04/03/2025

Rural Energy Efficiency Renovation Roadmap for Vulnerable Groups (REER)

Regional Strategy of Osona and Lluçanès 2025-2035

Co-funded by the European Union within the framework of the GA 101077272 project. However, the opinions expressed are the sole responsibility of the authors and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the authority granting the subsidy can be held responsible for them.

Legal Notice

Published in 2024 by RENOVERTY.

Editorial team

TABLE OF CONTENTS

List of tables

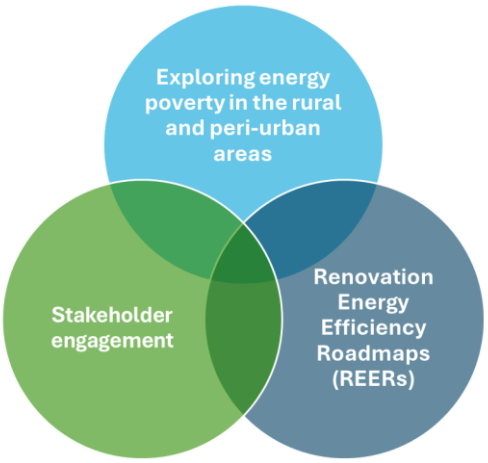
List of illustrations

List of charts

Summary

RENOVERTY (*Home Renovation Roadmaps to Address Energy Poverty in Vulnerable Rural Districts*) is a project co-funded by the European Commission whose regional objective is the design of a **Rural Energy Efficiency Roadmap** (**REER**) that offers guidance and solutions specific to the region of Osona to make the process of **residential energy renovation** more accessible to all citizens, thereby addressing the challenge of energy renovation by focusing specifically on the challenges and opportunities for rural areas and energy-vulnerable groups.

Illustration 1: Pillars of RENOVERTY



Source: RENOVERTY

The main pillars of the project contain concepts such as poverty which is correlated with vulnerability. The understanding of energy poverty in this REER stems from the general definition of energy poverty as set in the Commission Recommendation (EU): energy poverty is a situation in which households are unable to access essential energy services. In the Spanish Strategy against Energy Poverty, it specifies that energy poverty can be manifested in citizens through different indicators, such as the inability to maintain an adequate temperature at home, late payment of bills, excessively low energy expenditure or expenditure on energy supplies that is disproportionate to the level of income. A vulnerable consumer is defined as a consumer of electrical energy or thermal energy who is in a situation of energy poverty and may benefit from support measures established by the administrations.

This document is the roadmap for the promotion of solutions to increase energy renovations and decrease rural energy poverty in the region of Osona 2025-2035. It is a guide to local administrations in order to implement useful solutions to overcome political, economic and technical barriers. It is addressed to stakeholders surrounding energy building renovation in

rural areas with a focus on vulnerability, such as all levels policy makers, social services, utilities, contractors, ESCOs, public administration…
The methodology used for the roadmap's design places the agents of the territory at its center, thereby including citizens at the core of the methodology, allowing for their local energy and housing needs to be understood, and is consulted by experts in the field of the sector. For this reason, energy diagnosis and participation processes are developed based on the execution of energy audits for different families in the region along with the organisation of informative exchange sessions with citizens and relevant actors.

A selection of audits, conducted to gain an understanding of the typical energy performance in this sample of homes, was carried out at a technical level to obtain energy certificates for the households within Osona and Lluçanès. During these technical visits, experts and auditors also offer families, previously identified by social services, tariff advice on bills associated with domestic consumption and explain the benefits of energy retrofitting thereby providing additional social support to households.

The informative exchange sessions are based on a process of co-creation, through which the barriers faced by families exposed to energy poverty were identified, as well as the difficulties encountered in the day-to-day lives of vulnerable households by experts in the sector. Then, the information obtained from the local perspective is scaled to the national perspective, incorporating constructive criticism in each feedback session to achieve a comprehensive and inclusive roadmap within the territory that leaves no one behind. The document was analysed by the different actors participating in the co-creation, each providing their vision of how the suggested actions should be effectively implemented, ensuring that the strategy realistically addresses the real needs of citizens following each co-creation step.

Illustration 2. Categories of measures proposed during the REER co-creation

Source: Ecoserveis

The result of this process is this final strategic document and roadmap that offers (**1**) technical energy efficiency guidelines and solutions to be implemented by households based on the analysis of local housing and (**2**) addresses the barriers identified throughout the project, offering several main categories of measures (Illustration 2) with different actions to be implemented by relevant stakeholders for the alleviation of rural energy poverty (meant for stakeholders).

Collaborators in the preparation of the REER

This document is the result of citizen collaboration in the region of Osona and the participation of the territory's leading stakeholders in the co-creation process. Collaborations took place between local actors from the region of Osona, relevant stakeholders from the Catalan area and other territories. Below is the list of contributors to the co-creation process ordered according to their participation in the process:

Participation in local co-creation activities at the county level:

Osona County Council, Osona Local Energy Agency, Regional Housing Office, La Plana Commonwealth Social Services, Osona Social Action Consortium, Association for the Rural Development of Central Catalonia, Leader Ripollès Ges Bisaura Association, Association for the Integral Rural Development of the North-Eastern Zone of Catalonia, Association of Rural and Maritime Initiatives of Catalonia, Malla City Council, Tarsos Cooperative, Osona Energia Cooperative, Rockwool insulation manufacturers.

Participation in the co-creation of validation of the REER at the Catalan regional level:

Barcelona City Council, Barcelona Provincial Council, Department of Social Rights of the Generalitat de Catalunya, Vallès Occidental Regional Council, Housing Agency of Catalonia, Catalan Institute of Energy, College of Technical Architects of Barcelona, Code Architecture Studio, Efficient Energy Cluster of Catalonia, Real Estate Services Cluster, Be-Side business consultancy real estate services sector, Resilis Foundation, Social House Habitatge Social.

Participation in the co-creation of REER validation at the state level and other regions:

Government of Navarre, Local Housing of Navarra Nasuvinsa de Suelo y Vivienda, Enterprise Intiam Ruai, Celobert cooperative, Foundation Europace, Foundation Ecología y Desarrollo, Consortium Leader of Rural Development (Desarrollo Rural del Camp), LAG Grup d'Acció Local Rural Muntanya d'Alacant, Rural Development Association Desarrollo Rural Sierra de Cazorla, Rural Development Association Desarrollo Integral del Bajo Martín y Andorra-Sierra de Arcos, Rural Development Group Desarrollo Rural de la Sierra de Cádiz, Rural Development Association Desarrollo Rural Colectivo de Tierra de Campos, Rural Development Centre Desarrollo Rural Alcarria Conquense, Rural Development Association Tierra Estella de Desarrollo Rural, Rural Development Association Desarrollo de la Ribera Alta del Ebro, Association Costa da Morte, Federation of Associations for Territorial Development Desarrollo Territorial del Tajo-Tajuña, Rural Development Association Desarrollo Rural Sostenible RURABLE, Consortium Desarrollo de la Zona Media, Architecture Without Borders, Centre for Land Policy and Valuations, Polytechnic University of Catalonia (UPC).

1. Contextualization: RENOVERTY in the region of Osona

The EU building stock accounts for 40% of annual energy consumption and 36% of annual greenhouse gas emissions. Within the framework of the energy transition and the plans to mitigate climate change, the EU **requires extensive renovation** of buildings to ensure that its objectives are met [1].

To this end, the European Green Deal aims to improve the sustainability of the building sector mainly in two ways: firstly, by strengthening legislation related to energy efficiency and the energy performance of buildings; and, secondly, by promoting the electrification of end uses in the residential sector, together with the decarbonisation of the electricity sector. The EU's objective is the decarbonisation of the building stock by 2050, stated by the Energy Performance Building Directive.

The member states count with national strategies to deal with the decrease in consumption in buildings. At the Spanish level, the ERESEE 2020 roadmap mentions that with regard to the energy performance of the Spanish residential stock, it should be noted that almost **60% of Spanish homes were constructed before the first Spanish regulation that requires minimum energy efficiency**, which - in Spain, as in many other European states - was approved after the oil crisis at the end of the 70s (NBE CT 79 standard). The dwellings built between the 80s and 2007, although these must strictly comply with the minimums established by CT 79, their construction coincides with a context of growing family incomes and continuously falling energy prices, which means little attention to energy efficiency and lack of social awareness to climate topics [2].

Rural areas are more affected by the exodus to urban areas as there is an abandonment and **progressive deterioration of the existing rural residential stock** [3]. In addition, rural areas also suffer from a decrease in infrastructures and public services, since they are considered uneconomically unprofitable, as a minimum threshold of users cannot be covered, and thus disappear. The decrease in their productive capacity, their services and gentrification [4] make rural areas especially vulnerable to energy poverty and, therefore, they must be taken into account especially in the roadmaps for retrofitting [5]. The designing of a renovation **roadmap** must not only include solutions to improve efficiency in buildings, but also should highlight opportunities to **overcome political and social barriers at different levels** (household, municipal, regional and state).

With this vision, the **RENOVERTY** project was set up and seeks to promote the renovation of vulnerable rural districts and lay the foundations for increasing energy efficiency through the provision of Rural Energy Efficiency Roadmaps (REER) for housing renovation. The REERs are

written in accordance with the characteristics of the 7 pilot regions participating in the project and their households, with the collaboration of local actors, including Local Action Groups (LAGs), for the creation and implementation of these roadmaps. The REERs provide a comprehensive model and guidelines for household renovation as well as identify supporting policy actions, considering the pilots' different geographical and social contexts. The roadmap model can be replicated in other regions, offering support to scale project outcomes and guide other public actors in the renovation of vulnerable rural districts, after the project ends. With these results, it builds capacity and empowers all actors, both public and citizens in rural areas, to actively participate in the process of renovating vulnerable districts/buildings by identifying barriers and engage in co-designing activities with the collaboration of the public and private sectors.

In Spain, RENOVERTY is implementing a pilot in the region of Osona to test the measures recommended in the Spanish REER, hand in hand with the Ecoserveis Association, in close collaboration with the Regional Council of Osona, the Local Energy Agency of Osona and the three Local Action Groups that offer municipal services in the region: Association for the Rural Development of Central Catalonia, Leader Ripollès Ges Bisaura Association and Association for the Integral Rural Development of the North-Eastern Area of Catalonia.

Within the framework of the roadmap, work is being done in Osona and the Lluçanès region, although the document refers mainly to Osona. The legal constitution of the Lluçanès region is very recent (2023) [6], having incorporated its joint municipalities for a time as a sub-region within Osona. 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 we have integrated the solutions in both territories.

1.1. The region of Osona

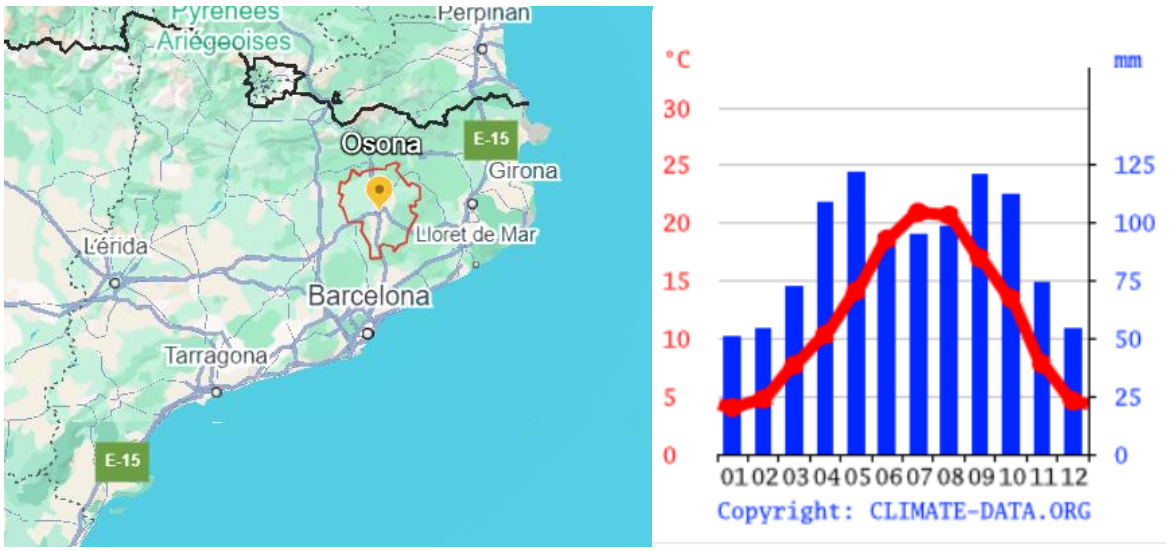
1.1.1. Geographical characteristics

Osona is a region located in inland Catalonia, bounded by Ripollès to the north, La Garrotxa to the northeast, La Selva to the east, Vallès Oriental to the south and Bages and Berguedà to the west. Its main nucleus is La Plana de Vic, a structural depression surrounded by several mountain ranges including the Pre-Pyrenees to the north, the Guilleries and the Montseny to the east, and the Moianès to the southwest. This plain has an average altitude ranging from 500 to 700 meters above sea level, and is characterized by fertile soils that favour agricultural and livestock activity. The region is crossed by the river Ter and its tributaries, which articulate a large part of its morphology.

Until 2023, a part of the territory known as the Lluçanès is considered within Osona. However, this plateau located between the regions of Bages, Osona and Berguedà, with altitudes ranging from 900 metres to the north and 450 metres to the south, is officially constituted as its own

region. The Lluçanès region stands out for its geological configuration of Tertiary origin, with Eocene materials that link with the first sub-Pyrenean folds to the north. This landscape, characterized by pastures, forests and crops, retains its own identity, now administratively recognized [7].

Illustration 3. Map from Osona (Catalonia) and Köppen-Geiger classification Vic (Cfb)



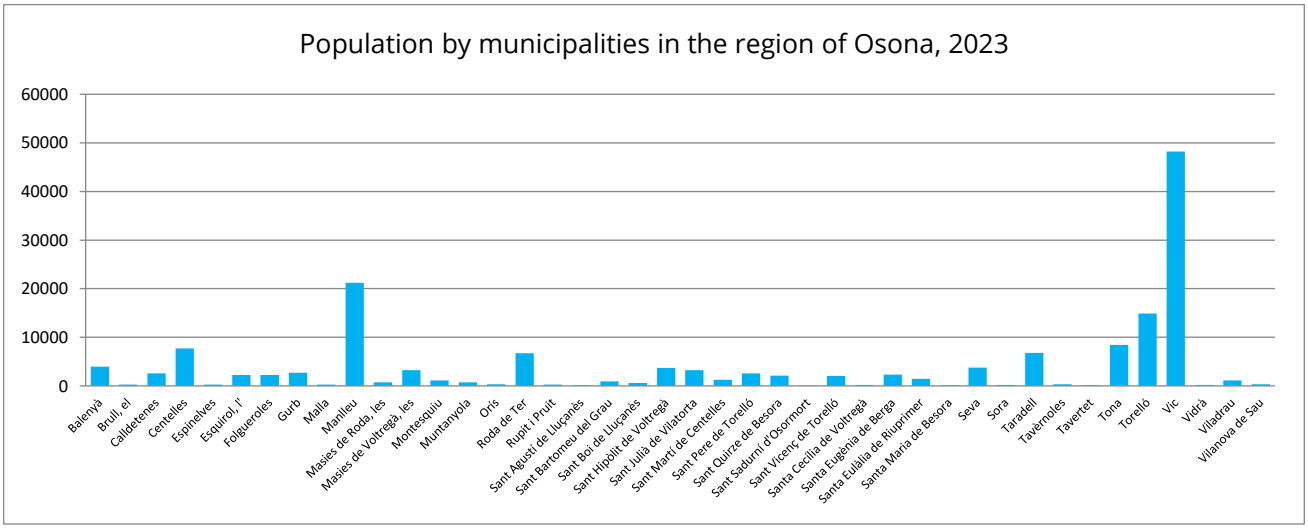
Source: Google Earth and Climate-Data.org

The climate of Osona and Lluçanès is Mediterranean with a continental influence and humid characteristics. In the higher areas of the north, such as the pre-Pyrenean areas, and in the east, which includes Montseny, Guilleries and Collsacabra, rainfall is significant and temperatures tend to be cooler. Rainfall is fairly evenly distributed throughout the year, although winter is the season with the least rainfall. Summer temperatures are warm in La Plana de Vic but more moderate in the higher areas. Winter is cold throughout the region, with frequent thermal inversions and persistent fog in the plains. In addition, the thermal amplitude is outstanding in the centre and west of the region, while frosts can appear in any season except in summer [8]. In the Köppen-Geiger global scale, it is classified as Cfb (oceanic mild climate) according to its mean annual temperature and rain cycle.

1.1.2. Population

The region of Osona has a population of 167,506 inhabitants [9]. It is made up of 42 municipalities with a very diverse population, from about 46,000 inhabitants in Vic to less than 100 in Sant Sadurní d'Osomort. The 25 most populated municipalities (over half) concentrate about 95% of the county's population, but account for only 44% of the territory, while 56% is distributed among the rest of the smaller municipalities. Of the total of forty-two municipalities, seven have more than 5,000 inhabitants, seventeen have between 1,000 and 5,000 and the remaining eighteen have less than 1,000 inhabitants, most of them being under 500 inhabitants.

Figure 1: Population by municipalities in the region of Osona



Source: Ecoserveis Association with IDESCAT 2023 data

1.1.3. Socio-economic characteristics

For the socioeconomic characterization of the region of Osona, four indicators of the Socioeconomic Observatory of Osona are analyzed [10]: the employed population, unemployed population, registered hires and as social indicators the average income and the % of population below the poverty line and at risk of social exclusion, comparing the values of the region with those of Catalonia.

In 2024, the region of Osona presents a more positive socioeconomic evolution in most indicators compared to Catalonia as a whole, registering a lower percentage of the unemployed population.

In terms of social indicators, there is also a positive result compared to Catalonia (2020 data), standing 3.63% above the average household income and registering 12.50% of the population below the poverty line and at risk of social exclusion compared to 16.60% in Catalonia.

According to the employed population indicators, of the total of 78,105 employed in the region, 45.11% are women and 54.88% men. Of this same total, 17.13% is foreign.

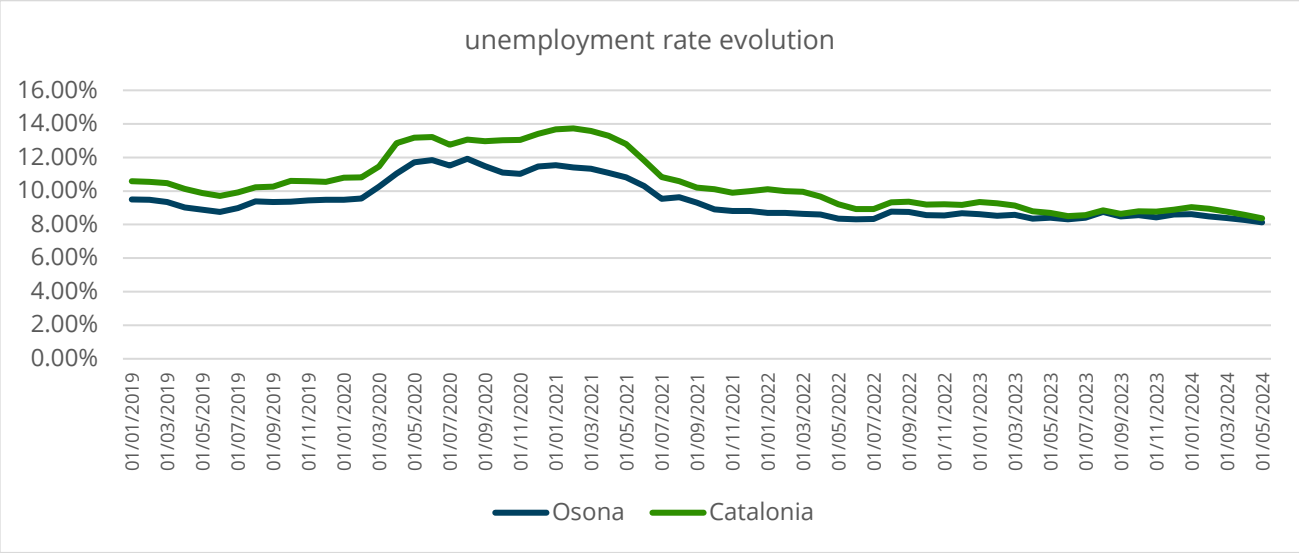
Classifying the employed population in the last quarter of 2024, 19% are under 30 years old, 32% are between 30 and 40 years old, 28% are between 45 and 54 years old and finally 21% are over 54 years old. The trend in Catalonia is similar, with 17% of the population under 30 years of age, 34% of those aged 30 to 40, 29% of those aged 45 to 54 and finally 20% of those over 54 years of age.

As for the registered unemployed population in 2024, 14% are under 30 years old, 28% are between 30 and 40 years old, 23% are between 45 and 54 years old and finally 35% are over 54 years old. The trend in Catalonia is very similar, standing at 13% of the population under 30 years

old, 29% between 30 and 40 years old, 24% between 45 and 54 years old and finally 34% over 54 years old.

The evolution of the unemployment rate in Osona compared to Catalonia has followed the same trend since 2019 but is always below, except in 2023 when it was almost equal (Figure 2). It should be noted that the Covid-19 crisis affected this trend, generating a very high increase in the rate, reaching an unemployment rate of 11.92% of the population in Osona compared to 13.22% in Catalonia.

Figure 2: Evolution of the unemployment rate in the region of Osona and in Catalonia



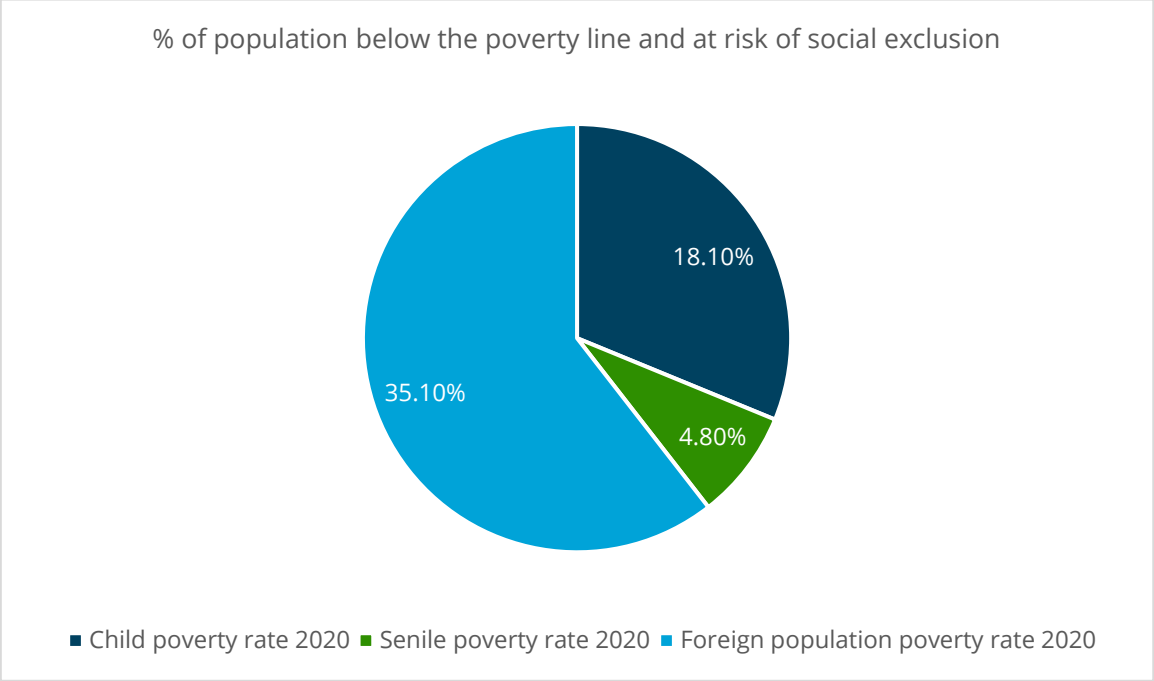
Source: Ecoserveis Association with data from the Socioeconomic Observatory of Osona

Comparing the evolution of hiring in the region and the unemployed population, a trend of peaks and decreases in hiring can be observed, while the curve of the unemployed is more stable. There is a higher trend towards temporary contracts than towards permanent contracts, which would generate this instability in the curve. Between the months of May and June 2021 and the months of March and April 2020, a funnel trend can be observed between the two curves, as a result of the Covid-19 crisis, where the correlation is an increase in the employed population directly linked to the reduction in hiring.

With regard to social indicators (Socioeconomic Observatory of Osona), the average income per capita in the region of Osona is lower than that of Catalonia (-1.22%), but higher in average income per household (+3.63%).

In Catalonia, 16.6% of the population was below the poverty line and at risk of social exclusion in 2020. In Osona, the value is smaller, standing at 12.50% of the population of the region. Within this 12.50%, 18.10% is the child poverty rate, 4.80% is senile poverty and 35.10% is the poverty rate of the foreign population.

Figure 3: % of population below the poverty line and at risk of social exclusion



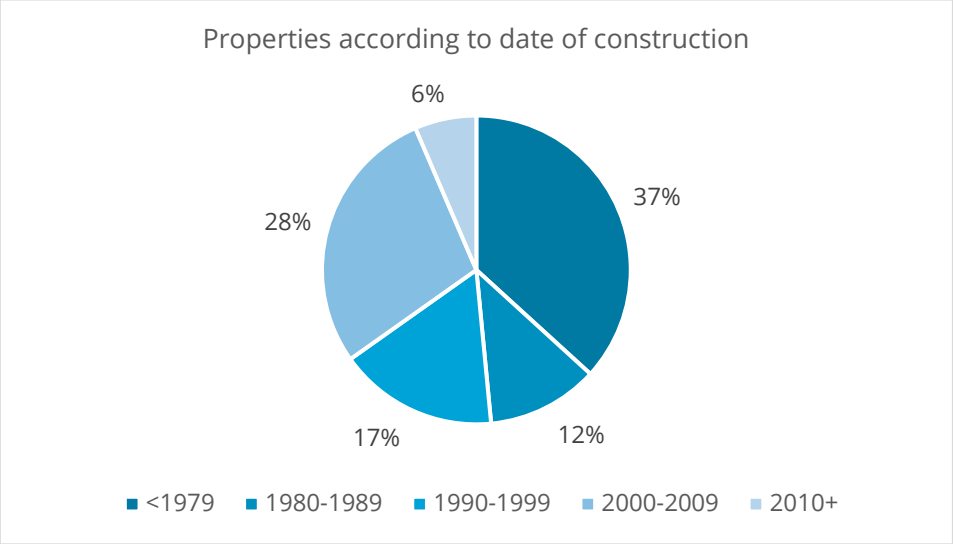
Source: Ecoserveis Association with data from the Socioeconomic Observatory of Osona

1.1.4. Characteristics of the housing stock

According to the Socioeconomic Observatory of Osona, considering that the Osona county includes the current county of Lluçanès, the housing stock was a total of 57,968, of which 43,041 were owned, 10,996 rented, 1,333 ceded and 2,599 under the "other forms of housing" tenure regime in 2011. In the region, there are approximately 200 social rentals, homes rented through the Social Rental Mediation Network. Sixteen requests to access social housing have been initiated to the corresponding authorities in 2023 and none have been formalised. The total number of applicants for subsidised housing is 1,245, with an increase of 200 more requests compared to 2022.

In 2024, properties according to the date of construction are classified as shown in the Figure below demonstrating that over a third of the building stock is older than 45 years.

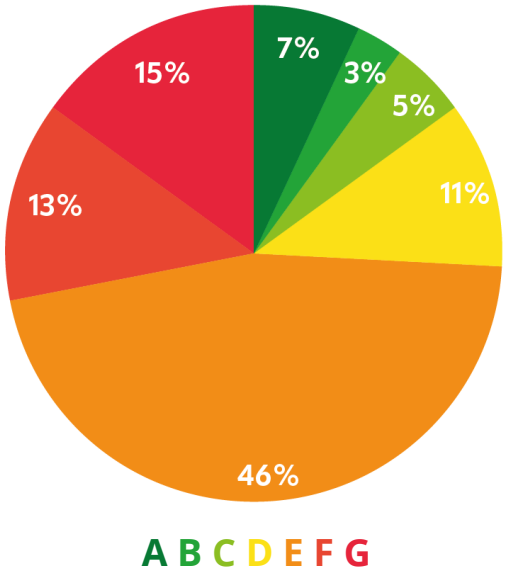
Figure 4: Properties in the region of Osona according to date of construction



Source: Ecoserveis Association with data from the Socioeconomic Observatory of Osona

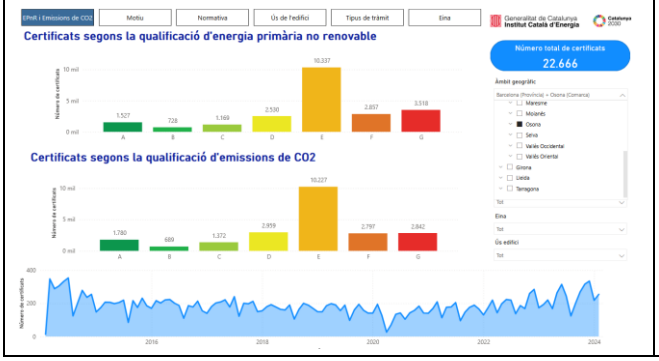
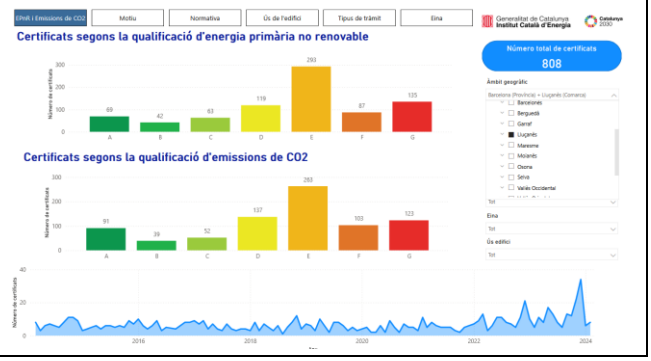
With regard to the energy rating of the housing stock, thanks to data from the ICAEN, it can be seen that the vast majority are very energy inefficient. The data corresponds to a total of 22,666 energy certificates in 2024. Of this total, 46% are graded with the letter E and 85% are between grades D and G. Only 15% make up grades A, B and C, of which only 6.7% were rated the best grades (with the letter A).

