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Renovation of rural areas for energy poverty mitigation - challenges and solutions

Synthesis of policy recommendations

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About RENOVERTY

RENOVERTY will foster energy efficiency building upgrades in the Central and Eastern Europe (CEE), South-eastern Europe (SEE) countries, as well as Southern European countries (SE), by setting the methodological and practical framework to build renovation roadmaps of vulnerable rural districts in a financially viable and socially just manner.

Specifically, the project aims to deliver tools and resources to support local and regional actors to build and execute operational single or multi-household roadmaps for rural areas. A scalable model will also be created to ensure the wide geographical replicability and implementation of the roadmaps by different actors at the EU level. Strategically, the project will contribute to minimising logistical, financial, administrative, and legal burdens caused by a complex and multi-stakeholder home renovation process. Additionally, RENOVERTY will ensure that building retrofits consider the social dimension by incorporating security, comfort, and improved accessibility in the roadmaps to further improve the quality of life of vulnerable populations.

Over the project's three years, seven pilots located in Sveta Nedelja & Žumberak (Croatia), Tartu (Estonia), Bükk-Mak & Somló-Marcalmente-Bakonyalja Leader (Hungary), Zasavje (Slovenia), Parma (Italy), Coimbra (Portugal), and Osona (Spain) will implement the roadmaps, while wider integration of rural and peri-urban development is foreseen in the long run.

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LIST OF ABBREVIATIONS

CCDR	Regional Coordination and Development Commissions
CIMs	Intermunicipal communities
DREEM	Dynamic High-Resolution Demand Management Model (DSM) Dynamic high-Resolution dE-mand-sidE Management
EC	Energy community
EED	Energy Efficiency Directive
EEM	Energy Efficiency Measure
EEOS	Energy Efficiency Obligation Scheme
EIS	Estonian Business and Innovation Agency (Estonian: *Ettevõtluse ja Innovatsiooni Sihtasutus*)
ENSVET	Slovenia's national network of independent energy advisors
EPBD	The Energy Performance of Buildings Directive
EPC	The Energy Performance Contract (Energy Performance Contracting)
ESCO	The Energy Service Model (Energy Service Company)
EU	European Union
FZOEU	Environmental Protection and Energy Efficiency Fund
LAG	Local Action Group
LTRS	Long-Term Renovation Strategy
MEPS	Minimum Energy Performance Standards
MITECO	Ministry for Ecological Transition and Demographic Challenge
NECP	National Energy and Climate Plan
NGO	Non-governmental organisation
OECoop	Osona Energy Cooperative
OSS	One Stop Shop
PER	Regional Energy Plan
PNRR	National Recovery and Resilience Plan (Italian: Piano Nazionale di Ripresa e Resilienza)
PUG	Municipal Urban Plans

REC	Renewable Energy Communities
REER	Renovation Energy Efficiency Roadmaps
REFLEX	Reflex Environmental Association
REGEA	North-West Croatia Regional Energy and Climate Agency
SCF	Social Climate Fund
SCP	Social Climate Plan
SECAP	Sustainable Energy and Climate Action Plan
TREA	Tartu Regional Energy Agency
VAT	Value Added Tax
ZER	Reduction of Energy Poverty (Slovenian: *Zmanjšanje energetske revščine*)

EXECUTIVE SUMMARY

This report synthesises the key findings, lessons learned, and policy recommendations from the RENOVERTY project, focusing on how tailored Rural Energy Efficiency Roadmaps (REERs) can address energy poverty in rural and peri-urban areas. It provides policy makers and practitioners with practical insights derived from seven pilot countries and proposes ways to replicate and scale this approach across Europe.

The report is structured in three main parts. It first outlines the specific characteristics of energy poverty and explains why REERs can be used as a suitable tool to connect policy goals with household-level realities. It then presents findings from pilot activities, based on energy audits, workshops, training sessions, and the co-creation of national roadmaps, with the co-creation workshops playing a particularly important role in identifying barriers preventing rural energy poverty alleviation, defining practical solutions to reduce these barriers, and ultimately shaping policy recommendations to enable the implementation of these solutions. Finally, it translates these experiences into recommendations for integrating REERs into policy frameworks such as National Energy and Climate Plans (NECP), Social Climate Plans (SCP), and the revised EPBD and EED.

Following three years of research, co-creation, and implementation of measures to support rural citizens, the RENOVERTY pilots confirm that high upfront costs, administrative burdens, and insufficient access to information, particularly in remote rural areas, represent major obstacles to energy renovation. At the same time, in cooperation with Local Actions Groups (LAGs), they developed effective solutions to facilitate rural renovations, such as the creation of one-stop-shops (OSS) and the bundling of renovation projects. These finding underline the importance of participatory processes for building trust, capacity, and locally adapted solutions.

RENOVERTY has found that the success of rural renovation strategies depends on political commitment, adequate funding, and cooperation across all levels of governance. To facilitate renovations, the strengthening of targeted financial instruments, simplification of legal and financial procedures, the embedding of social criteria into renovation policies, and the support of local actors in carrying out activities focused on energy poverty alleviation are recommended. By replicating and scaling the methodology for developing the REERs, as well as the solutions presented within them, Europe can ensure that the energy transition is not only effective but also inclusive and just.

1. Introduction

This document presents a synthesis of policy recommendations and practical implementation guidelines derived from the RENOVERTY project, aimed at addressing energy poverty in rural and peri-urban areas through the deployment of tailored Rural Energy Efficiency Roadmaps (REERs). It is designed not only for decision-makers at national and regional levels but also for municipalities, energy agencies, LAGs (Local Action Groups), NGOs, and other stakeholders interested in replicating or adapting the REER methodology in their local context.

Energy poverty refers to a condition in which households are unable to access essential energy services and products, leading to negative impacts on living standards and health. While energy poverty is recognized at the EU level and addressed in several legislative and non-legislative initiatives, its specific manifestations and impacts in rural areas remain largely underexplored and insufficiently tackled. The RENOVERTY project aims to close this gap by strengthening the framework for addressing energy poverty and energy efficiency in rural and peri-urban areas.

As part of its mission, RENOVERTY has focused on developing tailored REERs that offer practical guidance to citizens, local stakeholders, and decision-makers on how to alleviate rural energy poverty. These roadmaps are based on local data, participatory processes, and the practical realities of rural households living in energy poverty. With this approach, the project supports evidence-based policymaking and implementation, promoting inclusive and sustainable energy renovation practices that leave no one behind.

1.1. Specificities of energy poverty manifestations in rural areas

'Energy poverty', for the purposes of this document, refers to *a household which does not have access to basic energy services, where such services ensure basic levels and a decent standard of living and health, including adequate heating, hot water, cooling, lighting and energy to power household appliances, which is caused by a combination of factors, including a lack of affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes*, in accordance with Article 2, paragraph 52 of the recast Energy Efficiency Directive (EED) [1].

Furthermore, 'vulnerable households' are *households experiencing energy poverty or households, including those with lower middle incomes, which are particularly exposed to high energy costs and do not have the means to renovate the building in which they live*, as defined in Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings [2]. The same directive further states: *Inefficient buildings are often associated with energy poverty and social problems. Vulnerable households are particularly exposed*

to the increase in energy prices, as they spend most of their budget on energy products. Building renovation can lift people out of energy poverty and prevent energy poverty. At the same time, building renovation is not free and it is crucial to ensure that the social impact of building renovation costs, especially on vulnerable households, is kept under control.

Europe's aging building stock presents an urgent challenge: 35% of buildings are over 50 years old, and 75% remain energy inefficient, contributing to 40% of the EU's energy use and 36% of CO_2 emissions. [3] Rural areas face unique vulnerabilities that intensify energy poverty. Physical isolation, high poverty rates, and older, inefficient building stocks all contribute to a heightened vulnerability in rural regions. Rural citizens often live in outdated, energy-inefficient homes built before modern thermal standards were introduced in the 1970s, although similar challenges can also be found in some urban areas. Many rely on high-carbon fossil fuels such as coal, heating oil, and wood, not only due to limited energy options, but also because of the availability of wood from nearby forests, long-standing cultural habits, and a lack of awareness about negative health impacts.

The RENOVERTY project has revealed that energy poverty in rural areas differs significantly from that in urban environments. The key drivers, although not present only in rural areas, but particularly pronounced, include poorly insulated housing stock, outdated heating systems, unreliable access to modern energy sources, and a lack of targeted policy support. Additionally, rural households often face geographical isolation, aging populations, limited access to information on energy efficiency, and reduced financial capacity to renovate, which collectively increases their vulnerability. More detailed insights into the specific characteristics and challenges of rural energy poverty can be found in RENOVERTY's Deliverable 2.1 [4].

One of the first steps in understanding the state of energy poverty of families living in rural and peri-urban households was to carry out detailed energy audits in the pilot areas across seven European countries. In total, 88 energy audits were conducted, revealing that many of the audited buildings, composed of both single family and multi-family buildings, lacked adequate insulation, relied on inefficient windows and outdated heating systems, and suffered from insufficient ventilation. These deficiencies contribute to high energy bills, low indoor comfort, and health issues such as respiratory problems caused by dampness and mould. The results of the audits in the RENOVERTY pilot regions were used to identify opportunities for rural residential energy efficiency improvement, prioritise the most cost effective and energy reducing energy renovation measures, and inform the design of REERs tailored to each pilot region and countries.

However, while these technical findings provided a solid basis for designing tailored renovation roadmaps, they also highlighted the need for supportive policy environments. Retrofitting the homes within the pilots is not only a matter of improving the household's energy efficiency, but also a critical action that can enhance the well-being of the residents and support a just energy transition. A broader policy analysis conducted within the project found that:

- Existing national and regional policies often do not reflect the unique characteristics of rural areas.
- There is a lack of systematic monitoring and evaluation of implemented measures, which hinders the assessment of their effectiveness.
- Many policies focus on financial support, but eligibility criteria (such as property legalisation) can exclude the most vulnerable households.
- Educational and advisory services are limited, despite their importance for awareness and engagement.
- Comprehensive approaches integrating technical assistance, financial incentives, and community engagement remain scarce.

The project thus highlights the need for integrated, flexible, and well-targeted policy frameworks that consider the lived realities of rural citizens experiencing energy poverty. REERs represent one such instrument, built on local insights, but aligned with EU objectives, that can help bridge the policy-practice gap.

1.2. Importance of REERs

The REERs provide a structured and adaptable methodology for planning and implementing energy renovation measures in rural areas. By conducting household audits, involving local stakeholders through co-creation processes, and aligning actions with national and EU policy frameworks, REERs serve as both a strategic and operational tool for rural energy poverty alleviation. They bridge the gap between high-level energy policy goals and the lived realities of households experiencing energy poverty in rural areas.

These roadmaps have been developed in close collaboration with Local Action Groups (LAGs) – community-led partnerships that bring together public, private, and civil society actors to foster local development [5], and local stakeholders in seven regions: Sveta Nedelja & Žumberak (Croatia), Tartu (Estonia), Bükk-Mak & Somló-Marcalmente-Bakonyalja Leader (Hungary), Zasavje (Slovenia), Parma (Italy), Coimbra (Portugal), and Osona (Spain).[1] They respond to the unique challenges faced by rural areas, which are often overlooked by mainstream energy efficiency initiatives. More specifically, REERs offer clear, practical guidance on the alleviation of **technical, community, legislative, and financial barriers** to rural renovation, simplifying the retrofitting process for households experiencing energy poverty. By addressing barriers such as complex administrative requirements for renovation support, limited funding, and a lack of qualified professionals to carry out energy renovations, the roadmaps enable rural households to plan renovations tailored to their specific needs and budget.

[1] Access the roadmaps: https://ieecp.org/2025/02/28/new-rural-renovation-roadmaps-in-7-eu-countries-guide-homeowners-towards-sustainable-futures/

The roadmaps offer adaptable frameworks for rural municipalities to address building renovation, energy poverty, and carbon footprint reduction in ways that are both practical and community focused. They are structured in two complementary parts: the **technical roadmaps**, which provide focused guidance for individual households on implementing energy renovation measures, and the **conceptual roadmaps**, which are tailored to serve the broader needs of national, regional and local stakeholders.

The REERs align with the latest updates to the EU Energy Performance of Buildings Directive (EPBD), incorporating its goals for decarbonization and mandatory renovation milestones. By bridging legislative priorities with practical guidance, these roadmaps help rural communities transition to sustainable and comfortable living while contributing to the EU's broader climate objectives and the goal of achieving climate neutrality by 2050.

2. Key findings and actions from RENOVERTY pilots

RENOVERTY's approach has generated several important findings that enhance our understanding of energy poverty in rural and peri-urban areas and inform better-targeted interventions. A combination of technical assessments, policy analysis, and stakeholder engagement activities have created a robust evidence base for the REERs and the recommendations provided in this document.

- **88 energy audits** have been conducted across the pilot areas in seven countries (Spain, Italy, Portugal, Hungary, Croatia, Estonia, and Slovenia). These audits were critical to addressing the lack of knowledge about the rural building stock linked to energy poverty. They provided detailed data on building envelope quality, heating systems, ventilation, and energy sources. The audits confirmed that rural buildings are predominantly old, insufficiently insulated, and equipped with outdated and inefficient heating systems often reliant on solid fuels such as wood. Many households suffer from thermal discomfort, dampness, and mould, which negatively affect health, while the poor energy performance of these buildings leads to higher energy expenditures. This technical evidence helped shape the REERs with locally adapted renovation solutions.
- **25 relevant policies and initiatives** related to rural energy poverty were gathered and analysed. These were selected from across the RENOVERTY partner countries and complemented by additional EU-wide policy frameworks. The analysis revealed significant gaps, similar in all pilot countries, in policy design and implementation. While some measures aim to support energy efficiency and renovation, many lack rural-specific adaptation. The majority focus on financial aid alone and rarely integrates technical support, outreach activities, or capacity-building elements. Legal and procedural barriers,

such as requirements for property registration, often exclude the most vulnerable households, especially in Central, Eastern, and Southern Europe.

