Ideas for action

Driving the Green Transition through building renovation

Analysis of available financial instruments: current status, Key challenges, and proposals to accelerate their deployment

Results of the Working Group Climate Action in the built environment led by alinnea.

Hosted by

ie UNIVERSITY

Supported by

European Climate Foundation

alinnea
CATALYZING TRANSFORMATIVE IDEAS

Contents

alinnea
CATALYZING TRANSFORMATIVE IDEAS

alinnea has been a key player in Spain's climate action ecosystem since mid-2024. As part of IE University and supported by the European Climate Foundation, Alinnea spe-cializes in comparative analysis, identification, and articulation of climate change measures and actions that engage the public and private sectors, as well as civil socie-ty.

Operating under a multi-stakeholder, dialogue-research-action framework, **alinnea** seeks to develop solu-tions that overcome climate action barriers while ensuring they are socially just, economically viable, and beneficial for the environment and biodiver-sity protection.

Between May and July 2024, Alinnea conducted interviews and workshops with over seventy key stakeholders from the private sector, public administration, NGOs, trade unions, and academia, gathering insights on their concerns and priorities. Based on these discussions, a working group was formed to develop proposals for financing mechanisms aimed at building retrofitting and decarbonization.

Introduction

This report presents the main conclusions of the working group established within Alinnea, the main objective of which is to define financing mechanisms for building retrofitting and decarbo-nization.

The deliberations of this working group are reflected in the proposed recommenda-tions at the end of the report, which are intended as a roadmap to accelerate building retrofitting in Spain in line with the objectives set out by the National Integrated Ener-gy and Climate Plan (PNIEC) for 2030.

We would like to extend a special thanks to the members of this working group for sharing their ideas, insight, and time with the rest of the group.

Table 1: Members of Alinnea's working group - Identification of financing mechanisms for building retrofitting

NAME	SURNAME	ORGANISATION	POSITION
Alberto	Martinez de Ilarduya Garcia	Ensanche 21 Zabalgunea, S.A.	Chief Financial Officer
Alejandro	Tosina	Climate KIC	Senior Project Manager
Ana	Lafuente Gomez	Ayuntamiento de Zaragoza	Technician
Ana	Camarero	ICO	Sustainability Coordinator
Blanca	Navarro	ICO	Strategy Director and Chief Economist
Carlos	Aguilera	CaixaBank	Commercial Director of companies CaixaBank Madrid Sur
Cecilia	Foronda Diez	ECODES	Director of Energy and People
Cristina	García Diaz	MITECO	Technical Department Head OECC
Cristina	Robledano Noreña	Porticus	Senior Program Manager
Cristina	Monge	Political scientist and specialist in gover-nance of just ecological transition	Political Analyst
Cristina	Olivera Sanchez	Kearney	Sr. Manager Energy & Resources
Daniel	Martinez	ICO	Sustainability Development Area
David	Sánchez Carpio	CECU	Director
Diego	Cordón Viani	BBVA	Vertical Energy and Sustainability Spain
Dolores	Huerta	GBCE	General Director, GBCe
Elena	Navarro	Ayuntamiento de Zaragoza	Director General of European Funds
Emilio	Miguel Mitre	Urban Climate Economy s.l.u.	Director, UCE
Fernando	García Mozos	IDAE	Department Head
Francisco	Sanz Piedrafita	Ibercaja	Head of Sustainable Finance Solutions
Gonzalo	Sanchez Garcia	European Climate Foundation	Programme Manager
Iñaki	Arto	BC3	Research fellow

Irene	Garcia	Carbon Neutral Cities	Built Environment Lead
Isabel	Abellan Serna	Banco Sabadell	Head of ESG & Sustainable Finance
Javier	González González	Kearney	Partner
Joaquín	Garralda	SpainsIf	President
Juan	Capeáns Amenedo	IE University	Director of Sustainable Transition Hub
Judit	Carreras Garcia	Institute for a Just Transition MITERD	Advisory member of the Institute for Just Transition
Julio	Lumbreras	Plataforma CitiES 2030	Professor at UPM and member of the board of the EU Cities Mission
Laura	Visier Gonzalo	UCI	Director of Residential Renovation Area
Laura	Reboul	UGT	Technician in the UGT's Climate Action Area
Leyre	Echevarría	CBRE	ESG Director CBRE Spain
Lorena	Reula	Ayuntamiento de Zaragoza	Managing Director of the Zaragoza Vivienda municipal company
Luis	Martí Álvarez	ACCIONA	Director of Public Policy and Regulation
Manuel	Riera Díaz	UGT	Superior Technician in Climate Action and Just Ecological Transition
María	Rodriguez	Acciona	Public Policy and Regulation Manager
María	García Rodríguez	EIT CLIMATE-KIC / citiES 2030	Director, Spain
María Teresa	Ruiz Costal	Ibercaja	Sustainability and European Funds Manager
Mario	Manjón Rosado	Provivienda	Consultor
Mauricio	Yrivarren	Climate Strategy & Partners	Senior Research Associate
Maria Victoria	Román	BC3	Postdoctoral researcher
Miguel	Fernández Ramos	CBRE	Associate Director of Decarbonisation team ESG
MONTSE	HERNANDEZ	Ayuntamiento de Zaragoza	Head of Environment, Climate Action and Public Health Office
Nicolás	Vatter	Provivienda	Advocacy Specialist
Raquel	Zulaica	NASUVINSA	Renovation Promotion Area Manager
Roman	Weissmann Bermann	Caixabank	Area Director
Rubén	Velasco Sainz	Sacyr	Senior Strategy Manager
Sara	Casas	Cruz Roja	Environment Manager
Sergio	Roldan Ramirez	Caja Rural de Navarra	Head of the Housing Department
Sofia	Martinez	GEC	Global Policy Director (IIED/IIED Europe)
Soledad	Montero Linares	CECU	Consumer Technician
Susana	Martinez	IE University	Associate Professor in the Area of Finance, Accounting and Analysis of Equities and Fixed Income
Susana	Martín Belmonte	REVO Prosperidad Sostenible	Public Policy Manager
Tomás	Conde Salazar	N World	ESG & Sustainable Finance director
Valentín	Alfaya Arias	Ferrovial	Sustainability Director
Luis	Tejero	Oficina del Nuevo Plan General	Head of Service

The working group received technical support from researchers Iñaki Arto and María Victoria Román of the Basque Centre for Climate Change (BC3), along with Cristina Monge Lasierra who facilitated the working sessions in collaboration with BC3.

Three dialogue sessions and one briefing session were conducted between June 2024 and January 2025. We extend our gratitude for the time and contributions of the individuals and organizations listed below, who presented on the following topics during these ses-sions:

- Financial architecture for energy efficient housing renovations, Susana Martín Belmonte, REVO prosperity
- CAEs (Energy Savings Certificates) Susana Martinez, GS for Energy Efficiency and Access, Secretary of State for Energy, MITERD
- Foresight scenarios for building renovation, Javier Montañez of Invisible
- New tools and new opportunities for Europe and industry players through the reformulation of the Energy Efficiency Directive (EED) and the EPBD, Peter Sweatman of Climate Strategy
- Financial product proposals for the building renovation business, Emilio Miguel Mitre, Urban Climate Economy
- Fund Vulnerable Housing Renovation, Sara Casas of the Red Cross and Cecilia Foronda of ECODES
- Picking up the pace: Loans for residential climate-proofing, Pedro Gete, IE University
- Emissions Trading for road transport, building and other fuel uses, (ETS2), Cristina García, OECC, MITERD
- Introduction to GFI Spain, Eduardo Brunet, Green Finance Institute

We would also like to express our gratitude to Ignacio de la Puerta, an architect at IP Arquitectura y Urbanismo, for his time and the valuable information he provided. Ignacio is a member of the team in charge of Opengela[1], a programme aimed at ex-panding urban regeneration in the Basque Country.