Figure 5: Energy ratings of homes



Source: Ecoserveis Association with ICAEN 2024 data [11]

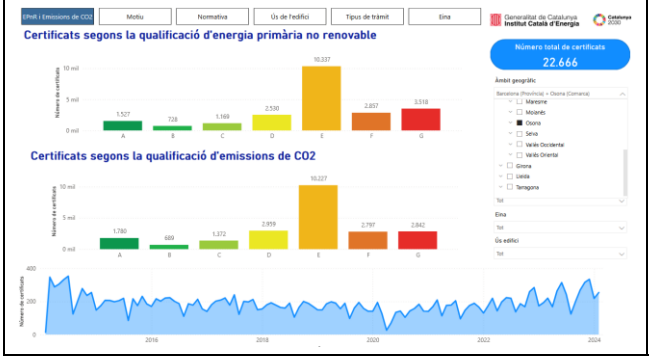
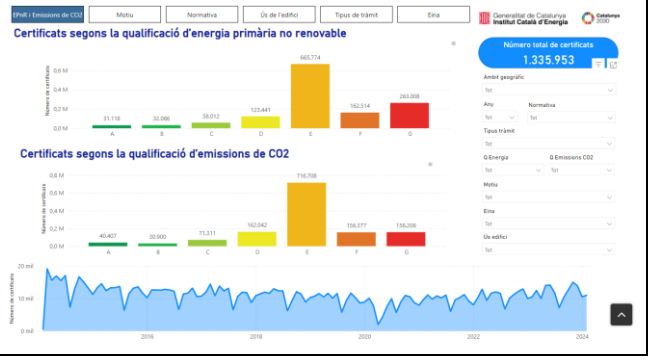
Figure 6: Certificates of Osona and Lluçanès, according to non-renewable primary energy and CO_2 emissions

Osona	Lluçanès
	

Source: Ecoserveis Association with ICAEN 2024 data [11]

In Osona and Lluçanès, there is a very similar proportion of energy ratings in the certificates, although in Lluçanès there is a greater number of ratings than in Osona. Compared to the situation in Catalonia, the relations are essentially similar, although Osona stands out for a higher proportion of G grades.

Figure 7: Energy certificates of Osona compared to Catalonia

Osona	Catalonia
	

Source: Ecoserveis Association with ICAEN 2024 data [11]

The geoclimatic situation of Osona requires adequate solutions to face the varied climatic conditions. Thermal insulation, the adaptation of enclosures and the integration of renewable energy systems are key elements to guarantee home comfort and energy efficiency of buildings in the region, where the thermal amplitude is significant and the possibility of frost only disappears during the summer.

1.2. Roadmap in Osona: work methodology

To prepare the roadmap, the methodology in Table 1 has been followed, divided into several phases of work.

Table 1: Work schedule

October – December 2022	January-March 2023	April-June 2023	July-September 2023	October-December 2023	January-March 2024	April-June 2024	July-September 2024	October-December 2024	January-October 2025
Phase 1: Data collection and contextualisation									
		Phase 2: Design of the energy renovation roadmap							
						Phase 3: Validation of the energy renovation roadmap			
								Implementation	

Source: Ecoserveis Association

Phase 1: Data collection and contextualisation

- Diagnosis of the state of the dwellings and the characteristics of the cohabitation units: Twenty energy and social audits of dwellings were conducted, a quantitative *Dynamic high-Resolution analysis of dEmand-sidE Management* (DREEM)[1] was performed based on average data from the twenty selected dwellings and an assessment was carried out to identify renovation policies, financing schemesand grant applicable to the territory. Specifically, the housing stock in the region of Osona was diagnosed, the existing territorial planning was studied (The Partial Territorial Plan of the Central Regions and some Municipal Development Plans) and European Directive 2024/1275 was reviewed.
- Identification of challenges with the territory's agents: Two workshops with citizens were organized to collect the barriers and opportunities that they perceive around home energy retrofitting.

In Phases 2 and 3, a strong participatory component is guaranteed: the design of the document is based on an in-situ technical and social diagnosis and a co-creation process. The co-creation process is developed with different work/exchange sessions and a wide variety of expert actors in the field, from the local to the national level. The sessions consider the two characteristic components of the roadmap: rural areas and energy vulnerability.

[1] A building simulation methodology explained in Section 2.2. DREEM model

Phase 2: Design of the energy renovation roadmap

- The co-creation process took place in the region of Osona involving local actors. It was based on two working sessions aimed at identifying the challenges and possible solutions to address the energy retrofitting of homes leaving no one behind. The working sessions present the information of the energy audits and the activities with citizens.
- The preparation of the first draft of the roadmap was divided into two parts: a first technical part with recommendations based on the results of the DREEM simulations and the reports of the energy certificates of the twenty audits, and a second non-technical part that proposes specific measures that help families in the region to overcome barriers in order to implement the recommendations.

Phase 3: Validation of the energy renovation roadmap

To achieve a local, applicable and scalable roadmap, the first draft of phase 2 was validated at three levels in three different working sessions, incorporating proposals for improvement after each session.

- Working session with local actors
- Working session with Catalan regional actors
- Working session with national actors and other regions

Once this roadmap was created, it is necessary to implement the identified measures. The measures were being subsequently applied to the drafting of this roadmap by the different actors, both local and national, and can range from retrofitting measures to administrative and technical support and advice to implement them.

1.3. Structure and considerations of the roadmap

1.3.1. Roadmap Structure

The roadmap is divided into two parts, the one that should be used by households and responds to the technical challenges of energy renovation and the one for stakeholders that addresses the non-technical challenges, which are equally necessary to address energy renovation in a territory.

- **Technical considerations for home renovation**

  This section offers the technical aspect of the energy renovation roadmap that can be implemented in homes to improve their energy efficiency. These proposals for measures are derived from the result of the technical reports of the energy audits and from the study carried out, with the same data, using *Dynamic high-Resolution dEmand-sidE Management* (DREEM) [12], a fully integrated, high-resolution upstream dynamic model that can incorporate key features towards the simulation of actions to incorporate

renewables and improve energy efficiency by responding to the demand of buildings. DREEM is able to identify the most suitable measures to be implemented, per pilot, based on data collected during the energy audit, and rank the measures according to specific criteria: cost effectiveness, energy savings, and so on. Finally, there is a section to plan the renovation, considering all the measures of energy improvement of both methodologies, the energy audit certifications and the DREEM model.

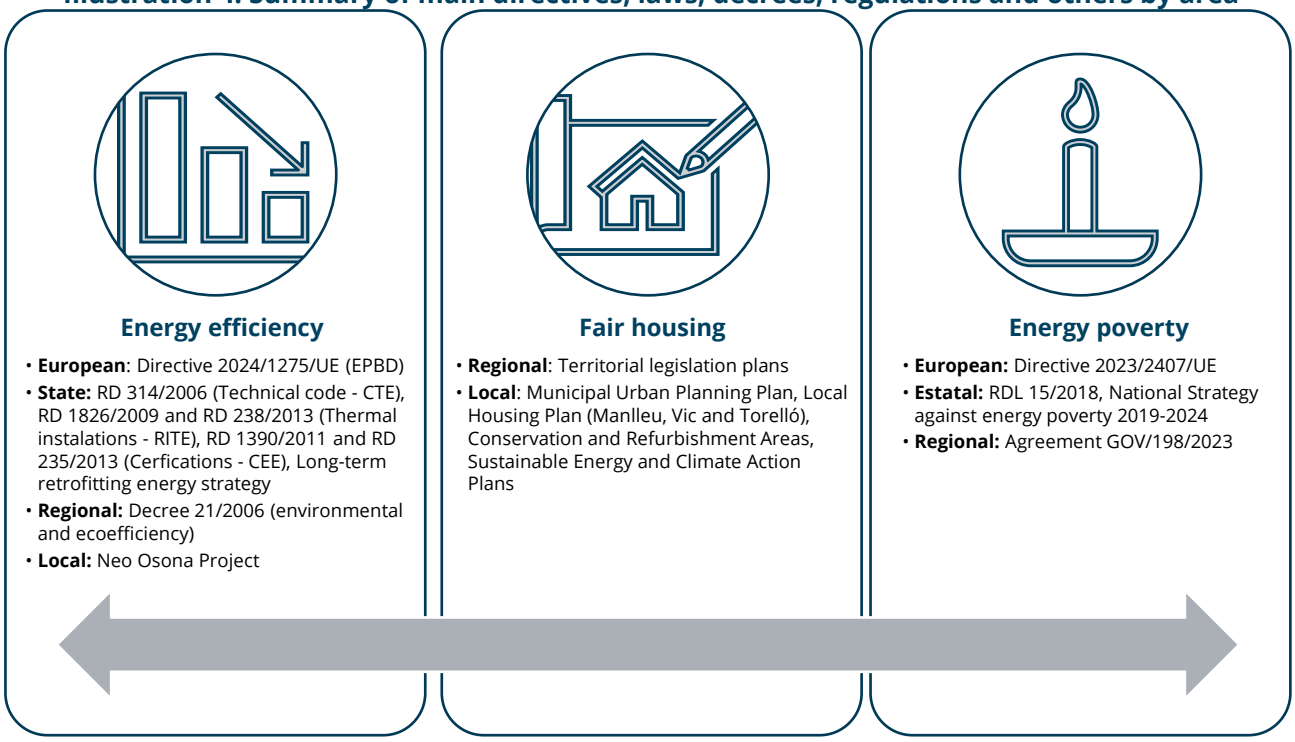
- **Conceptualize and implement actions to address energy retrofitting in rural areas without leaving anyone behind**

  This section offers a series of measures, consisting of recommendations of actions to be implemented. These actions are a prerequisite to allow for the increased adoption of energy retrofits which are promoted in the technical part.

1.3.2. Relevant considerations for the roadmap on the legal, strategic and contextual framework

This roadmap is a regional management instrument for the energy retrofitting of homes in rural areas and vulnerable groups in Osona. For this reason, the plans, strategies, and regulatory framework applicable to the territory of Osona in the areas of energy retrofitting, housing, rural development and energy poverty are considered. These regulations range from the European to the local level, but they are not always in the same scope. A more complete list of directives, laws, decrees and regulations, can be consulted in the EnerLEX tool. [13]

Illustration 4: Summary of main directives, laws, decrees, regulations and others by area



Source: Ecoserveis Association

1.3.2.1. Energy Efficiency

<u>European Level</u>:

Directive 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy efficiency of buildings (EPBD).

The update of the directive mentions key points to leave no one behind in planning for energy renovation, such as points (60) and (63). These points make special mention of Member States promoting different policies to create financial products, subsidies and specific grants for the improvement of the energy efficiency of buildings that are primarily aimed at vulnerable households.

It should also be noted that Member States must be able to communicate through their renewal passports the different options, such as phased planning, to reduce disturbances to individuals, as detailed in point (42).

The articles that are relevant for the measures described in this roadmap are the following:

Article 3: National Building Renovation Plan

"*Each Member State shall establish a national building renovation plan to ensure the renovation of its national parks (..) transforming them into highly energy efficient and decarbonised real estate stocks by 2050 at the latest*". It should be noted that these national plans must include, as detailed in

point (2b), "*objectives established at the national level and measurable progress indicators that include the reduction in the number of people affected by energy poverty*".

Article 12: Renewal passport

This measure proposes that Member States voluntarily introduce renewal passport systems, becoming mandatory tools if desired. It should be noted that the article emphasizes that "*Member States will take measures to ensure that renovation passports are affordable and will consider providing financial assistance to vulnerable households wishing to renovate buildings*."

In this sense, this roadmap as a management tool is a passport to renewal, an inspiring guide that details the regional strategy of Osona to achieve affordable building renovation for all.

Article 17: Financial incentives, capacities and market barriers

This article amends energy vulnerability in points (18) "*Financial incentives will be allocated as a priority to vulnerable households (...) in accordance with Article 24 of Directive (EU) 2023/1791*" and (19) "*Member States shall introduce effective safeguards to protect vulnerable households in particular, including by providing rental subsidies or imposing limits on rent increases, and may incentivise those financial schemes that meet the initial costs of renovations, such as invoice-based financing schemes*".

Article 18: One-stop shops for the energy efficiency of buildings

Member States shall ensure that technical assistance services are available throughout their territory by establishing at least one one-stop-shop in municipalities with more than 80,000 inhabitants or where the service cannot be accessed within 90 minutes by local transport. In addition, the directive specifies that "*they will offer specific services for vulnerable households, people affected by energy poverty and people belonging to low-income households*".

Article 35: Transpositions

The legal, regulatory and administrative provisions necessary to comply with the provisions of the articles will apply in some cases in 2025 and in others in 2026.

Section 5 of Article 17 that mentions the elimination of non-economic barriers must be transposed into state laws before January 1, 2025, on the other hand, the rest of the relevant articles have a margin until May 29, 2026.

State Level:

The actions carried out for the partial transposition of the amendments to other European efficiency directives such as Directive 2010/31/EU, derived from Directive 2018/844 are:

- Modification of the RITE - Regulation of thermal installations in buildings [14] that establishes the conditions that heating, air conditioning and domestic hot water installations must meet, to achieve a rational use of energy

- Modification of the CEE system - Certification of energy efficiency in buildings [15]
- Modification of the CTE - Technical Building Code [16], which is a regulatory framework that establishes the basic quality requirements that buildings must meet in relation to the basic requirements of safety and habitability

Therefore, the 2024 regulations should also be transposed on these legislative documents. In addition, at the state level, there is a strategy included in a series of documents within the strategy called ERESEE.

ERESEE Strategy

The ERESEE, the Long-Term Strategy for Energy Retrofitting in the Building Sector in Spain, seeks to define an action plan with intervention scenarios, measures and progress indicators for the energy retrofitting of residential and non-residential, public and private building stocks, to convert them into a highly energy-efficient and decarbonised park before 2050. This document arises from the implementation of the European mandate established in Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 about the energy efficiency of buildings.

ERESEE wants to promote a profound transformation of the building sector to align it with the general energy and climate objectives established in the medium and long term, with horizons in the 2030s and 2050s. The ERESEE content summary is as follows:

- Diagnosis of the Spanish residential stock and energy consumption in homes
- Modelling of the park
- Retrofitting approaches with various scenarios including:
    - Interventions on the envelope
    - Interventions on heating and DHW installations
    - Calculation of the associated economic costs
    - Calculations of energy and emissions savings
- Results of the main measures proposed by the ERESEE
- Conclusions on the need to articulate the measures from an integrated and multiscale point of view

<u>Regional Level (Catalan):</u>

DECREE 21/2006, of 14 February, which regulates the adoption of environmental criteria and eco-efficiency in the buildings

This Decree establishes that new building and renovation projects must integrate criteria, construction systems, technologies and measures in the four areas: water, energy, construction materials and systems and waste, which make sustainable development of the building sector possible. As for energy, among others, it establishes maximum criteria for thermal transmittance

of facades, glass, enclosures and thermal bridges, and establishes efficiency criteria for domestic hot water.

Regional level:

The Local Energy Agency of Osona and the Regional Council of Osona intend to reduce CO_2 emissions by 40% by 2027 through various actions, articulated and coordinated within the framework of the Neo Osona project [17], promoting the energy transition and giving prominence to people through energy communities.

1.3.2.2. Fair Housing

Regional Level (Catalan):

DECREE 408/2024, of 22 October, approving the Sectoral Territorial Housing Plan and developing the objective of urban solidarity provided for in Law 18/2007, of 28 December, on the right to housing

Law 18/2007 on the right to housing establishes that the Territorial Plan is a key instrument for housing planning and programming and therefore complies with Decree 408/2024. Decree 408/2024 [18] of the Sectoral Territorial Housing Plan is the framework that guides the application of housing policies in Catalonia and is developed through specific plans.

The Plan determines the municipalities included in the areas of strong and accredited residential demand and sets the five-year objectives of the municipalities in terms of urban solidarity, as well as the increase in the stock of social rental housing to be achieved. The Plan also deals with determining the standards for the reservation of land for public housing in the municipalities included in areas of strong and accredited residential demand.

The purposes of the Plan include (Decree 408/2024 Article 3.2):

- Compliance with the objective of urban solidarity, which consists of having a minimum stock of housing allocated to social policies of 15% of the total number of existing main homes in municipalities included in areas of strong and accredited residential demand within twenty years. For the objective of urban solidarity, the following areas are defined:
    - Strong and accredited residential demand.
    - Preferential
    - Rural
    - Non-preferential
    - Complementary intervention
    - Of low demand
- The increase in the stock of affordable rental housing to reach 9% of the main housing stock in Catalonia.

Local Level:

Different legislative instruments ordered at a hierarchical level are:

1. **Municipal Urban Planning Plan** (POUM): It is the highest instrument of territorial and urban planning at the municipal level. It defines the use of the land, the areas that can be developed and the criteria for urban development. It is a framework document, and the other plans must be adapted to its criteria. There are POUMs approved and available in many municipalities, such as in Vic, Torelló, Manlleu, Prats de Lluçanès, Olost, Sant Agustí de Lluçanès, Sant Pere de Torelló, Sant Vicenç de Torelló and the municipality of L'Esquirol.
2. **Local Housing Plans** (PLH): They derive from the POUM and establish specific strategies and actions in the field of housing. Through the PLH, housing policies adapted to local needs are planned. They are regulated planning instruments set out in Law 18/2007 on the Right to Housing. In the region of Osona, there are the following PLHs:
    a. Vic: The PLH of Vic [19], definitively approved in August 2023, establishes the strategic lines for the period 2023-2028. This plan includes measures to increase the supply of affordable housing, encourage the retrofitting of the existing stock and promote energy efficiency. The creation of grant programmes for vulnerable groups and the implementation of policies that encourage social renting are also planned.
    b. Torelló: The Torelló PLH [20] was definitively approved in July 2021. This plan analyses the housing situation in the municipality and proposes actions for the coming years, including the promotion of public housing and the retrofitting of buildings. In addition, a participatory process was carried out to involve citizens in the definition of housing policies.
    c. Manlleu: For this Plan, there is subcontracting by the Barcelona Provincial Council and the contract states [21]: *"The municipality of Manlleu has been declared a municipality of Area of Strong and Accredited Demand and a Stressed Residential Market Area, with a high level of HPO applications and with a complex problem at the housing level: high occupancy rate, anomalous use of housing, problems of conservation of residential buildings and sanitation (...). make it necessary to have a technical document (...) that defines strategies and proposals to be developed by the local government to promote the achievement of the right of citizens to enjoy decent housing in affordable conditions".* The Plan has not yet been approved in 2024.

3. **Conservation and Refurbishment Areas** (ACR): These are specific programmes included within the PLH or derived from its actions. Its objective is to refurbish and improve deteriorated urban areas or with habitability deficits. The PLH of Vic [19] includes a measure that ensures that it is declared Areas of Conservation and Refurbishment.

4. **Sustainable Energy and Climate Action Plans** (SECAP): They are not urban planning, but environmental, and focus on reducing emissions and adapting to climate change. They complement the POUM, influencing aspects such as the energy efficiency of buildings or the promotion of green areas. Some of the municipalities that already drafted this plan are: Vic, Manlleu and Torelló.

Within this legislative framework, Centelles has been selected as a municipality with **Residential environment of programmed retrofitting** (ERRP) by the Government of Catalonia [22] through the Neighbourhoods Programme [23]. Its Municipal Development Plan of Centelles was approved in 1983 and has not been updated. This selection allows the municipality to receive additional subsidies from the Next Generation Funds [24].

1.3.2.3. Energy Poverty

European Level

Directive 2023/2407/EU, published on 23 October 2023

This directive is a recommendation of the European Commission that addresses energy poverty and defines it as the situation in which households cannot access essential energy services at an affordable cost. The recommendation urges the Member States to identify and quantify affected households, set reduction targets and implement policies to improve energy efficiency and reduce energy bills. It also promotes the protection of vulnerable consumers and equitable access to sustainable energy.

State Level

Royal Decree-Law 15/2018, of 5 October, on urgent measures for the energy transition and consumer protection.

This Royal Decree-Law establishes urgent measures for the just energy transition, some of which refer to energy poverty, which are:

- Improvement of the social bonus: Introduction of the thermal and electricity social tariff (bono social) to protect vulnerable consumers.
- Extended protection: Prohibition of cutting off the electricity supply to severely vulnerable households during the winter.
- Just Transition: Promoting Sustainable Energy Sources and Social Protection in Energy Change

National Strategy against Energy Poverty 2019-2024

The strategy aims to reduce energy poverty by 25% in 2025 and by 50% in 2030. The measurement of energy poverty is defined through four indicators: disproportionate energy expenditure, inability to maintain the home in adequate conditions, delays in payment and low consumption. Structural measures are designed to combat it, including the energy renovation of homes, financial support for vulnerable consumers and the promotion of energy education.

Regional Level

Agreement GOV/198/2023, 26 September

From which the Temporary Support Programme for the Comprehensive Approach to Energy Poverty in Catalonia is created. This programme aims to guarantee access to basic supplies of drinking water, gas and electricity for people and family units at risk of residential exclusion. The measures include the prohibition of supply cuts due to non-payment, the creation of a solidarity care fund financed by public administrations and supply companies, and the establishment of communication protocols with social services to intervene before any interruption of service.

2. Technical considerations for the renovation of homes affected by energy poverty

To draw up the recommendations for the technical measures to be implemented by households in Osona interested in energy retrofits, a diagnosis of the state of the dwellings and the characteristics of a sample of households is made. The methodology used follows three steps to recommend retrofitting measures:

1. Diagnosis of the housing stock in the region of Osona. The existing territorial planning has been studied (The Partial Territorial Plan of the Central Counties and some Municipal Planning Plans) and European Directive 2024/1275 has been revised, providing background on. (Section 1. Contextualization: RENOVERTY in the region of Osona)
2. Twenty energy and social audits in homes in the region are carried out (Section 2.1. Energy audits).
3. Analysis *Dynamic high-Resolution dEmand-sidE Management* (DREEM) [12] with average data from the twenty homes audited (Section 2.2. DREEM model).

This roadmap highlights the need to consider the specificities that exist in rural areas when thinking about energy renovation of homes, and at the same time how this process can be made accessible to everyone, including the most vulnerable groups.

The objectives of the renovation aim to improve energy efficiency, thermal comfort, and the elimination of humidity for households in Osona, along with the integration of renewable energies. At the same time, these improvements help to considerably reduce and attenuate some of the effects of energy poverty. For example, not being able to maintain a comfortable temperature in the home (both in summer and in winter) is one of the main indicators of energy poverty[2] given that it affects people's health, causing respiratory and cardiovascular diseases and also affects mental health. The insufficiency of economic resources often makes families to prioritise essential and necessary expenses for survival thereby minimising social exclusion as much as possible, resulting in retrofitting not taking precedence in their daily activities. Some retrofitting offices consulted said that there are cases when it is even necessary to make a special effort to convince some residents to access the available grants for renovation due to how low renovation ranks on their list of priorities.

[2] According to the European Poverty Observatory, the four basic indicators are: Overconsumption (times more consumption than the average), Underconsumption (below half the average), not being able to maintain a comfortable temperature in the home in summer and winter, and having delays in the payment of utility bills.

Therefore, this roadmap is highly relevant given that a percentage of 12.5% of Osona's population experiences poverty[3], and 85% of the housing stock is energy inefficient.

To comply with energy regulations, it is necessary to ensure that all renovation actions respect the European and national energy efficiency regulations, such as EU Directive 2018/844 and the Technical Building Code (CTE) in Spain. By implementing construction technologies and practices that comply with current regulations, the energy rating of buildings should be improved, achieving at least a C rating or higher.

2.1. Energy audits

Twenty energy audits were carried out in vulnerable households in the region with the objective of issuing energy certificates and the corresponding technical reports, thus gaining real on-site data that serves as a sampling of the state of the housing stock on the territory. The program used for the technical analysis of audits is CE3X.

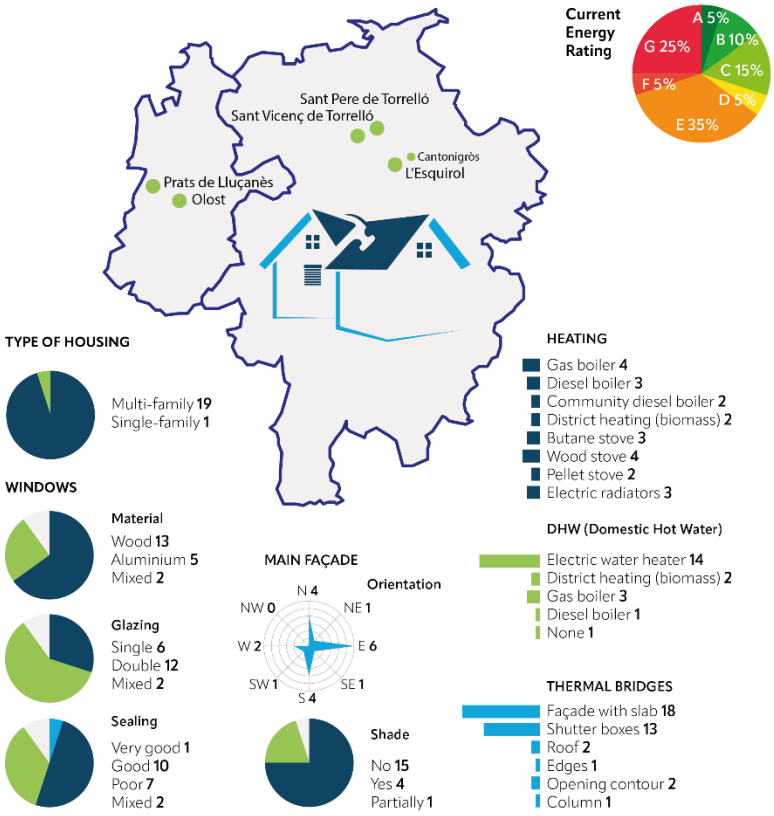
The selection of the audited homes was made by working together with social services to ensure the active participation of families exposed to conditions leading to energy vulnerability or energy poverty. Thus, the families that were chosen to participate in the audits had mostly recently requested grants from social services for aid in covering energy expenses.

Energy audits were also conducted while offering social support to the households, in which tariff support on domestic consumption was provided and experts explained the multiple benefits of energy renovation of homes. This also led to the identification of difficulties and barriers faced by these families.

The twenty homes audited are located in five municipalities around Vic, the capital of Osona: Prats de Lluçanès and Olost (in the northwest of Lluçanès), Sant Pere and Sant Vicenç de Torelló (in the north of Osona) and L'Esquirol including its satellite nucleus of Cantonigròs (in the northeast of Osona). Illustration 5 shows the characteristics of the audited homes, as well as their current energy performance rating.

[3] The data are from 2020, when the Lluçanès region was still part of Osona.

Illustration 5: Current situation of the 20 homes audited



Source: Ecoserveis Association with data from energy audits

The surface area of the **twenty audited homes** range between 37.5 and 140 m^2 and are located in multi-family buildings, with the exception of one of the homes being a single-family semi-detached house, built between 1790 and 2010. The energy rating of most of the households is low, between G and E, although three homes have higher ratings of A and B.