- **130 stakeholders and experts** were consulted, providing insights into local barriers, needs, and viable solutions for tackling rural energy poverty. Respondents included local and regional authorities, energy agencies, NGOs, social services, and financial institutions. Their feedback confirmed that energy poverty in rural areas is complex and often invisible. The main challenges identified include the legal status of buildings, limited funding, low household awareness of both benefits of energy renovation and available funding schemes, administrative burdens, and a lack of coordination between actors. However, many also recognised the potential of one-stop shops, improved communication strategies, and more inclusive renovation programmes tailored to rural realities.
- **50 workshops with more than 600 participants** across all pilot countries, bringing together stakeholders from the local, regional and national levels as well as citizens. These workshops played a key role in co-designing and validating the REERs, ensuring that the guidelines reflect solutions that are relevant to real local needs and contexts.
- **13 training sessions with more than 170 participants** in the pilot countries, aimed at building the capacity of citizens, local actors, LAGs, social institutions and other relevant stakeholders. The trainings provided practical knowledge on renovation measures, financing opportunities, and community engagement.
- **7 sets of REERs developed in 7 pilot countries** in close collaboration with **LAGs in seven regions**.

Each REER builds on four fundamental aspects: **technical**, **financial**, **legal** and **community**-level aspects. The different measures designed during the co-creation process with local stakeholders, involving LAGs, NGOs, local authorities, and local contractors were included in their category and address one or more of the four strategic aspects of the document:

- **Technical aspects**: actions to be implemented that respond to the reduction of energy demand.
- **Financial aspects**: actions that have an impact on the financing of energy renovation actions.
- **Legal aspects**: actions aimed at modifying current legislation to include the energy renovation of homes as a priority in political agendas.
- **Community-level** aspects: actions that involve energy communities to work more in the community

This integrated structure of the REERs ensures that both **technical interventions and enabling conditions**, such as financing, legal frameworks, and community support, are addressed simultaneously. It also provides a replicable template for other regions aiming to design renovation strategies tailored to rural realities.

2.1. Lessons learned from REER development

The creation and implementation of the REERs across the seven RENOVERTY pilots and countries provided valuable lessons that are crucial for any future roadmap replication:

- **Contextualisation is key**: The success of the REERs relies heavily on a deep understanding of local contexts, including the characteristics of buildings, energy systems, and socio-demographic profiles of citizens. One-size-fits-all solutions are ineffective in rural areas due to the diversity of housing types, energy sources, and household capacities.
- **Stakeholder involvement ensures relevance and trust**: The co-creation process, which included municipalities, LAGs, energy experts, NGOs, and households, proved essential to securing buy-in and creating realistic, implementable roadmaps. By drawing on the local, practical knowledge of these actors, the process ensured that the proposed actions were feasible, context-specific, and aligned with real community needs.
- **Energy audits are foundational**: On-site technical assessments not only provided crucial data to help reduce the gap concerning rural energy landscapes but also helped to increase household awareness about their inefficient energy use and possible improvements, thereby serving as an entry point to introduce renovation measures and identify priority actions.
- **Capacity building matters**: Supporting both households and local actors with training, workshops, and technical materials helped to increase confidence and readiness for renovation. Local authorities and NGOs need clear guidelines on how to address the energy needs of citizens, while households benefit from direct consultation and simplified information about household renovation.
- **Policy alignment enhances uptake**: The roadmaps were more impactful when linked to existing or planned national calls for energy renovation. This required close collaboration with ministries, environmental funds, and other stakeholders to ensure REERs could inform future programme design and implementation.

These findings underpin the broader conclusions and recommendations that follow and should be considered essential for anyone aiming to replicate or scale up the RENOVERTY methodology.

3. Practical recommendations in pilot countries

3.1. Croatia

3.1.1. Rural energy poverty in Croatia

To understand the specific characteristics of buildings inhabited by individuals affected by energy poverty in rural and peri-urban areas of Croatia, the development and implementation of REERs focused on the rural and peri-urban areas of Sveta Nedelja and Žumberak. These pilot regions were selected for their contrasting socio-economic characteristics, allowing a deeper understanding of energy poverty in diverse rural contexts. Sveta Nedelja, located in central Croatia near the capital Zagreb, is a small town with over 18,000 residents, where nearly half of its 14 settlements meet rural area criteria. It is a well-developed area with a growing population and rising living standards. In contrast, Žumberak, a nearby municipality with only 610 residents spread over more than 100 square kilometres, faces significant depopulation, with some settlements having fewer than five residents. Žumberak is designated as an area of special state concern due to its economic, structural, and demographic challenges (Law on Areas of Special State Concern [6]).

With the support of LAGs Sava and Vallis Colapis, households residing in family houses, the predominant rural housing type in the area, were identified for the audits based on their knowledge of local conditions. Energy audits were conducted for 15 family houses, revealing inadequate insulation, outdated heating systems, and inefficient windows, all contributing to high energy costs and discomfort.

The most common barriers identified through field visits and workshops included high upfront renovation costs, limited access to information, complex administrative requirements, and technical constraints such as outdated structures or unclear property legal status. For many residents, especially the elderly, these hurdles were compounded by low digital literacy and physical isolation.

3.1.2 Summary of challenges and identified barriers

The RENOVERTY pilot regions of Sveta Nedelja and Žumberak offered contrasting but complementary insights into the nature of rural energy poverty in Croatia. Sveta Nedelja, with its rising living standards and proximity to the capital, exemplifies the peri-urban challenge of engaging households experiencing energy poverty who may be overlooked due to general prosperity indicators. Žumberak, on the other hand, faces structural disadvantages including

population decline, limited infrastructure, and designation as an area of special state concern, which amplify energy poverty challenges.

The energy renovation of dwellings inhabited by those experiencing energy poverty in these regions and similar ones in Croatia can often be delayed by numerous obstacles and challenges that can hinder homeowner's access to the necessary resources, thereby slowing down the achievement of desired goals. Common obstacles have been identified according to the feedback from the field visits and workshops organized within the RENOVERTY project and are described below.

Financial costs

High upfront costs remain the primary obstacle for carrying out energy renovations, as homeowners often lack the financial means to fund renovations. In rural areas, the costs of implementing energy efficiency measures or renewable energy solutions are often higher due to limited access and fewer available contractors.

Access to information and support

Homeowners experiencing energy poverty often lack information about renovation opportunities, subsidies, or incentives, even when available. The absence of advisory support further complicates the process. A significant share of the rural population is elderly, isolated, and unfamiliar with digital or bureaucratic processes. There's also a general lack of awareness of available programmes and their benefits.

Administrative challenges

Application processes for existing programs are often unclear and inaccessible to people experiencing energy poverty. The collection and submission of necessary permits and documentation can discourage homeowners from pursuing renovations.

Technical and legal constraints

Older houses may require significant structural improvements before energy renovations can proceed, increasing project complexity and cost. Additionally, proof of building legality is often required for national funding programs, posing another barrier for securing financial support. In some cases, ownership issues are unresolved across generations.

3.1.3 Implemented and proposed solutions

Several solutions were developed in response to the above challenges, many of which can be applied more broadly in Croatia or even scaled EU-wide. The REERs outline solutions adapted to rural realities and already serve as a tool to support households in applying for the Call for Expression of Interest for 100% co-financing of energy renovations. These recommendations, based on energy audits and citizen and stakeholder feedback, are grouped into four groups:

technical, financial, legal and administrative, as well as social and community. Together, they aim to ensure effective and sustainable implementation of energy renovation projects, improving living conditions and reducing energy poverty in rural communities.

Technical solutions

Energy renovation projects can be bundled by local authorities or energy communities in geographically concentrated areas to optimize resources and create economies of scale. To address limited market capacity, incentives for experts and contractors (e.g. transport and accommodation subsidies) should be introduced. A comprehensive assessment of each building and alignment with EPCs ensures that energy efficiency measures are implemented holistically and in line with national and EU energy performance goals.

Financial solutions

Tailored financial instruments are needed to make renovations accessible for households experiencing energy poverty. These include targeted grants, co-financing schemes and microloans with low or zero interest to enable gradual repayment of renovation costs. Cooperation between national funds, local governments and private partners can create new financing opportunities, while energy communities can play a role in collectively financing renovation measures.

Legal and administrative solutions

Simplifying legalisation procedures and administrative processes is essential, particularly for rural households facing property registration issues. Establishing local technical assistance centres in rural areas such as local One-Stop-Shops (OSS) can help citizens navigate grant applications, connect with installers and financial institutions, and overcome geographic isolation by providing direct support and guidance.

Social and community solutions

Awareness and education campaigns highlighter key to empowering citizens and increasing participation in renovation programmes. The implementation of a "turnkey" model can further streamline the renovation process by simplifying procedures and reducing burden of households. In parallel, the establishment of local OSS centres would ensure ongoing technical and administrative support, while LAGs can act as trusted intermediaries between national policy instruments and the local population. Their involvement was critical for building trust, explaining benefits, and collecting applications.

3.1.4 Recommendations for REER integration into national, regional and local policy

The following section summarises recommendations for the integration of REERs across different levels of government, highlighting each level's influence and potential for implementing specific measures. Ensuring coherence and coordination among these levels is key to maximising the long-term impact of the REER methodology and enabling its replication beyond pilot areas.

National level:

At the national level, the REERs can serve as a reference framework for policy design, coordination, and funding allocation for energy poverty reduction. Their integration into the NECP, the Low Carbon Development Strategy, and the Long-Term Renovation Strategy would ensure that rural and peri-urban households are explicitly recognised within national targets and funding programmes.

The Social Climate Plan (SCP) and Social Climate Fund (SCF) present the most immediate opportunity to operationalise the REER approach. By embedding the REERs into the SCP, the government can ensure that financial assistance and subsidies are directed towards households identified as energy-poor, using the REER as implementation tool for prioritising the measures.

Ministries responsible for energy, environmental protection, construction and social policy could use the REERs to guide the development of tailored support programmes for low-income households, combining technical assistance, simplified administrative procedures, and targeted financial instruments. Furthermore, integrating REERs into national calls for co-financing (such as those managed by Environmental Protection and Energy Efficiency Fund - FZOEU) would help streamline eligibility and documentation requirements. By aligning funding rules with the REER methodology, the process of applying for renovation subsidies could be simplified, especially for households experiencing energy poverty with limited administrative capacity.

Regional level

Regional authorities (counties) play an important bridging role between national frameworks and local implementation. The REERs can be used as a strategic tool for regional planning, ensuring that regional energy and climate strategies address the specific characteristics of rural and peri-urban settlements. Counties can integrate REER principles into their regional development and energy efficiency plans, identifying priority areas and facilitating joint renovation initiatives through regional energy agencies. Cooperation between counties and LAGs can support the establishment of regional OSSs that provide technical, administrative, legal and financial assistance to local authorities and citizens. Counties could integrate the REERs into regional strategies and plans and work with various stakeholders, including local organisations and experts, to provide tailored support to households experiencing energy poverty.

Local level

Local self-government units are the key actors in translating national and regional strategies into concrete actions that reach citizens. The REERs offer framework through which local authorities can identify, plan and implement targeted renovation interventions while engaging communities in the process. They know best the specific needs of the community and can adapt the REERs to suit local conditions.

Local governments should integrate REER recommendations into their local energy and climate plans (such as SECAPs), municipal budget and public asset management strategies as this would enable the design of annual renovation pipelines that reflect local housing stock characteristics and social needs. Cooperation with LAGs, civil society organisations, experts and local craftsmen can ensure the successful implementation of household energy renovation projects, which can serve as a model for other communities. LAGs have proven to be trusted intermediaries capable of linking national policy instrument with households, supporting application processes and fostering trust among citizens. Establishing OSSs operated by LAGs can provide direct assistance for households, helping them prepare documentations, understand funding options, and coordinate technical assessments. Additionally, LAGs and municipalities can promote energy communities as a complementary mechanism to renovation, enabling collective energy generation and shared cost savings that further enhance affordability.

By embedding REERs into local governance, municipalities move beyond isolated projects towards long-term, community-driven renovation strategies, which can serve as replicable models across other rural regions.

3.1.5 Replication potential and national scalability

The RENOVERTY project has shown that successful implementation and scaling of energy renovation measures in rural Croatia depend on localised, participatory approaches. One of the key enablers identified during the project is the active involvement of local actors, particularly LAGs. Due to their established networks, trust within communities, and strong understanding of local challenges, LAGs can serve as effective facilitators and replicators of the REER methodology. The REER model has high potential for replication in other Croatian rural and peri-urban regions. Its flexibility allows it to be adapted to various socio-economic contexts, while its structured, co-creation methodology ensures local ownership and relevance. Croatia's experience within RENOVERTY illustrates how REERs can serve as both a technical and strategic tool to accelerate rural energy renovations and improve the living conditions of citizens experiencing energy poverty.

To enhance replication and scalability at national level, the following actions are recommended:

- **Empower LAGs and other local actors** through training, technical assistance, and funding to take on facilitation roles in energy renovation.

- **Ensure ongoing collaboration** between national bodies (e.g. ministries, FZOEU), regional authorities, and local stakeholders.
- **Pilot the REER model in other rural areas**, especially those with demographic, geographic, and economic profiles like the RENOVERTY pilots

By embedding REERs within a supportive ecosystem of local actors, national policy, and funding mechanisms, Croatia can significantly advance inclusive and effective energy renovation across rural territories.

3.2 Estonia

3.2.1. Rural energy poverty in Estonia

Estonia's current national development documents do not consider energy poverty as an issue on its own. Household performance is considered comprehensively at both national and local government level. The 'Wellbeing Development Plan 2023-2030" aims to reduce poverty.

To transpose the requirements of Article 7 of the Energy Efficiency Directive (EU 2018/2002), the Energy Sector Organisation Act was supplemented in 2019, which clarified the development of procedures to address energy poverty. To achieve the energy efficiency objectives through different measures, the design of renovations or similar measures should consider whether and how the risk group of energy purchase and those affected by energy poverty could be included in energy efficiency measures so that they can also benefit from measures to improve the energy efficiency of housing.

In the transposition of the Directive, a person affected by energy poverty was linked to maintenance support, which means that the number of beneficiaries of subsistence support is equal to the number of persons affected by energy poverty. A person affected by energy poverty is a person or family living alone within the meaning of the Social Welfare Act who has received at least one subsistence allowance in the last six months and whose income per family member in the previous month does not exceed the minimum wage.

To achieve improvement of the situation of natural persons and households in economically insecure situations who are unable to participate in energy saving measures without additional support, the Government will identify measures for natural persons, households or service providers targeted those who are in an economically insecure situation, in order to alleviate energy poverty. The following energy efficiency measures shall be made available to persons affected by energy poverty:

- Home support will be offered to families with many children to improve the living conditions of low-income child-rich households.