2. Sector Description

2.1 Characterization of the building stock in Spain and associated impacts

According to the Institute for the Diversification and Saving of Energy (hereafter, IDEA[2]), there are 9 million buildings in Spain, of which 7.5 million are residential. These buildings include 25 million homes, and 2 million of these dwellings are in poor condition. IDAE estimates that 90% of these buildings were constructed prior to the Technical Building Code of 2006, which established energy efficiency requirements for the first time. Hence, 60% of the homes were built before any energy efficiency regu-lations were in place.

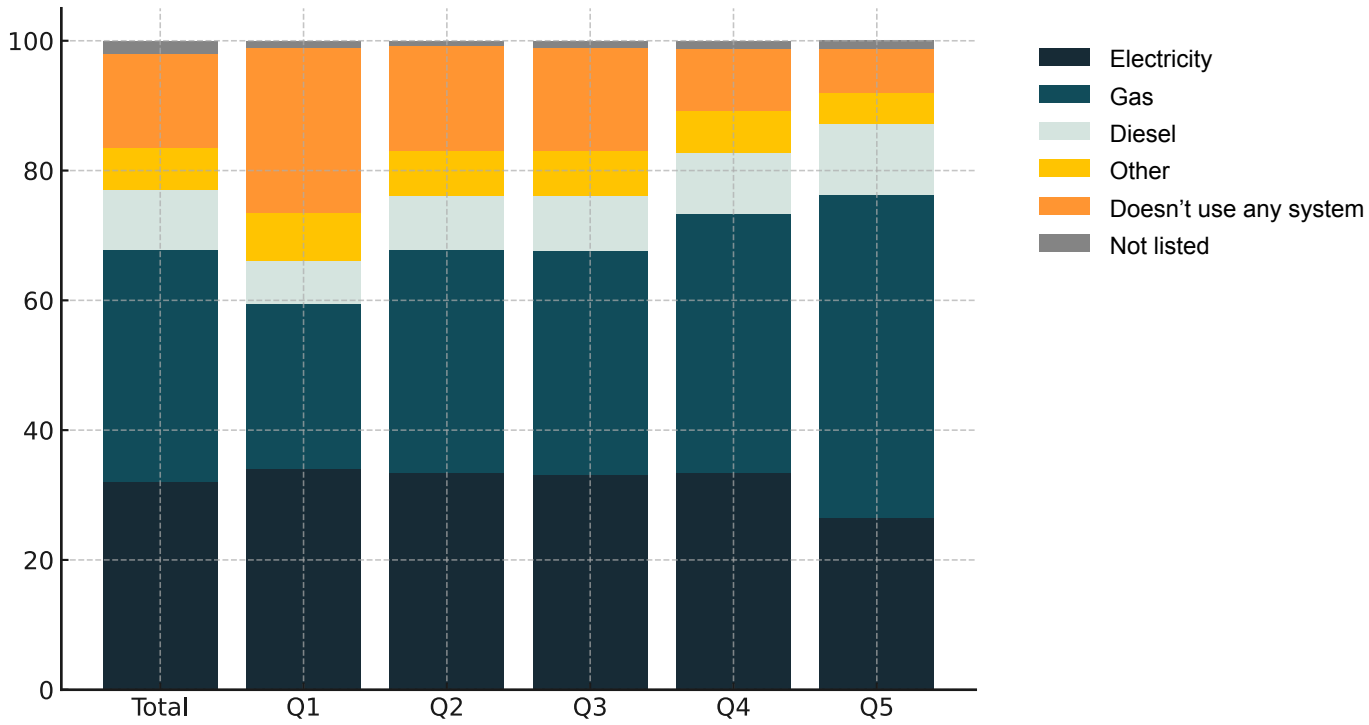
According to the Ministry for Ecological Transition and the Demographic Challenge (hereafter, MITECO[3]), 54% of the 5.97 million energy efficiency certificates issued fall under category E. These certificates are rated on a seven-letter scale, ranging from A (most efficient buildings) to G (least efficient buildings). Only 1% are classified as category A, 2% as category B, while 79% fall into the lower category D.

According to the European Commission's Building Stock Observatory[4], 43% of the area built for residential use (42% for non-residential area) was built before 1980, 28% (33%) before 2000, and the remaining 29% (25%) after that date. Furthermore, in 2022, 9% of the population was late in paying utility bills, and in 2020, 20% of the population lived in homes with leaks or water damage or with rotten floors, frames or windows.

According to the 2023 Living Conditions Survey[5], and as illustrated in Figure 1, most households (36%) use natural gas heating systems, primarily in higher-income homes.

Meanwhile, a substantial portion of households (32%) lack any heating system at all, a situation more prevalent among lower-income households.

Figure 1. Energy source for home heating, totals and by income quintile

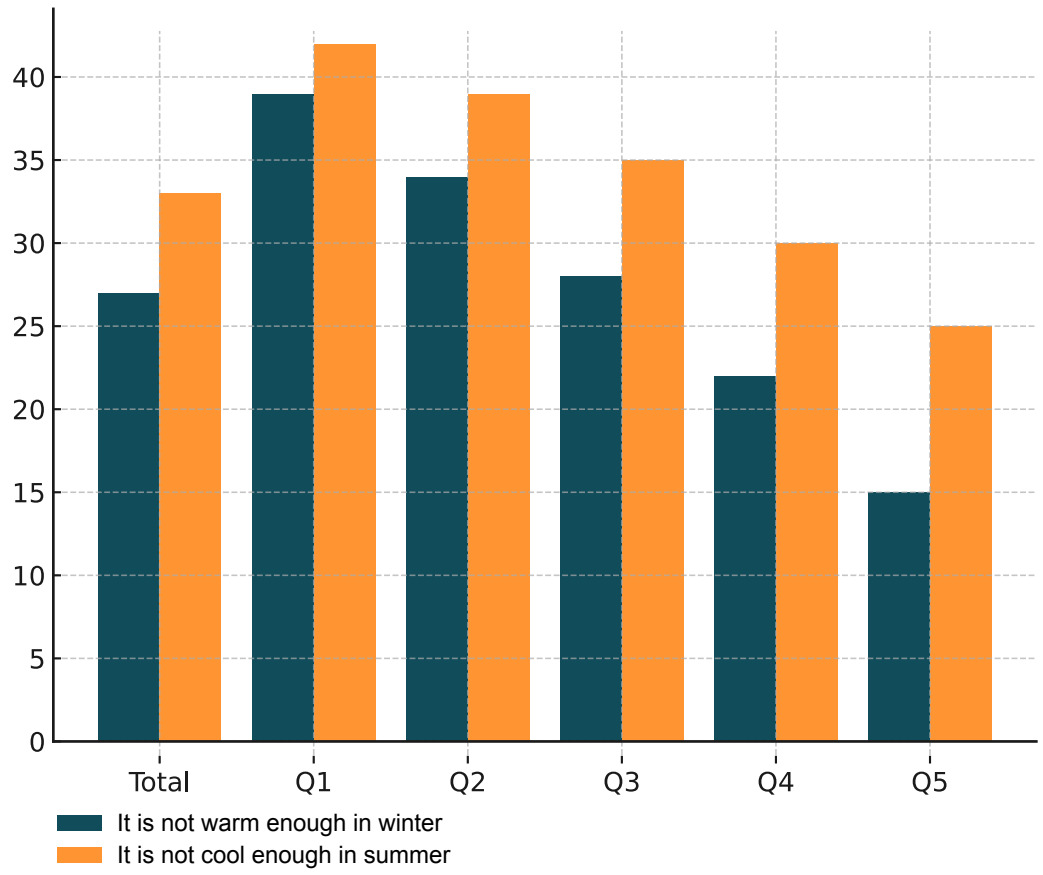


Source: National Institute of Statistics. Living Conditions Survey. 2023

Likewise, according to this same survey (as shown in Figure 2), 34% of homes have inadequate room temperatures during hot months, while this percentage drops to 28% in cold months. Higher income mitigates lack of thermal comfort in both cases but is more pronounced in cold months.