Figure 8
Energy rating of the audited homes

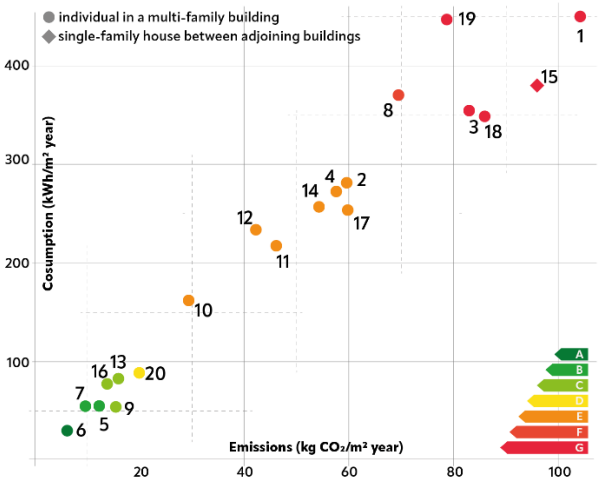
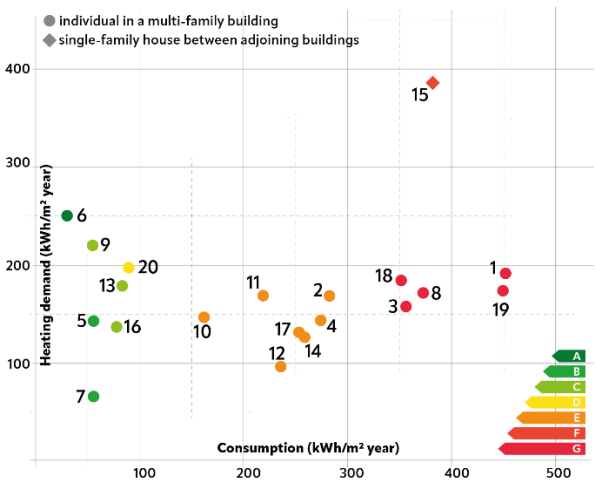


Figure 9
Heating demand of the audited dwellings



(**1-20**: the audited dwellings)[4]

Source: Ecoserveis Association

Most of the door and window enclosures are watertight and have double glazed windows. The material enclosures are primarily made of wood, followed by aluminium, of which only two include a thermal break.

Regarding **orientation**, all combinations were found and only few facades have shadow patterns. On the north-facing facades, no shadows were cast despite the presence of nearby elements such as buildings, trees, and advertising structures. Due to the lack of shade on the east-, south-, and west-facing facades, blinds were commonly used. However, their installation often creates thermal bridges that need to be addressed.

Table 2 compares the **demand for heating** based on the audits carried out with the reference values of the Girona province clusters in the ERESEE 2020 [2] [25]. In multi-family households, if the minimum values are considered, the audited values are approximately double the corresponding reference values. This means that the audited homes have design and envelope conditions (such as walls, windows or roofs) that have room for improvement with respect to their energy performance.

[4] In order to maintain the anonymity of the data, we use the serial number of the twenty audited homes as a reference.

Table 2. ERESEE 2020 heating demands and audits [kWh/(m² year)]

Year construction	Multi-family		Single-family	
	ERESEE 2020	Audited	ERESEE	Audited
<1940	125.6 - 92.9	223.5 – 169.5		
1941-1960	117.8 - 80.9	251.3		
1961-1980	80.8 - 72.1	137 - 185.4	159.7	378.4
1981-2007	58.1 - 42.2	99.2 - 193.3		
2008-2011	38.6 - 27.8	79.8 - 176.8		

Source: Ecoserveis Association

To complement the comparison of demand and consumption, it can be seen in Figure 9 that most homes with a total consumption of less than 100 kWh/(m² year) have a heating demand of more than 100 kWh/(m² year). This can be given for three reasons or a combination of them:

- Heating demand is not 100% covered
- Heating equipment has an efficiency superior to unity
- There is on-site renewable generation

To find the correct reason, the equipment must be studied: stoves are mostly used for heating consumption — butane, wood and pellet stoves — and a few boilers, generally diesel except for one natural gas. Electric radiators are also used and, in two homes (homes 6 and 7) in Sant Pere de Torrelló, they are connected to the aforementioned municipal heat network. Therefore, only two households have renewable generation through the heat network but the rest have heating equipment with efficiencies below unity. This indicates that households with the best energy ratings in terms of consumption do not have the best comfort conditions in winter (it is an indication of possible energy poverty).

When it comes to the **domestic hot water** system, in most of the homes audited, electric water heaters of various capacities as well as mixed gas or diesel boilers were found, along with the connection to the municipal heat network (generated by biomass combustion) in two cases in Sant Pere de Torrelló. In one of these twenty homes, there is no hot water installation, but water is heated by fire via a butane stove.

In none of the inspections can the section and composition of the surrounding walls be checked, so the default values corresponding to the year of construction of each building were used in the EPCs. In all cases, **thermal bridges** are found, generally at the meeting points of facades with roofed slabs, in shutter boxes, and in contact with other elements such as pillars.

There is a strong correlation between CO_2 emissions and non-renewable primary energy consumption (Figure 8), which indicates that there is still room to decarbonise the housing stock.

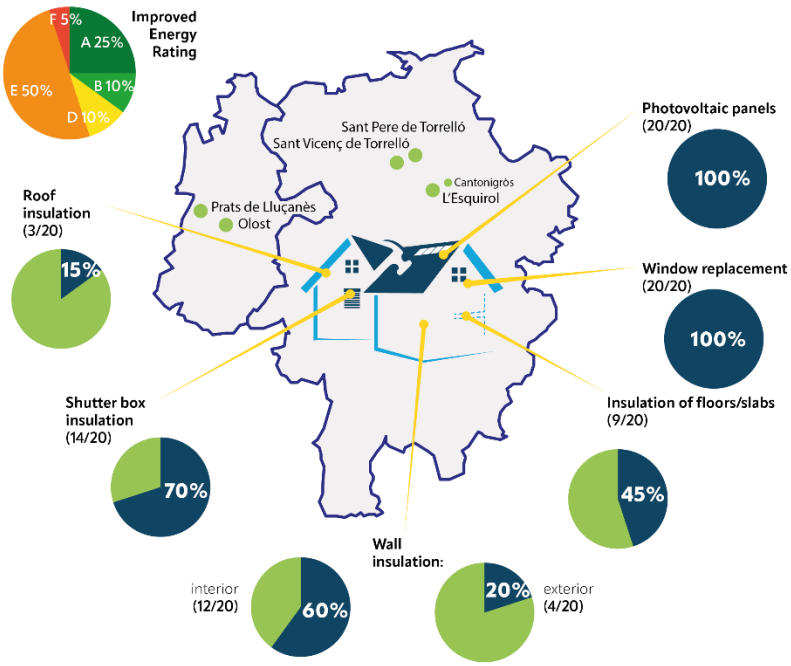
As solutions, the certification ends by recommending:

- Elimination of thermal bridges and insulation of shutter boxes
- Window changes
- Improvements in the insulation of envelopes
- Self-consumption photovoltaic solar installation

None of the reports considered the change of heating and DHW systems, but these points were not ruled out when defining the final measures.

The costs of the proposed photovoltaic installations range from €675 to €6,750, with an average of €2,503.75 per home.

Illustration 6: Energy improvement measures recommended by audits



Source: Ecoserveis Association

2.2. DREEM model

The Dynamic high-Resolution dEmand-sidE Management (DREEM) model is a fully integrated simulation model for energy demand and demand-side management that increases the computational capacity of current Building Energy System (BES) and demand-side models

This model is used within the framework of RENOVERTY [26] [27] [28] to provide additional information to the energy certificate reports and, therefore, is based on energy audits, and focuses on the two different types of homes audited: single-family and multi-family. Most of the homes audited in the Osona pilot have an energy efficiency class of E and G with an average primary energy of 223.49 kWh/(m²·year). The DREEM methodology applied in Osona uses this average to run simulations of homes with different scenarios of renovation measures.

The DREEM methodology [12] analyses the **energy savings** in different energy action scenarios, and it can do so at a national or housing level. In this case, it is done at the household level, and using the energy consumption and energy savings, different indicators are calculated:

- **Levelized Cost of Saved Energy** - **LCSE (€/kWh)** is used to know the effectiveness-price ratio of the measures implemented. The LCSE is defined as the total cost of energy saved, levelled over the average savings life of energy efficiency actions. The lower the LCSE, the more cost-effective the intervention under study will be.
- **Annual economic savings (€),** calculated with an average price for each energy vector (electricity: €0.212/kWh, natural gas: €0.095/kWh, biomass: €0.031/kWh) and an interest rate of 4%.
- **Annual CO_2 emissions ($kgCO_2$),** calculated with emission factors (kg CO_2/kWh) from different energy sources (i.e. oil, gas, electricity and biomass).
- **Predicted** Mean Vote (**PMV**) which, based on the Fanger approach, is a comfort indicator included in the EN 15251 standard. Relevant to this document, zero is a maximum thermal comfort value (neutrality), satisfactory comfort is less than 0.5, and unacceptable is a value greater than 1.
- **Long-term return**, calculated with NPV **(€).**

The measures analysed and compared using these indicators are:

- EEM1: External Building Insulation (SATE)
- EEM2: Double glazed windows
- EEM3: Roof insulation
- EEM4: Improvement of natural gas boilers
- EEM5: Change from diesel boiler to biomass boiler
- EEM6: Change of heating system to heat pumps
- EEM7: Efficient LED Bulbs

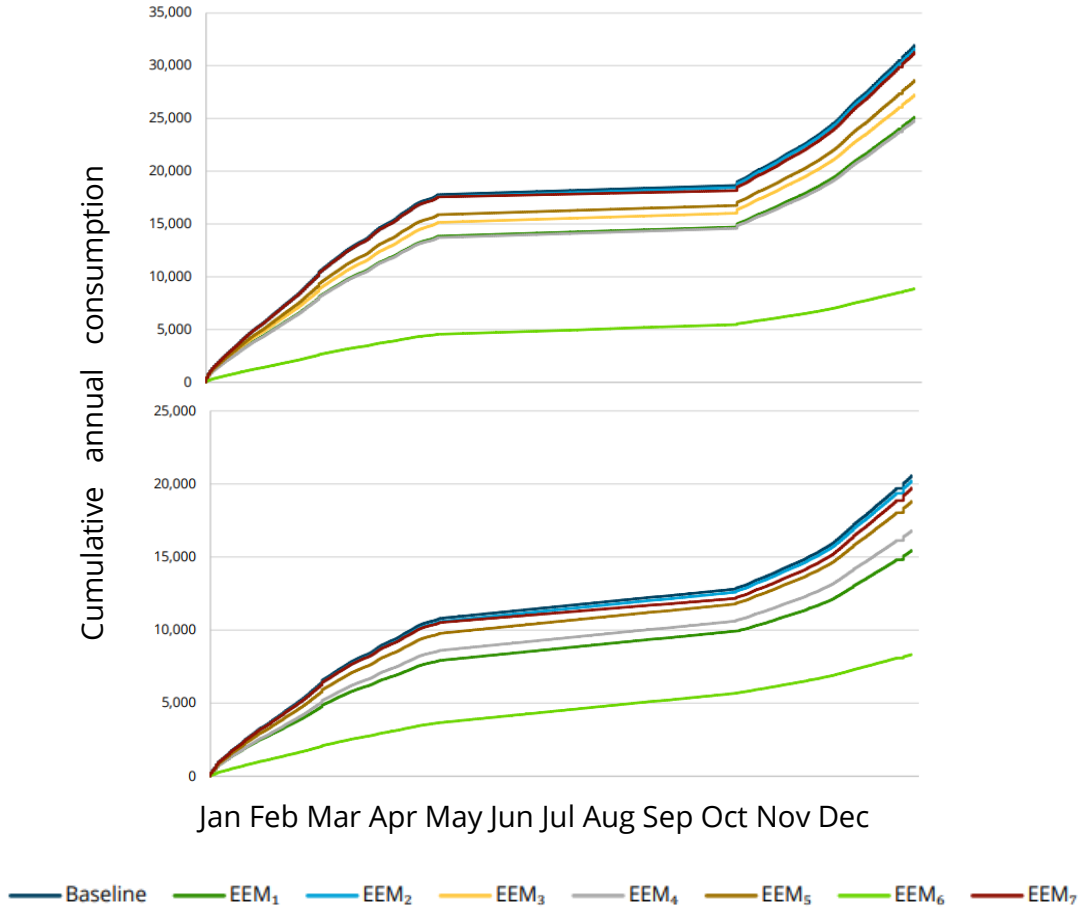
2.2.1. DREEM analysis results towards energy savings

Figure 10 shows the evolution of the accumulated monthly consumption in kWh during one year for each energy saving measure and the case without renovation measures (dark blue) by type of household (single-family or multi-family). Each measure is represented in a line. At the bottom of the figure there are those that represent the most energy savings, and the percentage of savings is calculated compared to the case without renovation measures. In other words, by type of housing, the results are:

For single-family homes: EEM6 (heat pump) leads to the greatest energy savings, around 70% reduction compared to the baseline scenario, while EEM4 (efficient natural gas boiler) and EEM1 (SATE) lead to a reduction of approximately 20%.

For multi-family homes: EEM6 represents the greatest energy savings of 60% compared to the reference scenario, while EEM1 (SATE) and EEM4 (efficient natural gas boiler) represent energy savings of 25% and 20%, respectively.

Figure 10. Cumulative annual consumption (Upper: single-family, Lower: multi-family)



Source: RENOVERTY Report D4.1 [28]

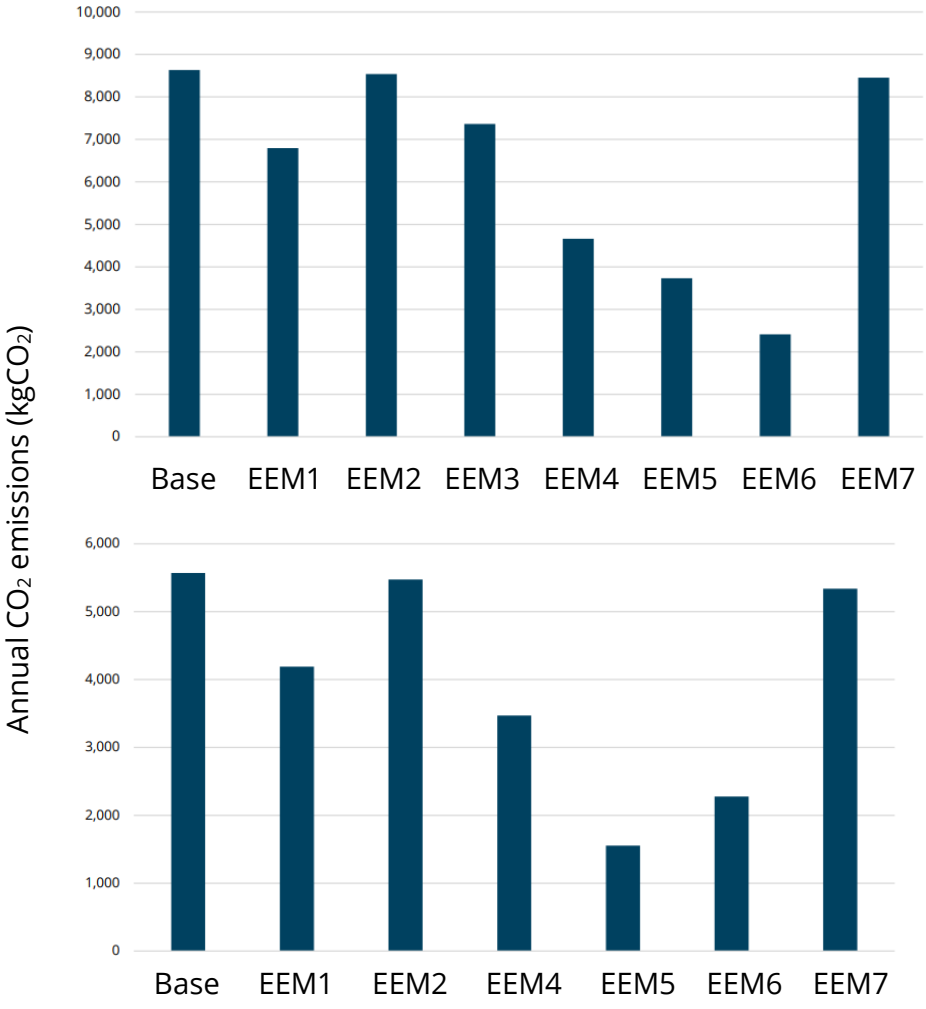
2.2.2. DREEM analysis results in terms of CO_2 emissions

Figure **11** shows the annual CO2 emissions in kg of the different retrofitting measures and the base case (without retrofitting). The measures with the smallest bars are those with the greatest reductions, and the savings are calculated by subtracting the emissions from the base case minus the retrofitting measure. By type, the results are:

For single-family homes: EEM6 (heat pump) has the highest emission reduction with a saving of 6,200 kg of CO_2 per year, followed by EEM5 (biomass boiler) and EEM4 (efficient natural gas boiler) around 4,900 and 4,000 kg of CO_2, respectively

For multi-family homes: EEM5 (biomass boiler) saves almost 4,000 kg of CO2 per year, followed by EEM6 (heat pump) and EEM4 (efficient natural gas boiler) which avoid around 3,300 and 2,100 kg of CO_2, respectively.

Figure 11. CO_2 emissions (Upper: single-family, Lower: multi-family)



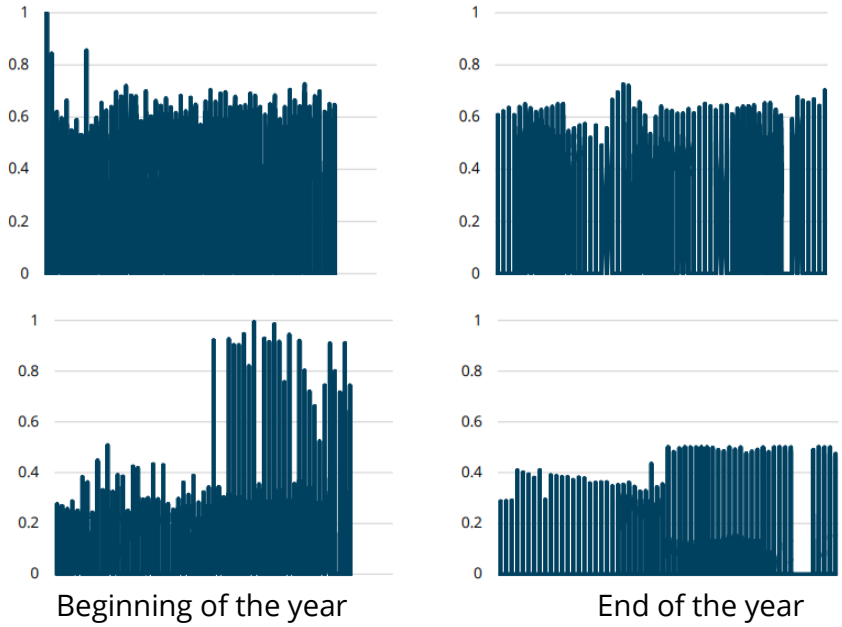
Source: RENOVERTY Report D4.1 [28]

2.2.3. DREEM analysis results in terms of energy comfort

Figure 12 shows the thermal comfort measured with the weighted average vote or PMV. To interpret the graph: zero is a maximum value of thermal comfort (neutrality), a satisfactory comfort is less than 0.5 and an unacceptable value is a value greater than 1.

Bearing this criterion in mind, energy needs in winter are covered in an acceptable way (single-family) and satisfactory (multi-family) by the different energy saving measures.

Figure 12. Thermal comfort in winter (Upper: single-family, Lower: multi-family)



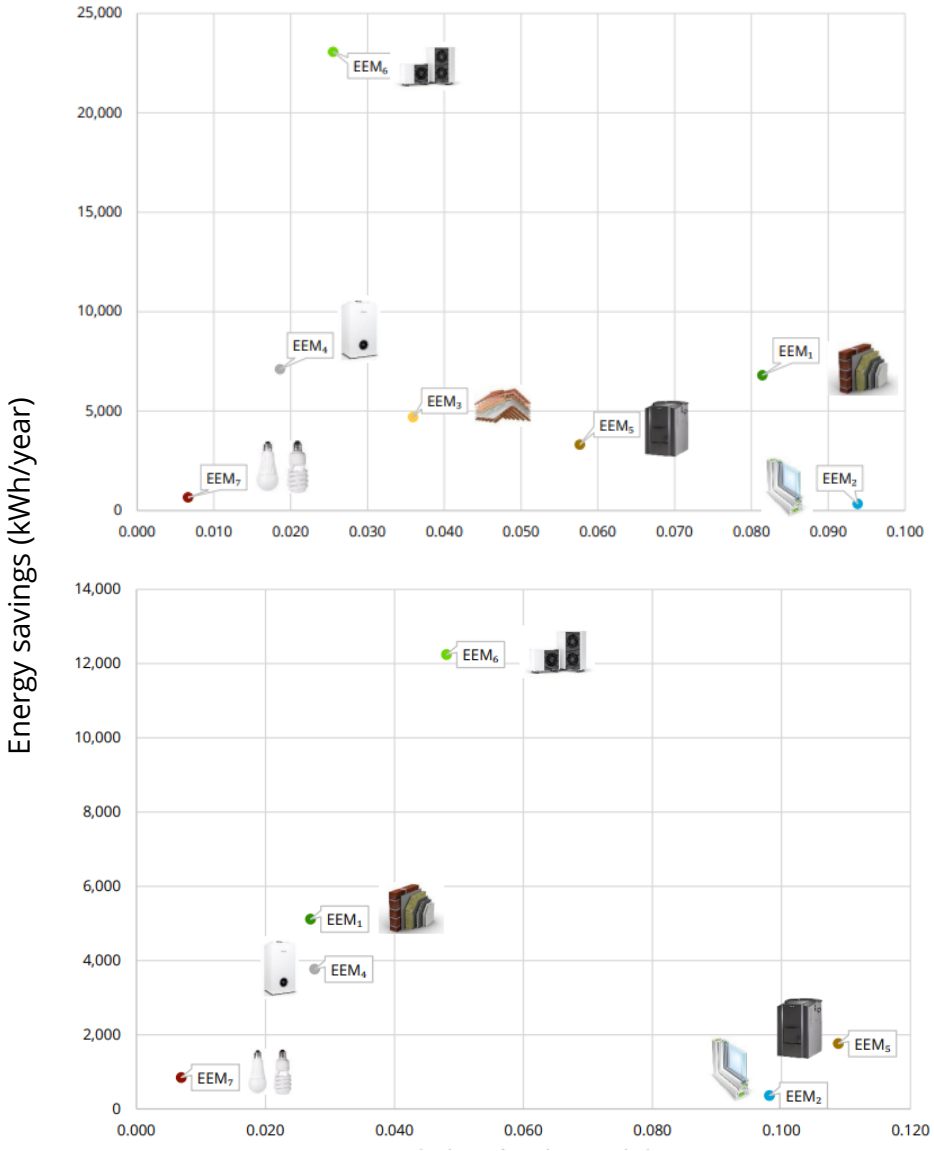
Source: RENOVERTY Report D4.1 [28]

2.2.4. DREEM Analysis Results in Economic Savings

Figure 13 relates annual energy savings to LCSE (levelized cost of saved energy). The measures that are in the upper left quadrant of the figure are those that combine the best potential for energy and economic savings. If the energy saving factor is prioritized, the results are described below.

For both single-family and multi-family households, EEM6 (heat pump) and EEM4 (efficient natural gas boiler) indicate the best combination of energy saving potential with lower investment costs, while EEM2 (windows) indicates the need for relevant incentives and initiatives to reduce investment costs.

Figure 13. Economic savings (Upper: single-family, Lower: multi-family)



Source: RENOVERTY Report D4.1 [28]

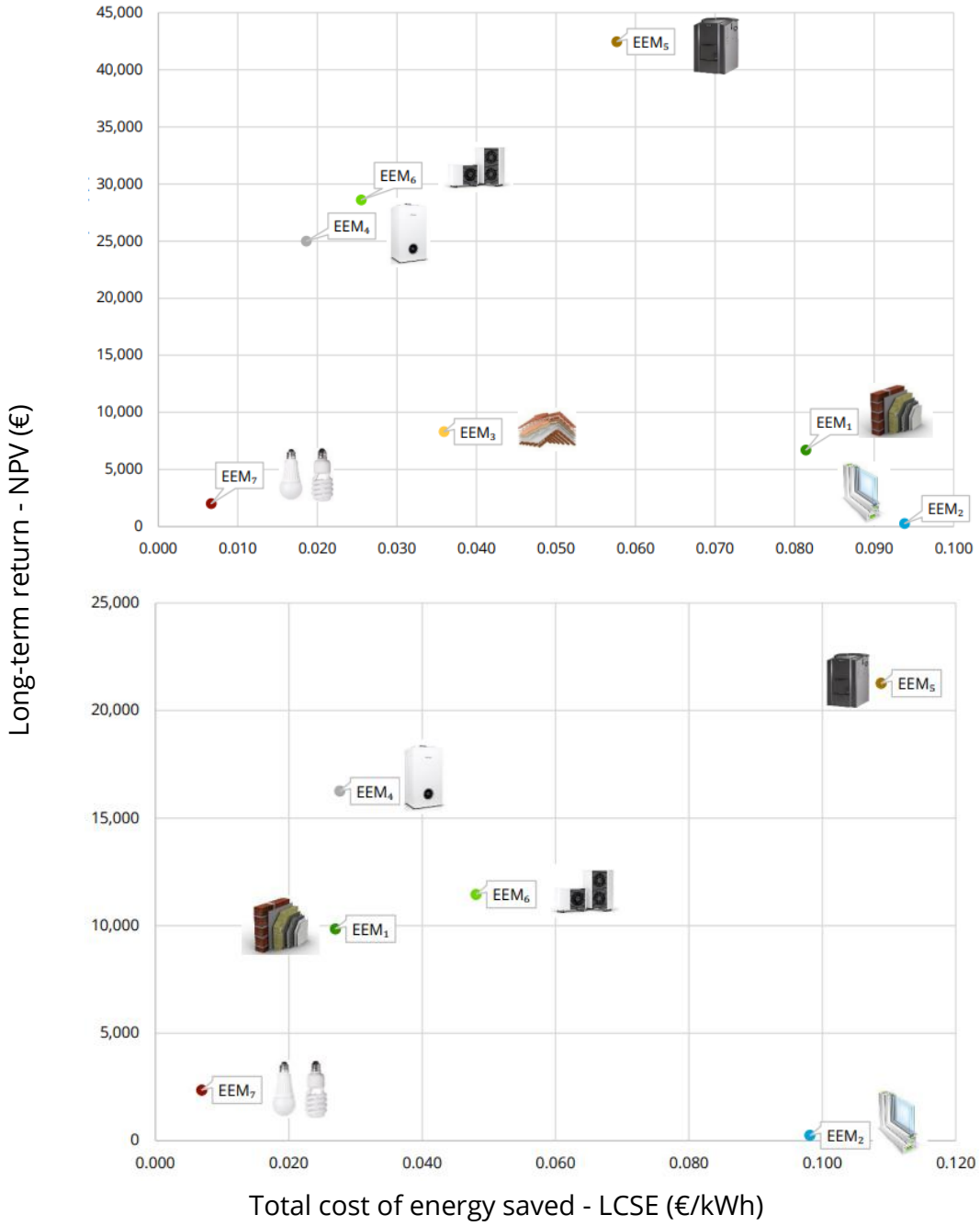
2.2.5. DREEM analysis results in terms of profitability

Figure 14 represents the long-term value or profitability (NPV calculation), in relation to LCSE (levelized cost of saved energy). The measures in the upper left quadrant of the figure are those that combine the best profitability and savings. Taking into account long-term returns (measures in the top half of the chart):

For single-family homes: The EEM5 (biomass boiler) and EEM6 (heat pump) solutions are the highest, offering a substantial return with NPV of around €42,000 and €28,000, respectively, and demonstrating a strong return on energy savings.

For multi-family homes: EEM5 (biomass boiler) and EEM4 (efficient natural gas boiler) demonstrate the best performance with NPV of around €21,000 and €16,000, respectively.

Figure 14. Long-term return (NPV) [28]



Source: RENOVERTY Report D4.1 [28]

The conclusions of the simulations of the DREEM model are that active measures like changes of heating equipment are generally those that provide the greatest energy, economic and CO_2 emission savings to both types of homes, single-family and multi-family. For single-family homes, the EEM6 solution (heat pump) stands out especially above the rest.

2.3. Summary and technical conclusions of the audits and the DREEM model

Energy audits make the collection of data on typological dwellings in Osona possible and are therefore used for two studies:

- The first is a study of energy improvement measures with CE3X, which are included in the audit
- The second is a study using economic indicators to develop the most relevant energy efficiency measures to be implemented in Osona through the DREEM model.

It should be noted that, apart from using different software, the two studies also have different approaches, and that is why the final recommendations are different. The differences between the two approaches are:

- The audits allow the individualized study of households to give more specific measures for each case, taking into account the availability and acceptance of the measurements of the inhabitants. The recommendations of the measures are based on those that involve the most energy savings, considering that the demands of the analysed buildings are below the state averages referenced in the ERESEE 2020 [25]. The approach is based on improving comfort and the potential for improving energy demand.
- The DREEM model uses the data collected in audits to summarise the typological characteristics of the dwellings, but takes into account more average references when the sample of data is small (in the case of single-family dwellings, there is only one sample). This study takes into account that this REER report is focused on vulnerable people and therefore also considers the economic aspect of the investment and long-term returns, and therefore, deep renovation measures, which include envelope insulation and others, are ruled out as they are expensive and presenting long payback times.