- Support for the renovation of small and multi-apartment buildings will be offered to improve the energy efficiency of housing, and, in the case of apartment buildings, all members of a co-ownership association will be supported in carrying out energy-saving works. A higher aid rate is made available in regions where the value of the property is lower. As the property value and the income of residents in each area are fairly well-correlated, support measures based on the principle of regionality also reduce energy poverty for those who are beneficiaries.
- Investment aid will be given for the development of a municipal housing fund on a case-by-case basis. The support will improve the availability of rented dwellings for households that cannot acquire or rent rented dwellings from the rental market, including those with a lower socio-economic status.

In Estonia, the development and implementation of REERs focused on the rural and peri-urban areas, specifically on five multi apartment buildings located in Kaagvere village in Tartu County and Kääpa village in Jõgeva county. These pilot regions were selected for their socio-economic characteristics, allowing a deeper understanding of energy poverty in diverse rural contexts and replicability of measures in other regions in Estonia. In these pilot areas of the project, the reconstruction support rate is 50% of eligible costs

These audits gathered technical data of building and data of consumption of energy by households. Data of energy consumption was used for generation of energy certificates and for feedback and consultations for families on energy saving, consumption pattern and habits, while also evaluating the building situation for the development of the renovation measures. Additionally, several workshops were held with citizens and with stakeholders to explore the building stock, understand citizens' expectations and needs, and collect challenges related with renovation. The co-creation process with citizens and stakeholders was carried out through additional workshops, aimed at developing and designing measures to address barriers and benefit from opportunities provided by the state. Based on the entire process, the final roadmaps were developed for all five buildings, focusing for legal, financial, technical and social/community aspects.

3.2.2 Summary of challenges and identified barriers

Energy-efficient renovation of homes can often be delayed by numerous obstacles and challenges that can hinder the owner's access to the necessary resources, thereby slowing down or even preventing the achievement of the desired goals. The co-creation process that took place in Estonia identified obstacles and barriers that can be extended (with certain exceptions) to buildings in other rural areas in the country and to building owners whose buildings are inhabited by vulnerable groups.

Financial costs

The main obstacle remains the high initial costs, as homeowners often lack the financial resources to finance the renovation. In rural areas, the costs of implementing energy efficiency measures or renewable energy solutions are often higher, as access is limited and contractors are fewer.

Access to information and support

Homeowners with energy poverty often lack information about renovation options, subsidies or incentives, even when available. The lack of advisory support makes the process even more difficult.

Administrative challenges

Application processes for existing programs are often unclear and inaccessible to people experiencing energy poverty. Gathering and submitting the necessary permits and documentation can discourage homeowners from undertaking renovations.

Technical and legal limitations

Older homes may require significant structural improvements before they can proceed with energy-efficient renovations, increasing the complexity and cost of the project.

3.2.3 Implemented and proposed solutions

The solutions and recommendations described below are based on meetings with residents and an analysis of past practice. The guidelines follow the barriers identified in the previous section and describe possible ways to overcome these barriers. Measures to overcome these barriers should consider a combination of technical, legislative and social aspects of the energy transition.

Financial solutions

The main financial solutions for energy efficient renovation in rural areas include the development of additional and targeted financial support mechanisms, such as grants, co-financing schemes and low-interest loans specifically for households experiencing energy poverty. The creation of energy communities or the creation of a local cooperative to finance renovation projects offers a collaborative approach. Strengthening cooperation between local authorities and national funds can create targeted funding opportunities for rural areas. In addition, promoting public-private partnerships, where private companies co-finance renovation projects, can reduce the financial burden on local budgets. In addition, private companies entering public-private partnerships can gain significant benefits (e.g. access to public funding, reduced financial risks and new market opportunities).

Community and social solutions

The main solutions include ongoing and continuous awareness-raising and information campaigns for owners on the benefits of energy renovation and financial support through the Ettevõtluse ja Innovatsiooni Sihtasutus (EIS). Despite county advisors and a market-based technical consultant, the necessary information does not reach the relevant target group. We find and recommend that advice and information sharing must become proactive, targeted and consistent. Community awareness programmes can be an additional option to raise awareness about the benefits of energy renovation and the availability of financial resources. We recommend designing continuous awareness programs for communities. It is important to ensure a single service (OSS) as close in proximity as possible to the target group.

Legal solutions

The eligibility criteria do not yet sufficiently consider vulnerable population groups. This challenge can only be addressed through coordinated cooperation between municipalities and ministries responsible for energy and social policy. It would be necessary to consider linking energy efficiency awareness and simpler measures with municipal financing options that would focus on assisting vulnerable households, including those who are not recipients of social benefits and therefore are not eligible for subsidies to cover utility costs. It is also recommended to enter into community agreements with organisations and associations that contribute to increasing the volume of comprehensive renovation of apartment buildings in rural areas.

Technical solutions

In addition to the currently supported full renovation measure, the recommendation is that there should be the possibility of partial and step-by-step renovation. This ensures a more motivated implementation of supported renovation and thereby reduces the cost of utilities. It is important to design measures that would increase the motivation of managers to promote energy renovation, whereby it is possible to consider either including the promotion of energy renovation among the responsibilities of managers or financial incentives (a smaller part of the investment intended for the work of managers).

3.2.4 Recommendations for REER integration into national, regional and local policy

When designing a national building renovation policy, it is important to implement general and cross-cutting principles:

- **Co-creation as a cornerstone of successful policymaking and implementation:** The process of drawing up a National Building Renovation Plan should include public consultation processes, paying particular attention to the inclusion of vulnerable groups in rural areas. The co-creation process must clearly demonstrate how the policy works in the interests of the resident.

- **Co-creation at the building level:** This is important to demonstrate that renovation is primarily driven by the wishes and needs of the resident. Here is a clear change in the rhetoric of implementing a National Renovation Plan.
- **The specificities of rural areas must be considered:** the National Building Renovation Plan should include typologies of rural buildings and adapt approaches to their structural and social characteristics.
- **Integrated approach to renovation:** energy-efficient renovation must be linked to several factors, including the recommendations of the European Bauhaus.

Targeted and continuous financial support for vulnerable households:

This support, which contributes to the ability of apartment owners to invest in activities that promote the energy efficiency of buildings and the use of local renewable energy, must continue. If possible, increase the proportion of support for households in rural areas.

Below, recommendations for the integration of REERs at the different levels of government are summarised:

- **National level:** At the national level, the guidelines could be integrated into the implementation process of measures defined in the National Energy and Climate Plan and the Low Carbon Development Strategy, but they could also be implemented by integrating them into other policy areas aimed at energy efficiency and reducing energy poverty. Ministries responsible for energy, environmental protection and social policy could use them as a reference point for developing long-term programmes to assist households experiencing energy poverty. Linking and integrating the guidelines into the climate policy social plan would increase support for citizens experiencing energy poverty through financial assistance and grants from the climate policy social fund.
  To simplify the renovation processes and thus reduce the cost, it is reasonable to develop various tools at the national level, such as an online renovation guide, a collection of good examples, etc., drawings of the most common nodes in construction and calculated by engineers. It is also necessary to find ways to accelerate the reconstruction with prefabricated panels in the factory, supporting both the supply side (manufacturers of prefabricated facade panels, designers) and the consumption side (the willingness of apartment associations and owners to order these solutions).
- **Regional level:** Regional authorities can use the guidelines to design and implement energy renovation programmes adapted to regional conditions and needs. For example, counties could integrate the guidelines into regional strategies and plans and work with different stakeholders, including local organisations and experts, to provide tailored support to households with energy poverty.
- **Local level:** Local governments have focused on the processing of permits and notifications in residential renovations today, rather than on how to fix the buildings. The

municipalities that participated in the survey do not see themselves as having a very clear role in the renovation of apartment buildings. This points to the need to define a clear role of municipalities and with this increase the role of municipalities in residential renovations.

- **Neighbourhood level**: Only the municipality, which knows the local conditions and needs best, can coordinate and push for renovations. In addition, the necessary capacity to fulfil this role must be ensured via the involvement of competent and motivated officials. Consider whether and to what extent it is appropriate to provide resources directly to the municipality to support the renovation of residential buildings. Inform and train local government employees so that they understand the field of renovation better and see its connections to organizing local development and achieving climate goals.

3.2.5 Replication potential and national scalability

Citizen engagement

Raising public awareness about renovation and energy efficiency in households, including energy poverty and vulnerable groups, is in focus to increase participation in energy renovation national goals. Activities will include organizing national and local awareness events, conducting workshops and information sessions in counties and municipalities to inform households about funding opportunities, such as EIS (Kredex) and disseminating success stories to encourage wider adoption of renovation measures.

Engaging households: services to households

In Estonia, the national grant scheme for the renovation of apartment buildings and single-family buildings is functioning well. Challenges include how to reach wider applicants, particularly to households experiencing energy poverty. Tartu Regional Energy Agency (TREA), RENOVERTY's piloting partner in Estonia is working out a one-stop-service to provide in the market consultancy and project management services for renovation. Together with municipality officials and other local organisations, the Agency will organize events for households to provide residents with practical information about the benefits of energy renovations and funds available for implementing renovation measures.

Regional and national level

Bilateral communication is a fruitful tool to improve policy or regulations at the regional and national level to ensure the integration of the REERs into energy policies and broader strategies. TREA will contact the regional level county governments and municipality level local governments not only in Tartu County, but other regional governments as well, to improve and update strategic and development documents with renovation tasks and goals.

Capacity building for local actors

Local actors that are in direct contact with households and owners have a role in renovation and in tackling energy poverty. TREA will provide training to municipality officials, local organisation employees, and renovation technical consultants who work locally. Training and round table meetings will focus on (i) Economic visibility and benefits for households of energy efficiency measures; (ii) The economic and environmental benefits of energy-efficient renovations; and (iii) Practical information on funds available for households experiencing energy poverty.

In conclusion **the scalability recommendations** are:

- For citizen engagement is crucial to provide new knowledge and best practices, organize workshops and share experiences continuously by using **formed platform model.**
- With **OSS**, it is possible to quickly and at low-cost scale a full renovation service (from idea to implementation) in various locations as close to households as possible.
- In addition, this model of OSS provides an opportunity to simultaneously increase the capacity to renovate at the local level together with local market actors.
- To boost renovation at regional and local level, it is important to include **REER as a tool** in energy and climate plans.

3.3 Hungary

3.3.1. Rural energy poverty in Hungary

In Hungary, two pilot areas where LAGs are active were selected in RENOVERTY, namely the Bükk Térségi (76960 people, 42 municipalities) and the Somló-Marcalmente-Bakonyalja (25037 people, 42 municipalities). The Bükk region is in Northern Hungary, where mining and forestry have historically shaped the development of the rural areas. In the SMB region (situated in Central Transdanubia), forestry also plays a role, but agriculture is the dominant land use. While the geographical distance between these two LAGs is considerable by Hungarian standards, they share many similarities. In both Hungarian pilot areas, there are municipalities where rural households are affected not only by energy poverty but also represent a socially vulnerable segment of the population. However, there are two key differences: the Bükk Térségi LAG lies within a county included in the Just Transition programme, and fossil fuels are more commonly used for heating in that area. As a result, air pollution becomes a significant issue during the winter months, when smog from the inappropriate burning of fuels settles in the river valleys.

In Somló-Marcalmente-Bakonyalja and Bükk Térségi LAG, 8 single family houses were identified for the audits conducted within the framework of the project. To select households, REFLEX,

RENOVERTY's Hungarian piloting partner collaborated with local stakeholders, including LAGs, municipalities, and NGOs. The selected houses were chosen to represent the typical building materials and construction methods found in the area, alongside the most characteristic and frequently studied Kádár cubes, traditional adobe houses and two-storey detached houses built in the 1980s and 1990s. The 8 audits carried out provide an insight into the characteristics of the energy-poor residential buildings in the two areas, which have been issued with a certified energy performance certificate by the energy experts. The audits revealed that most of the houses are inadequately insulated, the heating system is outdated, and the windows and doors are outdated, which can have a significant impact on the quality of life of residents. Some of the households are nearly 100 years old and renovating them to improve energy efficiency can be challenging and costly, but is nonetheless necessary to tackle energy poverty, based on audit results and stakeholder feedback.

3.3.2 Summary of challenges and identified barriers

Throughout the co-creation process of the REERs, REFLEX has identified several technical, legal, financial and social barriers and challenges which overlap in the two LAGs due to the similarities between the two regions.

Technical

There is a shortage of skilled professionals in both LAGs, since this is a national problem. Many contractors lack proper qualifications, raising concerns about the quality of their work, while existing and qualified professionals are often already highly engaged. Additionally, the range of materials and service providers for renovation, especially in the Home Renovation Programme where only registered stakeholders can be contracted, is limited in both rural areas.

Legal

In Hungary, the concept of energy poverty is not centrally defined as households living in poverty are primarily identified as energy poor. They are often only able to conclude contracts with the help of a professional intermediary. Vulnerable households must choose whether to manage the renovation process themselves by coordinating with various professionals or to hire a general contractor. However, there is a general lack of trust toward general contractors. Contracting raises additional challenges, both in terms of subsidy-related agreements and service contracts. Furthermore, in rural areas of Hungary, many people live in non-residential buildings (such as press houses or garden equipment storage facilities) classified as agricultural properties, which are ineligible for renovation subsidies, as they are not officially recognised for permanent housing.

Financial

In Hungary, the centrally reduced utility cost is the most challenging in terms of energy-efficient renovations, as artificially low-kept residential energy prices lead to long payback periods for renovations. Vulnerable households often lack the financial background to invest in energy-efficiency renovations. Additionally, subsidies are unpredictable as current support may be closed or suspended due to budget exhaustion or regulatory changes, making long-term planning difficult. The application processes are often overburdened by bureaucracy.

Social

Energy communities are still at an early stage of development in Hungary. They may offer opportunities for households experiencing energy poverty in the coming years. Many of the households experiencing energy poverty lack awareness of the benefits of energy-efficiency renovations, available resources, and eligibility criteria. Furthermore, there is widespread scepticism towards subsidy schemes and a general lack of trust in contractors and professionals, which further hinders tackling energy-poverty in rural areas.

3.3.3 Implemented and proposed solutions

The REERs co-creation process, based on the contribution of the stakeholders on energy poverty and energy renovation, has led to the following proposals on social, legal, financial and technical aspects.

Legal solutions

In Hungary, the most important legal and administrative solutions include the recognition of households experiencing energy poverty by legal regulators for targeted financial support. Simplification of administrative procedures is also essential.