1. *https://opengela.eus/*
2. *https://www.idae.es/rehabilitacion-energetica-una-prioridad-y-una-oportunidad-para-todos*
3. *https://portal-miteco-stage.adobecqms.net/content/dam/mite-co/es/energia/files-1/Eficiencia/CertificacionEnergetica/documentosinformativos/2023_Informedeseguimiento_11_CERTIFICACION_ENERGETICA_V5.pdf*
4. *https://building-stock-observatory.energy.ec.europa.eu/factsheets/*
5. *https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176807&menu=ultiDatos&idp=1254735976608*

Figure 2. Lack of thermal comfort in winter and summer for all homes and by in-come quintile.



Source: National Institute of Statistics. Living Conditions Survey. 2023

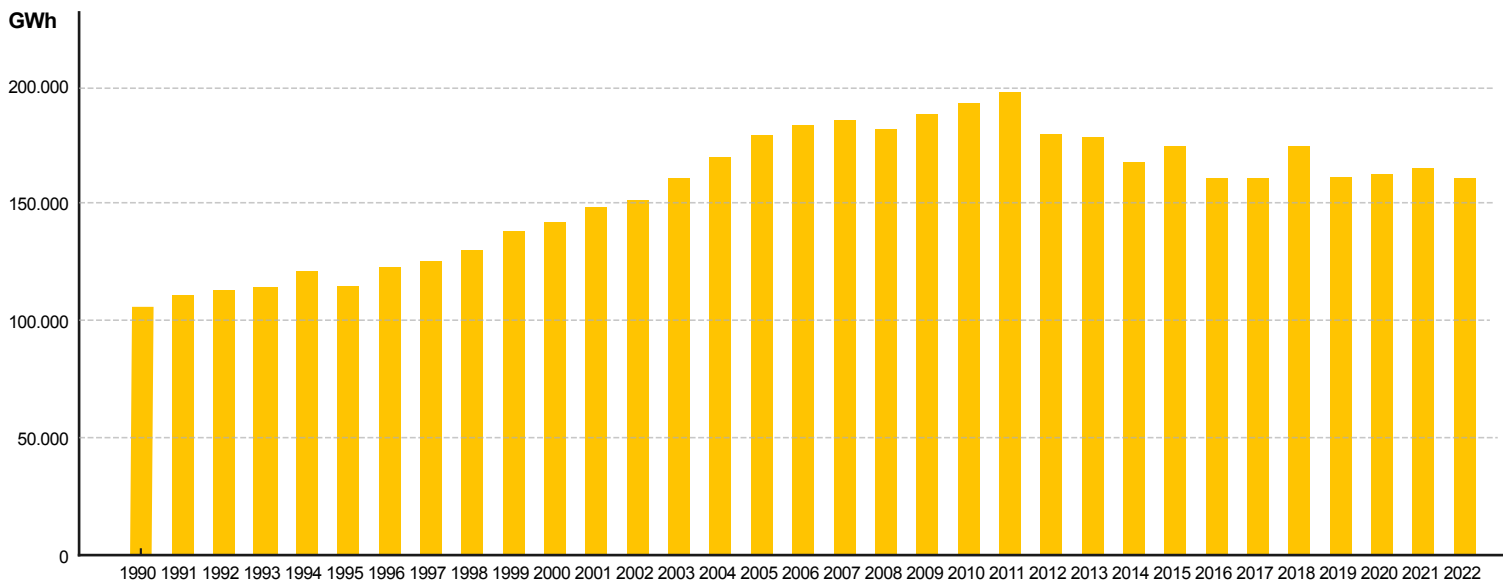
According to the 2011 report by the Working Group on Renovation (GRT)[6], 1% of homes are classified as over-occupied, meaning their residents lack the socially recognized mini-mum living space. At the opposite end, 27% of homes are under-occupied, where inhabit-ants have three times more space than the habitability standards suggest (for example, a home designed for four people is occupied by just one). This inefficient use of housing and climate control resources contributes to an overestimation of energy poverty indicators, as it may classify disproportionately large homes with few inhabitants as “energy poor”. This working group was one of the first dedicated to analysing options for accelerating building retrofits in Spain playing a key role in subsequent efforts. The report was coordi-nated by Albert Cuchí and Peter Sweatman on behalf of Green Building Council Spain and the CONAMA Foundation.

The inefficiency of the building stock and the continued reliance on fossil fuels such as natural gas for heating, contribute to signi-ficant environmental impacts within the building sector. According to the Observatory for Energy Transition and Climate Action (OTEA), in 2023 this sector was responsible for 7% of Spain’s greenhouse gas emis-sions—a figure that rises to 17% when including indirect emissions from electricity use—and accounted for 18% of the country’s total energy consumption[7].

Furthermore, according to the Building Stock Observatory, the non-residential sector accounts for around 40% of energy consumption and 35% of building sector emissions.

As shown in Figure 3, from 1990 to 2010 there has been an increase in energy use, which is not only due to an increase in build-ing stock, but also to increased comfort demands and building facility usage. On the one hand, this trend reflects the increase in income levels resulting from economic growth, and on the other it reflects Jevons' paradox, whereby an increase in efficiency (in this case through equipment replace-ment) generates greater overall demand. Indeed, the 2011 GTR report states that be-tween 1990 and 2004 energy use in buildings in Spain increased by 56% per capita (compared to 12% in Europe) and by 38% per household.

Figure 3. Final energy consumption in buildings



Source: OTEA, 2023

6. https://www.gbce.es/archivos/ckfinderfiles/Investigacion/libro_GTR_cast_postimprenta.pdf
7. https://otea.info/

2.2 IMPACT REDUCTION STRATEGIES

A series of strategies focused on energy efficiency, alternative energy usage, and ar-chitectural design that prioritizes resource saving must be employed to minimize environmental impacts and promote sustainability in the construction and housing sector. The main strategies are detailed below:

● Energy efficiency

Energy efficiency is a fundamental pillar for reducing resource consumption and greenhouse gas emissions. Several key measures can be implemented to optimise energy use in buildings.

- Improve insulation of walls, ceilings, and floors: One of the most effective strategies to reduce energy consumption is ensuring proper insulation. High-quality materials and modern insulation techniques minimize thermal losses, maintaining a stable indoor temperature and reducing the need for heating and cooling.
- Efficient windows: Installing double or triple-glazed windows with high thermal efficiency frames significantly reduces heat loss. These windows improve indoor temperature control, leading to more efficient use of cli-mate control systems.
- Efficient lighting: LED and natural light: Replacing incandescent bulbs with LEDs and maximizing natural light not only reduces energy consumption but also enhances indoor environmental quality.

● Use of renewable energies and charging points for electric vehicles

Transitioning to renewable energy sources is essential for reducing dependence on fossil fuels and lowering pollutant emissions.

- Solar panels: Installing photovoltaic solar panels enables users to generate clean energy and lower electricity costs. Additionally, solar thermal sys-tems provide a sustainable solution for heating water efficiently.
- Geothermal and aerothermal systems: These technologies utilize under-ground heat or outdoor air to efficiently supply heating, cooling, and sani-tary hot water, reducing environmental impact and improving energy effi-ciency.
- Electrification: Replacing fossil fuel-based systems with electric technolo-gies allows for the use of renewable energy sources, contributing to lower greenhouse gas emissions and reduced air pollution, provided the electrici-ty is sourced from renewables.
- Charging infrastructure for electric vehicles: Facilitating the installation of charging points in residential buildings is essential for supporting decarbon-ized mobility and accelerating the transition to sustainable transportation.