For this reason, the audits conclude that the best measures to improve energy demand are change of windows, insulation of thermal bridges, walls and roofs, while the DREEM model indicates the changing heating equipment as the best measure.

For this REER, the results of both studies are considered valid, given that financing methods are also studied according to the profile of the inhabitants, detailed in *Section 2.5. Financing and subsidies for energy renovation*.

2.4 Planning energy renovation

2.4.1. Proposal for prioritisation of measures

Based on the audits undertaken, the DREEM analysis, the territorial planning, the existing building in the area, the expectations of the residents and the geoclimatic characteristics of the region, a series of energy efficiency measures are determined that are considered more appropriate for the community as a whole. These recommendations are drawn up considering the relationship between cost and benefit, as well as prioritisation according to the energy, economic and social impact they may generate.

It is important to note that the costs of the proposed measures can vary significantly depending on several factors such as the type of materials selected, the quantity of each one needed, and the suppliers' rates at the time of purchase. Likewise, prices can fluctuate depending on market conditions in a given period. For this reason, although a generic estimate is offered based on data obtained at the end of 2024 from reliable sources in the sector, these figures are for guidance purposes only and should not be taken as exact validity. In the case of specific renovation projects, it is recommended to develop a comparison of detailed and updated budgets to ensure that the solutions chosen fit the specific needs and the available budget of each household's renovation project. Table 3 below provides information on the selected measures.

Table 3: Recommended measures

		Priority	Indicative cost[5]
I Insulation and envelope improvements			
	Solution of thermal bridges The discontinuity of thermal insulation — in places where slabs are joined with facades, in corners or where different elements or materials convey — there are thermal losses that must be solved to improve the energy performance of the home and, on occasion, prevent condensation and humidity.	High	(depends on each detail)
	Exterior insulation of the surrounding walls (EEM1)[6] The exterior technical insulation system (SATE) consists of placing insulating material on the outside of the building's facades, improving the thermal insulation properties. It can be applied both in constructions with a light framework and in brick	High	80-180 €/m^2 • Main materials (thermal insulation panels and finishing layers) 40-70 €/m^2

[5] Sources consulted: **IDAE**: Technical guides for energy renovation , average prices from suppliers in the renovation sector (Baumit, Sto Ibérica, Weber Saint-Gobain, Plan Reforma, Certicalia), etc. [58]
[6] (EEMX): Reference to the DREEM measure

	buildings (masonry). The insulation adheres to the wall by fastening, which can be a combination of adhesives or by mechanical fastening.		• Labour 20-40 €/m^2 • Topcoats (acrylic or silicate coating 15-30€/m^2; resistant decorative paint 10-20€/m^2; ceramic coatings 30-50€/m^2, treated wood or prefabricated panels 40-70€/m^2) • Scaffolding rental 5-15 €/m^2
	Interior insulation of walls Sometimes, when external insulation is not possible, it can be considered to insulate the house from the inside, along the external walls, although this implies a slight reduction in the interior useful space. It is very important to take into account possible condensation to avoid the appearance and aggravation of humidity problems.	High	40-90 €/m^2 • Main materials (thermal insulation panels and finishing layers) 20-40 €/m^2 • Labour 15-30 €/m^2 • Interior finishes 10-20 €/m^2 • Scaffolding rental
	Insulation of blind boxes Blind boxes always present a risk of thermal bridge, because they are usually placed without taking them into account. They must be checked and insulated, while taking into account possible condensation, to avoid the aggravation of humidity.	High	(30-50€/box • Materials 10-20 €/box • Labor 30-30 €/box
	Roof insulation (EEM3) Roofs are even more exposed to the sun and heat than walls, as well as snow in winter, so effective insulation is crucial to prevent overheating in summer and heat loss in winter.	High	40-130 m^2 flat roof • Materials 20-60 €/m^2 • Labour 20-70 €/m^2 Leaning • Materials 15-35 €/m^2 • Labor 15-35 €/m^2
	Insulation of slabs In certain cases, such as when first-floor homes are located above unused ground floors or spaces with non-residential purposes, like garages or warehouses, it may be necessary to install insulation in the floor that separates them.	High	30-55€/m^2 Insulation under the slab: • Materials 15-30 €/m^2 • Labour 15-25 €/m^2

	Solution to humidity / dehumidification [7] Damp damages many materials, and the deterioration can be serious: building materials such as brick or concrete can crumble and lose strength, wood can swell, deform or rot, metals rust, coatings and paints crack and fall, leaving stains and visible mould, and insulating materials lose their effectiveness and lose their thermal insulation capacity. In addition, humidity also seriously affects people's health: it favours the proliferation of mould and fungi, which release spores into the air, which can cause respiratory problems, aggravate allergies, worsen conditions such as arthritis and cause joint and muscle pain, cause dermatological problems and weaken the immune system, etc. The dampness is solved with dehumidifiers, ventilations, application of drying agents, even heating the affected part to speed up the process.	High	• Portable dehumidifiers: 150-500€/unit • Forced ventilation systems: €1,000 – €2,000 /installation • Application of drying agents: 8-15 €/m^2 • Heating of affected surfaces: 20-50€ /h hour of service
	Waterproofing Once the humidity has been resolved, measures must be taken to prevent it from reappearing, checking the thermal bridges and avoiding any possibility of condensation. It is also necessary to waterproof the structure by applying waterproofing products, laying waterproof membranes, drainage systems and insulating the joints, as needed.	High	• Surface waterproofing: 20-40 €/m^2 • Installation of waterproof membranes 25-50 €/m^2 • Drainage systems 30-70 €/m^2 • Insulation of structural joints 10-25 €/m^2
II Closures			
	Enclosures with air chamber and thermal break (EEM2)		
	In general, it is necessary to replace old windows and doors with new, more efficient ones, made of wood or PVC with thermal breakage and 4-16-4 air chamber. In colder areas, two air chambers between glass can also be considered, in addition, The *Catalan Institute of Energy* offers a tool to make a more accurate calculation in each case: https://calculadorafinestres.icaen.gencat.cat. The window calculator takes into account the location of the home (and therefore the climate), the heating equipment, the energy source for heating and the dimensions of different types of windows, and whether they have blinds or not.	High	**Windows**[8] PVC • Double glazing: 200-400 €/ unit • Triple glazing 300-600 €/unit ALUMINIUM WITH THERMAL BREAK • Double glazing: 300-600 €/ unit • Triple glazing 500-800 €/unit

[7] with pre-dehumidification of the affected part

[8] Small window (50x50 cm): -20% of the average price; Large window (120-150 cm): +30% of the average price

			WOOD • Double glazing: 400-700 €/ unit • Triple glazing 600-1.000 €/unit **Additional options:** • Sun treatment or low emissivity (low-e glass): +10-20%. • Integrated blind: +50-100 €/unit. • Oscillating system: +20-30 €/unit. **Doors**[9] PVC • Full door: 300–600 €/ unit • Double glazed door: 200-400 €/ unit • Triple glazed door 600-900 €/unit ALUMINIUM WITH THERMAL BREAK • Full door: 500-900 €/unit • Double glazed door: 700-1.100 €/ unit • Triple glazed door 1.000-1.500 €/unit WOOD • Full door: 600 – 1.000 €/unit • Double glazed door: 800-1.200 €/ unit • Triple glazed door 1.200-1.800 €/unit **Additional options:**

[9] Small door: -15% of the average price; Large door (entrance or double doors): +20-40% of the average price

			• Reinforced security (armored doors): +200-500 €/unit. • Tilt-and-turn or sliding system: +150-300 €/unit. • Personalized or decorative finishes: +100-300 €/unit.
III DHW and heating			
	Installation or improvement of gas boilers (EEM4) It is advisable to replace old gas boilers with new ones to improve their energy efficiency and reduce gas consumption. New models, especially condensing boilers, make better use of the heat generated, thus reducing emissions and expenses. It should be taken into account, however, that this type of boiler could be banned by the European Parliament[10] and that, therefore, it is probably cheaper to consider a solution that lasts longer.	Average	• Mixed condensing boiler (DHW and heating) 1.800 – 3.500 € • Installation 300-700 €
	Installation or improvement of biomass boilers (EEM5) Boilers that burn organic materials such as pellets, chips or wood logs are a more sustainable option as they use renewable sources and generate fewer CO_2 emissions compared to traditional ones. They require connection to a biomass storage tank.	Average	• Pellet boiler 4.000 – 8.000 € • Wood chip boiler: €7,000 – €12,000 • Wood log boiler: €3,000 – €5,000 • Storage deposit: €1,000 – €3,000 • Installation 800-2.000 € • Annual maintenance: 100-300€ (ash cleaning, component review and efficiency tests)
	Installation of solar thermal collectors Solar collectors capture the sun's energy and transform it into heat, heating the water in the accumulator, to be used both for domestic use in the kitchen or shower, and for heating.	Average	COLLABORATION FLAT READERS: 2.000-4.500€ • System: 1.500-3.000€ (4 people approx) • €500-1,500, depending on complexity

[10] News found in https://www.europarl.europa.eu/doceo/document/P-9-2024-001119_EN.html

			COLLABORATION VACUUM TUBE READERS: €3,300 – €7,000 • System: 2.500-5.000€ • Installation: 800-2.000€ **Additional expenses:** • Water storage tank: 500-1.200€ • Pressure gauges, valves and other accessories: 100-300€ • Annual maintenance: 100-200€
	Heat and Cold Pumps (EEM6) Heat and cold pumps work through a cooling cycle that transfers heat from one place to another. In heating mode, the pump extracts heat from the outside (even at low temperatures) and transfers it to the inside. In cooling mode it does the opposite - it extracts heat from the inside and transfers it to the outside, working like an air conditioner. Heat pumps consume less energy than traditional systems, provide both heating and cooling, and reduce the use of fossil fuels and CO_2 emissions	Average	• Air-to-air: 2.000-4.000€ • Air-to-water: 4.000-8.000€ • Installation: 1.000–2.500€ **Additional expenses:** • Domestic hot water tank (optional): 500-1.200€ (capacity from 200 to 500 l) • Materials for connections, valves and control systems: 100-500€ • Annual maintenance: 100-300€
IV Electricity			
	Use of highly efficient appliances (energy efficiency category at least A) Highly efficient appliances incorporate new technologies such as intelligent consumption control, adjusting to needs, and use less energy to perform the same tasks as less efficient appliances. Highly efficient appliances are usually designed to have a longer lifespan, which reduces the need for frequent replacement and reduces electronic waste.	Average	• Appliances with label A: 300-2.500€

	Use of LED bulbs (EEM7) LED bulbs consume 80% to 90% less energy than traditional incandescent bulbs to produce the same amount of light, have a longer lifespan than traditional bulbs (up to 25 times longer), generate less heat, and are mercury-free, making them safer for the environment. They therefore represent beneficial savings at all levels.	Average	• Light bulbs: 4-15 €/ unit • Tubes 10-30€/unit • RGB bulbs: 10-25€/unit • Smart LED: 15-50€/unit
V Environment			
	Planting vegetation that provides shade where possible In cases of facades without shade or blinds, especially if they are directly oriented towards the sun (south), planting trees can be a doubly beneficial measure: not only would it help with the energy efficiency of the home by reducing the need for air conditioning in summer, but it would also contribute to the improvement of public spaces, lowering street temperatures and offering shade. An ideal holistic approach would include green solutions at the housing level (plants on the balcony), at the community level (green facades) and at the city level (planting trees on public roads).	Low	The cost is variable and will depend on the level of action: housing, community and city

Source: Ecoserveis Association

The objectives of a home energy renovation include the improvement of energy efficiency, reduction of costs and environmental impact, and improvement of comfort in the home. To achieve these objectives, in homes with very low energy certificates qualifications, it is likely that a comprehensive energy renovation will have to be carried out, which consists of applying practically all of the measures proposed in Table 3 at the same time. However, a comprehensive energy renovation can be carried out in phases, thus reducing the initial investment of families. In order to prioritize the phases, it can be taken into account that:

1. An energy renovation must start by solving dampness (if any) and waterproofing the building to prevent future structural damage and deterioration of the envelope, eliminating all thermal bridges and installing any additional insulation necessary, followed by the renovation of windows and doors to avoid heat loss.

2. In the event that it is considered installing solar panels (photovoltaic and thermal), one must ensure that it is not necessary to drill or alter the layers once waterproofing and insulation have been placed. Insulation systems that already include built-in ducts can be considered. In any case, adequate sealing must be guaranteed to prevent the creation of new thermal bridges.

3. Finally, boilers, appliances and lighting can be changed to more efficient options and, if possible, vegetation can be planted (for example, by transplanting already grown trees) to shade the facades exposed to the sun.

This is the natural and desirable sequence of each renovation, but the economic situation of people in vulnerable situations and the possible slowness of responses from public administrations in the granting of subsidies can influence planning, adjusting it according to the possibilities of each household.

In this sense, changing lighting for more efficient bulbs is certainly the most economical and immediate measure. In a second phase, changing appliances and boilers can be the next step, followed by all the necessary improvements to the envelope. The most expensive measures are the installation of solar collectors or other heating systems, photovoltaic panels, and the replacement of doors and windows.

Table 4: Summary of the economic effort of the measures

Improvements	**Priority**	**Cost**
I Envelope		
Dehumidification	High	Medium
Waterproofing	High	Medium
Insulation and solution of thermal bridges	High	Medium - high
II Closures		
Replacement of doors and windows	High	High
III Hot water and heating		
Installation/improvement of gas boilers	Average	Medium
Installation/improvement of biomass boilers	Average	Medium
Installation of solar thermal collectors	Average	Medium
Heat pumps	Average	Medium
IV Electricity		

Acquisition of efficient appliances	Average	Medium
Installation of LED bulbs	Low	Low

Source: Ecoserveis Association based on average prices in the sector (2024)[11]

Once the decision of energy renovation in the home is taken, it is necessary to contact professionals to have a complete solution (audit, advice on feasibility and all the different solutions, cost optimization, project completion, construction management) and construction companies that perform the work. The works require licenses that must be processed at the town hall of the municipality, and the payment of the related fees. There are applicable grants and subsidies, as well as financing schemes to cover costs related to the energy renovation, listed below in Section 2.5. Financing and subsidies for energy renovation.

2.4.2. Costs and Resource Allocation

In an energy renovation, expenses can be classified as direct and indirect. The expenses vary according to the market situation and the movement of prices at any given time, as well as according to the quantities of material and labour required in each retrofitting, which are specified in each Material Execution Budget (PEM), which includes the expenses of the direct cost (the sum of the prices of its components of labour, materials, machinery and auxiliary expenses) and indirect expenses, which are those not directly attributable to a specific item of the work but necessary for its proper development, such as administrative management, health and safety, quality control, temporary installations, signage, civil liability insurance and other general management expenses, etc.

The professional fees of the technicians of the projects and licenses are calculated with a percentage of this budget, so there are few prices that can be given precisely. Additional municipal taxes also vary between different municipalities.

The Catalan Institute of Energy offers different practical simulators for guidance of costs associated with different renovation measures:

- **Simulator of energy renovation measures for buildings** [29]— It allows the evaluation of different options, providing a first notion of the possible retrofitting options and their technical and economic feasibility.

[11] Sources consulted: **IDAE**: Technical guides for energy renovation , average prices from suppliers in the renovation sector (Baumit, Sto Ibérica, Weber Saint-Gobain, Plan Reforma, Certicalia), etc. [58]

- **Windows Calculator** [30]— This application helps to estimate the energy and economic savings derived from the installation of efficient windows, contributing to the improvement of the energy efficiency of the building.
- **Map of measures for energy saving and efficiency** [31]— This resource provides information on various actions that can be implemented to improve energy efficiency in buildings, including energy renovation
- **Search engine for energy saving and efficiency projects** [32]— This tool allows you to find energy saving and efficiency projects successfully executed in Catalonia, as a reference for future renovations.

The cost of municipal licences can vary depending on the municipality, as different percentages are applied to the PEM (Material Execution Budget). Some municipalities offer discounts on the Construction, Installations and Works Tax for energy efficiency or sustainability projects, significantly reducing the final cost of licenses, so it is necessary to consult directly with the corresponding city council for updated information.

In addition to the cost of the license, there are other associated municipal taxes that should be kept in mind:

- **Fee for processing the building permit**
    - This fee covers the administrative costs of managing and approving the license.
    - **Approximate cost**: This can be a percentage of the project's budget or a fixed fee, often between **€50 and €500**, depending on the municipality and the type of work.
- **Occupancy rate of public roads**
    - It is applied if it is necessary to occupy public spaces, such as pavements or streets, with containers, scaffolding or other equipment during the works.
    - **Approximate cost**:
        - Containers: between **€10 and €50 per day**.
        - Scaffolding: rates according to square meters occupied, often between **€5 and €15 per m² per month**.
- **Fee for the management of construction waste**
    - Some municipalities charge a fee for the management and disposal of waste generated during the works, such as rubble or old materials.
    - **Approximate cost**: It may vary depending on the estimated volume of waste, but it is usually between **€0.5 and €2 per cubic metre of waste**.
- **Security deposits**

- Some municipalities require a refundable deposit as collateral to ensure that regulations will be complied with, including proper waste management.
- **Amount**: Often proportional to the cost of the project or the volume of waste, with amounts ranging from **€300 to €3,000**, depending on the type of work.

- **Other possible fees**
  - In some cases, there may be specific fees, such as for mandatory technical reports (e.g. building inspections).
  - **Cost**: Variable depending on the municipality.

Although there are many variables in all of the budget items, at an indicative level, some approximations can be made in terms of the economic impact, in order to be able to plan the refurbishment in a way that is more appropriate to the possibilities of each user. Comparing the ranges of the minimum and maximum prices for each item taking the average values, and considering the different VAT rates that apply in each item, we obtain this example (assuming that a complete renovation is carried out):

Table 5: Example of a budget for a comprehensive energy renovation

Part of the work	Estimated average cost (€)	VAT rate
Initial energy certificate	250	21%
Refurbishment project	3.000	21%
Optional construction management	3.250	21%
Building license (including ICIO)	2.000	Exempt
Administrative processing fee	250	Exempt
Occupancy rate of public roads	150	Exempt
Waste management fee	150	Exempt
Execution of waterproofing	5.000	10%
Execution of SATE insulation	9.000	10%
Enclosures (windows and doors)	12.000	10%
Installation of renewable energies	10.000	10%
Transport of materials	150	21%
Waste transport	150	21%
Scaffolding rental	500	21%
Total cost before deductions	**52.350**	
Personal Income Tax deduction	**-5.000**	
Final cost after deductions	**47.350**	

Ecoserveis association with data from various sources
(IDAE, supplier companies, professional organizations, municipal websites, etc.)

2.4.3. Professionals in the sector in the territory

This section offers a practical list of different profiles involved in the renovation of buildings, and of entities and organisations that represent professionals in Osona and Lluçanès.

Energy Retrofitting Offices

The energy retrofitting offices are intended, as set out in the directive, to offer interested people all the necessary information and support during the processes and help with the solution of problems, if they arise.

The necessary professional profiles are:

- Expert consultants in:
  - Architecture and building
  - Efficiency
  - Facilities
  - Regulations
  - Legal advice
  - Mediation
  - Social work
- Building retrofitting agents
  - Energy advice
  - Advice on procedures
  - Accompaniment and mediation

The energy retrofitting offices also offer guidance on hiring professionals and refer interested persons to the respective professional associations to get in touch with them.

Execution of the retrofitting works:

As for the services to be contracted, it must be clear which figures are involved in the process:

1. **Energy certifier**, effectuates the energy audit and issues the Energy Certificate that analyses the current energy consumption and performance of the building, also detecting the elements that need improvement.

2. **Architect or technical architect**, for the overall design of the retrofitting, and the planning of the best structural and energy solutions, ensuring that the project complies with the regulations and supervising the correct execution.

3. **Building and/or energy engineer**, for the design of thermal and electrical systems (heating, ventilation, air conditioning, photovoltaics, etc.) with the definition of the most efficient technological solutions.

4. **Sustainability and energy efficiency consultant** advises on the implementation of energy efficiency measures, sustainable materials and the use of renewable resources while seeking the maximum reduction of environmental impact.

5. **Project Manager or Site Manager** coordinates and supervises the entire retrofitting process, ensuring that it is executed correctly and complied with within the deadlines and budget.

6. **Specialized installers** (insulation, windows, energy systems, ventilation, etc.) are in charge of the installation of specific elements of the project

7. **Bricklayers**, are responsible for the construction or reconstruction of walls, cladding and other elements of the building's structure. They also prepare the structure for the installation of insulation and carpentry.

8. **Enclosure installers,** install doors and windows in the openings of the building, ensuring proper watertightness and energy efficiency.

9. **Painters**, to finish surfaces with paint or other decorative coatings.

10. **Suppliers of materials** are companies supplying the necessary materials, according to the indications of the project.

11. **Transporters**, on the one hand, they transport the materials necessary for the retrofitting from the suppliers to the site of the work (guaranteeing timely delivery and in good condition) and the transport of old materials and waste generated (rubble, old windows and doors) to landfills or recycling points. On the other hand, in the case of possible rehousing during the works, they fulfil the transfer of furniture and boxes with residents' personal belongings.

12. **Final inspection and quality control** takes place once the work is completed. A final audit is completed to verify that the works are executed and finished correctly, that there are no defects and that the home is fully energy efficient.

Table 6: Entities and organisations of professionals operating in Osona and Lluçanès

Entity	Link
Industrial Engineers of Catalonia (demarcation of Central Catalonia)	https://www.eic.cat/eic-home
College of Architects of Catalonia (demarcation of Central Catalonia)	https://www.arquitectes.cat/ca/directori/comarques-centrals
Barcelona College of Technical Architecture (Osona and Moianès Delegation)	https://www.cateb.cat/delegacio-osona-moianes/
Guild of Installers of Osona	https://www.aico.cat/

Catalan Association of Public Works Construction Companies	https://surinya.wixsite.com/constcat
Chamber of Building Contractors of Catalonia	http://ccoc.cat/
Cluster of Advanced Materials of Catalonia	https://www.clustermav.com/
CREATION: Osona Entrepreneurship, Innovation and Knowledge Agency	https://www.creaccio.cat/
Administration Finques Osona	https://www.finquesosona.com/
Business Directory of Osona	https://empresesosona.cat/inici

Source: table prepared by Ecoserveis Association with relevant links from each entity

2.4.4. Addressing complexities in the retrofitting process

Starting an energy renovation project involves various complexities ranging from financial and technical difficulties to adaptation to regulations, administrative complexity and resistance to change.

The Itinerant Regional Energy Retrofitting Office will be the main point of reference that will inform, guide, advise and accompany people in their energy retrofitting processes, offering solutions to the difficulties that may be encountered and unblocking the possible obstacles in the wheel of the different stages of the project.

Table 7 offers an analysis of possible risks that may emerge during an energy renovation project:

Table 7: Analysis of possible risks associated with energy renovation

	RISK	SOLUTION	WHO	HOW
	Delays in obtaining permits.	Consult the professionals at the Energy Retrofitting Office and plan ahead and coordinate with the local authorities to speed up the procedures. Make sure to comply with local regulations to avoid application	Professional staff of the Energy Retrofitting Office.	The professionals of the Retrofitting Office offer comprehensive support in all phases of the retrofitting project. They are well aware of the phases of the procedures and the usual waiting times, so they help to plan the administrative part in

		requirements and verify that the required documentation is complete and well submitted. In the event of unforeseen events or delays, the building retrofitting agent helps the person with the claim procedures.		such a way that it best fits the needs.
ADMINISTRATIVE COMPLEXITY	**Long, complex and cumbersome administrative procedures.**	Consult the professionals of the Energy Retrofitting Office. By going to the specific service and advice points for energy retrofitting, interested parties can obtain clear information about the steps to follow, the legal requirements, and the deadlines. In case of requirements, the Retrofitting Office also helps to unblock.	Professional staff of the Energy Retrofitting Office.	The professional staff of the Energy Retrofitting Office is responsible for carrying out all the support for administrative procedures.
ADMINISTRATIVE COMPLEXITY	**Changes in regulations**.	Stay up-to-date with regulations and adapt the retrofitting plan as needed.	Professional staff of the Energy Retrofitting Office.	With each new regulation, the building retrofitting agent provides users with all the relevant information, as soon as possible and in a clear and easy-to-understand wording and format.

SOCIAL CHALLENGES	**Resistance of residents to the works**.	Continuous communication with residents to explain the benefits and minimise disruptions, offering logistical support when necessary.	The building retrofitting agent. Mediator profile of the Energy Retrofitting Office with support for Property Administrator.	Progressive mediation sessions with residents' associations. Possible awareness campaigns.
ECONOMIC	**Unforeseen cost overruns**.	Establish a contingency fund of 10-15% of the total budget to cover any cost overruns.	Professional staff of the Energy Retrofitting Office.	Knowing the costs and procedures well, and with good monitoring and communication between all the parties involved, anticipating possible unforeseen events in time helps to reduce them.
TECHNICAL	**Technical issues during implementation**.	Hiring reliable technical teams with experience and training in the technologies used, and rigorous monitoring of the project.	Professional staff of the Energy Retrofitting Office.	The Energy Retrofitting Office has a pool of well-referenced local professionals to minimise risks.
	Phased retrofitting.	Plan the phases in such a way that they complement each other and do not alter the decisions of the previous phases. Use good quality materials that are suitable for each phase, this will prevent corrections from being made later.	Professional staff of the Energy Retrofitting Office and technical staff in charge of studying the house.	The Energy Retrofitting Office has a pool of well-referenced local professionals to minimise risks.

		Comprehensive retrofitting minimizes this risk since the study is done in its entirety, but it is a more expensive procedure.		
EFFECTS	**Effects during retrofitting**	Offer alternative accommodation for the duration of the works, as detailed in the following section.	The municipality	Municipally-owned homes can serve as temporary accommodation for residents while the works last: public housing, for example, municipal households historically used for professional guest houses (old doctors' houses, teachers' houses or rectories). You can also consider temporarily rehousing in hotels or tourist apartments, or even building low-cost temporary residential modules.
		Financial compensation to cover expenses while residents stay with families or friends.	The municipality	On a monthly calculation of expenditure needs, people who are rehoused in the homes of relatives, friends or other related people can be financially compensated.
		Retrofitting by zones	The construction management	Planning the renovation in such a way that while the works last in one

			and the construction company	part of the house, the residents stay in the other, and so on.

Source: Ecoserveis Association

2.4.5. Effects during retrofitting

The management of the effects on residents during the energy renovation phase of buildings is a critical part of ensuring the success of the project. There are different possibilities that are highlighted below, but in all cases, detailed and careful planning and communication are always the fundamental starting points.

It is key to inform the residents about the work plan, the estimated duration of the works, the working hours and the affected areas, as well as to organize regular meetings with the residents to explain the project at each step and resolve doubts. In this regard, clear communication channels must be established, such as a specific point of contact so that residents can express their concerns and receive quick responses. The Retrofitting Offices can offer all guidance and advice to interested parties, as well as be a reference in all matters related to energy retrofitting.

There are different ways to manage the effects while the works last, in the event that the retrofitting has to take longer. Brief interventions, such as a change of windows or doors, can be carried out in a few days, but in the case of more in-depth retrofitting, the people affected must have efficient provisional solutions to continue with a normal life, such as having alternative housing.

Some municipalities offer temporary accommodation to residents while the works last, including the move to and from the works. This accommodation can be of different types:

1. The municipality offers accommodation in one of the municipal social housing buildings (HPO – social housing). The stock of public housing is rather scarce in small municipalities.
2. The municipality offers accommodation in old rectories or houses of teachers or doctors, owned by the municipality. In Osona and Lluçanès, studies are being held to identify these homes and assess their use as an alternative during renovation projects.
3. The municipality relocates people to third-party homes (hotels, third sector entities, COHABITAT, and flats for tourist use out of season).
4. The municipality is building temporary housing, such as the APROP (Temporary Proximity Accommodation) project in Barcelona [33]. In the event that the adaptation of prefabricated modules can be considered, there are feasible experiences in rural areas:

Illustration 7: Prefabricated module Port-a-Bach, New Zealand

Source: AtelierWorkshop [34]

Illustration 7: Quik House Prefabricated Module in the United States

Source: Adam Kalkin [35]

These and other similar examples can be studied to be adapted to the specific environment of Osona and Lluçanès and replicated by local professionals and companies.

A good example in rural settings is the Quik House in the United States. This prefabricated house is made with six shipping containers and can be assembled in just a few days. It is designed for rural or semi-rural environments and can be customized according to the needs of the owners. It aims to provide housing quickly in rural areas, with a modern and functional aesthetic. It is energy-efficient with additional insulation and plenty of natural light. The modular design allows modules to be added or removed as needed. Its modular design allows components to be moved and assembled as needed, making it suitable for rural areas where the need for housing may be temporary.

Another solution may be a monthly financial compensation calculated and estimated based on actual expenses, while residents live provisionally in the homes of relatives or friends.