From a policy and legal perspective, based on the findings of the REERs, REFLEX provides recommendations for incorporation into the National Social Climate Action Plan, with the aim of ensuring that the findings and conclusions of the REERs are properly reflected in national policy measures. Meanwhile, the Constitutional Court annulled the climate law's target for greenhouse gas emissions by 2030, ruling that the legislator's target was insufficient, and obliged the government to draft a detailed law by the end of June next year. A working group is being set up to develop policy recommendations in cooperation with several civil society organisations. Within this working group, particular emphasis will be placed on ensuring that the issue of energy poverty is adequately addressed in legislation

Financial solutions

Complementary and targeted financial support mechanisms including subsidies for households experiencing energy poverty, co-financing, and low-interest loans, with a special focus on socially vulnerable groups, are key financial solutions for energy efficiency in rural areas. The introduction of low-interest or interest-free micro-credits to allow for the gradual repayment of renovation costs could help this process. Detailed planning of the works, taking into account not only energy efficiency investments but also structural renovation or refurbishment of the building, can ensure that households can allocate sufficient resources, taking into account unforeseen costs.

At the time of the identification of the measures, there was no central resource accessible to vulnerable households experiencing energy-poverty in Hungary, only the renovations carried out under the Energy Efficiency Obligation Scheme (EEOS). In the two pilot areas, the companies involved in this scheme are not known, so REFLEX is supporting households by identifying and consulting those local and regional stakeholders who could join the EEOS.

Technical solutions

Recognising that professional support is limited and often unaffordable for vulnerable households in rural areas experiencing energy poverty, REFLEX provides targeted technical assistance through a simplified 'energy audit light' approach. This includes a door-to-door energy diagnostic to assess renovation options, an analysis of available financial support mechanisms and guidance on how to apply for the Rural Home Renovation Grant.

Social solutions

At the social level, forums for local households involving territorial LEADER associations, the municipality and local NGOs, could be used to explain the benefits of energy efficiency investments and the available financing opportunities to rural households.

Based on our experience, it is essential to provide targeted information to demonstrate the value and long-term benefits of continued energy efficiency upgrades to households experiencing energy-poverty. Moreover, those households that have already undertaken minor energy efficiency improvements, resulting in lower energy bills, often perceive no further need for additional investments. REFLEXs propose delivering information through participation in community events and dedicated social media campaigns, focusing on the advantages of energy renovation and clearly explaining the availability of financial resources and the related.

3.3.4 Recommendations for REER integration into national, regional and local policy

Below, recommendations for the integration of REERs at the different levels of government are summarised:

- **National level:** At the national level, targets and measures to help reduce energy poverty should be included in the National Energy and Climate Plan (NEKT). The correlation between energy efficiency and energy poverty can also be integrated into other policy documents. Ministries responsible for energy, environment and social policy could use them as a reference when designing long-term programmes for households experiencing energy poverty. Complementary and targeted financial support mechanisms including subsidies for households experiencing energy poverty, co-financing, and low-interest loans, with a special focus on socially vulnerable groups, are key financial solutions for energy efficiency in rural areas. The introduction of low-interest or interest-free micro-credits to allow for the gradual repayment of renovation costs could help this process. Detailed planning of the works, considering not only energy efficiency investments but also structural renovation or refurbishment of the building, can ensure that households can allocate sufficient resources, considering unforeseen costs. Based on the decision of the Hungarian Constitutional Court, a new Climate Act must be adopted by 30 June 2026, one that provides genuine solutions to both the causes and consequences of climate change. It is not enough to merely set targets - scientifically grounded, concrete, and implementable measures are required, along with genuine societal participation in their design and execution. The Constitutional Court ruled that the current Climate Act is unconstitutional, as it fails to protect our children and future generations and does not provide the necessary guarantees for effective climate action, thereby obliging the National Assembly to enact new legislation. Climate change is no longer a problem of the future - it is happening here and now. Hungary is particularly hard hit, as the Carpathian Basin is warming faster than the global average. Heatwaves, droughts, crop failures, and flash floods are becoming increasingly frequent. These events threaten not only nature but also our daily food supply, water resources, health, and homes. The future of our children and grandchildren, as well as a liveable environment, is at stake. The process initiated by civil society organisations provides an opportunity to ensure that issues related to energy poverty - whether concerning mitigation, adaptation, or resilience - are included in the recommendations formulated for the new legislation. In this regard, the Hungarian REEEs and the criteria they outline provide an excellent foundation.

- **Regional level:** Unfortunately, in Hungarian development policy, the territorial level - whether rural areas (LAGs), counties, or NUTS2 regions - plays only a limited role. The REER

can support the work of counties and LAGs if these actors decide, beyond the legally mandated tasks, to voluntarily take on initiatives addressing energy poverty, as was done within the RENOVERTY framework by the Bükk and SMB regions. Through its network and the projects, it implements - such as EPAH - Reflex works to familiarise territorial actors interested in the topic with these REERs, enabling their integration into the strategies and development programmes of other regions.

- **Local level:** Local authorities play a key role in the direct implementation of the measures outlined in the guidelines. They are most familiar with the specific needs of local communities and can adapt the guidelines to local conditions. By working with LAGs, NGOs and experts, municipalities can ensure the successful implementation of household energy renovation projects that can serve as models for other communities. Through its network and the projects, it implements - such as EPAH - Reflex works to familiarise local actors interested in the topic with the REERs, enabling their integration into local development programmes and documents. Reflex believes that this is the level at which it is most worthwhile to address the issue. Accordingly, it plans, taking potential funding opportunities into account and building on the REEEs, to develop smaller-scale projects in cooperation with municipalities. Within this framework, partner municipalities will be able to prepare their own roadmaps.

3.3.5 Replication potential and national scalability

Ensuring the replicability and scalability of the Hungarian roadmaps is essential for maximising their impact and making them accessible to all stakeholders involved in the renovation of rural households affected by energy poverty. Designing the REERs through a co-creation process ensures that they can be adapted to various local and regional conditions. As roadmaps can be implemented in different contexts, they enable a broader endorsement and a more significant contribution to the achievement of national energy efficiency targets. The roadmaps provide a step-by-step approach that can be tailored and applied to different communities, funding structures, and policy frameworks.

To ensure that the REER roadmap is widely adopted and effectively utilised, the following key steps have been outlined:

- **Stakeholder and territorial mapping:** It is essential to thoroughly understand the relevant stakeholders and territorial linkages at the local, regional, national and international level. Tools and guidelines must remain flexible and easily adaptable, while promoting cooperation to share best practices, support knowledge exchange, and effective implementation of solutions. This approach will ensure that the REER remains a

relevant and effective tool in tackling energy poverty while ensuring adaptation to the constantly changing social and economic environment.

- **Networking and presentation:** The introduction of REERs on the national level and to relevant organisations is crucial. These actors can facilitate adoption and replication through their networks, experience, and commitment to supporting the implementation of the recommendations of the REER.
- **Gathering feedback and national adaptation:** Incorporating feedback from local networks and institutions ensures that the roadmap addresses regional needs and supports its relevance and scalability on a national level.
- **Integration to national policies and strategies:** Integration of the roadmaps into national policies, strategies and initiatives through cooperation with competent stakeholders will institutionalise their role in addressing energy poverty.
- **Demonstrating impact:** Quantifying the expected social, economic, and environmental benefits is key to securing support of policymakers and stakeholders. Showcasing concrete outcomes such as energy savings achieved or cost reductions of rural households experiencing energy poverty will strengthen stakeholder commitment and illustrate the value of REER as an effective and compelling tool for broader adoption.

Through these measures, the REER roadmap can become a practical and adaptable tool, fostering the widespread implementation of energy-efficient and sustainable housing solutions for vulnerable households in Hungary.

3.4 Italy

3.4.1. Rural energy poverty in Italy

The RENOVERTY project selected the province of Parma as the Italian pilot site due to its representative rural characteristics and significant challenges related to energy poverty. Located in the heart of the Po Valley, Parma is part of one of Italy's most economically productive and densely populated regions. Despite its strengths in the agri-food and manufacturing sectors, the rural and mountainous areas of the province exhibit considerable disparities, especially in terms of infrastructure, accessibility, and the energy performance of residential buildings.

The pilot focused on assessing the energy condition of housing in less urbanised parts of the province, particularly in the municipalities of Fornovo, Solignano, Berceto, Bedonia, Tornolo, and Albareto. These areas are characterized by scattered settlement patterns, aging populations, and a large share of buildings constructed prior to the enforcement of energy performance

legislation in 1976. Many homes are poorly insulated and rely on obsolete heating systems, often using LPG, diesel, or wood due to limited access to the methane gas network.

To accurately map the current state of energy performance and needs, a total of 24 buildings were inspected, and detailed Energy Performance Certificates (EPCs) were issued. Just as in all other pilots, these assessments were complemented using the DREEM model, a simulation tool used to estimate the potential energy and financial impact of various renovation measures. The approach enabled the project team to propose tailored, technically feasible, and financially viable renovation strategies. The pilot thus served as a living lab to test and refine the REER methodology under real-world rural conditions.

3.4.2 Summary of challenges and identified barriers

The pilot area revealed a complex matrix of interrelated barriers that hinder energy efficiency upgrades in rural Italy.

Technical

From a technical standpoint, the predominant building typologies in Parma's rural areas, stone and brick houses often dating back to the early 1900s, pose significant challenges. These structures generally lack insulation and rely on outdated heating systems, making retrofitting both technically demanding and expensive. Moreover, the irregular forms and architectural constraints of these buildings further complicate the installation of insulation, new heating systems, or renewable energy technologies.

Legal

Legally and administratively, building renovation is often delayed or discouraged by Italy's intricate and time-consuming permit processes. Buildings located in areas with heritage or environmental constraints face particularly stringent requirements, which may discourage homeowners from initiating renovations. Additionally, navigating incentive schemes such as the Ecobonus requires specialized knowledge and administrative support, often lacking in smaller rural municipalities.

Financial

Financial constraints emerged as the most significant barrier, especially for vulnerable groups such as elderly residents, single-parent households, or families with irregular incomes. Many cannot afford the initial investment required for energy renovations, even when long-term savings are projected. Access to financing is uneven, with traditional credit channels often out of reach for low-income households. Even when subsidies exist, the complex application procedures and timing uncertainties act as further deterrents.

Social

Socially, the issue of energy poverty is compounded by a lack of awareness and trust. Many rural homeowners are unfamiliar with energy efficiency concepts or remain sceptical about the tangible benefits of retrofitting. Cultural factors also play a role, particularly in multi-family buildings, where consensus among residents is hard to achieve. Moreover, the temporary inconvenience and disruptions caused by renovation works (noise, dust, access restrictions) can discourage elderly or less mobile residents from participating in improvement initiatives.

3.4.3 Implemented and proposed solutions

To effectively address the complex set of barriers identified in the pilot area, a range of technical, financial, legal and community-oriented solutions were integrated into the roadmap. These interventions aim to facilitate future renovation processes and promote the uptake of energy efficiency measures among vulnerable rural households.

Technical Solutions

On the technical front, we launched a community tool-lending bank and RENOLABS to deliver structured 60–90-minute “quick win” sessions that combine hands-on demonstrations with practical guidance, covering the installation of heat-reflective panels, targeted sealing of windows and doors to reduce drafts and heat loss, and the effective use of plug-in energy meters to track consumption and identify savings opportunities. Each participant left with a small starter kit and access to shared tools, enabling immediate at-home application, follow-through on recommended measures, and ongoing peer support.

Financial Solutions

In terms of financial support, the roadmap outlines the use of existing incentive schemes as key mechanisms to reduce the financial burden on households. In cases where public subsidies are insufficient or difficult to access, the plan proposes alternative financing models. For those experiencing energy poverty or credit exclusion, the roadmap recommends engagement with third-sector organizations and microcredit institutions to provide additional support.

Legal Solutions

Furthermore, the roadmap emphasizes the importance of strengthening outreach and technical assistance. A proposal has been made to establish an information and advisory service, with both virtual and with weekly in-person support. This service would be connected to existing energy helpdesks in the region and offer tailored advice for both single-family and condominium dwellings.

Community Solutions

To foster behavioural change and community engagement, the roadmap proposes the launch of awareness campaigns targeting rural residents. These campaigns would include participation in local fairs, publication of informative content and the organization of public events to explain renovation benefits and processes.

Lastly, the roadmap calls for the promotion of Renewable Energy Communities (RECs) as a medium to long-term strategy.

Taken together, these proposed solutions form a comprehensive response to the technical, financial, social and legal challenges associated with rural energy renovation.

3.4.4 Recommendations for REER integration into national, regional and local policy

Below, recommendations for the integration of REERs at the different levels of government are summarised:

- **National level:** At the national level, the REER methodology aligns with Italy's NECP and Long-Term Renovation Strategy (LTRS), which aim to decarbonise the building stock and address energy poverty. REER can serve as a replicable model for targeting rural and vulnerable areas, using EPC data and pre-audit diagnostics. It should be integrated into the design of forthcoming national instruments such as the National Programme for Energy Renovation of Public and Private Buildings (PNRR follow-up) and inform the deployment of Just Transition Mechanism and Social Climate Fund resources. REER could also contribute to shaping future reforms of the Building Renovation Passport and the Minimum Energy Performance Standards (MEPS).
- **Regional level:** At the regional level, the REER is highly compatible with the Regional Energy Plan (PER) of Emilia-Romagna, which prioritises energy efficiency in existing buildings and the promotion of Renewable Energy Communities (RECs). The plan explicitly calls for interventions in inner and mountainous areas (*Aree Interne*), aligning closely with the Parma pilot experience. REERs can be institutionalised within the PER's implementation tools such as regional calls for energy retrofitting in low-income municipalities or technical assistance services. Moreover, integration with the Regional Strategy for Sustainable Development and the *Patto per il Lavoro e per il Clima* would ensure coherence across environmental, social, and economic pillars. Specific instruments, such as the Energy Helpdesk (Sportello Energia) network and the regional guarantee fund for green investments, could act as operational vehicles for REER dissemination and uptake.

- **Local level:** At the local level, the REER model can be integrated into the Sustainable Energy and Climate Action Plans (SECAPs) already adopted by many municipalities under the Covenant of Mayors. The municipalities involved in the Parma pilot can use REER as a practical roadmap for fulfilling their SECAP objectives on building retrofits and citizen engagement. Local administrations should also embed REER into their Municipal Urban Plans (PUGs) and building regulations by introducing context-sensitive renovation guidelines for historical and dispersed settlements. Furthermore, the establishment of inter-municipal consortia or unions (Unioni dei Comuni) to coordinate REER activities, such as joint calls for funding, shared advisory services, and collective energy communities, would greatly enhance scale and effectiveness.