● Smart energy management

Technology can be used to manage and optimize energy consumption in homes and thereby reduce and optimize home energy consumption.

- Home automation systems: Home automation systems make it possible to automate lighting management, climate control and other devices, adapt-ing their operation to the real needs of users and avoiding energy waste.
- Metering and control: Installing systems that measure and monitor energy consumption in real time helps to identify inefficiencies and accurately ad-just energy use.

● Design and architecture

Architectural design aimed at energy efficiency and the integration of renewable en-ergy sources enables the optimization of natural environmental features to enhance energy performance.

- Passive design: Passive design strategies, such as proper building orienta-tion and using thermally efficient materials and cross ventilation, reduce reliance on mechanical climate control systems.
- Incorporating climate change considerations at the local level—such as ris-ing average and extreme temperatures or shifts in precipitation patterns—ensures that buildings are better adapted to the evolving climatic condi-tions.
- Green roofs: Green roofs enhance thermal insulation, mitigate the urban heat island effect, support biodiversity in urban environments, and contrib-ute to building adaptation to rising temperatures caused by climate change.

● Efficient household appliances

Using energy-efficient appliances (class A++ or higher) significantly reduces household en-ergy consumption. Investing in these efficient devices helps to considerably lower envi-ronmental impact (footprint) while also generating long-term economic savings.

● Regular Maintenance

Performing periodic maintenance of the building's climate control systems, appliances and infrastructure ensures its optimal operation and prolongs its useful life. This in-cludes cleaning filters, checking insulation, and reviewing electrical and plumbing sys-tems.

This set of integrated emission reduction strategies helps create a built environment that is more energy efficient, decarbonized and adapted to the needs of resource conservation and emissions reduction.

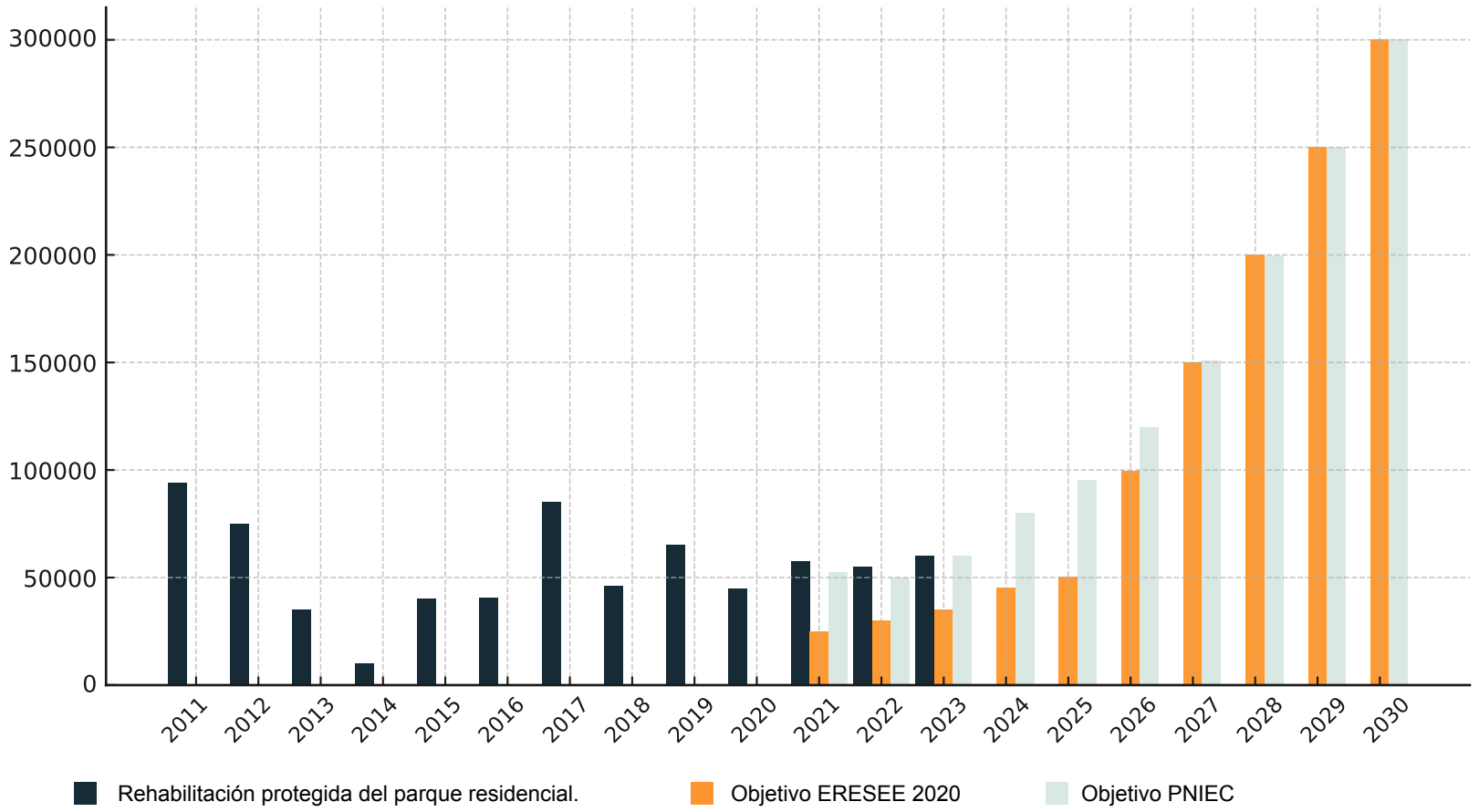
---

8. https://www.transportes.gob.es/recursos_mfom/paginabasica/recursos/eresee_2020.pdf
9. https://www.miteco.gob.es/content/dam/miteco/es/energia/-files-1/_layouts/15/Borrador%20para%20la%20actualizaci%C3%B3n%20del%20PNIEC%202023-2030-64347.pdf

2.3 BUILDING RENOVATION SECTOR

The following table presents data on residential building stock retrofits that have received some form of public assistance (protected), based on the number of definitive approvals from state and regional (Autonomous Community) plans as well as the objectives of the long-term Strategy for Energy Renovation in the Building Sector in Spain (ERESEE 2020)[8] and the Integrated National Energy and Climate Plan (PNIEC)[9] .

Figure 4. Total housing renovation (energy and non-energy) and ERESEE 2020 and PNIEC 2030 objectives



Fuente: Ministerio de Transporte y Movilidad Sostenible, ERESEE 2020 y PNIEC

Only a portion of the total of the renovation works included in the table above corre-spond to energy renovations. In fact, existing data on the destination of retrofit aid show that, at least until 2016, most of it has been spent on measures to improve ac-cessibility and a smaller percentage on energy efficiency (5% in Navarre, 15% in Ara-gon and La Rioja, 20% in the Balearic Islands, 25% in the Valencian Community, 30% in Asturias and Catalonia, 40% in Castilla León and 50% in Galicia)[10].

Bearing in mind that available historical data shows the maximum number of com-pleted retrofit projects is 94,000 homes per year (2011), and the aim is to reach 300,000 by 2030, this seems to be a significant challenge on several levels, not only in terms of financial resources but also in terms of human capital.

