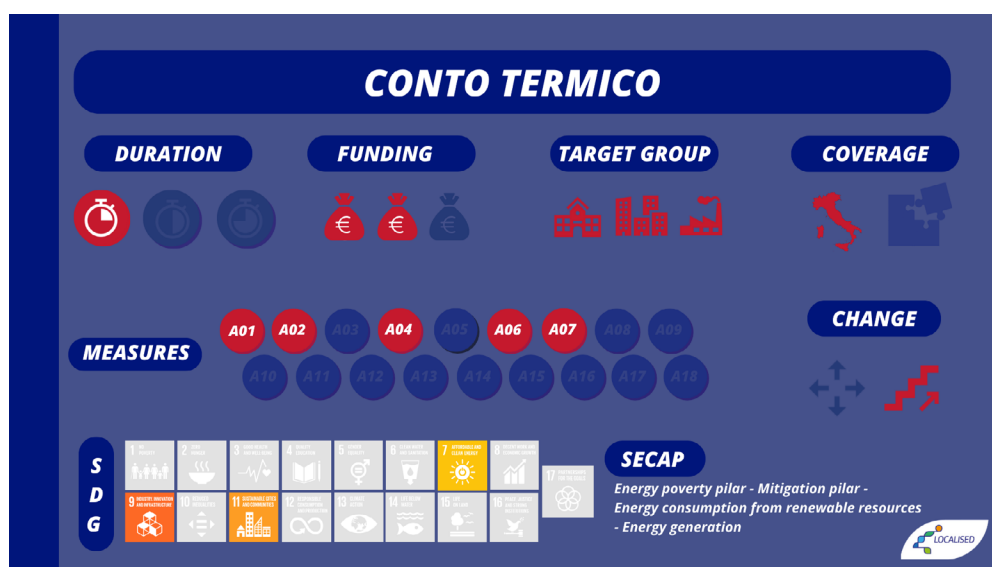


Figure 3: Example of a “Building Card” developed for a Renovation Wave Program in Italy

Results

Our analysis **underscores the diverse climate needs across EU countries, emphasising the importance of a climate-sensitive approach in future policies** as shown in **Figure 4**. The investigation of the 112 selected programs shows that they prioritise climate actions towards improving heating systems in colder regions, while supporting cooling systems enhancement and improving renewables in regions with a warmer climate.

Most programs also include measures for better insulation, ventilation, and innovative energy efficiency regulations (**Figure 4**). Consequently, these Renovation Wave initiatives align closely with key SDGs - particularly SDG7 (Affordable and Clean Energy), SDG11 (Sustainable Cities and Communities), and SDG13 (Climate Action). In terms of SECAPs, pillars related to energy generation, consumption, and access are the ones tightly related to the assessed programs.

| Most common SDGs | | | | | | | | | | | | Climate actions | |
|-----------------------|---|---|---|--------------------|---|---|---|-----------------------------------|----|----|----|------------------------------------|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1. IMPROVE INSULATION, VENTILATION | 10. HEAT PUMP, WATER HEATING |
| | | | | | | | | | | | | 2. HIGH EFFICIENT LIGHTING | 11. DECREASE THERMAL TRANSFER |
| | | | | | | | | | | | | 3. EFFICIENT APPLIANCES | 12. SMART ENERGY MANAGEMENT |
| | | | | | | | | | | | | 4. COOLING SYSTEMS | 13. WATER DISTRIBUTION PLANT |
| | | | | | | | | | | | | 5. HEATING SYSTEMS | 14. HABITS TO REDUCE CONSUMPTION |
| | | | | | | | | | | | | 6. VENTILATION SYSTEMS | 15. REDUCE ENERGY DEMAND OF CONSTRUCTION MATERIAL |
| | | | | | | | | | | | | 7. IMPROVE RENEWABLES | 16. EFFICIENT CONSTRUCTION |
| | | | | | | | | | | | | 8. ELECTRIFY NON ELECTRIC SYSTEMS | 17. EFFICIENT BUILDING DESIGN |
| | | | | | | | | | | | | 9. INTEGRATE DISTRICT HEATING | 18. INNOVATIVE REGULATIONS |
| Most common SECAPs | | | | | | | | | | | | | |
| MITIGATION PILLAR | | | | ENERGY CONSUMPTION | | | | 7. IMPROVE RENEWABLES | | | | | |
| ENERGY POVERTY PILLAR | | | | ENERGY GENERATION | | | | 8. ELECTRIFY NON ELECTRIC SYSTEMS | | | | | |
| DIFFERENT FUELS | | | | VULNERABILITY | | | | 9. INTEGRATE DISTRICT HEATING | | | | | |

Figure 4: Alignment of the Renovation Wave programmes with SDGs, SECAPs, and Climate actions^[4]

Recommendations

Future **policies should deepen the connections to SDGs by embedding comprehensive sustainability frameworks**. A stronger emphasis on SDG12 (responsible consumption and production) could be achieved by promoting EU-sourced sustainable and recyclable materials in renovation projects and fostering circular economy practices that reduce waste and resource use.

Finally, we should highlight the **need for better data collection, curation, and integration across the EU regions and member states**. This will **facilitate comprehensive ex-post analyses, enabling the refinement of future policy decisions**. We further propose the **formation of an EU Buildings Knowledge Inventory (EUBKI) based on the “Building Cards” idea developed in our project**.

This centralised database would provide researchers and policymakers with critical insights into the allocation of existing funds on different levels, their intended objectives, and the achieved outcomes. By fostering transparency and informed decision-making, the EUBKI would support the development of more effective and targeted strategies in the building sector. By promoting transparency and providing actionable insights, the EUBKI would enable the development of innovative and well-informed strategies to transform the building sector.

References

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