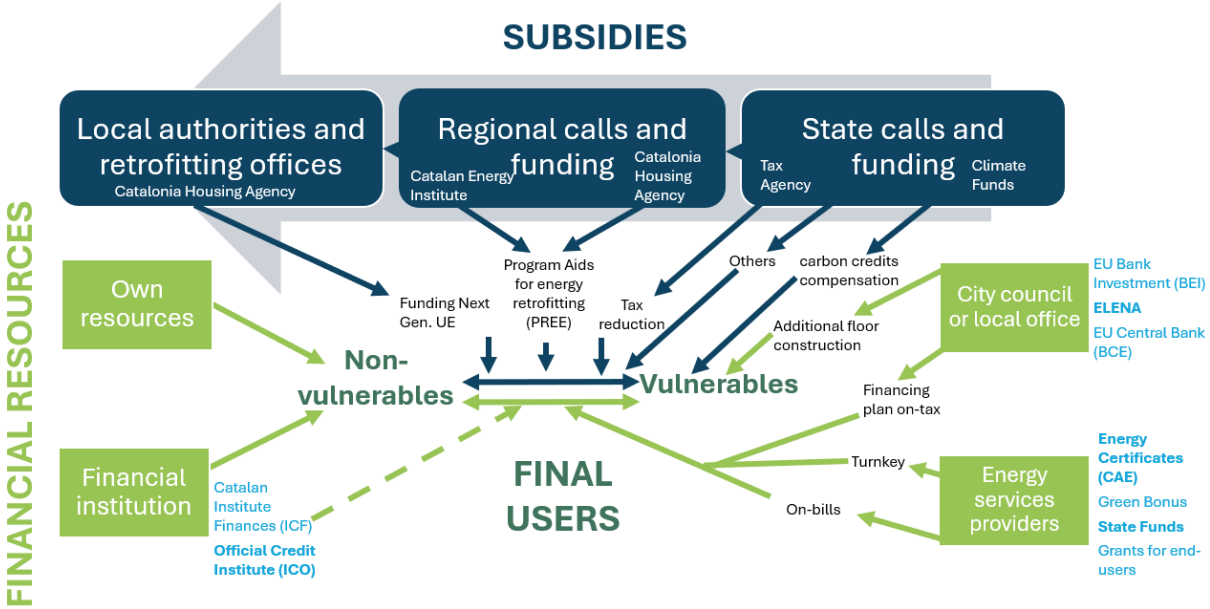
In certain circumstances (or when the other solutions are inapplicable) renovations can be proposed by zones, without completely displacing residents. Work is being done on one part of the building while residents concentrate on other areas, and then relocating them as the works progress. This option is certainly the least desirable since the degree of affectation is the highest and requires a very precise organization.

2.5. Financing and subsidies for energy renovation

The most difficult barrier to overcome is the economic one. Those vulnerable households who find it difficult to pay utility bills and basic cost-of-living expenses cannot afford the costs of retrofitting, or cannot afford less costly actions such as the replacement of old second-hand appliances with new higher energy efficiency rating appliances. Through grant and subsidy programmes added to payment or financing plans, part or all of the energy retrofitting actions can be covered for such households, the latter depending on the applicant's proof of vulnerability.

This section offers a summary, on the one hand, of the subsidies for energy efficiency actions in buildings for different economic capacity profiles, and on the other, of financing methods and mechanisms to provide an advance in the funds required for retrofitting and to be able to make the return in periodic payments. The synthesis is based on existing calls and possible financing plans, whether current or closed, but **to have all the schemes updated it would be necessary to contact the Local Retrofitting Office**. Illustration 8 summarizes lines of **subsidy** and plans of **funding** which vulnerable and non-vulnerable people and communities of owners can opt for. Not all of the lines are currently available, but if new calls for grants are opened, the corresponding bodies will disseminate them.

Illustration 8. Scheme of subsidies, grants and sources of financing



Source: Ecoserveis Association

2.5.1 Subsidies and grants

Next Generation Grants

The grants aimed at improving the energy efficiency of homes, with funding from the European Next Generation funds [36], are managed by the municipal or county retrofitting offices themselves. The renovation offices may depend on the Catalan Housing Agency, Housing Consortia or other bodies.

The main objective of the **Next Generation EU** funds for the energy renovation of homes is to reduce the consumption of non-renewable primary energy and improve the energy efficiency of multi-family and single-family buildings. The grants are applicable to both primary and second homes, and can also cover other types of retrofitting, such as accessibility or conservation. There are three grant programmes accessible to citizens [24]**:**

- Programme 3: Actions at the building level (by communities of owners) (Illustration 9)
- Programme 4: Actions at the housing level (for private owners) (Illustration 9)
- Programme 5: Drafting of the retrofitting project and building book (for communities and individuals)

As shown by the Illustration 9, the grants range from 40% to 80% depending on the saving of non-renewable primary energy and can reach up to 100% in the case of vulnerable people.

Illustration 9. Programmes 3 and 4 of Next Generation grants in Catalonia

PROGRAMMES 3 AND 4 HOUSEHOLD RETROFITTING
BUILDINGS (Programme 3) Savings NRPE ≥ 30% and <45%: grant 40%. Maximum per household 6.300 € and 56 €/m^2 per establishment Savings NRPE ≥ 45% and <60%: grant 60%. Maximum per household 11.600 € and 104 €/m^2 per establishment Savings NRPE ≥ 60%: grant 80%. Maximum per household 11.600 € and 104 €/m^2 per establishment **HOUSEHOLDS IN BLOCK (Programme 4)** 40% of retrofitting cost. Limit 3.000€ per household. Minimum cost 1.000 €/household
NRPE: Non-renewable primary energy In case of economic vulnerability can be 100%

Source: ICAEN

Tax reductions

The Tax Agency has three temporary deductions for amounts invested in works to improve the energy efficiency of homes [37]:

- Deduction for works to reduce the demand for heating and cooling: 20% deduction
- Deduction for works to improve the consumption of non-renewable primary energy: 40% deduction
- Deduction for energy renovation works: 60% deduction

In the event that the energy retrofitting action includes the installation of a self-consumption photovoltaic system, the city councils can offer discounts on the IBI, the Property Tax, or the ICIO, the Construction, Installations and Works Tax. For example, the City Council of Torelló in 2023 offered a reduction of up to 50% of the IBI and 95% in the case of the ICIO [38].

PREE Program

The ICAEN (Catalan Institute of Energy) manages state funds for grants for the energy retrofitting of buildings, called the Energy Retrofitting Grant Programme for Buildings (PREE), which are coordinated at a higher level by the Institute for Diversification for Energy Saving (IDAE). The current call at the time of writing this roadmap (2024) is closed, but there will likely be others from 2025 onwards, so it is recommended to be aware of communications on official portals

[39] [40]. The PREE5000 is intended for municipalities with fewer than 5,000 inhabitants and is not only focused on residential buildings. The eligible actions include improvements in the thermal envelope, replacement of fossil generation equipment with renewable thermal ones, incorporation of regulation and control elements and improvement of lighting efficiency. The grants from past calls are described in the Illustration 10.

Illustration 10. PREE5000 grant in Catalonia

ICAEN PREE5000
TYPOLOGY 1. THERMAL ENVELOPE Fixed grant 50% Additional grants: a. Social criteria +15% b. Energy efficiency +5 +10 + 15% c. Global performance +25% **TYPOLOGY 2. INSTALLATIONS** Fixed grant 40% Additional grants: a. Social criteria +10% b. Energy efficiency +5 +10 % c. Global performance +5 +15 +20% **Real mean of grant's intensity 70%**

Source: ICAEN

Social Climate Fund

The Social Climate Fund [41], which will be launched in 2026, is intended to distribute economic compensation so that the penalty for CO_2 emissions cease to be a regressive measure and be a stimulus for renewal.

The Social Climate Fund will distribute a total of €9,112 million in Spain, provided that the Spanish government can provide 25% of the plan. This amount will be allocated to those affected by the payment of CO_2 emissions: SMEs, households using road transport, and households using fossil fuels for heating. Although the measure is not yet underway, it is necessary to be attentive to the amount that is finally allocated to vulnerable households.

Other state grant

The Spanish State has a specific fund dedicated to energy efficiency [42], which comes from other European sources such as the ERDF Fund. Although funds can be transferred to local bodies so that the funds can be managed, as is the case with the PREE Programme, in some cases the call may be made by the central bodies of the state.

2.5.2 Funding programmes

Own Funds

Having your own funds for financing is one of the barriers identified in this REER. Even so, for non-vulnerable profiles, it may be an appropriate measure, especially if you have a phased retrofitting plan with technical support from the Technical Retrofitting Office or other entities in its absence, such as the Technical Retrofitting Office of Catalonia [43].

Financial institutions

Agreement between the Ministry of Transport and Sustainable Mobility and the Official Credit Institute (MITMA-ICO) [44]

On 16 February 2023, the agreement between the General Secretariat for Urban Agenda and Housing and the ICO was published to manage the guarantees in the line "Line of guarantees for residential building retrofitting" [45]. The participating entities are the following: ABANCA, Banco Sabadell, BBVA, C. R. Central, Caja Rural de Asturias, Caja Rural de Soria, Caja Rural de Teruel, Caja Rural del Sur, Cajasiete, UCI (Union of Real Estate Credits), Banco Cooperativo, Bantierra Nueva Caja Rural Aragón, BCC (Grupo Cajamar), CaixaBanc, Caja Rural de Burgos, Caja Rural de Granada, Caja Rural de Zamora, Caja Rural de Navarra, Santander, Unicaja Banco [46].

The conditions are published on the website of the Official Credit Institute [46]. In summary, they are:

- Fixed or variable interest rate, established by table [47]
- 50% MITMA guarantee
- Up to 15 years repayment with a 2-year grace period

The financing line is valid until 30 November 2025.

Collaboration agreement between the Departments of Economy and Finance and Social Rights, the Housing Agency of Catalonia (AHC) and financial institutions

On 24 February 2022, a collaboration agreement [48] [49] was formalised between the Departments of Economy and Finance and Social Rights, the Housing Agency of Catalonia (AHC), the Catalan Institute of Finance (ICF), Avalis de Catalunya SGR and ten entities in the financial sector to launch a line of loans for residential energy renovation works to communities of

owners, individuals and building retrofitting agents. The loan line is associated with the "Residential Energy Retrofitting Grant Line" managed by the AHC and linked to the Next Generation EU funds.

The financial institutions that adhere to the signing of the agreement and ratify the 2024 addendum are the following: ARQUIA BANCA, Bankinter, BBVA, Banco de Sabadell, Banco Santander, CaixaBank, Caixa d'Enginyers, Deutsche Bank, Ibercaja and UCI (Real Estate Credit Union). [50]

Each financial institution has the loans announced on its website, for example, the Bank of Sabadell announces it as a CCPP Retrofitting Loan [51] or Caixa d'Enginyers, ECO Rehabilita Loan [52]. There is also a list of financial institutions on the IDAE website from an old PREE call, but the entities continue to have lines of loan for the energy retrofitting of buildings [40].

The summarized conditions are [53]:

- **Owners' communities**: Fixed rate < 5.25% per annum
- **Individuals**: Interest rate < 4% per annum
- **Building retrofitting agents**: Interest rate < 5% per annum + 1.5% discount with guarantee

The justification of the investment for the collection of the grants must be executed before June 2026.

Financing through public entities

There is a study by REVO [41] that indicates several financing methods that are suitable for vulnerable profiles. It is necessary to evaluate case by case, and consult with the agents involved, but there are examples of financing through the city council in other municipalities, as is the case of Santa Coloma de Gramenet. With the support of European programs such as ELENA and the support of the European Central Bank and the European Investment Bank, the city council assumes the investment costs and assumes the risk of the credit operation instead of the owners or communities of owners. The investment is recovered with three possibilities:

  - Through monthly payments by the user as far as possible
  - With an entry in the land registry so that you pay
  - Through a tax figure, with a low interest rate

Another example to give the administration economic viability is investing in public housing through the construction of an additional floor, if the structure of the building is robust enough.

Not all public entities have the same capacity, and that not all city councils, especially those of Osona and Lluçanès, have the capacity to invest and take the risks that this entails. Even so, city councils can take the lessons learned in Santa Coloma de Gramenet as an example and start with small pilot projects with less risk.

Financing through energy service providers

Within the category of financing through energy service providers, many types of financing and services are offered since it is part of the business model of the companies themselves. In this section, a few examples of this type of financing are given, but the providers websites can be consulted find an updated version of their services.

On the one hand, there are the payments on invoice offered by the retailers. The electricity retailer assumes the initial investment (can make one from financing funds such as green bonds, energy savings certificates CAEs or sovereign funds of Spain) and the household pays through the invoice related to the electricity meter.

In addition, there are also companies that offer a turnkey energy retrofitting service which means that they take care of the entire cycle explained in Illustration 11, and thus the user does not have to advance the money that comes from the subsidy, but it is the company itself that covers its expenses. This type of service is usually offered by companies called ESEs (energy service companies), which by law are those that provide energy services to third parties, make the investment and face the financial risk in doing so. Some examples of this type of financing can be found on the websites of the companies in charge [54] [55]. Below are some theoretical examples described:

- The property management company of a multi-family block building wants to offer an energy retrofitting service to the entire building, in order to improve the housing stock it supplies, as well as to attract customers. It proposes to the community of neighbours a series of interventions assuming the risk, and the return on investment is managed in the monthly housing payments.
- The leading company in photovoltaic self-consumption in Vic wants to promote its commercial activity. It conducts a survey of customers in Vic in order to make an aggregate purchase of photovoltaic modules and assumes the initial investment. It also offers customers to assume the cost of the installation and an energy management system where they can see the production of their installation as well as its consumption and instant advice to optimize it. The monthly payments include the return on investment and the fee for the app. Once the debt has been settled in five years, customers can unsubscribe from the energy management app or pay a reduced fee, in order to continue improving energy savings based on good management of their consumption. Thus, the user does not have to advance the money that comes from the subsidy, but it is the company itself that covers its expenses.

2.5.3 Summary

The Table 8 and the Table 9 show a summary of the sections 2.5.1 Subsidies and grants and 2.5.2 Funding programmes respectively.

Table 8: Summary of grants and subsidies related to energy renovation

Grant/Subsidy	Description	Coverage (%)	Managing body	Validity
Next Generation Grants [56])	Subsidies for the energy retrofitting of buildings, with variable coverage depending on the cost of the project and according to the energy improvement.	Up to 80% and up to 100% for vulnerable	Retrofitting offices	Stable
Personal Income Tax Deductions [37]	Deductions of up to 60% in Personal Income Tax for energy renovation expenses incurred until the end of 2025.	Up to 60%	Tax Agency	End of 2025
IBI or ICIO discounts [38]	For self-consumption photovoltaic installations in the rural and urban environment	Depends on City council	City council	Consult City council website
PREE5000 - ICAEN: Grant programme for the energy retrofitting of buildings [39]	Grants for the energy renovation of buildings, not just residential.	Variable	ICAEN (Catalan Institute of Energy)	Not in force

Social Climate Fund [41]	Financial compensation for those most affected by penalties for CO_2 emissions	Unknown	Corresponding Spanish body, probably Ministry of Transport and Sustainable Mobility	Not available Expected in 2026

Source: Ecoserveis Association

Table 9: Summary of financing mechanisms for energy renovation

Financial products	Description	Coverage (%)	Managing body	Validity
Own funding	Payments according to the economic power of the inhabitants, being able to have a phased retrofitting plan	100%	Particular	Stable
Agreement between the Ministry of Transport and Sustainable Mobility and the Official Credit Institute (MITMA-ICO) [44]	Loan with guarantee for the energy retrofitting of buildings intended for owners or communities of owners who execute renovation works on residential buildings located in Spain and who have received grant from the Autonomous Communities. Conditions: [46] • Fixed or variable interest rate, established by table. [47] • 50% MITMA guarantee • Up to 15 years repayment with a 2-year grace period	Up to €30,000 per project	Financial institution	November 30, 2025

	Valid until 30 November 2025			
Collaboration agreement between the Departments of Economy and Finance and Social Rights, the Housing Agency of Catalonia (AHC), the Catalan Institute of Finance (ICF), Avalis de Catalunya SGR and ten entities in the financial sector [48] [49]	Loans for the energy retrofitting of buildings, with bureaucratic facilities due to the demand for grants and subsidies. Conditions: [53] • **Owners' communities**: Fixed rate < 5.25% per annum • **Individuals**: Interest rate < 4% per annum • **Building retrofitting agents**: Interest rate < 5% per annum + 1.5% discount with guarantee	Up to 100% of the investment made (including VAT), depending on the recipient	Financial institution	June 2026
Financing through energy service providers	**On-bill scheme:** The electricity supplier assumes the initial investment (being able to make a financing fund such as green bonds or sovereign wealth funds in Spain) and the household pays through the bill related to the electricity meter. **Turnkey projects**: the energy services company is in charge of applying for the subsidies they apply for and they can assume receiving the payment once the work has been completed, even in monthly fees.	Unknown	Energy Services Company	Stable

Funding through the city council	The city council assumes the investment costs and assumes the risk of the credit operation in place of the owners or communities of owners. The investment is recovered with three possibilities: • Through monthly payments by the user as far as possible • With an entry in the land registry so that you pay • Through a tax figure, with a low interest rate	Up to 100%	City Council through financing from the European Investment Bank (EIB), INVEST-EU guarantee fund and technical advice from the ELENA programme	Not available

Source: Ecoserveis Association

2.6. Phased planning: step-by-step summary infographic

Below is a summary of the necessary steps to follow to develop an energy retrofitting project. At an economic level, although the subsidies are received in full at the end of the process, the financing methods mentioned in the previous section allow the funds to be advanced. **As such, energy retrofitting offices must respond** to the possible complexities that may arise **during the different stages of energy renovation and ensure that families are accompanied during this process.**

Illustration 11: Infographic summary of the steps to follow for an energy renovation

Source: Ecoserveis Association

3. Conceptualize and implement actions to address energy poverty in rural areas leaving no one behind

3.1. How to address the energy renovation of homes in rural areas and vulnerable groups

The sampling of homes for the twenty audits has been developed with families previously identified by social services who are experiencing energy vulnerability. The visits collected data in two ways: on the one hand, technical data for obtaining energy certificates and working on the first technical part of the roadmap, and on the other hand, families were accompanied with the aim of determining the characteristics of the cohabitation units and offering them advice in energy terms, with an emphasis on energy retrofitting: what it is, what benefits it has and what current financial mechanisms exist.

The technical branch of the audits makes the construction of the previous section of the roadmap possible, offering the technological solutions of the 20 homes to apply energy renovation measures.

The social aspect allows us to identify a series of barriers that hinder the access that these families have to everything prior to implementing the first part of this strategy. The social diagnosis makes evident the need **to design measures that respond to the barriers identified** if families are to be able to initiate the improvements proposed in the technical part of the document.

It is important to consider that the barriers identified must be exacerbated by the added difficulty that each cohabitation unit has different casuistry and, therefore, priorities that are far from energy efficiency focused on reducing demand. Among the cohabitation units, there are situations of single-parent families, pensioners, migrants with difficulties with the language, families with members with degrees of disability and dependency, unemployed members, some of whom add different cases from those described and even two situations of threat of eviction.

In order to broaden the identification and perception of the barriers associated with retrofitting projects, activities are carried out with citizens and members of the energy communities of the region. The objective is to put citizens at the center and collect as much information as possible to work with the relevant actors in the sector of the Osona region.

The co-creation process is divided into two phases: design and validation.

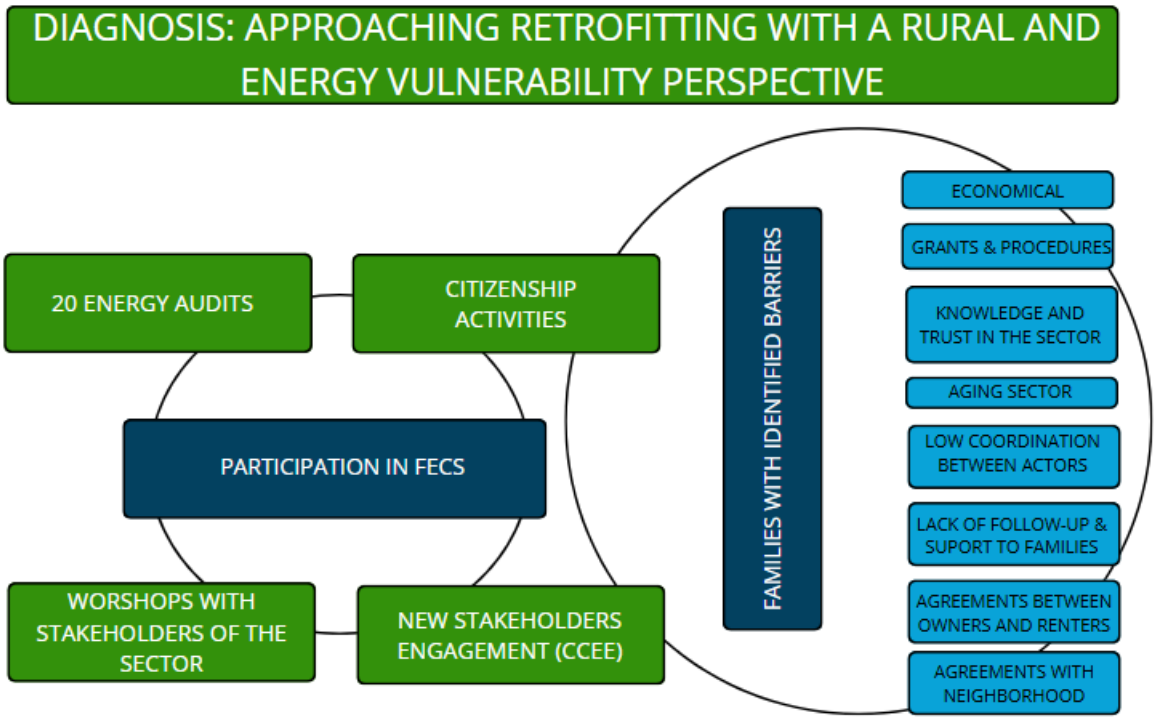
Design phase: This was based on two participatory activities where, on the one hand, the difficulties of access to energy retrofitting projects were identified and, on the other, what ways

there may be to overcome them. Both activities were worked on with local actors in the region, using the information collected in the contextualisation phase as a starting point.

Thanks to the participatory sessions, a very broad list of barriers is identified, which is grouped into 8 main categories:

- Economic
- Access and management of procedures and subsidies
- Lack of knowledge and mistrust in the sector
- Aged sector
- Low coordination between actors
- Lack of support for families
- Agreements between property and rental
- Agreements between neighborhood communities

Illustration 12: Co-creation process used for diagnosis, identification of barriers and possible ways to overcome them



Source: Ecoserveis Association

3.2. Barriers identified against energy renovation

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

- **Financial, grants and subsidies**
  Economic barriers are the great challenge for energy retrofitting. This barrier, manifested in several different ways, has been the most recurrent throughout the co-creation process. Facing the expenses associated with a renovation project is expensive and, if the inflation in the prices of materials, in recent times is added to this, i, the grievance increases. Grant and subsidies are tools to cover the economic lag, however, both are also categorized as barriers in themselves. On the one hand, despite having access to subsidies, the family is the one who has to 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**

  In addition, the different 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, taking into account 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 takes into account all the barriers that hinder retrofitting projects.

- **Lack of knowledge and mistrust in the sector**
  If the economic and implementation barriers are resolved, engagement of families comes into play. How information arrives on what energy renovation is, what benefits are associated with it, what grant there is and who it can be addressed to are questions that need to be addressed. Administrations, retrofitting offices, energy communities, property managers, and building retrofitting agents are all fundamental actors for empowerment in terms of energy.
  In addition, 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**

It is also important to consider that the vast majority live in rental properties, so the lack of interest or frustration of not knowing how to collaborate with the property owner to undertake home improvement measures as an additional complexity of this barrier. It should be noted that although 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. In some cases, and especially if multi-family homes are considered, there may not even be a consolidated community of owners or a property administrator to which households can speak about potential renovations.

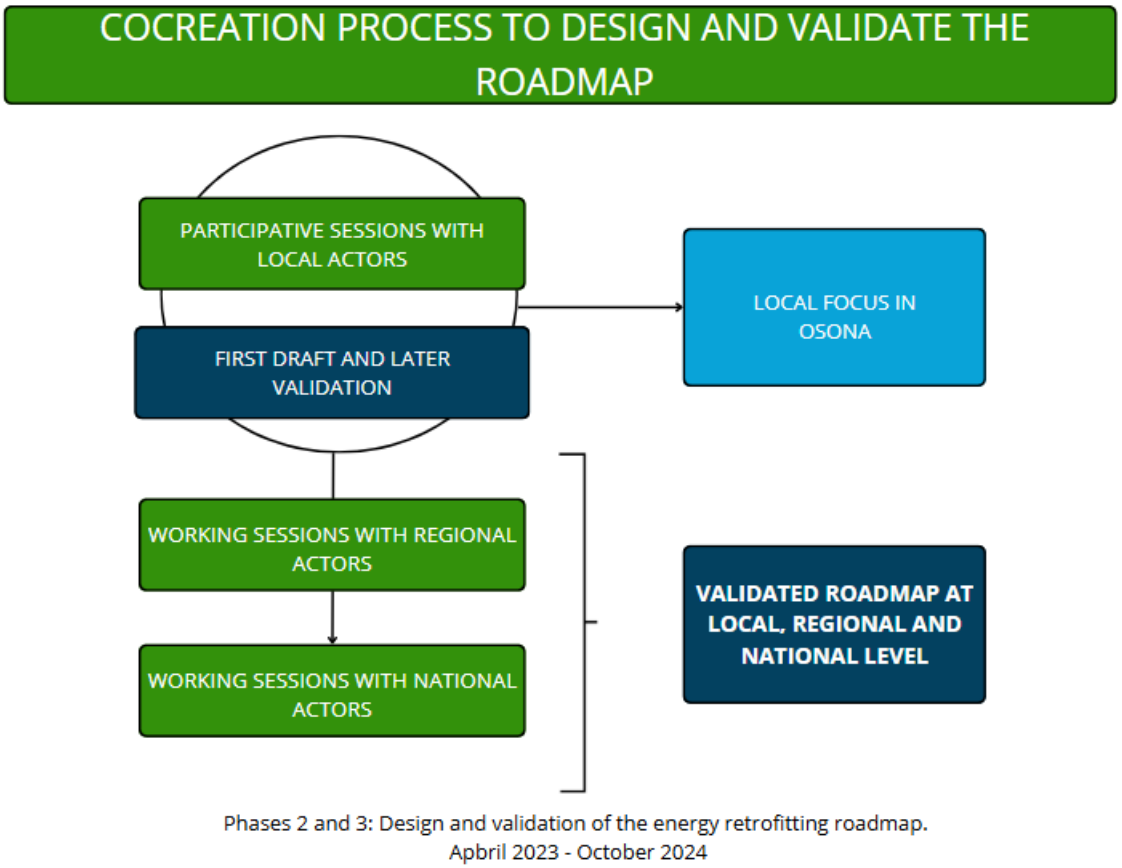
- **Aged sector**
  During the co-design of the strategy, specialists in renovation projects expressed that the construction and installer sectors are aging and have few staff to execute current and upcoming works. In addition, the use of some materials in renovations requires a specific type of training. 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. Taking into account the whole range of barriers already described, it is very important to streamline communication around retrofitting and advocate for coordination between the different actors. Different barriers can be solved at the once thanks to the collective incidence that can be made.

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.

During the co-creation, work was done to find solutions to the barriers identified and their major challenges. Once the round of activities with citizens and relevant actors in the sector at the regional level of Osona was completed, the first draft of the strategy was drafted, and everyone was brought together for a first local validation. After improving the proposals, the validation was scaled to a participatory process with regional and national actors. The second part of this strategy was designed thanks to the expert views scaled to different levels and all of the validations of the document. This following section describes a series of measures that seek to respond to the barriers and challenges identified during the sampling of energy audits and the co-creation process, in order to make the first technical part of the roadmap accessible.

Illustration 13: Design and validation of the roadmap based on the co-creation process



Source: Ecoserveis Association

3.3. Overcoming barriers and challenges: measures to promote energy renovation in the territory

Four fundamental aspects are addressed within the REER: **technical**, **financial**, **legal** and **community**-level aspects.

This document can therefore be used as a regional strategy for Osona to be implemented until 2035. The roadmap is made up of 7 categories of measures and 18 actions to be implemented. The different actions are 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 community.

Thus, the roadmap groups the actions to be implemented into **7 categories of key measures**. These categories are defined as possible solutions to the barriers previously identified and described, and at the same time must respond to the main focus of the roadmap: addressing the energy renovation of homes in rural areas by focusing on energy vulnerability.

1. **Training and communication**
   The actions included in the training and communication measure are 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.
   It is a cross-cutting category, which is necessary to respond to all barriers. If we are clear about the ways of what should be done, how it should be done, who should respond and when, we will be giving way to speed up energy renovation processes.

2. **The building retrofitting agent**
   The social analysis of the roadmap highlights the high level of mistrust and ignorance towards the energy sector, which is more pronounced in vulnerable groups. It is therefore essential that families are advised and accompanied from the very beginning of any renovation process. The building retrofitting agent can offer this mediation and at the same time overcome other barriers such as difficulties in accessing procedures and subsidies or agreements between owners and tenants and between residents of the same community.
   At the same time, city councils, property administrators and companies in the sector can also offer the attention and impetus needed by all those involved (owners, professionals, companies, manufacturers, etc.) and act as a stepping stone for the retrofitting of the territory.