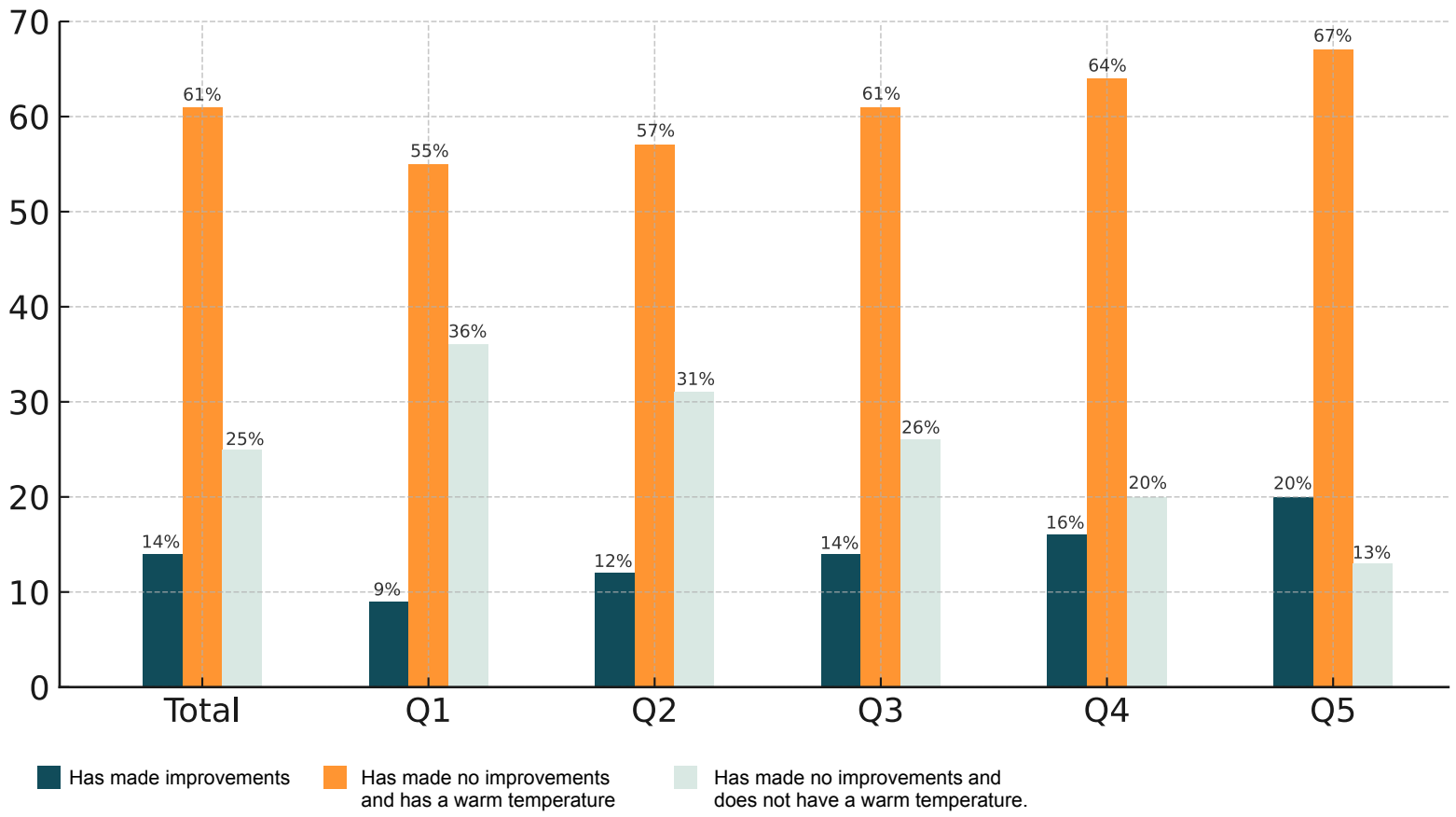
The analysis of building retrofitting in Spain is not recent. As early as 2014[11], the re-port by the Retrofit Working Group coordinated by the Green Building Council Spain and CONAMA indicated that the sector had the capacity to renovate buildings at a rate of up to 400,000 homes per year. Employment data for the construction, compiled INE[12] shows that by 2023 the sector employed half as many people as in 2007 during the peak the real estate boom. According to the Special Bulletin on Renovation (2011)[13], renovation accounted for half of the construction sector's turnover in 2019.

According to the Building Stock Observatory[14], Spain's residential building renovation rate is among the lowest compared to neighbouring countries, standing at just 0.08%, with 71,000 buildings renovated in 2016. To meet the renovation targets, the rate of residential renovation would need to increase to 3.4%, as estimated by the Higher Council of Architects' Associations of Spain[15].

Regarding building retrofitting by income level, the Living Conditions Survey (2023) in-dicates that efficiency improvements are concentrated in higher-income households (Figure 5). In the highest income quintile, twice as many homes (20%) have under-gone efficiency improvements, compared to just 9% in the lowest quintile. However, a relatively high percentage of wealthier households (between 13% and 20%) would still improve their winter comfort levels by upgrading their home's envelope or equipment.

10. https://www.observatoriociudad3r.com/biblioteca/diagnostico-de-la-rehabilitacion-en-comunidades-autonomas-luces-y-sombras-de-un-sector-que-no-despega/
11. https://www.gbce.es/archivos/ckfinderfiles/GTR/Informe%20GTR%202014.pdf
12. https://www.ine.es/dyngs/INEbase/operacion.htm?c=Estadistica_C&cid=1254736176918&menu=resultados&idp=1254735976595
13. https://publicaciones.transportes.gob.es/observatorio-de-vivienda-y-suelo--boletin-especial-sobre-rehabilitacion-2021
14. https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/eu-building-stock-observatory_en
15. https://www.observatorio2030.com/sites/default/files/2021-11/Gui%CC%81a%20Ciudadana%20Rehabilitacio%CC%81n_DIGITAL.pdf

Figure 5. Percentage of Homes with Efficiency Improvements by Income Quintile and Thermal Comfort



Source: National Institute of Statistics. Living Conditions Survey. 202

Although the situation varies by Autonomous Community, income generally has more influence than geographical area on thermal comfort and the capacity to make effi-ciency improvements in housing. This may reflect not only the influence of purchasing power but also the perceived limited cost-effectiveness of these improvements in ge-ographical areas where winters are short and milder.

It is important to highlight that most households do not get cold in winter despite not having renovated their homes (60%). This percentage rises with higher income levels, indicating that greater purchasing power enables access to higher-quality housing and increased use of heating.

According to Isover & Placo's Home Barometer (2021)[16], thermal insulation and reducing energy bills are important factors for more than 90% of households when choosing a new home. While over 50% express interest in energy retrofitting, financial constraints pre-vent them from undertaking it, whereas 20% are both interested and financially able to proceed. The primary reasons for energy retrofitting, in order of importance, are cost sav-ings, improved comfort, environmental considerations, noise reduction, and property value appreciation. Additionally, 75% of homeowners are unaware of how to apply for finan-cial aid and typically seek information from their local municipality or online source.

2.4 REGULATORY FRAMEWORK FOR ENERGY RENOVATION

This framework is composed of different strategies, regulations, and plans that are in-cluded in the report Keys of sustainability to accelerate the housing retrofitting process in Spain from the Higher Council of Architects' Associations of Spain[17], and are summarized below:

2.4.1 The Spanish Urban Agenda

The Spanish Urban Agenda is a strategic framework aimed at fostering sustainable urban development and enhancing the quality of life in Spain's cities and urban envi-ronments. A key pillar of this agenda is the improvement of building quality and sus-tainability, driving essential actions to transform the residential building stock and adapt it to both present and future needs.

One of the main objectives of the Urban Agenda is to increase energy efficiency and reduce energy consumption. This entails promoting the energy retrofitting of build-ings, encouraging the adoption of sustainable technologies, and minimizing energy demand to support climate change mitigation efforts.