Furthermore, based on the pilot experience in Parma, several concrete recommendations can be made for embedding the REER framework into broader policy strategies. First and foremost, the accessibility of financial incentives must be improved, particularly for households in energy poverty. This requires not only simplifying application processes but also expanding the eligibility criteria and allowing for more flexible financing mechanisms such as direct grants or advance payment options.

Secondly, regulatory simplification is essential. The renovation process must be streamlined through the creation of One Stop Shops that provide coordinated technical, financial, and administrative support. Permitting procedures, especially for buildings under architectural or historical protection, should be revised to allow for context-sensitive energy efficiency interventions.

Third, there is a strong need to institutionalise public-private and third-sector partnerships. Energy poverty cannot be tackled by the public sector alone. By involving banks, non-profits, local energy agencies, and ESCOs, a broader ecosystem of support can be created, ensuring that interventions are inclusive and socially equitable.

Another important policy direction is to accelerate the deployment of RECs. These can play a pivotal role in decentralizing energy generation and consumption, especially in rural areas where grid access is limited or unreliable. National and regional frameworks should support the creation of RECs through technical assistance, simplified licensing, and dedicated funding streams.

Finally, capacity-building and technical education must be prioritised. A shortage of qualified professionals capable of implementing high-quality retrofits is a growing concern. Continuous training programmes, certification schemes, and incentives for professional development will be crucial to meet the rising demand for energy renovations across Italy.

3.4.5 Replication potential and national scalability

The Parma pilot demonstrates a replicable model for addressing rural energy poverty through a comprehensive, place-based approach. The combination of technical audits, EPCs, simulation modelling via DREEM, and tailored intervention strategies provides a robust methodology that can be applied across Italy's diverse rural landscapes. By using real-world data to inform decision-making, the model ensures that recommendations are both effective and contextually appropriate.

Scalability is reinforced by the model's alignment with broader European and national goals, such as those enshrined in the revised EPBD, which mandates significant reductions in greenhouse gas emissions from the building sector. Italy's Integrated National Energy and Climate Plan (PNIEC) also outline ambitious targets for decarbonisation and energy efficiency, particularly in vulnerable regions. Moreover, the tools and procedures developed under RENOVERTY can be easily adapted to different governance levels. Local authorities can implement similar audits and awareness campaigns; regional governments can integrate REER recommendations into their climate and energy strategies; and national policymakers can draw on these findings to refine incentive schemes and regulatory frameworks.

The pilot also highlights the importance of engaging community stakeholders, including agricultural associations, local energy agencies, and civil society organisations. Their involvement not only improves outreach and legitimacy but also ensures that renovation efforts are embedded within the social and economic fabric of rural communities. Through this participatory and integrated approach, the REER model presents a viable pathway for scaling up energy efficiency interventions and combating rural energy poverty nationwide.

3.5 Portugal

3.5.1. Rural energy poverty in Portugal

Energy poverty in Portugal is a multidimensional and persistent issue, with rural areas being particularly affected. Several structural factors contribute to the high incidence of energy poverty in these regions. These include low household income, an aging population, inefficient building stock, and limited access to modern energy systems. Many rural homes were built before 1980, prior to the introduction of national thermal insulation requirements, and have never been upgraded. These buildings typically lack insulation, have inefficient windows and heating systems, and rely heavily on biomass such as wood for heating.

In the Coimbra region, which served as the pilot site for RENOVERTY in Portugal, energy audits conducted in two locations, Vila Nova de Oliveirinha and Arzila, confirmed that many buildings

fall into the lowest energy efficiency categories (D to F). The households audited exhibited poor thermal comfort, high energy use, and a heavy dependence on outdated heating systems. Most houses had no cooling systems at all. Additionally, these households are typically inhabited by elderly individuals or families with low income, who often lack the financial and technical means to undertake renovation projects. The situation is further compounded by the effects of rural depopulation and territorial inequality. As younger generations migrate to urban centres in search of better economic opportunities, the remaining population is often older and less resilient to economic shocks, making energy poverty a severe condition. Moreover, centralised policy making in Portugal often overlooks the specific needs of these territories, perpetuating cycles of vulnerability and underinvestment.

Nationally, it is estimated that over 660,000 individuals live in severe energy poverty, and Portugal consistently ranks among the EU countries with the highest levels of inadequate heating. The government's National Strategy to Combat Energy Poverty has set ambitious goals for 2030, but implementation will require structural changes, particularly in financing and administrative support mechanisms tailored to rural needs.

3.5.2 Summary of challenges and identified barriers

The RENOVERTY pilot in Portugal revealed a complex web of interconnected barriers that hinder vulnerable households in rural areas to implement energy renovation in their dwellings. These challenges are grouped into five major categories, described below.

Financial Barriers

The most significant barrier is the lack of available funding mechanisms for vulnerable households. Existing schemes typically require the beneficiary to pre-finance the intervention and seek reimbursement afterwards, a structure that excludes many who cannot afford upfront investments. Long waiting times, co-financing requirements, and unclear eligibility criteria further discourage participation. In addition, rural households face higher renovation costs due to transport distances, small market size, and limited contractor availability, while local financing options remain scarce. The high cost of energy audits, which are often a prerequisite for accessing funding, further compounds this issue. Moreover, even scarce, financial support for energy renovations has been largely aimed at all residential consumers, rather than tailored to the specific needs of those in energy poverty.

Administrative Barriers

Bureaucracy and lack of clarity in application procedures deter participation. Many rural households, particularly those headed by elderly individuals, are unable to navigate the complex requirements of energy renovation support schemes. These include proving property ownership, submitting technical documentation, and complying with regulatory procedures.

Legal Barriers

Legal and administrative barriers arise from complex and time-consuming procedures that make it difficult for vulnerable households to access public support. Application processes for renovation funding often require extensive documentation, such as property deeds or building permits, that many rural homeowners do not possess or find difficult to obtain. For older or less digitally literate citizens, the need to submit forms online or travel to administrative centres presents an additional obstacle. Furthermore, the lack of coordination between national programmes and municipal structures leads to inefficiencies and confusion among applicants.

Technical Barriers

Buildings in rural areas of Coimbra are often old and constructed with materials that make energy renovation more complex and costly. Many structures are built with single-layer brick or stone walls and have never undergone retrofitting. The absence of insulation, poor quality of doors and windows, and inefficient water heating systems are common. These factors result in long payback periods for energy renovations, further discouraging investment. In remote areas, the lack of trained installers, energy auditors, and qualified technicians limits the capacity to deliver renovation projects. Moreover, access to construction materials and specialised equipment is often constrained by poor logistics and distance from urban centres, which raises costs and delays implementation.

Social Barriers

Awareness of energy efficiency benefits and renovation opportunities remains low among the rural population. There is also a general mistrust of renovation programmes, partly due to past experiences with failed or poorly executed government schemes. Digital illiteracy and isolation are also important factors, particularly in aging communities that are less connected to support networks. Moreover, the relatively mild climate, in Portugal, and the habit of using an additional blanket or coat, hinders households to see energy renovations as an important need. Many residents are unaware of the potential benefits of improving their home's energy performance or of the financial and technical support available. The lack of accessible information channels, trusted intermediaries, and locally available advice further reinforces disengagement.

3.5.3 Implemented and proposed solutions

In Portugal, RENOVERTY used the co-creation approach to develop effective and realistic solutions tailored to the needs of rural households. This participatory process involved local actors such as LAGs (e.g. ADIBER and CoimbraMaisFuturo), parish councils, social organisations, and community associations, as well as a RES cooperative. Based on 20 energy audits and site visits, a set of technical and institutional measures was proposed.

Financial Solutions

In Portugal, the RENOVERTY initiative proposed a set of complementary financial solutions aimed at removing one of the main obstacles to energy renovation in rural areas: the lack of accessible and timely funding. The project's recommendations focused on eliminating the need for upfront investment, simplifying access to subsidies, and aligning national and local mechanisms to the real conditions of low-income and rural households. One of the main contributions was the formulation of policy inputs to the National Long-Term Strategy to Combat Energy Poverty, advocating for subsidy schemes that directly cover the cost of works, either through pre-financing mechanisms or by transferring funds directly to accredited contractors. This approach would replace the current reimbursement system, which effectively excludes the most vulnerable families. RENOVERTY also encouraged the adoption of simpler and longer application procedures with eligibility rules tailored to rural realities, where many homeowners lack formal documentation or easy access to municipal offices. At the municipal level, RENOVERTY's local work in Tábua and Vila Nova de Oliveirinha included exploring new collaborative financial models, such as Renewable Energy Communities (RECs), which could combine collective generation and shared self-consumption with household renovation measures to achieve sustained reductions in energy bills. Furthermore, actions were taken to encourage the coordination of aggregate purchases of energy efficient equipment and construction materials through collective procurement. The roadmap also recommended combining public and private sources of finance, including municipal funds, EU programmes such as the Recovery and Resilience Facility and the Social Climate Fund, credit lines from local banks, and microfinance initiatives. The creation of revolving funds managed at the municipal level, possibly linked to One-Stop Shops (OSS), was proposed to ensure continuous financial support and reinvestment in further renovations, enabling long-term sustainability of the funding ecosystem.

Technical Solutions

The technical recommendations for energy renovation in rural Portugal focus on ensuring that future interventions are practical, scalable, and adapted to local conditions, while guaranteeing quality and long-term impact. A priority is the standardisation of technical guidance and renovation roadmaps based on the experience from pilot audits. National and regional authorities should promote the systematic use of energy audits and Energy Performance Certificates as diagnostic and planning tools, ensuring that every renovation project begins with a clear identification of needs, priorities, and expected results. These audits should be publicly supported for low-income households to make them accessible across rural territories.

A second key recommendation is to prioritise low-cost and high-return interventions in national support schemes. Measures such as roof and loft insulation, airtightness improvement, replacement of single-glazed windows, efficient heating upgrades, and the installation of heat recovery systems should be incentivised as first steps in a progressive renovation approach. Policy frameworks should therefore promote phased renovation planning, allowing households to implement improvements gradually without losing access to support in subsequent stages.

This approach would be especially relevant in rural contexts where households face financial constraints and limited access to qualified contractors.

Another essential recommendation is the strengthening of local technical support structures. One-Stop Shops (OSS) should be expanded and empowered to offer not only administrative and financial advice but also technical assistance, including pre-diagnoses, cost estimations, and referrals to qualified professionals. Municipalities should consider mobile or itinerant technical services to reach remote households, ensuring that no resident is excluded from the renovation process due to geographical isolation. These OSS should also serve as data collection points to monitor the performance of implemented measures and feed into local and national renovation strategies.

Building a robust network of trained and certified professionals is also critical. Technical schools, vocational institutes, and regional energy agencies should coordinate with municipalities to develop specialised training programmes for installers, auditors, and small contractors focusing on rural building typologies and traditional construction materials. Certification and continuous education mechanisms must ensure quality assurance and promote trust among homeowners.

Finally, technical recommendations should extend to integrated energy solutions. The promotion of Renewable Energy Communities (RECs) in rural areas can complement renovation efforts by enabling collective generation and self-consumption of renewable energy, lowering operational costs and increasing resilience. Technical frameworks for RECs should therefore include guidance on the joint renovation of building envelopes and energy systems, fostering synergies between efficiency and renewable supply.

Community Solutions

A central recommendation is to foster the creation of local groups or community networks where homeowners can exchange renovation experiences, share tools and resources, and learn from others who have undertaken similar projects. These initiatives could be supported by municipalities, LAGs, or local associations and should promote peer learning through meetings, workshops, and community events. By encouraging collaboration and the pooling of small resources such as transport, tools, or technical expertise, these networks would strengthen social ties, build confidence, and spread practical knowledge across rural communities.

To sustain long-term change, a capacity-building strategy should be implemented, including training programmes for local intermediaries, such as social workers, municipal technicians, installers, and community leaders. These actors are essential multipliers who can translate technical and financial information into accessible advice, identify vulnerable households, and maintain close contact with residents throughout the renovation process.

Finally, promote the establishment of Renewable Energy Communities (RECs) as a way to address community and social barriers to renovation and energy transition. Beyond collective

self-consumption, RECs can serve as inclusive platforms for cooperation, helping residents jointly plan and finance energy improvements while strengthening trust and local engagement. Supporting municipalities and LAGs in facilitating these initiatives, through simplified administrative procedures, technical assistance, and seed funding, would enable communities to organise around shared goals, reduce individual effort and costs, and build the social cohesion needed for long-term energy resilience in rural areas.

Legal and Administrative Solutions

The legal and administrative recommendations for Portugal focus on simplifying regulatory procedures, clarifying institutional responsibilities, and ensuring that energy renovation support mechanisms are accessible to all, particularly to those in rural and vulnerable contexts. A primary recommendation is the streamlining and simplification of administrative procedures for accessing renovation incentives. Current funding schemes often involve complex documentation and digital processes that exclude households with limited literacy or internet access. Simplified application models (e.g. using standard forms, automatic data exchange between institutions, and reduced document requirements) should be developed, with the possibility of municipal verification in place of formal property records where necessary. This approach would make the process more inclusive while maintaining accountability and transparency.

A second key recommendation is the institutionalisation of One-Stop Shops (OSS) as the central interface between citizens, municipalities, and national authorities. OSS should be institutionalised as the primary access point for information, technical support, and administrative procedures related to home renovation, operating as both local service desks and coordination hubs. They should be the primary resource for assisting households in preparing applications, verifying eligibility, connecting with certified contractors, and monitoring implementation. In smaller municipalities or dispersed rural areas, itinerant OSS or shared inter-municipal structures can ensure territorial coverage. Establishing clear guidelines and stable funding for these offices is essential to guarantee continuity beyond project-based initiatives.

To ensure alignment and effectiveness, the roles and responsibilities across governance levels should be clearly defined. National authorities should focus on setting coherent frameworks, harmonising funding criteria, and integrating social and energy policies, while municipalities should be empowered to handle local outreach, data collection, and community engagement. Regional coordination bodies, such as energy agencies and regional development commissions, can facilitate knowledge exchange, provide training for local administrators, and ensure that municipal activities are consistent with national and EU objectives.