3. **Mobile Energy Retrofitting Office**
   An energy retrofitting office, commonly known as a one-stop-shop, is essential in order to respond to the different needs of citizens in the field of energy renovation of homes, and this is reflected in the new Directive in Article 18: "*Member States, in cooperation with the competent authorities and private sector stakeholders, shall ensure the establishment and operation of technical assistance services, through inclusive one-stop shops for the energy efficiency of buildings, aimed at all the agents involved in the renovation of buildings, among others, homeowners and administrative, financial and economic agents*".

Within the framework of RENOVERTY, this category of measure specifies the need to create this office, of a regional nature, but being itinerant to reach the set of decentralised municipalities.

4. **Financing measures**

   The economic barrier emerges repeatedly throughout the co-creation process, both on the part of citizens and on the side of experts in the sector. It is for this reason that the roadmap presents a category of financing measures, which describes actions 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**

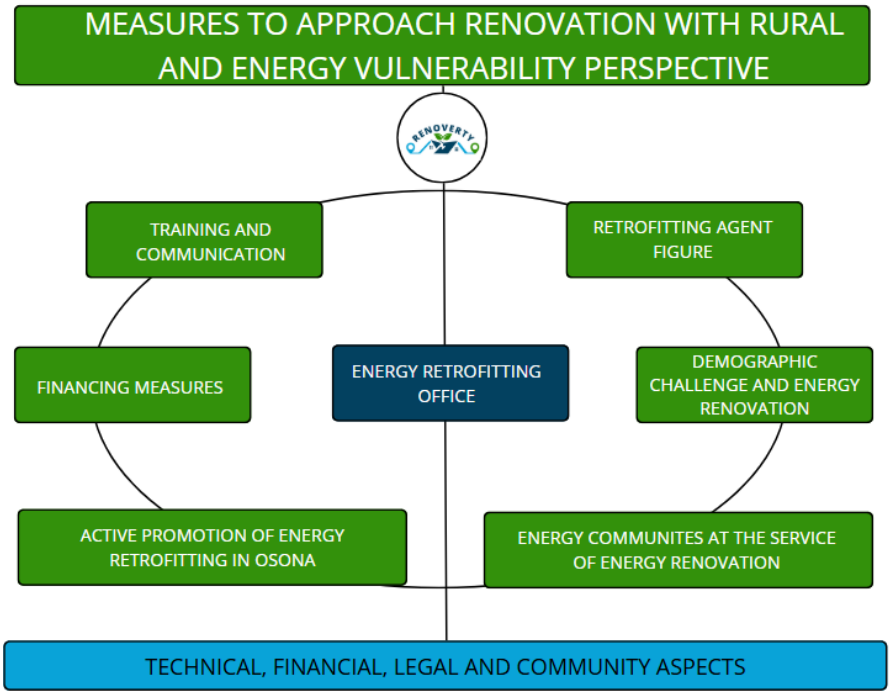
   This category of measure aims to promote energy retrofitting in an active way in the region, with actions that touch the legal leg such as the updating of the current strategic development plans of local entities to put the energy retrofitting of homes on the political agendas or economically including energy efficiency criteria for the setting of the rental price in homes.

   Planning is an essential preliminary step when promoting any type of action from the public administration, and for this reason a diagnostic action is presented that serves to prioritize actions and the creation of a transversal working table that responds in a holistic and multi-stakeholder way to the roadmap as a whole.

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.

Illustration 14: Outline of the 7 categories of measures of the roadmap



Source: Ecoserveis Association

3.3.1. Summary table of the measures to promote the energy retrofitting of the region

The summary table of the actions included in each category of measures is presented below (Table 10). Each of the actions include a description and justification, the implementation, the temporality, the responsible agent, the agents involved, the cost, the financing, the evaluation indicators and the relationship between them. Every action is deeply described in format of a worksheet. All the fact sheets can be found after Table 10.

Overall, this roadmap has:

1. offered technical energy efficiency guidelines and solutions to be implemented in households based on the analysis of local housing
2. addressed the barriers identified offering seven main categories of measures (Illustration 14) with different actions to be implemented by relevant stakeholders for the alleviation of rural energy poverty.

Table 10: Measures to promote energy retrofitting in the territory

TRAINING AND COMMUNICATION							
Action	**Beneficiaries**	**Funding**	**Responsible for**	**Support**	**Temporality**	**Evaluation indicators**	**Related measures**
1. Communication campaigns	City councils and citizens	The energy retrofitting office's own budget for the preparation of the contents to be communicated. An approximate cost of €5,000/year is calculated.	Retrofitting Office, City Councils and Local Action Groups	Osona County Council, Osona Local Energy Agency, Barcelona Provincial Council	2025-2035: Recurring action. Annual campaigns and specific communications.	10 annual campaigns (2025-2035) and number of specific communications	Action 6, Action 7
2. Training in energy renovation of homes	City councils (departments of social services, consumption, housing), energy communities, professionals in the sector and professional associations	Regional budget, Barcelona Provincial Council, Generalitat de Catalunya. It is budgeted for 1 course of 10 hours to professionals per year 1,500€/year. It is budgeted for 5 training courses of 4 hours per year €3,000/year.	Retrofitting Office, Osona County Council, Osona Local Energy Agency	Department of Social Rights and Inclusion, Housing Agency of Catalonia, ICAEN, Real Estate Services Cluster, Professional Associations, CREACCIÓ, Local Action Groups	2025-2035: Recurring action. Annual courses and training.	Annual number of training courses completed and participants	Action 6

-THE BUILDING RETROFITTING AGENT							
Action	**Beneficiaries**	**Funding**	**Responsible for**	**Support**	**Temporality**	**Evaluation indicators**	**Related measures**
3. City councils as promoters of energy renovation	Citizenship	Barcelona Provincial Council, Catalan Housing Agency	Municipalities	Osona County Council, Local Housing Office, Barcelona Provincial Council, Housing Agency of Catalonia	2025-2030	Number of City Councils with promotional instruments for energy renovation	Action 1, Action 2
4. Property administrators and construction companies in the territory as promoters of energy retrofitting	Property administrators and construction companies in the territory	The energy renovation office's own resources	Energy Retrofitting Office	Osona County Council, Osona Local Energy Agency, CREACCIÓ, Barcelona Chamber of Commerce	2025: Identification and adhesion to the circuit of the retrofitting office and the transversal table 2026-2035: Training when required and participation in the transversal table	Number of property administrators and companies linked to the retrofitting office and the transversal work table	Action 2, Action 6, Action 13
5. Social services as reference figures and support for families in vulnerable situations	Social services	The energy renovation office's own resources	Osona County Council, Energy Retrofitting Office	Local Energy Agency of Osona, Osona Consortium of Social Services (Osona Social Action)	2025: Training and adhesion to the circuit of the retrofitting office and the transversal table 2026-2035: Training when required and participation in the transversal table	Number of social services departments in the region involved	Action 2, Action 6 and Action 13

OFFICE OF ENERGY RETROFITTING							
Action	**Beneficiaries**	**Funding**	**Responsible for**	**Support**	**Temporality**	**Evaluation indicators**	**Related measures**
6. Design and implementation of the itinerant energy retrofitting office	Citizenship	Cost of the technical person to be hired: €17,500/6 months Indirect costs: €2,500/6 months Funding: Local Action Group of Central Catalonia and Barcelona Provincial Council	Association for Rural Development of Central Catalonia	Osona County Council, Ecoserveis Association	2025: Itinerant pilot office 2026-2027: Regional office with the aim of becoming a fixed service	Number of municipalities participating in the pilot test; Number of citizen services; Number of users of the itinerant office; Number of homes retrofitted with the support of the office	Action 1, Action 2, Action 4, Action 5, Action 7, Action 8, Action 11, Action 13, Action 14, Action 15
FINANCING MEASURES							
Action	**Beneficiaries**	**Funding**	**Responsible for**	**Support**	**Temporality**	**Evaluation indicators**	**Related measures**
7. Promotion of public funds and programmes in the region of Osona	Citizenship	Human resources linked to the retrofitting office	Energy Retrofitting Office	Regional Housing Office, Local Energy Agency of Osona, Local Action Groups	2025-2035: Recurring action. Quarterly review and update, until the completion of the roadmap in 2035	Number of beneficiaries of annual public funds and programmes	Action 1, Action 6
8. Study of access to private financing funds in the region of Osona	Citizenship	Human resources linked to the energy retrofitting office	Energy Retrofitting Office	Regional Housing Office, Local Energy Agency of Osona, Local Action Groups, Efficient Energy Cluster of Catalonia, Union of Real Estate	2025: Identification of private financing funds 2026: Establish agreements	Number of collaborating entities that are members of the Transversal Working Group	Action 1, Action 13

				Credits, Banks, Energy Service Companies, Catalan Institute of Finance	2026-2035: Participation in the transversal table		
ADDRESSING THE DEMOGRAPH CHALLENGE WITH ENERGY RENOVATION							
Action	**Beneficiaries**	**Funding**	**Responsible for**	**Support**	**Temporality**	**Evaluation indicators**	**Related measures**
9. Promotion of cooperative housing models in rural areas by encouraging retrofitting	Citizens and municipalities	Municipalities through public-private funding, Barcelona Provincial Council through the catalogue of services, Local Action Groups through Cal Rural	Municipalities	ARCA, Local Action Groups, Osona County Council	2025: management of the catalogue of farmhouses through the POUM 2026-2035: promotion of new housing models and energy renovations of farmhouses	Number of homes retrofitted	
10. Promotion of rental with transfer of use of retrofitted homes	Citizenship	Barcelona Provincial Council	City Councils and Local Action Groups	Barcelona Provincial Council, Osona County Council	2025: Alpens rider 2026-2027: monitoring and assessment of the Alpens rider 2028-2035: replication of the model	Number of rental contracts with assignment of use in retrofitted homes	

ACTIVE PROMOTION OF ENERGY RETROFITTING IN THE REGION OF OSONA							
Action	**Beneficiaries**	**Funding**	**Responsible for**	**Support**	**Temporality**	**Evaluation indicators**	**Related measures**
11. Include energy efficiency criteria for setting the price of renting homes	People who own a free market home, which they make available to the Osona County Council's Housing Pool and renters	Regional Housing Office, through the Catalan Housing Agency and Housing Exchange of the Osona County Council	Osona County Council, Regional Housing Office	Catalan Housing Agency, Tenants' Union of Osona	2028: Create the line of renovation grants 2029-2030: Opening of the call 2031: Assessment of the call and possible extension	Homes retrofitted in the social housing stock	Action 6, Action 13
12. Update of strategic plans with energy renovation as a priority	Multi-actor benefit throughout the Osona Region	It will depend on the body responsible for each document. Internal collections of city councils, catalogue of services of the Barcelona Provincial Council, County Council, Local Action Groups,...	Osona County Council, Osona Local Energy Agency, Town Halls of the region	Barcelona Provincial Council, Local Action Groups, Regional Housing Office	2025-2030	Number of updated development plans	Action 3, Action 13
13. Promotion of the transversal table for the promotion of energy retrofitting in the region	Local actors in the sector (public-private) in the region of Osona	The action does not provide for expenses for meetings	Osona County Council	Local Energy Agency of Osona, Local Action Groups	2025-2035: Recurring action. The table will have to meet three times a year	Number of annual meetings of the table (objective of 3)	Action 4, Action 5, Action 6, Action 8, Action 11, Action 12

14. Activation of support and promotion mechanisms for energy renovation in Osona at supra-municipal, state and European level	Citizens, City Councils, local actors in the sector (public-private) in the region of Osona	Barcelona Provincial Council, EPAH	Osona County Council	Municipalities	2025-2030: Identification of existing supports 2025: Implementation	Number of supports activated at other levels of governance activated	Action 12, Action 13
ENERGY COMMUNITIES AT THE SERVICE OF RENOVATION							
Action	**Beneficiaries**	**Funding**	**Responsible for**	**Support**	**Temporality**	**Evaluation indicators**	**Related measures**
15. Community dissemination for energy retrofitting	Citizenship	EC social base Subsidies (e.g. SolarCoop)	Energy Communities, Local Energy Agency of Osona	Community Transformation Offices and Regional Energy Transition Offices	2025-2035: Recurring action. Annual campaigns and specific communications.	10 annual campaigns (2025-2035) and number of specific communications	Action 1, Action 6
16. Creation of citizen care and advice services	Citizenship	EC social base IDAE CE-OTC	Energy communities Community Transformation Offices EC Coordinators	Regional Energy Transition Offices	2025: Training for volunteer members of the EC in energy retrofitting 2026: Start of the service as a pilot and of a voluntary nature linked to the retrofitting office 2029: Assessment of the professionalisation and pooling of the service	Number of volunteers trained in energy renovation issues; Number of ECs participating in the measure; Number of citizen services	Action 2, Action 6

17. Promotion of aggregate purchases of energy resources and services	Citizenship	EC social base ICAEN Grants Program	Energy Communities	EC Coordinators Community Transformation Offices Local Energy Agency of Osona	2025: Creation of the management group 2026-2035: Recurring Action. When the need is detected, make collective purchases	Number of collective purchases made	
18. Search for community financial mechanisms for energy retrofitting	Citizenship	EC social base IDAE CE-Implements ICAEN Grants Program	Energy Communities	Banking entities EC Coordinators	2027: Banking Product Development 2028: Creation of leasing mechanisms 2029: Explore funding through CAEs	Number of improvements covered by the established financial mechanisms	

Source: Ecoserveis Association

3.3.2. Measures to promote energy retrofitting in the region

TRAINING AND COMMUNICATION
1. COMMUNICATION CAMPAIGNS
DESCRIPTION OF THE MEASURE To promote energy renovation for all citizens, it is necessary to keep them informed and updated. This action seeks to communicate on a recurring basis the benefits of energy renovation, grants and subsidies as well as the updates that arise. It is also important to communicate how retrofitting is being worked on in each municipality and at the regional level, emphasizing the citizen support they offer as well as communicating the existence of this roadmap as a commitment and the actions that can directly benefit citizens. The roadmap seeks to bring the energy retrofitting process closer to rural areas, in such a way that it is essential to launch communications that take into account the dispersion of many municipalities in the region, as well as to ensure that no one is left behind and therefore to direct campaigns to all audiences, including the most vulnerable groups.
IMPLEMENTATION The measure may be implemented as follows: 1) The energy retrofitting office (*Action 6. Itinerant Energy Retrofitting Office*) is the body in charge of centralising the information and conveying it to the rest of the bodies involved. The office will be responsible for preparing the content that must be communicated. 2) The office will coordinate with local authorities and Local Action Groups to provide communication materials. 3) Local authorities and Local Action Groups are responsible for communicating this to the public and identifying citizen communication channels. 4) Transmit information in infographic format, organize workshops, informative talks, and/or others that best fit the resources or needs according to municipality and final recipients.

5) Once the itinerant retrofitting office is constituted, a specific communication campaign will have to be created that reaches all the municipalities of the region and the public.

It is important to consider the different citizen groups in order not to leave any one behind and to implement communication with different channels to ensure the transversality of the measure. Thus, issues such as the digital divide and variances in language in communication campaigns will be taken into account.

The roadmap is a document valid until 2035, and sets the objective of launching an annual communication campaign, with the involvement of the energy retrofitting office, the Local Action Groups and the City Councils. The annual campaigns must include all the information related to starting an energy retrofitting project, paying special attention to vulnerability, and all the support offered at the regional level to facilitate the process. The action seeks to ensure that the information reaches all the citizens of the region, so care will be taken to use the different channels that allow it at the same time.

In addition, specific focused campaigns can be launched if necessary, such as communications related to possible changes in subsidies (*Action 7. Promotion of public funds and programs in the region of Osona*), always with the aim of keeping citizens updated.

Possible communication channels:

- Social networks
- Infographics
- Newsletters
- Informative talks
- Working groups
- Calls
- E-mails
- Others

- Frequency of communication: 1 annual campaign and specific communications according to needs.
- What is to be communicated: detailed information on the entire retrofitting process in the annual campaigns and updates or specific information according to needs during the campaigns.

Beneficiaries
City councils and citizens
Funding
The energy retrofitting office's own budget for the preparation of the content to be communicated. An approximate cost of €5,000/year is calculated.
Responsible for
Retrofitting Office, City Councils and Local Action Groups

Support	
Osona County Council, Osona Local Energy Agency, Barcelona Provincial Council	
Temporality	
2025-2035: Recurring action. Annual campaigns and specific communications.	
Evaluation indicators	
10 annual campaigns (2025-2035) and number of specific communications	
Related measures	
Action 6	Action 7

TRAINING AND COMMUNICATION

2. TRAINING IN ENERGY RETROFITTING OF HOMES

DESCRIPTION OF THE MEASURE

In order to overcome the lack of knowledge and mistrust on the part of citizens towards the energy sector, it is important to unify the discourse and communication around energy retrofitting. For this reason, this action proposes training plans aimed at the different actors involved in the different phases of energy renovation.

The training plans also seek to convey communication towards energy-vulnerable groups in order to ensure that they receive information on financing mechanisms, identifying those that establish access criteria according to the IPREM.

Training plans should be aimed at:

- **Social Services Professionals**
  As actors with direct attention to the most vulnerable groups

- **City Councils and Energy Communities**
  Training aimed at learning about the energy retrofitting process to become facilitators with citizens and train them as the first point of attention to citizens, in terms of energy efficiency.

- **Professionals in the renovation sector**
  1) Provide training to companies in the construction and renovation sector
  2) To make an impact on existing Training and Insertion Programmes in the field of energy retrofitting.

- **Professional associations**
  1) Design of training in the field of energy renovation, with an emphasis on vulnerability and rural areas.

2) To influence existing plans by providing a social perspective.

IMPLEMENTATION

The measure may be carried out as follows:

1) To respond to plans aimed at social services, town councils and members of energy communities in the region:

   1.1) Creation of specific training in energy retrofitting of homes and vulnerability at the regional level.

   - The Regional Council of Osona, together with the Local Energy Agency and in coordination with the retrofitting office (*Action 6. Itinerant Energy Retrofitting Office*) will create training aimed at social services, town councils and members of the region's energy communities.

   - The Catalan Housing Agency, professional associations and guilds are actors to consider for support in the creation of training.

   - In order to tailor the content to the real needs of social services, municipalities and energy communities, a prior knowledge or gap analysis will first be carried out.

2) To respond to the plans aimed at professionals in the sector and professional associations, the regional energy retrofitting office is responsible for:

   2.1) Identification of existing training in energy retrofitting of homes.

   2.2) Identification of skills needs in professional associations in the sector.

   - The Housing Agency of Catalonia, the professional associations, the guilds and CREACCIÓ are actors to consider for support in the creation of training.

   2.3) Update of existing programs focusing on energy vulnerability and the challenge of rurality by addressing the needs of schools.

Considering the temporality of the roadmap to 2035, the annual objective is set for:

- Impart training for each of the actors identified above.

- Decide on the duration and type of training based on the searches obtained in points 1) and 2) of the implementation phases.

• To ensure that all professionals in the Osona region of social services, town councils, energy communities, companies in the sector and members are aware of the training offer. Local Action Groups can help disseminate calls.
Beneficiaries
City councils (departments of social services, consumption, housing), energy communities, professionals in the sector and professional associations
Funding
Regional budget, Barcelona Provincial Council, Generalitat de Catalunya. It is budgeted for 1 course of 10 hours to professionals per year 1,500€/year. It is budgeted for 5 training courses of 4 hours per year €3,000/year.
Responsible for
Retrofitting Office, Osona County Council, Osona Local Energy Agency
Support
Department of Social Rights and Inclusion, Housing Agency of Catalonia, ICAEN, Real Estate Services Cluster, Professional Associations, CREACCIÓ, Local Action Groups
Temporality
2025-2035: Recurring action. Annual courses and training.
Evaluation indicators
Annual number of training courses completed and participants
Related measures
Action 6

THE BUILDING RETROFITTING AGENT
3. CITY COUNCILS AS PROMOTERS OF ENERGY RENOVATION
DESCRIPTION OF THE MEASURE In rural municipalities, the proximity that the City Council can have to the citizens makes it a key mediator and promoter of the energy retrofitting process. Action *2* of *Training in energy retrofitting of homes* for different actors seeks to cover the basic knowledge on energy retrofitting that must have, in this case, city councils. To complement the training part, this action aims to convey the municipalities as active promoters of energy retrofitting.

There are different mechanisms to activate municipal powers linked to the energy retrofitting of homes, allowing city councils to create strategic lines of diagnosis, planning and direct action for the promotion of retrofitting actions.

This fact sheet explores the implementation paths that the municipalities of the Osona region can follow, considering the different territorial characteristics, to become active promoters of energy renovation of homes.

IMPLEMENTATION

The measure may be carried out as follows:

1) Identify existing planning tools and update them to have an impact on energy retrofitting.

1.1) For municipalities with between 10,000 and 75,000 inhabitants:

In Osona they are Vic, Torelló and Manlleu.

It is possible to locate the homes in the worst condition of the municipality and to be able to make an impact on the properties for their comprehensive retrofitting. The Conservation and Refurbishment Areas (ACR) are a municipal competence, where the City Council becomes an acting administration, and areas can be declared in particularly degraded or risky areas.

The appropriate framework for proposing the declaration of refurbishment areas should be the Local Housing Plan (PLH). If the municipality does not have a PLH, it can be requested through the Barcelona Provincial Council's Service Catalogue. If you already have PLH, you can update it to ensure the energy renovation of homes.

Vic and Torelló have the PLH. In the case of Vic, an action to delimit Conservation and Refurbishment Areas is described, which is not the case of Torelló.

Manlleu drafted one valid for 2011-2016.

- Catalogue of services: Area of Urban Planning, Housing and Urban Regeneration. Urban planning and housing. Call: *Local housing plans*.

1.2) For municipalities regardless of the number of inhabitants:

Programmed Retrofitting Residential Environments (ERRP) can be delimited and declared. This is the Next Generation in Catalonia Grant Programme for

neighbourhood-level renovation actions, which aims to finance the joint carrying out of renovation works in buildings of predominantly residential use and housing, including single-family homes, and the urbanisation or redevelopment of public spaces within designated areas of action. City councils must submit the ERRPs for approval by the Generalitat and, once accepted, they may be submitted to the Generalitat's calls for subsidies to finance the retrofitting of buildings and the urbanization or redevelopment of public spaces.

The municipalities of the region of Osona mostly have less than 10,000 inhabitants, except for Vic, Torelló and Manlleu. Therefore, for the municipalities of Balenyà, El Brull, Calldetenes, Centelles, Espinelves, l'Esquirol, Folgueroles, Gurb, Malla, Masies de Roda, Masies de Voltregà, Montesquiu, Muntanyola, Orís, Roda de Ter, Rupit i Pruit, Sant Agustí de Lluçanès, Sant Bartomeu del Grau, Sant Boi de Lluçanès, Sant Hipòlit de Voltregà, Sant Julià de Vilatorta, Sant Martí de Centelles, Sant Pere de Torelló, Sant Quirze de Besora, Sant Sadurní d'Osomort, Sant Vicenç de Torelló, Santa Cecília de Voltregà, Santa Eugènia de Berga, Santa Eulàlia de Riuprimer, Santa Maria de Besora, Seva, Sora, Taradell, Tavèrnoles, Tavertet, Tona, Vidrà, Viladrau and Vilanova de Sau that are excluded from the drafting of the PLH, the ERRP declaration is a good alternative. The municipalities of Vic, Manlleu and Torelló can also declare it.

In Osona, only Centelles has made the ERRP declaration.

2) In rural municipalities with few inhabitants, in line with the action of communication campaigns (*Action 1. Communication campaigns*), City Councils can also play a very important role in promoting the energy renovation of homes by doing a "door-to-door" approach, considering the proximity and possible trust among citizens.

Beneficiaries
Citizenship
Funding
Barcelona Provincial Council, Catalan Housing Agency
Responsible for
Municipalities
Support
Osona County Council, Local Housing Office, Barcelona Provincial Council, Housing Agency of Catalonia
Temporality
2025-2030
Evaluation indicators
Number of City Councils with promotional instruments for energy renovation

Related measures	
Action 1	Action 2

THE BUILDING RETROFITTING AGENT

4. PROPERTY ADMINISTRATORS AND CONSTRUCTION COMPANIES IN THE TERRITORY AS PROMOTERS OF ENERGY RETROFITTING

DESCRIPTION OF THE MEASURE

Property managers play a key role in overcoming the barriers of mediation between communities of residents and in channelling communication between property and tenant. At the same time, they can facilitate the training of homeowners to undertake energy renovation actions considering citizens' duties, using buildings that have failed technical inspection as incentives.

The construction companies of the region are also important actors to be located within the framework of the roadmap for them to operate as building retrofitting agents, channelling their commercial tasks by communicating the varied benefits of energy retrofitting, as well as questioning them in the territorial complexity of rurality and energy vulnerability.

Thanks to the focus of training on energy retrofitting of homes in rural areas and with special attention to vulnerable groups (*Action 2* of *Training in energy retrofitting of homes*), property managers and construction companies in the region can become key actors for the implementation of the roadmap, and therefore the action seeks to channel them as building retrofitting agents.

IMPLEMENTATION

The measure may proceed as follows:

1) The first step must be the mapping of property administrators in the region, which can be developed with the help of the Association of Property Administrators and the regional economic promotion entity CREACCIÓ, led by the energy retrofitting office.

2) Secondly, to identify the companies in the sector that operate in the region of Osona, which can be implemented with the economic promotion entity of CREACCIÓ and the Barcelona Chamber of Commerce (Osona delegation), led by the energy retrofitting office.

3) Train and raise awareness of both actors (*Action 2. Training in energy renovation of homes*) in the field of energy retrofitting of homes in rural areas and vulnerable groups. 4) Create a circuit of collaboration with the retrofitting office (*Action 6. Itinerant Energy Retrofitting Office).* 5) Invite companies in the sector and property managers to actively participate in the transversal table (*Action 13. Transversal table for the promotion of energy retrofitting in the region*).
Beneficiaries
Property administrators and construction companies in the territory
Funding
The energy renovation office's own resources
Responsible for
Energy Retrofitting Office
Support
Osona County Council, Osona Local Energy Agency, CREACCIÓ, Barcelona Chamber of Commerce
Temporality
2025: Identification and adhesion to the circuit of the retrofitting office and the transversal table
2026-2035: Training when required and participation in the transversal table
Evaluation indicators
Number of property administrators and companies linked to the retrofitting office and the transversal work table
Related measures

Action 2	Action 6	Action 13

THE BUILDING RETROFITTING AGENT
5. SOCIAL SERVICES AS REFERENCE FIGURES AND SUPPORT FOR FAMILIES IN VULNERABLE SITUATIONS
DESCRIPTION OF THE MEASURE A lack of awareness and mistrust towards the energy sector has been the second most important barrier identified during the co-creation process, behind the economic one, being a much more pronounced barrier in vulnerable families. It is therefore very important that these

families receive support from the beginning of explaining what energy retrofitting is to the end of the improvement actions, including follow-up and monitoring.

Social services can become figures of reference and support for families in vulnerable situations. Thanks to the co-creation process, where success stories of energy retrofitting in vulnerable groups have been known, the importance of the work done by the mediators with the families, those who assume the social part of the work and without whom the technical part would not have been possible, has been highlighted.

Therefore, the accompaniment must not only be informative and technical, but also practical and emotional, with the aim of generating trust and resolving doubts or fears that may arise. Continuous monitoring until the completion of the improvement actions is essential to ensure that the process is undertaken effectively, that families understand the changes and that the impact of the work implemented is monitored.

Social services are a key agent in the process, as they can act as reference and support figures for vulnerable families. These professionals have an in-depth understanding of the social and economic needs of families, allowing them to make a connection and offer practical guidance. In addition, they can help guide families in obtaining resources or grant for energy retrofitting, as well as facilitate communication with other actors involved, such as technicians or public administrations.

This action is linked to the *2* of *Training in energy retrofitting of homes* where training plans are established for social services professionals in the field of energy retrofitting.

IMPLEMENTATION

The measure may be carried out as follows:

1) The first step must be the mapping and contact of the different departments of social services in the region, most of which are members of the Osona Consortium of Social Services, hand in hand with the Osona County Council.

2) Train and raise awareness of social services (*Action 2. Training in energy renovation of homes*) in the field of energy retrofitting of homes in rural areas and vulnerable groups.

3) Create a circuit of collaboration with the retrofitting office (*Action 6. Itinerant Energy Retrofitting Office).*

4) Invite social services to actively participate in the transversal table (*Action 13. Transversal table for the promotion of energy retrofitting in the region*).