Additionally, the agenda is committed to ensuring an adequate supply of affordable housing, addressing the need for citizens to access quality housing without facing ex-cessive financial strain. This is pursued through inclusive housing policies designed to guarantee safe, adequate, and sustainable housing for all.

Another fundamental pillar is securing housing access, particularly for the most vul-nerable populations, through targeted measures such as the creation and promotion of social housing. This includes reactivating vacant housing and making it available on the market while also prioritizing the retrofitting of existing residential stock. By doing so, the agenda aims to provide accessible and suitable housing solutions, with a par-ticular focus on supporting those in greatest need.

2.4.2 State Housing Plan

The State Housing Plan is an essential tool for addressing housing needs in Spain, as it aims to create a more accessible, efficient and sustainable housing model. This plan places a strong emphasis on promoting the rental market, as well as on boosting ret-rofitting and urban and rural regeneration and renovation, all of which contribute to developing more sustainable and liveable communities.

16 https://barometrohogares.es/wp-content/uploads/2021/05/Barometro-ISOVER-Placo%C2%AE-sobre-los-hogares.pdf
17. https://observatorio2030.com/sites/default/files/2022-06/-Claves%20de%20sostenibilidad%20para%20acelerar%20el%20proceso%20de%20rehabilitaci%C3%B3n%20de%20viviendas%20en%20Espa%C3%B1a%20%28WEB%20ACCESIBLE%29_compressed.pdf

One of the key programs within this plan is Program 5, which promotes upgrades in home energy efficiency and sustainability. This program provides specific aid for works that increase home energy efficiency, such as thermal insulation, installation of re-newable energy systems and improvement of heating and cooling systems. These up-grades not only contribute to energy savings and emissions reductions but also im-prove residents' quality of life.

On the other hand, Program 7 focuses on urban and rural regeneration and renewal. This program finances housing retrofitting projects and infrastructure improvements in neighbourhoods and rural areas, aiming to revitalize urban and rural environments, making them more sustainable and preserving the architectural heritage. These ac-tions also seek to facilitate access to adequate, quality housing, thereby promoting balanced and equitable development throughout the country.

2.4.3 Law 8/2013 on Urban Rehabilitation, Renovation and Regeneration.

Law 8/2013 on Urban Rehabilitation, Renovation and Regeneration in Spain establish-es a regulatory framework to promote the improvement and conservation of buildings and the urban environment, focusing on aspects of energy efficiency, accessibility, and sustainability[18].

The law prioritises the energy retrofitting of buildings by promoting actions that re-duce energy consumption (such as thermal insulation), improving heating systems and incorporating renewable energies. It also encourages the use of sustainable materials and construction methods that improve the environmental quality of housing and re-duce the residential sector's environmental footprint. The law also establishes the ob-ligation to carry out periodic inspections (Building Evaluation Report, IEE) that evalu-ate the building's conservation conditions, accessibility and energy efficiency.

It includes a financial framework and public funding to promote retrofitting, including grants and the possibility of forming public-private consortia to implement urban regeneration projects. In addition, the law facilitates the participation of private entities and residents themselves in managing and financing urban improvement projects.

The law not only focuses on the retrofitting of individual buildings, but also encom-passes the comprehensive regeneration of neighbourhoods, promoting interventions that improve the liveability and sustainability of entire areas.

2.4.4 Law 9/2022 on the Quality of Architecture

The main objective of Law 9/2022 on the Quality of Architecture is to promote archi-tectural quality in Spain, fostering a built environment that is more sustainable, effi-cient and liveable. The law strives to integrate sustainability and energy efficiency cri-teria in both new construction and existing building retrofitting.

One of the key aspects of the law is a commitment to increase the practically non-existent number of zero-energy buildings. This applies to new buildings, by requiring design that minimizes energy consumption by using efficient materials and renewable energy, and it also applies to the existing building stock as it promotes energy retrofit-ting of buildings to reduce consumption and emissions.

In this way, Law 9/2022 is not only committed to new architectural development that meets current sustainability needs but also promotes the conservation and retrofit of built heritage, thereby improving citizens quality of life and contributing to the fight against climate change.

2.4.5 2.4.5 Law 10/2022 on urgent measures to promote building retrofitting activities in the context of PRTR

Law 10/2022 on urgent measures to boost building retrofitting was approved within the framework of the Recovery, Transformation and Resilience Plan (PRTR). This is a set of provisions designed to promote energy efficiency and modernise the housing stock in Spain.

Among the most important incentives are the tax deductions applicable to retrofits that achieve significant improvements in buildings' energy consumption:

It offers a 20% deduction off the value of works that manage to reduce heating and cooling demand by at least 7%.

It grants a 40% deduction off the cost of the works when the intervention results in a reduction of at least 30% in non-renewable primary energy consumption.

For residential buildings that improve overall energy efficiency, achieving a minimum reduction of 30% in non-renewable primary energy consumption, up to 60% of the val-ue of this work can be used as a tax deduction.

In addition, a new 1.1 billion Euro line of guarantees was created from the Official Credit Institute (ICO) in order facilitate the financing of these retrofit projects. This line of guarantees will partially cover the risks associated with loans granted by pri-vate financial institutions, supporting projects that contribute to improving energy ef-ficiency.

The law also introduces significant improvements in horizontal property management. To facilitate decision making in homeowners' associations, a simple majority system was established to approve renovations aimed at improving building energy efficiency. This regime also applies to applications for aid and financing, streamlining the pro-cesses and encouraging the residents to participate actively.

Finally, it strengthens homeowners' communities' ability to access credit. Communi-ties now have full legal capacity to formalize loans for building retrofitting or im-provement, which facilitates modernization projects and ensures more efficient ac-cess to financing.

With these measures, Law 10/2022 seeks not only to improve the quality and sustain-ability of housing stock, but also to promote a more rational and efficient use of energy resources, in line with the country's environmental and economic recovery objec-tives.

2.4.6 ERESEE 2020. Renovation and financing roadmap[19]

The ERESEE 2020 (Long-Term Strategy for Energy Renovation in the Building Sector in Spain) establishes an ambitious roadmap for the renovation and financing of building stock,

18. https://www.boe.es/boe/dias/2013/06/27/pdfs/BOE-A-2013-6938.pdf
19. https://gbce.es/el-mitma-publica-la-hoja-de-ruta-para-seguir-avanzando-en-la-implementacion-de-la-eresee-y-lograr-un-sector-descarbonizado-para-2050/

aiming to promote energy efficiency and the progressive decarbonisation of the sector. This strategy is essential to meet the sustainability goals set for the coming decades.

Among the main objectives is to reach 300,000 certified energy retrofit projects by 2030, with the goal of achieving a fully decarbonized building sector by 2050. By that date, a 37.3% reduction in energy consumption and a 99% reduction in greenhouse gas emissions are expected based on 2020 levels.

One of the most relevant aspects of this strategy is the important role that the resi-dential sector will play. Estimates suggest that 74% of energy consumption savings will come from optimising home heating systems. In this context, a total of 7.1 million homes have been identified where intervention is highly cost-effective. Improvements to these buildings' envelopes, such as thermal insulation of façades, roofs and floors, are esteemed to generate close to €6/kWh in energy savings, which justifies these properties' renovation priority.

ERESEE 2020 proposes different financing roadmaps to facilitate these transfor-mations, adjusted to various repayment terms ranging from 15 to 30 years. These roadmaps contemplate significant participation by the private sector, which would represent 66% of the initial investment. However, thanks to the financial savings gen-erated by energy efficiency improvements, estimates suggest that 31% to 61% of the total investment can be recovered. This will significantly reduce the contribution of the private sector in the long term: from an initial 67% to 36% over a 15-year horizon, and to only 6% in 30 years.