Another important recommendation is to remove legal and regulatory barriers that prevent vulnerable households from participating in renovation programmes. This includes adapting

eligibility criteria to ease the documentation burden, which often poses difficulties for older or less digitally literate citizens who must travel considerable distances to obtain the required papers. Without such adjustments, a significant share of the rural housing stock remains excluded from renovation incentives. Clear, socially sensitive guidelines for handling cases of shared or inherited ownership should also be introduced to facilitate access to public support.

Finally, better coordination and data integration between programmes is essential. A unified national digital platform should consolidate renovation support schemes, allowing municipalities and OSS to track applications, avoid duplication, and evaluate programme outcomes. Coordination between the National Energy Agency (ADENE), the Environmental Fund, and regional authorities would enable more coherent implementation of the National Strategy to Combat Energy Poverty and the Long-Term Renovation Strategy.

3.5.4 Recommendations for REER integration into national, regional and local policy

Below, recommendations for the integration of REERs at the different levels of government are summarised:

- **National level:** At the national level, the focus should be on creating an enabling framework that simplifies access to renovation programmes, targets vulnerable households more effectively, and ensures coherence between social, housing, and energy policies. The government should prioritise the design of dedicated funding mechanisms for low-income and energy-poor households, eliminating the need for upfront investment and avoiding reimbursement-only schemes that discourage participation. Subsidies should be structured to directly finance approved contractors or local authorities implementing works on behalf of beneficiaries. Simplified eligibility rules must also be introduced, reducing documentation burdens that are particularly difficult for older or less digitally literate citizens, who often must travel long distances to obtain the required papers.

  National authorities should ensure that all funding instruments, including the Social Climate Fund, Environmental Fund, Recovery and Resilience Plan, and future State Budget programmes, follow a coherent framework for addressing energy poverty in rural areas. This requires harmonising eligibility criteria, streamlining application platforms, and integrating energy renovation with broader social support policies such as 1.º Direito and housing rehabilitation initiatives. Furthermore, legislation should formally recognise One-Stop Shops (OSS) as central instruments for the delivery of renovation support, defining their core functions, minimum service standards, and stable financing lines.

The government should also address structural regulatory barriers that hinder vulnerable households' access to renovation funding. This includes adapting property documentation requirements, establishing procedures for verifying occupancy in cases where ownership is informal, and facilitating the regularisation of dwellings that remain outside formal registers.

- **Regional level:** At the regional level, the priority is to coordinate and align actions between municipalities, energy agencies, and regional development bodies to ensure coherent implementation of national policies while addressing local specificities. Regional coordination structures such as the Comissão de Coordenação e Desenvolvimento Regional do Centro (CCDRC) and regional energy agencies should take a leading role in developing technical assistance and training programmes for municipal staff, auditors, and installers. These programmes should ensure that rural municipalities have access to qualified professionals and can maintain renovation quality and efficiency standards.
  Regional authorities should also facilitate knowledge exchange platforms where municipalities can share experiences, best practices, and data from renovation initiatives. This cooperation would allow for a more consistent implementation of One-Stop Shops across the region and help smaller municipalities pool resources. Moreover, regional coordination should encourage integrated planning approaches, linking energy renovation with regional development, rural revitalisation, and climate adaptation policies.
  Another regional responsibility is to manage and support data collection and aggregation from municipal OSS and energy audits. This would enable better regional-level monitoring of energy poverty trends and renovation impacts, supporting evidence-based adjustments to programmes. Finally, regional institutions should help leverage European funds, assisting municipalities and social organisations in preparing applications and ensuring alignment with the priorities of the Regional Operational Programmes and the Common Agricultural Policy (CAP) instruments that promote rural sustainability.

- **Local level:** At the local level, municipalities, parish councils and LAGs play a crucial role in directly engaging with households and implementing practical renovation actions. Municipalities should take the lead in establishing and maintaining One-Stop Shops as local access points for citizens seeking renovation advice, financial support, or referrals to certified professionals. Where permanent offices are not feasible, mobile or itinerant OSS should be created to reach isolated communities. These help desks should coordinate with municipal technical and social services to ensure that vulnerable households are systematically identified and supported throughout the renovation process.

Local authorities should also promote community-based renovation models, including collective procurement of energy efficient equipment and construction materials at lower costs through

economies of scale. Partnerships with LAGs and cooperatives can facilitate these initiatives while reinforcing local economic activity. Municipalities can further support the establishment of Renewable Energy Communities (RECs) to complement renovation measures with local renewable generation and shared energy savings, particularly in villages like Vila Nova de Oliveirinha, where community structures are already active.

Another important recommendation is for municipalities and LAGs to prioritise capacity-building and awareness initiatives at community level. These should include targeted information sessions, home visits, and collaboration with schools, cultural associations, and local media to raise awareness about the benefits of renovation, efficient energy use, and available financial support. Municipalities should also ensure that social workers, parish technicians, and local volunteers receive basic training in energy literacy and can act as trusted intermediaries between households and administrative services.

Lastly, local governments should engage in continuous monitoring and feedback collection, using information from OSS and renovation projects to report progress to regional and national authorities. This bottom-up feedback loop will help refine support schemes and ensure that future programmes truly respond to the needs and capacities of rural populations.

To support implementation, Portugal should adopt the facilitator model tested under RENOVERTY, expanding the role of local NGOs, LAGs, and associations as trusted intermediaries. Finally, the legal recognition of informal housing in rural areas should be addressed to avoid continued exclusion from energy efficiency programmes.

3.5.5 Replication potential and national scalability

The pilot activities carried out in the Coimbra region demonstrated that the RENOVERTY Rural Energy Efficiency Roadmap (REER) methodology can be successfully adapted to different rural contexts across Portugal. The combination of detailed technical assessments, community co-creation, and strong engagement with local governance structures proved to be a transferable model capable of addressing the structural barriers that affect most Portuguese rural territories. The approach emphasised inclusivity and proximity, working through LAGs, municipal technical offices, and local associations, to reach vulnerable households in a manner that traditional top-down programmes rarely achieve. By integrating social and technical dimensions, the Coimbra pilot has shown that the REER process can bridge the gap between national energy policy and local implementation.

A key feature supporting replication is the co-creation process embedded in the methodology. The involvement of municipalities, LAGs, social services, and residents in jointly identifying priorities and solutions has strengthened ownership and local trust, ensuring that renovation measures correspond to the real needs of households. This participatory framework can easily be reproduced in other municipalities through regional One-Stop Shops (OSS) and itinerant

advisory services. The inclusion of Renewable Energy Communities (RECs) in the REER approach further enhances its adaptability and long-term sustainability. In Vila Nova de Oliveirinha, for example, the potential creation of a REC was explored as a means of combining household renovation with shared energy generation, an experience that can inform replication in other regions seeking to integrate energy efficiency with collective self-consumption models.

Portugal's rural regions share comparable socio-economic and demographic characteristics, such as aging populations, deteriorated housing stock, low population density, and limited access to financing or qualified professionals. These commonalities make the REER model highly applicable on a national scale. Its flexible structure allows for calibration according to local climatic conditions, building typologies, and available institutional capacity, without altering its core methodology. The lessons learned from Coimbra will directly inform new pilot activities in Pampilhosa da Serra and Penamacor, two municipalities that exemplify the conditions under which the REER can expand its reach.

3.6 Slovenia

3.6.1. Rural energy poverty in Slovenia

The Slovenian *Regulation on criteria for defining and assessing the number of energy poor households* defines energy poverty as "*a situation in which a household with an income below the at-risk-of-poverty threshold is unable to meet its basic energy needs due to inadequate housing conditions or the inability to meet these needs at affordable prices or the low energy efficiency of its dwellings. Basic energy needs include, in particular the costs of heating, hot water, cooling, cooking and lighting.*" To be eligible for energy renovation subsidies aimed at households experiencing energy poverty that are distributed by Eco fund (national fund for energy renovation) the household needs to be the recipient of state-provided social financial assistance (e.g. social assistance or protection allowance).

In 2024 energy poverty affected approximately 7.3% of households (around 63,000 households) and 5.2% of individuals (about 110,000 individuals) in the country [7]. The factors contributing to the risk of experiencing energy poverty are various: poor housing conditions, energy prices, geographic and climate factors, household characteristics (age, health…) etc. In Slovenia, the highest rate of energy poverty is experienced in single-person households with residents who are over 65 years of age [8]. Renters are also one of the more vulnerable groups, with an energy poverty rate of 16.2% among this segment of the population [9].

In Slovenia the Zasavje region, located in central Slovenia along the Sava River, was selected as a pilot area for the development of REER. In Zasavje, the levels of energy poverty are slighty

above the national level, affecting 8.8% of all households in 2024, which represents about 2,000 households or 3,000 individuals [10]. One of the reasons Zasavje was chosen as a pilot region is also that it is a former mining region faced with different challenges or just transition.

As a first step a total of 12 single-family, multiapartment and multi-family houses were audited in Zasavje, Slovenia to gain an understanding of the typical energy performance in this sample of homes[16]. Although the sample size is small, the audits provided insight into the typical energy performance of buildings in the area. To tailor renovation strategies to the specific characteristics of different housing types, four corresponding REERs were developed through a co-creation process with national and local stakeholders:

1. Single-family houses
2. Multi-apartment buildings
3. Rental dwellings
4. Colonies (former rental apartments constructed by coal mining companies in the late 19th and early 20th centuries to accommodate workers near factories and mines).

The REERs provide practical information to Slovenian households about the process of energy renovation, with an emphasis on available options for financing energy efficiency measures as well as enable local actors that have direct access to households to better guide them in the process of renovation, particularly in the early stages (contacting Eco fund coordinators, applying for funds, etc.) and promote structural improvements to energy renovation processes of households experiencing energy poverty by identifying barriers to energy renovations and proposing ways to address them that could be implemented by either national actors (ministries, Eco fund) or local governments.

3.6.2 Summary of challenges and identified barriers

Slovenia has implemented some efficient measures to combat energy poverty, which need to be further strengthened to reach those for whom they are intended. Slovenia has established a well-functioning renovation financing scheme for households affected by energy poverty, which is managed by the national Eco Fund (Eko sklad). Under the current public call ZER 2024 eligible households can receive 100% reimbursement for renovation costs (currently up to €18,000 including VAT). The public call also includes administration assistance of a coordinator, that helps the applicant through the process (submitting application, gathering proforma invoices etc.). Besides upgrading existing measures such as Eco fund subsidy program, there are also many unaddressed challenges that require attention from policy makers. Households experiencing energy poverty in **rural areas** face **different challenges and barriers to undergoing energy renovation:**

- **Awareness and access to information on financial support:** Households affected by energy poverty lack information about availability of subsidies intended energy renovation (ZER 2024), especially the assistance provided by coordinators.
- **Eligibility criteria for financial support:** There are materially deprived population groups who are not included in the state social support system, either because they refuse to request support or because they slightly miss the fulfilment of the criteria for the support, which are therefore not eligible for the Eco Fund subsidy, which covers 100% of investment costs (ZER 2024). Such low-income households struggle or are completely unable to finance energy renovations.
- **Limitation of available subsidies for renovation:** Eco Fund subsidy aimed at reducing energy poverty (ZER 2024) can cover some energy efficiency measures but considering the rising prices of materials and consequently of contractors, the amount can fall short of financing all necessary measures (e.g. window installation + roof and external wall insulation in single-family houses). The current support also does not cover the installation of heat pumps or solar power systems. Inclusion of households facing energy poverty in energy communities has been identified as one of the measures to tackle energy poverty as part of the National Action Plan for Reducing Energy Poverty but has so far not been implemented.
- **Tenants lack the capacity to carry out renovations** in the absence of ownership rights. There is a lack of coordinated measures or resources dedicated to reducing energy poverty in rental housing, particularly in the private rental sector.
- **Decision-making process in multi-apartment buildings:** To carry out energy renovations on common parts of multi-apartment buildings, agreement among the households in the building is required. For works that are considered maintenance works, more than 50% consent is needed; for construction work on common parts of the building that requires a building permit, 75% consent is needed (and in the case of a loan, even 100% consent is required), which can hamper the decision to undergo renovation work. Related to this obstacle is also the lack of motivation of managers of multiapartment buildings to promote energy renovation works among the tenants.

There are also other obstacles such as: illegally constructed buildings or parts of buildings that need to be legalized, limited availability of contractors, a problem that can be even more pressing in rural and semi-urban areas, and lack of quality assurance guidelines that can help with choosing contractors.

Addressing these issues is crucial to ensure that national targets for reducing energy poverty are met and that no household is left behind in the transition to energy-efficient living conditions.

3.6.3 Implemented and proposed solutions

Based on the REER co-creation process and input from local and national stakeholders, there have been multiple solutions identified by FOCUS, RENOVERTY's piloting partner in Slovenia, as ways of addressing challenges facing vulnerable households in implementing energy renovations.

Technical solutions

Slovenia's support for renovation in vulnerable households needs to continue and expand. Strengthening the promotion of funding opportunities, such as programme ZER 2024, through social work centres is needed to encourage uptake of renovation measures among vulnerable households. One-stop-shop (OSS) services need to be combined with outreach through centers for social work and other local social actors to better reach vulnerable households. Slovenia's ENSVET energy advisors can serve as OSS, but their visibility and accessibility must be enhanced through local engagement. It is also needed to support the inclusion of vulnerable households in energy communities, which is already a measure, outlined in Slovenia's Action Plan for Reducing Energy Poverty.

Financial solutions

Existing Eco Fund subsidies need to be increased to reflect rising renovation costs and allow implementation of more priority measures for energy renovation, working towards covering for a deep renovation of the dwelling of vulnerable families. Definition of energy poverty needs to be revised to include households that are currently not covered by national social support systems yet cannot carry the burden of energy renovation. Also, municipal funding needs to be considered, in addition to the national funding, to support energy renovation for the vulnerable people. The upcoming Social Climate Fund needs to include resources to enhance the existing subsidies, support tenant-focused renovations, ensure energy community participation, and improve the outreach. Finally, to increase the motivation of building managers, financial incentives can also be considered, whereby a smaller share of the investment in energy renovation would be allocated to the work of building managers.

Legal and administrative Solutions

Building managers play an important role in leading the decision-making process regarding energy renovations in multi-apartment buildings. Legislation could stipulate that managers of multi-apartment buildings must actively inform residents about the possibilities of energy renovation and creation of energy communities. Targeted measures for tenants in private rentals should be stimulated, in coordination between housing, energy, and social ministries, including the Ministry for a Solidary Future, which oversees housing issues. The OSS rollout needs to be strengthened, and OSS related activities and projects (e.g. LIFE Renov-AID) need to be designed with vulnerable households in mind.