Beneficiaries		
Social services		
Funding		
The energy renovation office's own resources		
Responsible for		
Osona County Council, Energy Retrofitting Office		
Support		
Local Energy Agency of Osona, Osona Consortium of Social Services (Osona Social Action)		
Temporality		
2025: Training and adhesion to the circuit of the retrofitting office and the transversal table		
2026-2035: Training when required and participation in the transversal table		
Evaluation indicators		
Number of social services departments in the region involved		
Related measures		
Action 2	Action 6	Action 13

OFFICE OF ENERGY RETROFITTING
6. DESIGN AND IMPLEMENTATION OF THE ITINERANT ENERGY RETROFITTING OFFICE
DESCRIPTION OF THE MEASURE It is very important to centralise, homogenize and convey the different actions of the roadmap, and for this reason it is essential to create the promotion of a regional energy retrofitting office in the territory. Focusing on rural municipalities, often remote and far from the more centralised municipalities, the action proposes the creation of an itinerant energy retrofitting office, with the aim of reaching all the municipalities of Osona. The office will also ensure that it offers support to families with energy vulnerability in order to improve accessibility to energy renovation projects. With the aim of overcoming the barriers identified during the process of co-creating the design of the roadmap, the office will offer support to families from the beginning of the advice to the end of the improvement works, ensuring support in the following areas: 1) Technical advice 2) Administrative management 3) Subsidies and funding
IMPLEMENTATION

The action will begin in a first pilot phase and, after a year with all the lessons learned and needs to improve the service, through this action it will be ensured to establish the service as a regional office.

1) Pilot of the itinerant energy retrofitting office

1.1) A person will be hired through the Association for Rural Development of Central Catalonia, an entity that will coordinate the actions of the office during the pilot.

1.2) The person hired will be trained to ensure the quality of the service and the specificities of rural areas and the most vulnerable groups.

1.3) The services offered by the pilot office:

- Information and advice for citizens
- Update on everything related to energy renovation
- Support for the implementation of other roadmap actions

1.4) Structure and operation of the itinerant retrofitting office

- Person hired with a vehicle for the itinerant service
- Coordination with the Association for Rural Development of Central Catalonia
- Coordination with the City Councils to schedule visits, setting schedules, defining spaces and channels to communicate to citizens about the service
- Coordination with the building retrofitting agent of energy communities (*Action 15. Citizen Care and Advice Services*).
- Identification and coordination with all the actors in the energy retrofitting process and collaboration with the transversal working group (*Action 13. Transversal table for the promotion of energy retrofitting in the region*).

2) Regional itinerant energy retrofitting office

The objective of the regional itinerant energy retrofitting office is to maintain the service of the itinerant pilot office but expanding the contracted staff and to be able to have a physical office, always maintaining the roaming of the service.

It will also have to ensure that it provides comprehensive support and, therefore, no longer acts only as an information point like the pilot office, but also becomes a more active actor in energy retrofitting:

1) Technical and face-to-face advice

2) Administrative management
3) Bag of professionals
4) Subsidies and funding
5) Solving barriers to subsidies and funding

The regional itinerant energy retrofitting office will also convey and ensure the implementation of the actions of the roadmap that mention it as responsible or support in the implementation.

The actions linked to the regional itinerant energy retrofitting office are:

Actions linked to the Regional Energy Retrofitting Office	
Action 1	Communication campaigns
Action 2	Training in energy renovation of homes
Action 4	Property administrators and construction companies in the territory as promoters of energy renovation
Action 5	Social services as reference figures and support for families in vulnerable situations
Action 7	Improvement of access to public funds and programs in the region of Osona
Action 8	Improvement of access to private financing funds in the region of Osona
Action 11	Include energy efficiency criteria for setting the price of renting homes
Action 13	Promotion of the transversal table for the promotion of energy retrofitting in the region
Action 14	Community outreach for energy renovation
Action 15	Creation of citizen care and advice services

Article 18: One-stop-shops for the energy efficiency of buildings of the EPBD Directive says that Member States shall ensure that technical assistance services are available throughout their territory by establishing at least one one-stop-shop in municipalities with more than 80,000 inhabitants or when the service cannot be accessed within 90 minutes by local transport. In addition, the directive specifies that "they will offer specific services for vulnerable households, people affected by energy poverty and people belonging to low-income households". The transposition will be by the Member States by 2026 at the latest, so funding will be available for its implementation, and for this reason the action of the fact sheet will ensure the implementation of the service at the regional level.

Currently, possible funding avenues that can be explored are:

A. Royal Decree 853/2021, of 5 October, regulating the grant programmes in the field of residential retrofitting and social housing of the Recovery, Transformation and Resilience Plan, within point A.2. Support programme for the Retrofitting Offices.

B. The European Commission has provided new funding to continue the work of the European Local Energy Assistance Facility (ELENA), implemented by the European Investment Bank (EIB). ELENA offers technical assistance for investments in energy efficiency and renewable energies aimed at buildings and innovative urban transport.

Beneficiaries
Citizenship
Funding
Cost of the technical person to be hired: €17,500/6 months Indirect costs: €2,500/6 months Funding: Local Action Group of Central Catalonia and Barcelona Provincial Council
Responsible for
Association for Rural Development of Central Catalonia
Support
Osona County Council, Ecoserveis Association
Temporality
2025: Itinerant pilot office
2026-2027: Regional office with the aim of becoming a fixed service
Evaluation indicators
Number of municipalities participating in the pilot test
Number of citizen services
Number of users of the itinerant office
Number of retrofitted homes with the support of the office
Related measures

Action 1	Action 2	Action 4	Action 5	Action 7	Action 8	Action 11	Action 13	Action 14	Action 15

FINANCING MEASURES

7. PROMOTION OF PUBLIC FUNDS AND PROGRAMMES IN THE OSONA REGION

DESCRIPTION OF THE MEASURE

The benefits of energy renovation of homes are multiple, including improved people's health, thermal comfort at home, an increase in the heritage value of the home, the possibility of improving accessibility and a reduction in energy consumption. Despite the existing evidence of the return on investment in renovation, thanks to the reduction in demand and therefore the reduction in the associated household bills, the improvement actions to be carried out have a very high initial economic cost, an obvious barrier to initiating improvement actions.

To promote the energy renovation of homes, a wide variety of funds and public financing programmes are allocated, coming from different levels of public administration and managed at the same time by different actors.

During the identification of barriers to energy retrofitting that has been carried out in the region of Osona with experts in the sector, it has been seen that there is a certain lack of knowledge about the grants and at the same time the compatibility between them. For this reason, this roadmap seeks to improve access to information about public funds and programmes.

IMPLEMENTATION

The measure may be carried out as follows:

1) Link the action to the competencies of the itinerant and regional energy retrofitting office (*Action 6. Itinerant Energy Retrofitting Office).*

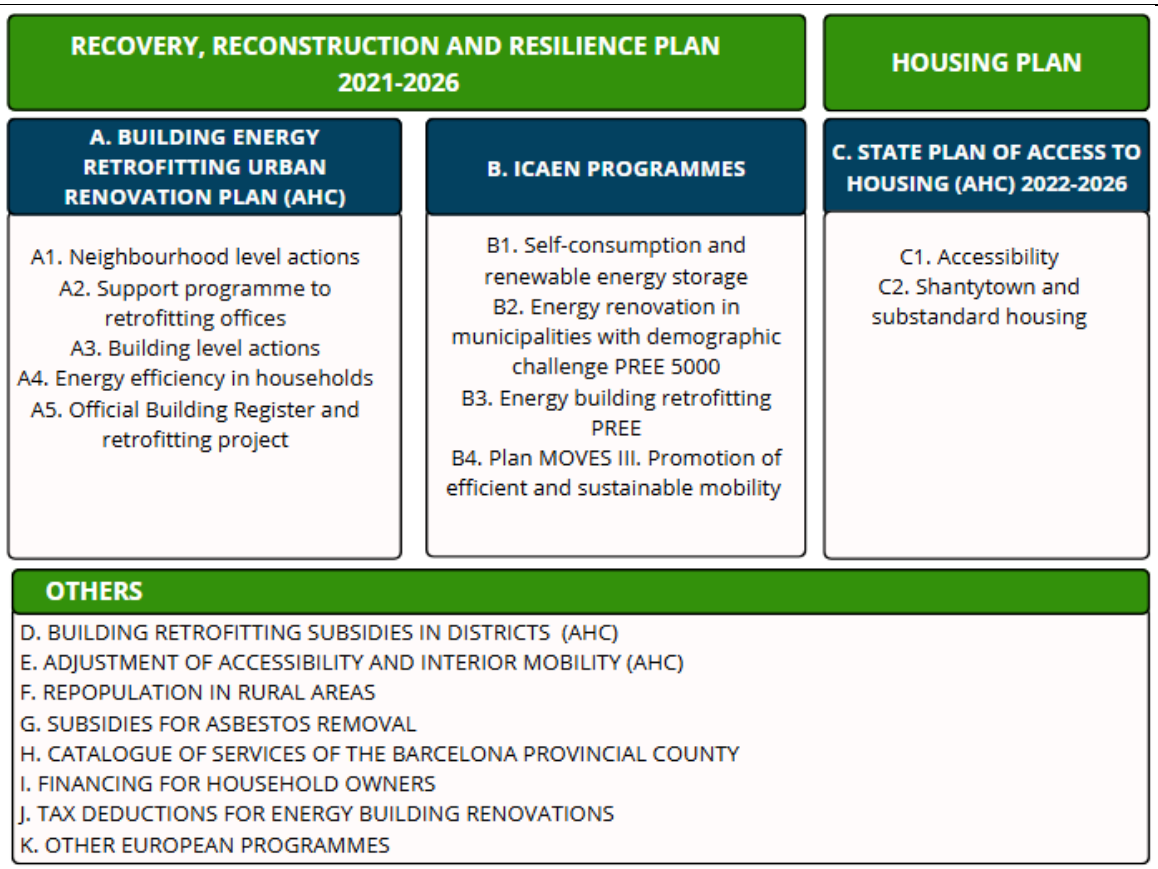
2) To identify the public funds and programmes that apply to the region of Osona.

3) Analyse the compatibilities between the grants, to offer the best recommendation in each case.

4) To synthesize the information in an informative format. The action can be linked to information campaigns (*Action 1. Communication campaigns*).

5) To update the information when there are changes or maturities in public funds and programmes.

Below is the mapping of current public funds and programmes:



Beneficiaries	
Citizenship	
Funding	
Human resources linked to the retrofitting office	
Responsible for	
Energy Retrofitting Office	
Support	
Regional Housing Office, Local Energy Agency of Osona, Local Action Groups	
Temporality	
2025-2035: Recurring action. Quarterly review and update, until the completion of the roadmap in 2035	
Evaluation indicators	
Number of beneficiaries of annual public funds and programmes	
Related measures	
Action 1	Action 6

FINANCING MEASURES

8. STUDY OF ACCESS TO PRIVATE FINANCING FUNDS IN THE OSONA REGION

DESCRIPTION OF THE MEASURE

When families must face the expenses associated with energy renovation projects, there are many concerns about financing.

Although there is a diversity of grants and subsidies and they can cover high percentages of the actions, the reality is that not all families have access to them or have to assume the other ineligible part.

Although the family may receive a subsidy, it cannot assume the improvement actions due to lack of capital in the initial investment, despite having advances (if these are not 100%), counting on the fact that the grant will not arrive until the retrofitting of the home is completed.

Thanks to the co-creation process carried out in the region of Osona and scaled up to the rest of the actors participating in the energy retrofitting process at regional and national levels, the importance of private financing funds has been seen, which, thanks to public-private collaborations, have led to success stories of energy renovations.

The fact sheet seeks to improve the access that families can have at the regional level when it comes to energy retrofitting to different private financing funds. The energy retrofitting office will oversee the promotion of this fact sheet.

IMPLEMENTATION

The phases to follow for the implementation of this sheet are:

1) **Identification of private financing funds**, considering access criteria for families in vulnerable situations. Some possible avenues to explore are:

   - Energy Service Companies (ESCOs): provide energy services or energy efficiency improvement services in a user's facilities or premises and face a certain degree of economic risk in doing so. Payment for the services provided will be based (in part or in full) on obtaining energy efficiency improvements and compliance with other agreed performance requirements.

   - Soft loans are those that are granted with favourable conditions, and therefore more advantageous than those offered by the financial markets, which include a long-term maturity and low interest rates.

- Bridging loans are those that cover the advance of the money when the beneficiary is waiting to receive the subsidy and, therefore, does not have the immediate liquidity to start the actions.

- Financing options for neighbourhood communities through the Real Estate Credit Union (UCI).

2) **For families that do not meet the requirements for access to credits or the financing options described in point 1 and who at the same time need 100% of the financing, the refund could be proposed as follows**:

   I. Part of it is offset by the non-refundable grant.

   II. Part of it is converted into installations considering the family's possibilities.

   III. The rest is recorded in the land registry and grant at the transfer of ownership.

   IV. Successful examples to replicate can be found in Santa Coloma and Barcelona.

3) **To synthesize the information in an informative format**. The action can be linked to information campaigns (*Action 1. Communication campaigns*).

4) **Update** the information when there are changes or expirations of the agreements.

5) **Incorporation into the transversal working group**

   Territorial agents linked to private financing will be invited to participate in the transversal working group (*Action 13. Transversal table for the promotion of energy retrofitting in the region*) with the aim of ensuring their active participation in the implementation of the measure.

   Some of these agents may be financial institutions, civil society, foundations, large and micro enterprises in the sector and others, SMEs and family offices.

Beneficiaries
Citizenship
Funding
Human resources linked to the energy retrofitting office
Responsible for
Energy Retrofitting Office
Support

Regional Housing Office, Local Energy Agency of Osona, Local Action Groups, Efficient Energy Cluster of Catalonia, Union of Real Estate Credits, Banks, Energy Service Companies, Catalan Institute of Finance
Temporality
2025: Identification of private financing funds
2026: Establish the agreements
2026-2035: Participation in the transversal table
Evaluation indicators
Number of collaborating entities that are members of the Transversal Working Group
Related measures

Action 1	Action 13

ADDRESSING THE DEMOGRAPHIC CHALLENGE WITH ENERGY RENOVATION

9. PROMOTION OF COOPERATIVE HOUSING MODELS IN RURAL AREAS BY ENCOURAGING RETROFITTING

DESCRIPTION OF THE MEASURE

The regions of Osona and Lluçanès have municipalities of demographic challenge, that is, rural territories where there is a loss of population.

This action aims to highlight those farmhouses, rural houses or other buildings with heritage and historical value that have been abandoned as potential structures to be retrofitted energetically by promoting cooperative housing models, an alternative system to access to housing, by which the property is conceived as an asset for use and not for speculation.

Before promoting new housing models and the energy renovations of farmhouses, rural houses or other buildings with historical heritage value, it must be considered that they are located, for the most part, on land that is not suitable for development. It is for this reason that all the actions that can be carried out are regulated, and are delimited by the Municipal Urban Planning Plans (POUM). Within the POUM, the Catalogue of Farmhouses and Rural Houses should be consulted, a regulatory document prepared by each municipality to identify and catalogue buildings on non-developable land that are considered susceptible to retrofitting and reconstruction. Only those included in the catalogue may be refurbished by law. Most City Councils have it posted on their website, often as part of the POUM. If it is not there, it must be searched on the website of the Register of Urban Planning of Catalonia.

The objective of the fact sheet is that the City Councils of the regions of Osona and Lluçanès can promote cooperative housing models by encouraging energy retrofitting.

IMPLEMENTATION

In order for the municipalities of Osona and Lluçanès to promote cooperative housing by influencing their energy retrofitting, the following action is proposed:

Step 1)

Review the POUM to identify if you have a catalogue of farmhouses and rural houses. The urban planning law establishes the inclusion in a catalogue of the reconstruction and retrofitting of farmhouses and rural houses. There are two ways to do so:

- ✓ **The city council has a catalogue**: the municipality will be able to promote retrofitting and cooperative housing.

  The municipalities that have a catalogue of farmhouses and rural houses in the region are L'Esquirol, Malla, Manlleu, Les Masies de Roda, Orís, Rupit i Pruit, Sant Bartomeu del Grau, Sant Martí de Centelles, Sant Quirze de Besora, Seva, Sora, Taradell, Tavèrnoles, Tona, Vic and Vilanova de Sau.

- ⊗ **The city council does not have a catalogue**: you can request support through the catalogue of services from the Barcelona Provincial Council for drafting.

  - Catalogue of services: Area of Urban Planning, Housing and Urban Regeneration. Urban planning and housing. Call: *Urban planning for small municipalities*.

Step 2)

Empowerment in alternative housing models. It is important that the City Councils, prior to promoting the availability of these listed farmhouses, know the existing housing alternatives.

The Local Action Groups within the framework of the Cal Rural have the line of action "Let's make a village" where they accompany and network existing projects. Therefore, they are active agents that can support municipalities to address the promotion of cooperative housing models in rural areas by encouraging retrofitting.

Step 3)

Develop a communication plan to make the catalogue known to all citizens with the aim of starting with housing projects that motivate its retrofitting.

The municipality of Vic has worked to promote urban farming, focusing on energy retrofitting through the Community of Vic project.

Beneficiaries
Citizens and municipalities
Funding
Municipalities through public-private funding, Barcelona Provincial Council through the catalogue of services and the General Investment Programme 2024 - 2027, Local Action Groups through Cal Rural
Responsible for
Municipalities
Support
ARCA, Local Action Groups, Osona County Council, Community of Vic
Temporality
2025: management of the catalogue of farmhouses through the POUM
2026-2035: promotion of new housing models and energy renovations of farmhouses
Evaluation indicators
Number of retrofitted homes

ADDRESSING THE DEMOGRAPH CHALLENGE WITH ENERGY RENOVATION

10. PROMOTION OF RENTAL WITH TRANSFER OF USE OF RETROFITTED HOMES

DESCRIPTION OF THE MEASURE

Another alternative housing model is rental with assignment of use with the City Council as an intermediary.

The aim is to locate owners of properties in a poor state of conservation, regardless of the certificate of occupancy, and convince them to transfer them free of charge to the City Council. In exchange, the energy retrofitting of the house is assumed at the municipal level and, once the actions have been completed, the City Council offers it on a social rental basis during the years of validity of the transfer.

Once the term of the transfer ends, the owner recovers the property and can decide its future as he sees fit.

It should be noted that many rural municipalities have empty buildings that were formerly reserved as housing for people who practiced certain professions: the doctor's house, the teacher's house, the priest's house... these properties can become the property of the City Council and begin the same retrofitting process and allocate the use to social rent.

This action aims to promote the renovation of buildings in poor condition or disuse by allocating them to social rent to tackle energy poverty.

IMPLEMENTATION

For the implementation of the action, there are 4 main phases. Within the framework of the roadmap, this action will be carried out in the municipality of Alpens, in the form of a pilot, with the aim of evaluating the impact of the measure for its replicability in the rest of the municipalities of the territory.

1) Identification of properties:

For prospecting, you can request a catalogue of services from the Barcelona Provincial Council to support the carrying out of works of a proactive nature aimed at defining and developing feasibility studies from an architectural, urban, legal and economic perspective. The studies include the feasibility of retrofitting ceded homes and urban farmsteads in the same type of tenure.

- Catalogue of services: Area of Urban Planning, Housing and Urban Regeneration. Urban planning and housing. Call: *Studies of housing and retrofitting actions*.

For the pilot of Alpens, the rectory and a second building of the municipality have been identified. The survey was carried out by the UPC as part of the study of the potential of the rectories of Lluçanès and other buildings in the Diocese of Vic as possible social housing.

2) Mediation and creation of agreements:

Once the properties have been identified, agreements must be created between the interested parties. Local Action Groups can be the mediating figure that accompanies the interested parties in this process. In the case of the Alpens pilot, the Local Action Group of Central Catalonia within the framework of the Cal Rural program will be the one who will accompany the City Council.

In the municipality of Alpens, the old rectory, owned by the bishopric, has been identified as a building to be energetically retrofitted with the use of social housing. In this case, the mediation will be between the Alpens City Council and the bishopric, with the Local Action Group offering support and accompaniment.

3) Execution phase:

3.1.) Energy renovation of the property: the City Council can request financial support from the Barcelona Provincial Council's catalogue of services. The requirement is the incorporation of the property into the affordable housing offer.

- Catalogue of services: Area of Urban Planning, Housing and Urban Regeneration. Urban planning and housing. Call: *Reforming, conditioning and retrofitting of municipal or ceded housing*.

3.2.) Incorporate the property into the affordable housing offer and find families who can live there under social rental conditions.
Beneficiaries
Citizenship
Funding
Barcelona Provincial Council
Responsible for
City Councils and Local Action Groups
Support
Barcelona Provincial Council, Osona County Council
Temporality
2025: Alpens rider
2026-2027: monitoring and assessment of the Alpens rider
2028-2035: replication of the model
Evaluation indicators
Number of rental contracts with assignment of use in retrofitted homes

ACTIVE PROMOTION OF ENERGY RETROFITTING IN THE REGION OF OSONA

11. INCLUDE ENERGY EFFICIENCY CRITERIA FOR SETTING THE PRICE OF HOUSING RENTALS

DESCRIPTION OF THE MEASURE

One of the fears identified by citizens in terms of starting energy improvements in their homes is the effect the modifications may have on the price of rent, considering that the vast majority do not own homes.

In order to promote the energy retrofitting of the Osona housing stock and ensure that there are no increases in the rental price of families in vulnerable situations, this fact sheet seeks to promote financial grant to properties where families in vulnerable situations live for rent, guaranteeing that if energy improvements are carried out, it does not have an impact on families.

An interesting model to be replicated by the region of Osona is that of grants for the retrofitting of home interiors to be incorporated into the Barcelona Rental Housing Pool, an initiative of the City Council hand in hand with the Barcelona Housing Consortium.

It consists of retrofitting properties thanks to the Barcelona housing pool, where by renting the apartment with the City Council, you can enjoy a subsidy to retrofit the home of up to 100% of the amount of the works, up to a maximum of 20,000 euros.

The objective of this fact sheet is to study the feasibility of replicating the model in the region of Osona, encouraging the retrofitting of homes without harming the rental price of families who can access the housing pool.

IMPLEMENTATION

The phases to follow for the implementation of this sheet are:

1) To create the line of grant for the retrofitting of home interiors to be incorporated into the Osona County Council's Housing Pool

2) Identify the ownership of the homes and communicate the benefits of participating by renting their flat with the Osona County Council's Housing Exchange.

3) Communicate the call on a recurring basis and follow up on the applications.

4) Link the action to the energy retrofitting office (*Action 6. Itinerant Energy Retrofitting Office*) and the transversal working table (*Action 13. Transversal table for the promotion of energy retrofitting in the region*).

Beneficiaries
People who own a free market home, which they make available to the Osona County Council's Housing Pool and renters
Funding
Regional Housing Office, through the Catalan Housing Agency and Housing Exchange of the Osona County Council
Responsible for
Osona County Council, Regional Housing Office
Support
Catalan Housing Agency, Tenants' Union of Osona
Temporality
2028: Create the line of renovation grants
2029-2030: Opening of the call
2031: Assessment of the call and possible extension
Evaluation indicators
Retrofitted homes in the social housing stock
Related measures

Action 6	Action 13

ACTIVE PROMOTION OF ENERGY RETROFITTING IN THE REGION OF OSONA

12. UPDATING STRATEGIC PLANS WITH ENERGY RENOVATION AS A PRIORITY

DESCRIPTION OF THE MEASURE

Management instruments are essential tools for strategic planning of local development. These are documents that are integrated into the plans, strategies, programmes, projects, etc. that are developed at the municipal level, with the aim of establishing goals and ordering priorities while adapting the necessary resources.

This roadmap is a management instrument for the energy retrofitting of the Osona region, focusing on rurality and energy vulnerability.

The action seeks to identify the diagnoses, plans, strategies, programs, projects and initiatives of the region of Osona that plan measures around the energy retrofitting of homes, access to housing, energy poverty and rural development to make an impact or updates reinforcing the complexities of rural areas and the most vulnerable groups through the integration of this roadmap.

IMPLEMENTATION

The phases to follow for the implementation of this sheet are:

1) Identify diagnoses, plans, strategies, programmes, projects and initiatives related to the energy renovation of homes, access to housing, energy poverty and rural development. Research can be carried out on:
    - Strategic regional document Neo Osona Transition
    - Sustainable Energy and Climate Action Plans (SECAP)
    - PLH of Vic and Torelló (see *Action 3. City councils as promoters of energy retrofitting*)
    - Local Development Strategies of the Local Action Groups of the territory
2) Identify the bodies responsible for each document.
3) Identify actions that are linked to the objectives of RENOVERTY.

    3.1) Encourage the implementation of existing actions focused on energy retrofitting of homes with vulnerable groups.

3.2) Update existing energy retrofitting actions, including energy vulnerability. 4) Ensure that the energy renovation of homes is positioned as a priority. 5) Link the action to the transversal work table (*Action 13. Transversal table for the promotion of energy retrofitting in the region*).
Beneficiaries
Multi-actor benefit throughout the Osona Region
Funding
It will depend on the body responsible for each document. Internal collections of city councils, catalogue of services of the Barcelona Provincial Council, County Council, Local Action Groups, etc.
Responsible for
Osona County Council, Osona Local Energy Agency, Town Halls of the region
Support
Barcelona Provincial Council, Local Action Groups, Regional Housing Office
Temporality
2025-2030
Evaluation indicators
Number of updated development plans
Related measures

Action 3	Action 13

ACTIVE PROMOTION OF ENERGY RETROFITTING IN THE REGION OF OSONA

13. PROMOTION OF THE TRANSVERSAL TABLE FOR THE PROMOTION OF ENERGY RETROFITTING IN THE REGION

DESCRIPTION OF THE MEASURE

A transversal working group is a governance instrument where a relational space is configured in which various actors, public, private and third sector, are coordinated.

The different actions of the roadmap are, in many cases, multilevel and multi-actor, so different agents in the energy renovation sector must be involved for their correct implementation.

In this sense, to ensure the correct implementation of the roadmap and to coordinate the participation of all the aforementioned actors, the action is aimed at constituting the

transversal working group to address the energy retrofitting of homes in the region of Osona, placing great emphasis on rural areas and vulnerable groups.

The table will make the respond to the proposed actions possible and, thanks to its transversal configuration, will allow the multiplicity of actors to work together to provide comprehensive responses, while taking advantage of the potential of each one, becoming more efficient.

IMPLEMENTATION

The phases to follow for the implementation of this sheet are:

1) Identify the coordination of the transversal work table. Due to the nature of the document, the coordinating actor is proposed to the Osona County Council.

2) Identify the actors who should be part of the transversal working group. This is a multi-actor search and must include, at least:

   Staff from the Energy Retrofitting Office, the Local Energy Agency of Osona, the Regional Office of Housing, Social Services, Local Action Groups, Barcelona Provincial Council, Guilds, Professional Associations, Property Administrators, Companies in the sector and the actors specifically mentioned in other sheets of the roadmap, such as the banks of private financing agreements.

3) Setting up the table: agreeing on the objectives and the commitment agreement.

4) Agree on the work plan of the table, including the organisational aspects of work.

The table is linked to several of the actions of the roadmap since its correct implementation depends on multi-stakeholder work in the region.

Beneficiaries
Local actors in the sector (public-private) in the region of Osona
Funding
The action does not provide for expenses for meetings
Responsible for
Osona County Council
Support
Local Energy Agency of Osona, Local Action Groups
Temporality
2025-2035: Recurring action. The table will have to meet three times a year
Evaluation indicators
Number of annual meetings of the table (minimum, 3)

Related measures					
Action 4	Action 5	Action 6	Action 8	Action 11	Action 12

ACTIVE PROMOTION OF ENERGY RETROFITTING IN THE REGION OF OSONA

14. ACTIVATION OF SUPPORT AND PROMOTION MECHANISMS FOR ENERGY RENOVATION IN OSONA AT SUPRA-MUNICIPAL, STATE AND EUROPEAN LEVEL

DESCRIPTION OF THE MEASURE

The promotion of energy renovation is a complex challenge that does not depend exclusively on a single level of governance. Its effective implementation requires a coordinated approach and for this reason, it is essential and strategic to plan coordination measures with other levels of supra-municipal, Autonomous Community, state and even European governance.

At the local level, city councils play a key role in the direct promotion of energy renovation actions, while other levels such as the Autonomous Communities, the State and the European Union can provide the regulatory framework, financing and tools to facilitate these actions.

During the period of application of the roadmap, different opportunities can be identified in the direct field of energy rehabilitation but also indirect ones in the rural area and vulnerability from different levels of governance. Mapping at supra-municipal, autonomous, state and European levels will make it possible to identify, in a first phase, which collaborations can be established and what support can be requested. This first action is constant throughout the period, although an initial effort is required, as new opportunities can appear at any time.

IMPLEMENTATION

The phases to be followed for the implementation of the measure are:

5) Identify the different supports for municipalities at different levels: European, state and Catalan. For 2025, some examples of support that may be of interest to continue implementing the roadmap have already been identified

    - Support at European level

      The Energy Poverty Advisory Board (EPAH) is the European Commission's public service aimed at supporting municipalities and regions in tackling energy poverty. At the end of 2025, a call for technical assistance will be published in which specific support can be requested to implement this roadmap. All the information is available on the EPAH website https://energy-poverty.ec.europa.eu/

- State

  During the year 2025, the publications of (1) the Social Climate Fund are expected, where it will be necessary to analyze the access routes for municipalities, and the new (2) National Strategy against Energy Poverty, where it will be necessary to see the included measures to promote energy rehabilitation for people in vulnerable situations.