2.4.7 National Integrated Energy and Climate Plan (PNIEC) and Recovery, Transfor-mation and Resilience Plan (PRTR)

Spain's updated PNIEC for 2023-2030 sets important goals for home energy retrofit-ting, which aims to improve energy efficiency and reduce emissions from the residen-tial sector. The plan seeks to rehabilitate the energy for 1.37 million[20] homes from 2021 to 2030, which is an increase from the previous target of 1.2 million. This is part of a broader effort to decarbonize the country, together with measures such as pro-moting self-consumption and home electrification.

PNIEC also promotes using renewable energies in heating and cooling systems and encourages general electrification of the economy until 35% of overall consumption is electric. Building interventions include improving thermal insulation and integrating renewable sources and energy storage technologies.

Spain's PRTR has allocated a significant amount of funds to the energy retrofitting of buildings, especially in the residential sector. In total, 3.42 billion euros[21] have been earmarked to improve housing energy efficiency, and a further 1.0 billion euros to build 20,000 energy-efficient social rental housing units. This budget is distributed out between direct aid, tax deductions and guarantees managed by ICO[22]. The disburse-ment of these funds is organised through transfers to the autonomous communities, which are responsible for launching invitations to tender and managing the aid. This approach seeks not only to improve energy efficiency but also to revitalize neighbour-hoods and support the transition to a more sustainable model, with a particular focus on smaller municipalities and demographically challenged areas.

2.4.8 National Building Renovation Plan

The Plan is provided for in the new Energy Performance of Buildings Directive which includes: Zero Emission Building, minimum energy performance standards, national building renovation plan, building renovation passport, national building energy per-formance database and Digital Building Register[23]. Progress has already been made on a proposed building renovation passport model (iBRoad2EPC).

2.4.9 Emissions Trading System 2 (ETS2) and Social Climate Fund (FSC)

ETS2 is a new extension of the European Union's Emissions Trading System (ETS), specifically designed to cover sectors hitherto unregulated under the original scheme. This extension mainly affects buildings and road transport, and implementation will begin in 2027. ETS2 obliges companies to purchase emission allowances for the CO_2 generated, which translates into an economic cost associated with polluting emis-sions.

Since ETS2 increases the cost of fossil energy use in buildings, the operating costs of properties that have not been adequately rehabilitated will rise. This creates a strong financial incentive to improve energy efficiency and reduce emissions through retrofit measures, such as improving insulation, upgrading heating and cooling systems to cleaner technologies, or implementing renewable energy.

To mitigate the economic impact on households, the European Union has proposed a SCF (Social Climate Fund) which will fund energy retrofitting and help vulnerable people make these improvements. Member States will be able to use this fund to subsi-dise the energy transition of residential buildings and provide financial support to fam-ilies affected by rising costs.

2.4.10 European Energy Efficiency Directive

The Energy Efficiency Directive (EED) is the main European Union regulation to reduce energy consumption, affecting sectors such as construction, also regulated by the Energy Performance of Buildings Directive (EPBD). Within the framework of the 2020 Energy and Climate Package, the EU proposed a target to reduce energy consumption by 20% compared to projections, although, unlike the renewable energy and emission reduction targets, this improvement is not binding on Member States, forcing the EU to use compliance boosting mechanisms.

The Directive establishes several measures, such as that Member States must develop detailed plans to improve the efficiency of the building stock or requirements on government building renovation (3% annually of the surface area of large public buildings that do not meet minimum standards). Spain transposed these obligations through Royal Decree-Law 8/2014, creating a sys-tem of obligations for energy suppliers. A public inventory of government buildings was also created to manage their energy efficiency.

20. https://www.miteco.gob.es/content/dam/miteco/es/energia/-files-1/_layouts/15/Borrador%20para%20la%20actualizaci%C3%B3n%20del%20PNIEC%202023-2030-64347.pdf
21. https://planderecuperacion.gob.es/noticias/conoce-ayudas-europeas-rehabilitacion-viviendas-prtr
22. https://www.mivau.gob.es/ministerio/proyectos-singulares/pr-tr/vivienda-y-agenda-urbana/programa-de-ayudas-para-la-rehabilitacion-integral-de-edificios-residenciales-y-viviendas
23. https://www.europarl.europa.eu/meetdocs/2014_2019/plmrep/COMMITTEES/ITRE/DV/2023/02-09/09_CA-EPBD_EN.pdf

Directive (EU) 2024/1275, published on May 8, 2024, introduces new rules to improve the energy performance of buildings in the European Union, in line with the Repower EU Plan and decarbonization targets.

The Directive sets minimum energy efficiency requirements (MEPs) for buildings with a view to achieving a zero emissions building stock by 2050. It also promotes the use of solar energy, requiring that new buildings optimize their solar energy generation capacity. From 2026-2027, solar panels must be installed on non-residential and public buildings, while residential buildings will have to comply with this measure by 2029.

All new buildings will need to meet Zero Emission Buildings (ZEB) standards by 2030, while this date is moved forward to 2028 for government buildings. In addition, by May 2026 a renovation passport system will be introduced, focusing on facilitating deep renovations through a phase-structured plan with clear objectives.

Large buildings must incorporate energy monitoring and optimization systems, and new or renovated buildings must be equipped with charging points for electric vehicles and spaces for bicycles. From 2025, incentives for fossil fuel boiler installations will be prohibited. Likewise, deep renovations will be encouraged with financial and technical support for vulnerable households.

A new energy certification scale (A-G) will be introduced, where "A" is assigned to ze-ro-emission buildings. A public and digital database with building energy information will also be created and made available to owners, potential buyers and financial in-stitutions.

2.5 FINANCING MECHANISMS

2.5.1 Financing mechanism proposals included in the EPBD

The Energy Performance of Buildings Directive (EPBD) and its Delegated Act of May 2025 establish a series of proposals to improve energy efficiency in building renova-tion. These proposals include:

- **Energy Performance Contracts:** Energy Performance Contracts (EPCs) are agreements between the beneficiary and the provider of an energy efficiency improvement measure, where investments are paid based on the agreed level of energy efficiency improvement. These contracts make it possible to finance improvements through the savings generated, thereby guaranteeing a return on investment.[24]
- **Pay-as-you-save:** These systems allow energy efficiency measures to be fi-nanced through the savings obtained in the energy bill. This model has already proven to be effective in the industrial sector and can be adapted for the build-ing sector.
- **Tax incentives:** Tax incentives, such as reduced tax rates on renovation works and materials, are proposed to encourage investment in energy efficiency. These incentives may include tax deductions, tax credits, and tax exemptions.
- **Guarantee funds:** It includes a proposal to create guarantee funds to support energy efficiency investments, reducing the risk for financial institutions and facilitating access to financing.[25]
- **Funds allocated for deep renovations:** These funds are intended to finance ren-ovations that involve significant upgrades to buildings' energy efficiency, ensuring a high level of energy savings[26].
- **Funds earmarked for renovations with a significant minimum energy savings target threshold:** Specific funds will be established for renovations that achieve a minimum energy savings threshold, providing incentives for improvements that generate the greatest energy benefits.
- **Mortgage Portfolio Standards:** Mortgage portfolio standards will be introduced to ensure that financial institutions include energy efficiency criteria in their mortgage portfolios, promoting the financing of energy efficient homes[27].

2.5.2 Subsidies

Subsidies are a key tool in promoting energy retrofitting and urban regeneration, par-ticularly for low-income households. The biggest disadvantage of grants is that they are subject to budgetary restrictions and that often the recipients could have financed the renovations independently without public assistance.