Social and Community Solutions

Local campaigns to promote energy renovation benefits and Eco Fund support need to be strengthened and led by trusted community actors such as social workers, healthcare professionals, and humanitarian organizations. As these local actors not only often lack knowledge on energy poverty and on Eco fund subsidy programs, but there is also a lack of knowledge transfer and collaboration among these local actors when it comes to energy poverty specifically, platforms for knowledge sharing among local actors need to be built to improve identification of vulnerable households and dissemination of funding information. Targeted education also needs to be provided to local actors on energy poverty and available financial mechanisms to strengthen their role in outreach and support. In addition, education and training of managers on the advantages of energy renovation, renewable energy sources and energy communities would contribute to greater awareness and motivation of managers.

3.6.4 Recommendations for REER integration into national, regional and local policy

The REERs can provide useful content, recommendations and information for policy on the national as well as the regional and local level.

- **National level:** At the national level, SCPs, a prerequisite for accessing funds from the SCF, directly address the needs of vulnerable groups by financing targeted initiatives to alleviate energy poverty across the country. Since these plans are still in development, there is a strategic opportunity to advocate for the inclusion of measures highlighted in the REERs, such as: strengthening current subsidy program for energy renovations of households affected by energy poverty of Eco fund, financing energy renovation measures for tenants, inclusion of vulnerable households in energy communities, financing community outreach programs to increase awareness of available funding. RENOVERTY REERs are also an important tool for supporting EPBD implementation in Slovenia. REERs can serve as an aid to ensure the effective implementation of the key innovations arising from the EPBD, in particular the National Building Renovation Plans and other measures such minimum energy performance standards, energy renovation passports, the operation of 'one-stop shops', the prevention of evictions due to rent increases after renovation (renovictions). A key systemic barrier identified in the REERs is the lack of support for energy renovations in (private) rental apartments. Addressing this issue will require the involvement of the Ministry for a Solidarity-Based Future and likely lead to policy amendments to the Housing Act and integration into the planned Real Estate Tax Act.

- **Regional level:** Regional actors (e.g. regional development agencies, local energy agencies) can use the guidelines as a starting point for planning and implementing energy retrofit programmes tailored to regional circumstances and needs.

- **Local Level:** Municipalities as the main local self-government units play a crucial role in the direct implementation of measures outlined in the REERs. With their deep understanding of community-specific needs, they are well-positioned to adapt the REERs to local contexts. By collaborating with **LAGs**, civil society organizations, and expert stakeholders, local authorities can effectively implement household energy renovation projects, creating replicable models for other municipalities.

3.6.5 Replication potential and national scalability

Scalability and replicability are critical factors in ensuring that the REERs are made available to all relevant actors. These principles ensure that successful strategies can be expanded and adapted to different contexts, reaching a larger population and creating a broader impact. When composing the REER, attention was paid that the document is composed in a manner to allow scalability and replicability.

The RENOVERTY project has highlighted co-creation as the foundation of successful policy design and implementation. Central to this process is the meaningful engagement of local stakeholders, including LAGs. With their deep roots in the community, trusted relationships, and nuanced understanding of local needs, local actors are well-positioned to champion and extend the reach of the REER approach, especially in engaging households to apply for funding for energy renovations.

REERs are more than just a technical blueprint. They are strategic tools capable of accelerating rural energy upgrades and addressing energy poverty. To ensure the wider reach of REERs the following key steps are proposed:

- **Fostering interministerial dialogue** on key systemic challenges to energy renovations (e.g. including households facing energy poverty in energy communities).
- **Strengthen the capacity of local enablers** (Centres for social work, humanitarian organizations etc.) by providing targeted energy renovation related training and expert guidance, and financial support to better enable them to distribute relevant information on energy renovations process directly to vulnerable households.
- **Foster continuous coordination** between national institutions (e.g., ministries), and local actors to ensure coherent policy and implementation.

3.7 Spain

3.7.1. Rural energy poverty in Spain

Rural territories face deep structural challenges that are not typically present in urban areas. For example, lack of basic infrastructure and services, from limited public transport options to poor digital connectivity. These limitations are based on the geographical situation but also demographic challenges like depopulation and an ageing population, which affects local economies and services available in rural regions. In addition, opportunities for young people in rural areas are also limited. The access to tertiary education in rural areas is less than half the EU average in urban areas. And this also happens with the economic matters: lower incomes, fewer job opportunities. These factors contribute to a clear barrier of lack of access to information. They have less qualified professionals in the region, and this make harder the possibility to implement a renovation project. Housing stock conditions, which is often older, less efficient, intensifies the challenge and increases household dependence on fossil fuels due to limited grid access. As a result, rural households in Spain consume up to 52% more energy than in the urban regions. But the situation is even worse since rural regions benefit less from renovation programs, with only 8.8% of renovation plans targeting rural areas. Therefore, in Spain, 36.4% of rural households experience energy poverty, which is more than the national average.

In Spain, RENOVERTY has been implemented in two regions: Osona County, since the beginning of the project and Lluçanes County, after their legal constitution in 2023. Despite constituting a new region, until 2027, the municipalities of Lluçanès will continue to be incorporated into the Osona County Council and will receive its services, which is why Ecoserveis, RENOVERTY's piloting partner in Spain, have integrated the solutions in both territories. Both regions are in inland Catalonia, and its main nucleus is La Plana de Vic, a structural depression surrounded by several mountain ranges. The region of Osona has a population of 167,506 inhabitants. It is made up of 42 municipalities with a very diverse population, from about 46,000 inhabitants in the biggest municipality, to less than 100 in the smallest one. Regarding the housing stock conditions provided by Socioeconomic Observatory of Osona, over a third of the building stock is older than 45 years, and only 15% of the energy certificates in 2024 make up grades A, B and C.

3.7.2 Summary of challenges and identified barriers

The list of barriers identified throughout the co-creation process was grouped into 8 categories, described below, with the challenges associated with them:

- **Financial, grants and subsidies:** Economic barriers were the great challenge for energy retrofitting, manifested in several different ways throughout the co-creation process. The

expenses associated with a renovation project are expensive and grants and subsidies are tools to cover the economic lag; however, both are also categorized as barriers in themselves. Despite having access to subsidies, the family is the one who must advance the money and, although there are different options for advances and even grants that cover 100% of the actions for vulnerable people, the retrofitting rates in Spain is very far from the European objectives.

- **Grant and subsidy procedures:** Grants are difficult to process and are often left waiting for requirements in the information to be provided. And if it is not complex enough, the documentation to be submitted can vary between one type of grant or another, generating a funnel between the planning of the retrofitting and the work to be carried out. The information does not reach rural areas in the same way as urban areas and, considering the characteristics of the audited families, although the information on grant and subsidies arrives, it is necessary to ensure that it is well digested and considers all the barriers that hinder retrofitting projects.
- **Lack of knowledge and mistrust in the sector:** How information arrives on what energy renovation is, what benefits are associated with it, what grants are available and who can benefit from them are questions that need to be addressed with citizens. Administrations, retrofitting offices, energy communities, property managers, and building retrofitting agents are all fundamental actors for empowerment in terms of energy. In energy-vulnerable groups, lack of awareness and mistrust are more pronounced.
- **Lack of support for families, agreements between property and rent, agreements between communities of neighbours:** The lack of interest or frustration of not knowing how to collaborate with the property owner to undertake home improvement measures is an important barrier. Even if families received all the information about energy renovation and agree that they want to renovate their homes, most of them live in rented accommodation or in neighbourhood associations, where some mediation is required, either with the property or with the rest of the community.
- **Aged sector:** During the co-design of the strategy, specialists in renovation projects expressed that the construction and installer sectors are aging and have few staff to execute current and upcoming works. In addition, the use of some materials in renovations requires a specific type of training. This represents another barrier when execution time exceeds, and the staff trained desists from proceeding.
- **Low coordination between actors:** There are many actors who participate in a retrofitting project as well as in each of the previous steps that households must go through before starting a renovation project. The communication around the renovation process is a challenge.

The barriers and major challenges are analysed considering their impact on rural areas and vulnerable groups. Most municipalities in the regions of Osona and Lluçanès are small, with less

than 5.000 inhabitants, with other major challenges such as demographics or the lack of infrastructure and services.

3.7.3 Implemented and proposed solutions

The Spanish REER groups the actions for rural energy poverty alleviation to be implemented into **7 categories of key measures**:

1. **Training and communication:** Measures aimed at improving the skills of professionals in the sector, including public administrations and professional associations, as well as citizens and organised groups, such as energy communities.
2. **The building retrofitting agent:** Measures that offer advice to families from the very beginning of any renovation process.
3. **Mobile Energy Retrofitting Office:** An energy retrofitting office to respond to the different needs of citizens in the field of energy renovation of homes. Within the framework of RENOVERTY, this category of measure specifies the need to create this office, being itinerant to reach the set of decentralised municipalities.
4. **Financing measures:** Measures that aim to respond to the economic limitation that families may feel when they want to start an energy renovation process. The fact sheets below focus on public funds and programs and on exploring ways of private financing in the region.
5. **Addressing the demographic challenge with energy renovation:** The region of Osona is made up of several municipalities with demographic challenges, namely being rural areas where depopulation occurs. The roadmap aims to turn this challenge into an opportunity, promoting alternative housing models that focus on the energy retrofitting of homes while promoting rural life.
6. **Active promotion of energy retrofitting in the region of Osona:** This category of measure aims to promote energy retrofitting in an active way in the region, with actions that touch the legal leg such as the updating of the current strategic development plans of local entities to put the energy retrofitting of homes on the political agendas or economically including energy efficiency criteria for the setting of the rental price in homes.
7. **Energy communities at the service of energy renovation:** The region of Osona has become a benchmark as a promoter of the energy transition thanks to energy communities, an initiative that is already a reality throughout the territory and that has been organized as a second-degree cooperative by pooling services. That is why energy communities can play a fundamental role in the context of energy retrofitting. These communities allow groups of people, companies and other entities to collaborate to generate, store, share and consume energy together, promoting the use of renewable energy sources and improving energy efficiency at the local level.

These categories were defined as possible solutions to the barriers identified and described. Finally, **actions were selected for implementation** during the project, each **addressing a different level (technical, financial, legal and community).** These actions which are aligned with the REER and can be understood as result of its general policy recommendations are divided in different solution levels were:

Technical solution

The design and implementation of a pilot itinerant regional energy renovation office in the territory have proven to be successful in many other regions and can be led by one of the LAGs in Osona. The office offers support to citizens, with special focus on families with energy vulnerability, covering the entire process. The ECs can act as information and advice points - either through trained volunteers (with the support of Local Energy Agency from Osona and on training), or, in the medium term, through joint professional services. This can make the service reach even small or dispersed municipalities. The inclusion of local groups is key to ensure their sustainability.

Legal and policy solution

The activation of support and promotion mechanisms for energy renovation aims to ensure that municipalities access available technical and financial resources through coordinated action across all governance levels — local, regional, national, and European. The Spanish pilot is mapping existing support mechanisms and collaborating with stakeholders to introduce new measures that promote energy renovation for vulnerable groups. The actions done and proven successful include a meeting with Ministry for Ecological Transition and Demographic Challenge and another Barcelona Provincial Council, and the participation in Official Public Participatory Process of two different policy plans.

Also, the promotion of social rent aims to increase the renovation of buildings in poor condition or in disuse by allocating them to social rent to tackle energy poverty. It proposes an alternative housing model based on a rental with assignment of use, with the City Council acting as an intermediary. The objective is to identify owners of properties in poor condition, regardless they hold a certificate of occupancy, and encourage them to transfer the property temporarily to the City Council free of charge. In return, the municipality undertakes the energy renovation of the dwelling. Once the refurbishment is complete, the City Council offers the property for social rent during the agreed period of transfer. When this period ends, ownership is returned to the original owner, who can then decide how to use the property moving forward.

Financial solution

The financial solution proposed is the implementation of a collective purchasing of energy resources and renovation services. This initiative allows several people or entities to come together to acquire products or renovation services jointly, thus achieving better conditions and

more competitive prices. This is a strategic measure to address economic and management barriers, which are very relevant in Osona. This strategy is also key to increasing the positive impact and long-term sustainability of Energy Communities (ECs) through the diversification of services. It allows the EC, with a diverse social base, to join forces to obtain better economic conditions, access a greater variety of suppliers and guarantee a more rigorous monitoring of the purchasing and installation process. The measure is led by OECoop (Osona Energy Cooperative), which supports all Energy Communities in the region. OECoop is currently developing an energy renovation business model for use by these communities, starting with the municipality of Sant Pere de Torelló.

The Local Energy Agency shared experiences of collective initiatives already existing in the region (such as the aggregate purchase of biomass or photovoltaic installations) and have contributed to designing a model that is flexible, replicable and easy to adapt to the capacities of each CE. This action reinforces the role of the CE as a platform for savings and efficiency.

Community solution

The peer-to-peer renovation lab recognizes the great potential of ECs as local speakers and local testimonies to reach segments of the population often disconnected from institutional campaigns. ECs can generate adapted informative materials and carry out workshops, conferences and training actions nearby, from a perspective of trust and community. In Osona, this action fits fully with the reality of several ECs that are already active and have the capacity for territorial organization.

3.7.4 Recommendations for REER integration into national, regional and local policy

The participatory and context-based approach of the RENOVERTY project offers valuable insights for integrating the Regional Energy Renovation Roadmap (REER) into multilevel policy frameworks. To ensure its effectiveness and replicability, the following recommendations are proposed according to the scale of governance.

National level

- **Adapt national plans to rural realities including renovation approach:** MITECO (Ministry for Ecological Transition and Demographic Challenge) is working on the development of the Social Climate Plan and the new National Strategy against Energy Poverty to be published this 2025. The Ministry is also working on the National Renovation Housing Plan and opened a public consultation as it is referred in the EPBD Directive. The experience of RENOVERTY can inspire measures to promote the scalability and replicability of the REERs in these plans. It's also important to identify new opportunities to integrate REERs recommendations in future strategic plans.