- At supra-municipal level

  During the year 2025, Barcelona Provincial Council is in the phase of reflection on how to address energy poverty in the province. It is a good time to emphasize the importance of energy rehabilitation that leaves no one behind so that provincial resources can be allocated to support energy rehabilitation with special attention to vulnerability.

6) To establish coordination between the different supports identified in order to ensure the access of the municipalities to the relevant resources and at the same time to ensure that the different municipalities of the region apply to the requests for access to the different technical and economic resources.

Beneficiaries
Citizens, City Councils, local actors in the sector (public-private) in the region of Osona
Funding
Barcelona Provincial Council, EPAH
Responsible for
Osona County Council
Support
Municipalities
Temporality
2025-2030: Identification of existing supports 2025: Implementation
Evaluation indicators
Number of supports activated at other levels of governance activated
Related measures

Action 12	Action 13

ENERGY COMMUNITIES AT THE SERVICE OF RENOVATION

15. COMMUNITY DISSEMINATION FOR ENERGY RETROFITTING

DESCRIPTION OF THE MEASURE

This measure focuses on using energy communities (ECs) as loudspeakers to convey key information about energy renovation to citizens. This approach allows it to reach a wider audience, through the creation and distribution of educational materials, such as infographics, videos and training content, the EC will help to raise awareness and inform about the opportunities and benefits of energy retrofitting throughout its territory.

Energy communities are taking on an increasingly important role in the energy landscape, especially in the region of Osona, where they are already a consolidated reality. These communities, which have grown exponentially at a European level, have become an essential actor in the dissemination of information, especially aimed at segments of citizens who may often not feel challenged by the public administration.

In this context, the EC presents itself as a non-profit entity with an innovative structure and function, which gives it great legitimacy and trust on the part of citizens. This proximity allows them to connect with people's real needs, facilitating the dissemination of key messages about the energy transition and energy retrofitting through channels that include community events, local publications, face-to-face and digital workshops, and an active presence on social networks. These channels also allow messages to effectively reach diverse audiences, who might otherwise be excluded.

IMPLEMENTATION

The implementation of this action is divided into two key phases. First, educational and informative content will be created, followed by a wide dissemination campaign locally and digitally.

1. Content creation: The creation of informative and educational materials will be promoted among the ECs aimed at promoting energy retrofitting, with special emphasis on energy vulnerability. These materials will include infographics, explanatory videos, practical guides and training materials that will be designed to be accessible and understandable to all segments of the population.

2. Dissemination campaign: Once the content has been created, extensive dissemination will be carried out through multiple channels. At the local level, the EC will use its own community spaces and events to distribute these materials directly. In parallel, social media and other digital media will be exploited to ensure that information reaches a wider audience, using the strength and legitimacy of the EC to

amplify the message at the county level and beyond. The dissemination campaign among the EC is linked to the *Action 1 actions. Communication campaigns* and Action *6. Itinerant Energy Retrofitting Office.*

Special emphasis will be placed on forging alliances and establishing fluid coordination with all relevant actors developing similar actions and content, such as the retrofitting office or the energy services of the municipalities where the Energy Communities (ECs) are located. These synergies will make the efficiency in dissemination possible and will guarantee a wider reach, reaching more citizens effectively.

These combined actions will allow the EC to become true community speakers, promoting citizen awareness and action in favour of energy retrofitting and the transition to a fairer and more sustainable energy model.

Beneficiaries	
Citizenship	
Funding	
EC social base Subsidies	
Responsible for	
Energy Communities, Local Energy Agency of Osona	
Support	
Community Transformation Offices and Regional Energy Transition Offices	
Temporality	
2025-2035: Recurring action. Annual campaigns and specific communications.	
EVALUATION INDICATORS	
10 annual campaigns (2025-2035) and number of specific communications	
Related measures	
Action 1	Action 6

ENERGY COMMUNITIES AT THE SERVICE OF RENOVATION

16. CREATION OF CITIZEN CARE AND ADVICE SERVICES

DESCRIPTION OF THE MEASURE

The measure consists of appointing building retrofitting agents within the energy communities to advise and guide citizens in energy retrofitting projects. These benchmarks will offer clear information, technical support and personalised guidance, thus facilitating the active participation of the community in the energy transition.

The EC can play an essential role as a building retrofitting agent in the energy transition of the Osona region thanks to its ability to reach a more diverse and broader sector of citizens.

The creation of this measure will allow the population to have direct access to clear information, expert guidance and technical support on energy retrofitting and the opportunities offered by energy communities.

These services are essential to empower citizens and encourage active participation in the energy transition, one of the pillars for achieving a more sustainable and democratic energy model. Personalised advice and support will help to dispel doubts, facilitate the understanding of the benefits of retrofitting, of participating in an energy community and promote citizen involvement in the collective management of energy resources. In addition, these services will contribute to social inclusion, ensuring that the entire population, regardless of their level of technical knowledge, can participate in an informed manner in the new energy paradigm.

IMPLEMENTATION

The implementation of these services can take various forms, adapting to the needs and possibilities of the different energy communities (EC) that are to be created or promoted in Osona. These services can be promoted both by a single EC and by a group of several ECs that want to join forces to offer a broader and more efficient service, depending on the modality to be implemented.

1. Voluntary nature: One of the options for implementing these services is through the volunteering of EC members, who have previously received specific training. These volunteers can act as the first points of contact for the public, offering basic advice and referring the most complex cases to professionals or other partners with more experience. This modality fosters social cohesion and a sense of community within the EC. The modality can be structured in the format of individualized attention or in group format in order to enhance the collective intelligence of the EC.

   1.1. The training courses are linked to *Action 2. Training in energy renovation of homes.*

2. Professionalization of the service: To guarantee a more structured and continuous service, you can opt for the professionalization of the service through the creation of specialized offices. Community Transformation Offices or similar can be established here, which act as central points of reference for citizens. These offices would be managed by professional staff widely trained in the subject. This would ensure that the information provided is rigorous, up-to-date and useful for all users, as well as a more structured and resilient support service to the availability of volunteers.

   2.1. The Community Transformation Offices will be linked to the Regional Itinerant Energy Retrofitting Office (*Action 6. Itinerant Energy Retrofitting Office*).

3. Collaboration between ECs: It is advisable to explore the possibility of several ECs collaborating to create a joint support service, thus optimizing human and material resources. This collaboration can take the form of a telematic attention service but can also allow the creation of itinerant services, which travel through different municipalities of Osona, ensuring that citizens of less populated areas or further away from urban centers also have access to these services. This approach, which includes several modalities, allows it to adapt to the different realities present throughout the territory of Osona, thus guaranteeing a successful implementation of the service. It is proposed to start voluntary advice between the ECs as a pilot.
Beneficiaries
Citizenship
Funding
EC social base IDAE CE-OTC
Responsible for
Energy communities Community Transformation Offices EC Coordinators
Support
Regional Energy Transition Offices
Temporality
2025: Training for volunteer members of the EC in energy retrofitting
2026: Start of the service as a pilot and of a voluntary nature linked to the retrofitting office
2029: Assessment of the professionalisation and pooling of the service
Evaluation indicators
Number of volunteers trained in energy renovation issues
Number of ECs participating in the measure
Number of citizen services
Related measures

Action 2	Action 6

ENERGY COMMUNITIES AT THE SERVICE OF RENOVATION

17. PROMOTION OF AGGREGATE PURCHASES OF ENERGY RESOURCES AND SERVICES

DESCRIPTION OF THE MEASURE

The collective or aggregate purchase of energy resources and services is an initiative in which several people or entities come together to acquire products or services jointly, thus achieving better conditions and more competitive prices. This strategy is 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.

In addition, this strategy not only facilitates access to more competitive prices, but also builds trust in the process, making it more transparent and accessible. Thus, it encourages the participation of members who, individually, may have hesitated to take the step towards energy renovation or to adopt new technologies. Collective procurement also positions the EC as a pioneer in the implementation of less common technologies, such as aerothermal energy. With this collaborative approach, the EC can accelerate and expand its impact in the local energy field, offering innovative and affordable solutions to a greater part of the population.

IMPLEMENTATION

The implementation of collective purchasing is carried out in two key phases to ensure efficient and effective management of the process. The first phase consists of receiving and grouping requests, while the second phase focuses on selecting the supplier and coordinating the purchase.

1. Management of applications: In this phase, a group previously formed within the EC will collect and group the applications of the participants for that collective purchase. This stage involves identifying common needs, gathering detailed information about applications, and organizing the data for subsequent selection and good coordination. In this sense:

    1.1. Creation of the collective purchasing management group
    1.2. Preparation of applications, once the purchase has been decided
    1.3. Management of applications

2. Supplier selection and coordination: Once the applications have been collected, the coordinating group will be responsible for selecting the suppliers that offer the best conditions in terms of price, quality and service. As they are private entities, the EC can either hold a tender for suppliers to submit their proposals, or choose according to the

criteria previously established and agreed by the EC. This phase includes the review of proposals, the negotiation of conditions, and the coordination of the purchase and logistics related to the delivery and/or installation of the goods or services in question. Examples of resources or services that can be collectively procured include heat pumps, aerothermal systems, biomass, enclosures and windows, energy retrofitting services, renewable production, energy audits, bicycles, and other means of sustainable transportation. With regard to previous experiences, there are more systematized purchases such as those of photovoltaic installations led by the Local Groups of the Som Energia cooperative, but there are also simpler ones such as the purchase of biomass developed by the La Tonenca Energy Community, among others. This strategy not only saves costs and obtains preferential conditions, but also increases the EC's capacity to generate a positive impact on the community, promoting a more sustainable and accessible energy model for all.
Beneficiaries
Citizenship
Funding
EC social base ICAEN Grants Program
Responsible for
Energy Communities
Support
EC Coordinators Community Transformation Offices Local Energy Agency of Osona
Temporality
2025: Creation of the management group
2026-2035: Recurring Action. When the need is detected, make collective purchases
Evaluation indicators
Number of collective purchases made

ENERGY COMMUNITIES AT THE SERVICE OF RENOVATION

18. SEARCH FOR COMMUNITY FINANCIAL MECHANISMS FOR ENERGY RETROFITTING

DESCRIPTION OF THE MEASURE

Energy communities can design financial mechanisms within their business models to incentivize their social base to implement energy renovations.

An example is the development of financial products that complement existing subsidies for retrofitting, thus covering the economic part not covered by the grant. This capacity arises from the sufficient volume that the EC must negotiate with banks and channel other subsidies, thus operating as an energy services company. This complementation would be channelled as a bridge loan with a low interest rate, which would not have been possible individually.

A second example is the establishment of *leasing* mechanisms for members. In this case, the EC can acquire part of the facilities with subsidies and then implement payment plans in instalments, similar to what has been done with shared self-consumption facilities. These financial mechanisms offer a flexible solution for energy renovation, facilitating access to the facilities and services necessary for the energy transition.

IMPLEMENTATION

The implementation of this action is carried out in two key phases to establish effective financial mechanisms that facilitate energy retrofitting for the social base of the EC. The phases are:

1. Development of banking products: The EC will work on the creation of financial products that complement subsidies for energy retrofitting. This involves negotiating with banks to obtain favourable conditions and establishing agreements that allow the EC to act as a financial intermediary. The EC will have to design and offer solutions that cover non-subsidised expenses, or a loan while the eligible cost is not received, ensuring that the social base can access the necessary grant without additional burdens.

2. Creation of leasing mechanisms: In this phase, the EC will acquire part of the facilities with the available subsidies aimed only at this type of entity, in order to implement a *leasing system* for the social base. This includes designing payment plans in affordable instalments and managing leasing contracts. The EC will have to coordinate the purchase of the facilities, negotiate the terms of the *lease*, and provide support to the partners to ensure a smooth and effective transition towards energy renovation.

3. Explore financing through PPAs (Energy Savings Certificates): PPAs are a new publicly regulated mechanism through which companies can offset greenhouse gas emissions

by sponsoring energy efficiency actions designed and executed by third parties. In this way, the PPAs can become levers of change in retrofitting actions, through the co-financing of these measures. With these financial mechanisms, the EC not only facilitates access to energy retrofitting for its social base, but also contributes to a sustainable and accessible model of energy transition, thus benefiting the entire community.
Beneficiaries
Citizenship
Funding
EC social base IDAE CE-Implements ICAEN Grants Program
Responsible for
Energy communities
Support
Banking entities EC Coordinators
Temporality
2027: Banking Product Development
2028: Creation of *leasing mechanisms*
2029: Explore funding through CAEs
Evaluation indicators
Number of improvements covered by the established financial mechanisms

4. References

[1] European Commission, "Report from the Comission to the European Parliment and the Council (October 2023)," [Online]. Available: https://climate.ec.europa.eu/document/download/5c4c611e-ae32-45d5-bda6-d78360ef52db_en?filename=COM_2023_654_1_EN_ACT_part1_CMR%2BSWD.pdf. [Accessed 2024].

[2] Arquitectura, Secretaría General de Agenda Urbana y Vivienda. Dirección General de Agenda Urbana y, "ERESEE 2020. Estrategia a largo plazo para la rehabilitación energética en el secotr de la edificación en España (Junio 2020)," [Online]. Available: https://www.transportes.gob.es/recursos_mfom/paginabasica/recursos/eresee_2020.pdf.

[3] A. Salvador López, J. Hernández Blanco, A. García García and F. Ayuga Téllez, "Recuperación de edificios en el medio rural," [Online]. Available: https://www.aeipro.com/files/congresos/2002barcelona/ciip02_1544_1551.2021.pdf.

[4] "Visión a largo plazo para las zonas rurales: por unas zonas rurales de la UE más fuertes, conectadas, resilientes y prósperas," Comisión Europea, 2021. [Online]. Available: https://ec.europa.eu/regional_policy/es/newsroom/news/2021/06/30-06-2021-long-term-vision-for-rural-areas-for-stronger-connected-resilient-prosperous-eu-rural-areas. [Accessed 2024].

[5] Gobierno de España, "Plan de Recuperación, Transformación y resiliencia. Componente 2. Implementación de la Agenda Urbana española: Plan de rehabilitación y regeneración urbana," 2023. [Online]. Available: https://planderecuperacion.gob.es/sites/default/files/2023-10/0310203_adenda_plan_de_recuperacion_componente2.pdf.

[6] Diari Oficial de la Generalitat de Catalunya (DOGC), "LLEI 7/2023, del 10 de maig, de creació de la comarca del Lluçanès.," [Online]. Available: https://portaljuridic.gencat.cat/ca/detalls/noticia/creacio_comarca_llucanes_dogc.

[7] Enciclopèdia Catalana, *Combinació d'informació trobada als articles sobre Osona i el Lluçanès,* 2024.

[8] Servei Meteorològic de Catalunya, "Climatologia Osona 1961-1991," [Online]. Available: https://static-m.meteo.cat/wordpressweb/wp-content/uploads/2014/11/13083422/Osona.pdf.

[9] Idescat, "El municipi en xifres," 2023. [Online]. Available: https://www.idescat.cat/pub/?id=censph&n=538&geo=mun:080174&hist=taules%2Fv2%2Fcensph%2F538%2F565%2Fcom%2Fdata%5Ec%3D2%2Fr%3D1%2Ft%3D-1c%3B0d%2C9%3B-2c%2Fe%3D0. [Accessed 2024].

[10] Observatori socioeconomic d'Osona, "Observatori socioeconomic d'Osona," [Online]. Available: http://www.observatorisocioeconomicosona.cat/.

[11] ICAEN, "Observatori de la certificació d'eficiencia energètica d'edificis," [Online]. Available: https://icaen.gencat.cat/ca/energia/usos_energia/edificis/certificacio/observatori-de-la-certificacio-deficiencia-energetica-dedificis/. [Accessed 2024].

[12] I2AM Paris, "The DREEM model," [Online]. Available: https://www.i2am-paris.eu/detailed_model_doc/dreem. [Accessed 2024].

[13] Institut Català de l'Energia, "EnerLEX: Marc normatiu d'eficiència energètica.," [Online]. Available: https://gencat.cat/icaen/enerlex/marc-normatiu/eficiencia-energetica.htm. [Accessed 2024].

[14] Ministerio de la Presidencia, "Real Decreto 1027/2007, de 20 de julio, por el que se aprueba el Reglamento de Instalaciones Térmicas en los Edificios," [Online]. Available: https://www.boe.es/eli/es/rd/2007/07/20/1027/con. [Accessed 2024].

[15] Ministerio de la Presidencia, Relaciones con las Cortes y Memoria Democrática, "Real Decreto 390/2021, de 1 de junio, por el que se aprueba el procedimiento básico para la certificación de la eficiencia energética de los edificios.," [Online]. Available: https://www.boe.es/eli/es/rd/2021/06/01/390/con. [Accessed 2024].

[16] Ministerio de Transportes, Movilidad y Agenda, "Código Técnico Edificación. Guía de aplicación. DBHE2019," [Online]. Available: https://www.codigotecnico.org/Guias/GuiaHE2019.html.

[17] Nova Energia Osona, "Objectius 2027," [Online]. Available: https://novaenergiaosona.cat/nova-energia-osona/objectius-2027/. [Accessed 2024].

[18] Diari Oficial de la Generalitat de Catalunya, "DECRET 408/2024, de 22 d'octubre, pel qual s'aprova el Pla territorial sectorial d'habitatge i es desenvolupa l'objectiu de solidaritat urbana que preveu la Llei 18/2007, de 28 de desembre, del dret a l'habitatge.," [Online]. Available: https://governobert.gencat.cat/ca/transparencia/normativa-i-informacio-interes-juridic/normativa/normativa-en-tramit/ter/en-tramit/projecte_decret_pla_territorial_sectorial_habitatge-00001#:~:text=a%20l'habitatge-,DECRET%20408%2F2024%2C%20de%2022%20d'octu. [Accessed 2024].

[19] Celobert Cooperativa, "Pla Local de l'Habitatge. Vic," [Online]. Available: https://seuelectronica.vic.cat/siac/info/Pla_local_habitatge.pdf.

[20] Celobert Cooperativa, "Pla Local de l'habitatge. Torelló," [Online]. Available: https://torello.cat/wp-content/uploads/2021/09/PLH-Torello-Fase-1.pdf. [Accessed 2024].

[21] Diputació de Barcelona, "Plec de prescripcions tècniques," [Online]. Available: https://contractaciopublica.cat/portal-api/descarrega-document/300486929/28CFE595A8F832F544E94BD5F46FDFBE.

[22] Ajuntament de Centelles, "Notícia sobre selecció del municipi pel Programa Barris," [Online]. Available: https://www.centelles.cat/ajuntament/comunicacio/noticia/1292/presentacio-programa-barris-de-rehabilitacio-dedificis-next-generation.

[23] Ajuntament de Centelles, "Programa Barris," [Online]. Available: https://www.centelles.cat/viure/urbanisme-i-medi-ambient/docs/programa-barris-2022.pdf. [Accessed 2024].

[24] European Union, "NextGenerationEU," [Online]. Available: https://next-generation-eu.europa.eu/index_en. [Accessed 2024].

[25] Subdirección General de Políticas Urbanas. Dirección General de Arquitectura, Vivienda y Suelo. Ministerio de Fomento. , "Estudio (02) para la ERESEE. Aproximación a la demanda energética residecial para la calefacción en España," 2018. [Online]. Available: https://cdn.mitma.gob.es/portal-web-drupal/planes_estartegicos/2_2020_aproximacion_demanda_residencial.pdf. [Accessed 2024].

[26] RENOVERTY - IEECP, "Deliverable D4.1. Evaluation of energy efficiency measures addressing the needs of energy poor households in rural areas," [Online]. Available: https://ieecp.org/wp-content/uploads/2024/07/RENOVERTY-Deliverable-4.1_final-version_layout-website.pdf. [Accessed 2024].

[27] RENOVERTY - IEECP, "Deliverable D2.1 Updating the energy poverty and energy efficiency framework in rural areas across the EU," [Online]. Available: https://ieecp.org/wp-content/uploads/2024/03/RENOVERTY-Deliverable-2.1_final_reviewed-layout-1.pdf. [Accessed 2024].

[28] A. Apostoliotis, D. Papantonis and A. Flamos, "Report on the evaluation of energy efficiency measures addressing the needs of energy poor households in rural areas: Deliverable 4.1 RENOVERTY project," 2024. [Online]. Available: https://zenodo.org/records/13374268.

[29] Institut Català de l'Energia (ICAEN), "Simulador de mesures de rehabilitació energètica d'edificis," [Online]. Available: https://simuladoredificis.icaen.gencat.cat/. [Accessed 2024].

[30] Insitut Català de l'Energia (ICAEN), "Calculadora de finestres," [Online]. Available: https://calculadorafinestres.icaen.gencat.cat/#/. [Accessed 2024].

[31] Institut Català de l'Energia (ICAEN), "Mapa de mesures per a l'estalvi i l'eficiència energètica," [Online]. Available: http://mapamesures.icaen.gencat.cat/mapamesures/AppPHP/. [Accessed 2024].

[32] Institut Català de l'Energia (ICAEN), "Cercador de projectes d'estalvi i eficiència energètica," [Online]. Available: http://cercador.icaen.gencat.cat/cercador. [Accessed 2024].

[33] Ajuntament de Barcelona, "APROP (Allotjaments de Proximitat Provisionals)," [Online]. Available: https://ajuntament.barcelona.cat/dretssocials/ca/innovacio-social/aprop. [Accessed 2024].

[34] Atelier Workshop, [Online]. Available: https://www.atelierworkshop.com) .

[35] Architechture and Hydiene, [Online]. Available: http://www.prefabs.com/PrefabHomes/AdamKalkin/QuikHouse.htm. [Accessed 2024].

[36] Consell Comarcal d'Osona. Nova Energia Osona (NEO), "Ajuts europeus per a la rehabilitació en la millora de l'eficiència energètica dels habitatges," [Online]. Available: https://novaenergiaosona.cat/2022/06/08/ajuts-europeus-per-a-la-rehabilitacio-en-la-millora-de-leficiencia-energetica-dels-habitatges/. [Accessed 2024].

[37] Agencia Tributaria, "Deduccions per obres de millora de l'eficiència energètica dels habitatges," [Online]. Available: https://sede.agenciatributaria.gob.es/Sede/ca_es/vivienda-otros-inmuebles/deducciones-obras-mejora-eficiencia-energetica-viviendas.html.

[38] NucliSolar Energies Renovables, "Bonificacions fiscals a Torelló 2023," [Online]. Available: https://nuclisolar.com/blog/bonificacions-fiscals-a-torello/. [Accessed 2025].

[39] Insitut Català d'Energia (ICAEN), "PREE5000 - ICAEN: Programa d'ajuts a la rehabilitació energètica d'edificis," [Online]. Available: https://icaen.gencat.cat/ca/energia/ajuts/edificis/pree5000-icaen-programa-dajuts-a-la-rehabilitacio-energetica-dedificis/.

[40] Insituto para la Diversificación y el Ahorro de Energía (IDAE), "Entidades colaboradoras. Préstamos para complementar las ayudas para la rehabilitación. Protocolo IDAE con Entidades financieras.," [Online]. Available: https://www.idae.es/ayudas-y-financiacion/para-la-rehabilitacion-de-edificios/convocatorias-cerradas/programa-pree/prestamos-para-complementar-las-ayudas-para-rehabilitacion/entidades-colaboradoras. [Accessed 2024].

[41] REVO Prosperidad Sostenible, "Informe perfiles sociiales y financiación de la renovación energética de viviendas," [Online]. Available: https://www.revoprosper.org/wp-content/uploads/2024/11/Revo-Perfiles-Socialies-report-v15N.pdf. [Accessed 2024].

[42] IDAE, "Fondo Nacional de Eficiencia Energética," [Online]. Available: https://www.idae.es/ayudas-y-financiacion/fondo-nacional-de-eficiencia-energetica. [Accessed 2024].

[43] Consell de Col·legis Territorials d'Administradors de FInques de Catalunya, "Oficina Tècnica de Rehabilitació," [Online]. Available: https://otrc.consellcaf.cat/esp/. [Accessed 2024].

[44] Instituto de Crédito Oficial, "ICO MIVAU Rehabilitación de Edificios Residenciales," [Online]. Available: https://www.ico.es/ca/ico-mitma-rehabilitaci%C3%B3n-de-edificios-residenciales.

[45] Boletín Oficial del Estado, "Resolución de 16 de febrero de 2023, de la Subsecretaría, por la que se publica el Convenio entre la Secretaría General de Agenda Urbana y Vivienda y el Instituto de Crédito Oficial, E.P.E., para la gestión de los avales por cuenta del Estado de la "Línea," [Online]. Available: https://www.boe.es/diario_boe/txt.php?id=BOE-A-2023-4642. [Accessed 2024].

[46] Instituto de Crédito Oficial, "ICO MIVAU Rehabilitación de Edificios Residenciales," [Online]. Available: https://www.ico.es/ca/ico-mitma-rehabilitaci%C3%B3n-de-edificios-residenciales. [Accessed 2024].

[47] Instituto de Crédito Oficial, "TAE màxima vigent de 25/11/2024 a 08/12/2024," [Online]. Available: https://www.ico.es/ca/web/guest/ico-mitma-rehabilitaci%C3%B3n-de-edificios-residenciales/tipos-de-interes. [Accessed 2024].

[48] Generalitat de Catalunya, "La Generalitat signa un conveni amb deu entitats financeres per a la rehabilitació energètica d'habitatges en el marc dels fons Next Generation EU," [Online]. Available: https://govern.cat/salapremsa/notes-premsa/418669/generalitat-signa-conveni-deu-entitats-financeres-rehabilitacio-energetica-dhabitatges-marc-dels-fons-next-generation-eu. [Accessed 2024].

[49] Institut Català de Finances (ICF), "Préstecs per finançar els agents o gestors rehabilitadors privats que impulsin la rehabilitació residencial amb l'objectiu de contribuir a la lluita contra en canvi climàtic," [Online]. Available: https://www.icf.cat/ca/productes-financers/prestecs/icf-avalis-habitatge/ .

[50] Diari Oficial de la Generalitat de Catalunya, "RESOLUCIÓ ECO/368/2024, de 9 de febrer, per la qual es dona publicitat a l'Addenda modificativa al Conveni entre l'Agència de l'Habitatge de Catalunya," [Online]. Available: https://dogc.gencat.cat/ca/document-del-dogc/?documentId=978745 .

[51] Banc de Sabadell, "Préstamo Rehabilitación CCPP," [Online]. Available: https://fondorecuperacioneuropeo.bancsabadell.com/rehabilitacion-edificio.

[52] Caixa d'Enginyers, "Préstec ECO Rehabilita," [Online]. Available: https://www.caixaenginyers.com/ca/web/webpublica/-/caja-de-ingenieros-promueve-la-rehabilitaci-c3-b3n-energ-c3-a9tica-de-viviendas-con-el-pr-c3-a9stamo-eco-rehabilita-y-los-fondos-next-generation-ue . [Accessed 2024].

[53] Gremi de constructors d'obres, "Acord de l'Institut Català de Finances amb entitats bancàries per facilitar el finançament d'obres de rehabilitació energètica residencial a comunitats de propietaris," [Online]. Available: https://www.gremi-obres.org/fons-europeus-next-generation-rehabilitem/#6. [Accessed 2024].

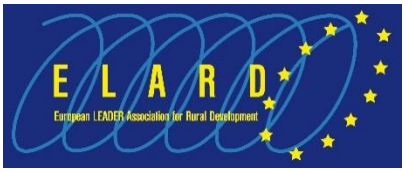
[54] Iberdrola, "Projectes claus en mà de rehabilitació energètica," [Online]. Available: https://www.iberdrola.es/comunidades/luz/rehabilitacion-energetica. [Accessed 2024].

[55] Acciona Energia, "Projectes claus en mà de rehabilitació energètica," [Online]. Available: https://soluciones.acciona-energia.com/hogares/comunidades/rehabilitacion-energetica . [Accessed 2024].

[56] Consell Comarcal d'Osona, "Ajuts europeus per a la rehabilitació en la millora de l'eficiència energètica dels habitatges," [Online]. Available: https://www.ccosona.cat/actualitat/2329-ajuts-europeus-per-a-la-rehabilitacio-en-la-millora-de-l-eficiencia-energetica-dels-habitatges.

[57] Institut Català de l'Energia (ICAEN), "Ajuts del Programa d'incentius lligats a l'autoconsum i emmagatzematge, amb fonts d'energia renovable i implantació de sistemes tèrmics renovables.," [Online]. Available: https://icaen.gencat.cat/ca/energia/ajuts/energies-renovables/ajuts-renovables-2022/index.html.

[58] Instituto para la Diversificación y Ahorro de la Energía (IDAE), "IDAE," [Online]. Available: https://www.idae.es/ca/tecnologies/eficiencia-energetica/edificacio/aillament-en-edificacio/guies-tecniques-la. [Accessed 2024].




@RENOVERTYLife


RENOVERTY Project

https://ieecp.org/projects/renoverty/

Co-funded by the European Union under project ID 101077272. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.