- **Establish dedicated national financial instruments for vulnerable groups and rural areas:** Create specific funding schemes at the national level to support building renovation in territories facing demographic challenges and energy poverty. These funds should consider the higher barriers faced in rural contexts and aim to ensure equity in the implementation of the EPBD.
- **Integrate the REER methodology and results into the national EPBD implementation framework:** National policies should incorporate the key findings and actions from the REER process to reflect real-life challenges and opportunities in rural regions. This includes acknowledging the importance of technical support, community engagement, and tailored renovation pathways. Doing so will ensure that the EPBD is not applied with a one-size-fits-all approach, but in a way that aligns with the needs of less-urbanised regions.
- **Support the replication of co-creation-based renovation roadmaps in other rural regions:** Allocate national funding or technical assistance to promote the development and replication of the Renoverty co-creation methodology in other rural areas. This will foster inclusive planning processes, improve ownership of the measures among local stakeholders, and ensure more efficient implementation.

Regional level

- **Adapt regional plans to rural realities including renovation approach:** Catalan Government is working to develop the PINNECAT 2023 Plan, the Energy and Climate Integration Plan in Catalonia. The experience of RENOVERTY can inspire a measure to promote the scalability and replicability of the REERs in these plans. It's also important to identify new opportunities to integrate REERs recommendation in future strategic plans. Also, it's important to focus on Osona's existing plans, such Neo Osona Transition, which proposes to reduce CO2 emissions by 40% before 2027 through various actions and try to use REERs recommendation that could help to accomplish its objectives.
- **Deploy regional funding and technical support mechanisms adapted to rural contexts:** Regional governments should operationalise national strategies through financial and advisory programmes that are tailored to the specific needs of their territories. This includes supporting one-stop-shops, energy renovation offices, and collective purchasing schemes, with particular attention to vulnerable households and depopulated areas.
- **Build on existing local knowledge and community-led initiatives**: Regional authorities should recognise and scale up the work of local actors already engaged in energy transition efforts, such as energy communities, cooperatives, and social organisations. For example, models developed by OECoop in Osona can inspire replication in other parts of the region.

- **Coordinate regional awareness and training initiatives**. Develop public campaigns and training programmes targeting both citizens and professionals in coordination with municipalities and local entities. These initiatives are key to increasing demand for renovation and improving the quality and accessibility of services in rural areas.

Local level

- **Involve local actors in the design and implementation of renovation policies**: Municipalities should work closely with social services, local action groups, cooperatives, and community organisations to ensure that policies respond to local realities. These actors have deep territorial knowledge and trusted relationships with citizens, making them essential for inclusive and effective implementation. The REER model can be also integrated into the **Sustainable Energy and Climate Action Plans (SECAPs)** already adopted by many municipalities under the Covenant of Mayors.
- **Promote stakeholder coordination platforms**: Local governments should facilitate and institutionalise spaces for collaboration between different actors involved in renovation, such as housing offices, social services, energy cooperatives, and community representatives. These platforms, especially when built through co-creation processes, can ensure the implementation of renovation strategies.
- **Develop integrated renovation services at the local level**: Invest in or support local offices that provide comprehensive renovation support, especially in small or dispersed municipalities. These services should guide citizens, ensuring accessibility for vulnerable populations, throughout the entire renovation process.

3.7.5 Replication potential and national scalability

The REER methodology could be replicated in other rural regions. The most important aspect of REER's success lies in its co-creation methodology, which has brought together various stakeholders and local citizens to understand the renovation challenge, identify barriers, and co-create solutions. This process not only fosters active engagement from all parties involved but also makes it possible to replicate the approach in other regions. By using the same co-creation model, new REERs can be developed that address the specific needs of each territory, ensuring that proposed solutions are relevant and effective.

One of the key enablers of the project's success is the active involvement of local actors during the co-creation process and the implementation of the REERs' measures. Due to their established networks, trust within communities, and a deep understanding of local challenges, local actors act as effective facilitators and replicators of the REER methodology. In the case of Osona, there are two key enablers: the LAGs and energy communities. Both have extensive local knowledge, and energy communities also have a close connection with citizens to empower them in energy renovation.

4. Scalability of the RENOVERTY methodology at the EU level

As EU Member States prepare to implement their Social Climate Plans under the new Social Climate Fund (SCF), the REER approach offers a timely and field-tested methodology to guide effective and just use of these funds. SCPs are required to focus on vulnerable households and provide support for building renovations, particularly those in poor energy condition. RENOVERTY's localised and co-created REERs directly contribute to these aims.

Similarly, NECPs, which outline Member States' contributions to EU energy and climate targets, must now place greater emphasis on social aspects and rural development, especially in light of the revised EED and EPBD. RENOVERTY's findings and roadmaps provide relevant evidence and tools for:

- Target setting and policy design,
- Enhancing renovation strategies for the worst-performing buildings, and
- Designing monitoring mechanisms to track the implementation and progress of socially just transitions.

Successful replication of the REER methodology across the EU will require:

- **Institutional support and mainstreaming:** Member States should incorporate the REER process into renovation programmes and planning tools, recognising its added value for engaging and prioritising rural and vulnerable populations.
- **Capacity-building:** Regional and local authorities, civil society organisations, and intermediaries (e.g., LAGs, NGOs, OSSs) need empowerment, including technical assistance and adequate financial resources, to engage effectively in co-creation and implementation efforts.
- **Political commitment:** National governments must recognise the specificities and challenges of rural energy poverty and integrate targeted solutions into overarching climate, housing, and energy frameworks to ensure that rural households are not left behind.
- **Peer learning:** Sharing experiences and best practices between regions and countries can support smoother adaptation of REERs to different administrative and socio-economic contexts.

- **Dedicated EU funding:** European funding instruments, such as Cohesion Policy programmes, LIFE, Horizon Europe, should include specific calls and budget lines for testing, adapting and scaling up REERs in different Member States and regions.
- **Monitoring and evaluation framework:** The European Commission should promote a common indicator set (e.g. reduction of rural energy poverty, participation of vulnerable households, renovation depth) to enable consistent monitoring and comparison of REER outcomes across Europe.
- **Enhanced EU-level technical assistance:** Existing instruments, such as ELENA or LIFE Clean Energy Transition, should be reinforced and expanded to provide hands-on guidance, training, and facilitation support for local and regional actors applying the REER methodology.

The REERs also promote the co-creation of measures tailored to local realities. This participatory approach fosters community buy-in, ensures that renovation measures match local needs and priorities, and improves targeting of funds. Institutionalising co-creation within national renovation schemes will be a critical enabler for wide-scale uptake.

Moreover, the REER model aligns with Article 15 of the revised EPBD in practice, as it mandates that Member States ensure the renovation of the worst-performing buildings and promote the inclusion of vulnerable households in building upgrades. Article 15 specifically calls for targeted renovation measures for these groups and increased access to technical assistance, awareness-raising, and advisory services.

If adopted more broadly, the REER model could thus serve as a practical tool to support the implementation of Article 15 of the revised EPBD. Specifically, it offers the potential to:

- Develop **localised renovation roadmaps** that are aligned with national energy performance targets and priorities.
- Focus on the **worst-performing buildings**, which are often overlooked by conventional renovation programmes.
- **Empower vulnerable and low-income households** by simplifying access to renovation support and reducing procedural complexity.
- Lay the groundwork for **renovation passports**, as promoted under the EPBD, by providing structured, step-by-step renovation planning tailored to household needs.
- This approach could help bridge the gap between policy ambition and practical implementation - particularly in rural and peri-urban contexts.

By aligning REERs with EPBD implementation, Member States can bridge the gap between legislative ambitions and on-the-ground realities - ensuring that no household or territory is left behind in the energy transition.

5. Key policy recommendations from RENOVERTY pilot countries

Addressing the building renovation of households experiencing energy poverty in rural areas requires a comprehensive set of policies implemented in coordination and collaboration among different stakeholders to achieve tailor-made solutions addressing the specific needs of the local communities.

At the EU level, the Clean Energy for All Europeans package includes several provisions on energy poverty. Recently revised EPBD (EU/2024/1275) notes that according to Eurostat energy balances and EEA Greenhouse Gas Inventory (2023), 85% of EU buildings were built before 2000 and amongst those, 75% have a poor energy performance. Acting on the energy efficiency of buildings is therefore key to saving energy, reducing bills for citizens and small enterprises and achieving a zero-emission and fully decarbonised building stock by 2050.

The revised directive facilitates more targeted financing to investments in the building sector, complementing other EU instruments and fighting energy poverty by supporting vulnerable consumers. Member States must ensure that at least 55% of the decrease in average primary energy use is achieved through the renovation of the worst-performing buildings. This is also related to the energy savings obligation Article 8 under the EED, which also includes a focus on households experiencing energy poverty - as to save more energy, buildings must become more efficient. The revised EED (EU/2023/1791) also puts a stronger focus on alleviating energy poverty. It aims at empowering consumers through stronger requirements for EU countries to raise awareness and provide information on energy efficiency.

It also emphasises the creation of one-stop shops, technical and financial advice and consumer protection via out-of-court mechanisms for the settlement of disputes. Furthermore, it includes improved regulations to identify and remove barriers related to split incentives for energy efficiency renovations between tenants and owners or among multiple owners.

Based on RENOVERY findings, together with new and upcoming EU legislation, the recommendations in Table 11 for mitigating energy poverty in rural areas through renovation of the building stock have been identified.

Table 11. Key policy recommendations from RENOVERTY pilot countries

Policy Area	Common Barriers Identified	Lessons Learned from Pilots	Key Policy Recommendations	Countries Highlighting This
Technical	Poor building envelope, outdated heating systems, lack of technical support	Energy audits are a crucial entry point; tailored renovation guidance increases uptake	Fund and mandate local One-Stop-Shops (OSS); promote bundled renovations; prioritise worst-performing buildings	HR; IT; SI; ES; PT, EE
Financial	High upfront costs, limited targeted support for households experiencing energy poverty	Microloans and targeted subsidies are more accessible when tailored and co-created	Establish grant schemes with simplified eligibility; support energy communities as financing mechanisms; co-finance transport/logistics costs in remote areas	HR; HU; IT; ES; PT
Administrative/ Legal	Complex procedures, unregistered buildings, unclear eligibility	Legal counselling and simplified permitting are essential for vulnerable groups	Enable legalisation support for illegally built dwellings; streamline application processes; align national renovation programmes with REER methodology	HR; IT; ES; PT
Social & Community	Low awareness, aging population, mistrust in institutions	Local engagement builds trust and improves targeting	Institutionalise co-creation; engage civil society and local intermediaries; implement awareness campaigns via trusted local actors	HR; HU; IT; SI; PT

Governance & Integration	Fragmented responsibilities, limited rural focus in NECPs or building policies	Policy alignment increases impact; regional ownership supports scaling	Integrate REERs into NECP, SCP, and local housing strategies; mandate regional adaptation of national renovation goals; promote municipal energy poverty strategies	HR; HU; IT; SI; ES; PT
Scalability & Replication	Lack of trained local actors, low capacity for technical coordination	LAGs and municipalities are essential multipliers if supported	Encourage and fund LAG capacity-building for renovation facilitation; disseminate REER tools nationally	HR; IT; ES; PT

6. Conclusion

The RENOVERTY project has demonstrated that addressing energy poverty in rural and peri-urban areas requires context-specific, participatory, and multi-level approaches. Through the development of Rural Energy Efficiency Roadmaps (REERs), the project has shown how evidence-based, co-created, and adaptable tools can translate EU and national policy goals into practical solutions that respond to the realities of households experiencing energy poverty.

The findings from the seven pilot countries reveal both shared and country-specific challenges, including financial constraints, legal and administrative barriers, lack of information, and inadequate technical solutions. They also underline the need to strengthen targeted financial instruments, simplify administrative and legal procedures, institutionalise local intermediaries to improve outreach and trust, embed social criteria into renovation programmes, and support bundled renovation approaches that reduce costs and create economies of scale in rural areas. At the same time, the pilots have highlighted innovative pathways forward, from the role of Local Action Groups as trusted intermediaries, to one-stop-shops for advisory support, and bundled renovation projects that create economies of scale. These insights provide a valuable basis for replication and scaling across different contexts.

In practice, the successful implementation of measures requires strong synergies across technical, legal, financial and social/community dimensions. Although solutions are ultimately presented within four main categories, many of them are by nature transversal, since real progress typically depends on several types of interventions working together. For example, social and community actions often succeed only when supported by an adequate legal framework, stable funding programmes and the necessary technical expertise. Likewise, financial support mechanisms tend to have the greatest impact when there is strong community engagement and sufficient administrative capacity on the ground, while technical measures usually rely on enabling legal, financial and social conditions to be effective and sustained. Recognising and addressing these transversal interdependencies is therefore essential for achieving lasting results.

At the policy level, RENOVERTY has illustrated how REERs can support the integration of rural perspectives into existing and emerging frameworks, such as National Energy and Climate Plans, Social Climate Plans, and EU directives (EPBD, EED). By linking policy ambition with on-the-ground realities, the REER methodology bridges a critical gap between strategy and implementation.

While the project has generated valuable insights, certain limitations must be acknowledged. The number of energy audits, although significant for a pilot, was small in comparison with the magnitude of the challenge across Europe. The degree of engagement from national institutions

also varied across pilot countries, and the limited timeframe prevents the monitoring of long-term outcomes of REER implementation.

Looking ahead, future research and practice should focus on testing the replication of REERs in additional contexts, monitoring long-term impacts on reducing energy, and linking the methodology with emerging financing schemes such as the Social Climate Fund. The sustainability and scalability of the REER approach will depend on political commitment, adequate financing, and strong institutional cooperation at EU, national, regional, and local levels. Above all, it will rely on empowering rural communities themselves, ensuring that vulnerable households are not only beneficiaries but active participants in the energy transition. With the right support, REERs can become a cornerstone of inclusive, just, and effective renovation strategies across Europe, contributing to the shared goal of climate neutrality by 2050.

In summary, RENOVERTY's added value lies in its ability to connect European and national policy ambitions with the lived realities of rural households, providing a practical and participatory methodology that can be transferred, scaled, and adapted across different contexts. It has shown that inclusive renovation processes are not only possible but also essential to achieving a fair energy transition. This evidence should serve as a call to action for policymakers at all levels to take up the REER approach, integrate it into key policy frameworks, and ensure dedicated support for its replication. By doing so, EU can accelerate progress towards climate neutrality while guaranteeing that rural and energy-poor communities are at the heart of the transition.

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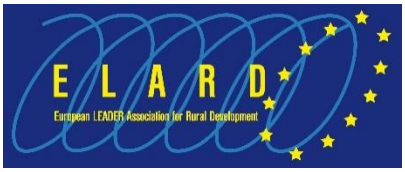

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