Among the most prominent State funded grant programs are: the Housing Renovation and Urban Regeneration Plan (through the PRTR), which offers 100% grants for low income housing, facilitating access to energy improvements for the most needy households; the State Housing Plan, which establishes income and climate zone-based aids, as well as providing additional support for temporary rehousing if necessary; PAREER (Aid Program for the Energy retrofitting of Existing Buildings), PAREER-CRECE, and PAREER II, which offer aid of up to 90% of the investment, with the aim of financ-ing renovations that increase building energy efficiency of buildings[28]; PREE and PREE 5000 for Energy retrofitting of buildings and DUS 5000 through MITECO-IDAE; aid for Spanish Urban Agenda pilot projects, State Plan for Access to Housing 2022-2025 by MITMA; FEDER funds are also allocated to Renovation projects, particularly those that contribute to meeting environmental objectives.[29]

According to GRT (2016)[30] , 90% of existing grants for building envelope improvement were managed by municipalities at least until 2016. Municipal programs are more sustained over time and tend to be more oriented towards serving vulnerable groups, ensuring that resources reach those who need them most, regardless of their location or economic situation. Although they are often more limited in terms of the amount of aid provided, these programs offer ongoing support that complements national and regional initiatives, and they are better adapted to local needs and specific situations of vulnerability[31].

2.5.3 Loans

Loans are a widely used financing option for energy retrofitting projects, but they pre-sent certain challenges. The first

24. Contrato de rendimiento energético (CRE): https://www.miteco.gob.es/es/energia/eficiencia/servicios-energeticos/contrato-rendimiento-energetico.html
25. Ayudas europeas para la rehabilitación de edificios residenciales y viviendas: https://www.mivau.gob.es/vivienda/ayudas-europeas-rehabilitacion-edificios-viviendas
26. Renovación profunda: nuevos métodos para transformar el mercado de la renovación :https://cordis.europa.eu/article/id/450491-deep-renovation-new-approaches-to-transform-the-renovation-market/es
27. ESTÁNDARES DE CARTERA HIPOTECARIA: https://www.climatestrategy.com/es/informe_29.php Underwriting the Renovation Wave with Mortgage Portfolio Standards for Energy Efficiency https://www.-climatestrategy.com/es/informe_20.php
28. https://www.transportes.gob.es/el-ministerio/planes-estrategicos/estrategia-a-largo-plazo-para-la-rehabilitacion-energetica-en-el-sector-de-la-edificacion-en-espana
29. https://observatorio2030.com/sites/default/files/2022-06/-Claves%20de%20sostenibilidad%20para%20acelerar%20el%20proceso%20de%20rehabilitaci%C3%B3n%20de%20viviendas%20en%20Espa%C3%B1a%20%28WEB%20ACCESIBLE%29_compressed.pdf
30. https://www.observatoriociudad3r.com/biblioteca/diagnostico-de-la-rehabilitacion-en-comunidades-autonomas-luces-y-sombras-de-un-sector-que-no-despega/
31. https://www.transportes.gob.es/el-ministerio/planes-estrategicos/estrategia-a-largo-plazo-para-la-rehabilitacion-energetica-en-el-sector-de-la-edificacion-en-espana

has to do with the scale of the projects. Aggregating demand by grouping Renovation projects together by residents' associations or even by whole neighbourhoods creates economies of scale, which facilitates the loans' fi-nancial viability. The costs can be prohibitive for small-scale initiatives, limiting access to financing for certain households or businesses. The second has to do with the lim-ited diversity of existing financing mechanisms that can respond to the needs of cus-tomers with different levels of borrowing capacity.

Public-private partnerships for soft loans are currently being promoted. These loans offer favourable conditions, such as reduced interest rates or longer repayment terms, making them more accessible to beneficiaries. An example of this modality is the ICO (Official Credit Institute) line, which provides loans on favourable terms, or PAREER, a program that subsidizes up to 60% of the cost of Renovation, while the rest can be fi-nanced through a soft loan.

The PAREER[32] program stipulates that actions must fall within one or more of the fol-lowing categories:

- Enhancement of energy efficiency in the thermal envelope.
- Thermal and lighting systems energy system efficiency upgrades
- Replacement of conventional energy with biomass in thermal systems.
- Replacement of conventional energy with geothermal energy in thermal sys-tems.

This type of financing is especially suitable for households or entities with borrowing capacity, that is, those that can take on a loan without compromising their financial stability. The aids, combined with soft loans, allow households with sufficient re-sources to make substantial improvements in energy efficiency without having to bear the full burden of the initial cost.

2.5.4 Taxation

Taxation plays a crucial role in promoting energy retrofitting, through tax incentives that facilitate investment in projects to improve the energy efficiency of buildings. One of the main mechanisms is income tax deduction, which allows taxpayers to de-duct up to 60% of the cost of energy saving renovations on their tax return[33].

In addition, energy retrofitting aid granted within the framework of Next Generation Funds, is not included in the personal income tax base, which means that the beneficiaries of this aid do not have to pay taxes on the funds received. This measure aims to facilitate grant access without creating an additional tax burden for beneficiaries.

Tax-exempt aid programs are as follows:

- Aid under the PREE 5000 program regulated by RD 691/2021, of August 3
- Aid under the PREE program regulated by RD 737/2020, of August 4
- Aid from neighbourhood, building, housing Renovation programs, project draft-ing, and LEE regulated in RD 853/2021, of October 5
- Aid from the self-consumption and storage programme, as well as the imple-mentation of renewable thermal energy systems regulated in RD 477/2021, of 29 June.

VAT policies differ in some regions such as Galicia, where VAT deductions are applied to energy retrofitting works. This reduces the initial investment cost for homeowners, making energy efficiency improvements more affordable.
Finally, some localities have implemented modifications to the Property Tax (IBI), of-fering discounts to those owners who make energy efficiency improvements to their homes. These tax incentives at the local level complement national subsidies and de-ductions, promoting a greater investment in improving building stock[34].

2.5.5 Energy Efficiency Obligations

Energy companies are obliged to comply with established energy efficiency (EE) tar-gets. If these objectives are not met, companies must contribute financially to the Na-tional Energy Efficiency Fund (FNEE), a mechanism aimed at financing projects and actions to improve energy efficiency in the country. The FNEE was created under Law 18/2014 of 15 October to finance national energy efficiency initiatives, in accordance with Article 20 of Directive 2012/27/EU of the European Parliament and of the Coun-cil, dated 25 October 2012, as amended by Directive (EU) 2018/2002. The FNEE oper-ates under the Ministry for Ecological Transition and the Demographic Challenge, through the State Secretariat for Energy, and is managed by the Institute for Energy Diversification and Saving (IDAE)[35].

In addition to this option, companies can choose to acquire Energy Saving Certificates (CAEs), which certify effective energy consumption reduction. CAEs allow companies to meet their commitments more flexibly, encouraging investment in technologies that promote energy savings.

Thus, both FNEE and CAEs are key tools in promoting energy efficiency, encouraging companies to reduce their carbon footprint and actively contributing to energy sustainability[36].

2.5.6 Contracts with Energy Service Companies (ESCOs)

Contracts with Energy Service Companies (ESCOs) are increasingly popular for imple-menting energy efficiency projects. In this type of agreement, the ESCO finances the necessary investment through its own balance sheet, without requiring the client to make initial outlay. Repayment is based on the actual economic savings generated, allowing companies or institutions to benefit from the energy improvement without a high initial cost.

This model is particularly suitable for large projects, such as those developed in public administrations, buildings or communities, which tend to have high energy consump-tion and require significant investments. However, one of the main barriers to their adoption is the lack of knowledge on behalf of public administrations about how these contracts work and the benefits they can offer.

Successful examples of projects carried out under this model include initiatives that have implemented innovative energy

32. https://www.idae.es/ayudas-y-financiacion/para-rehabilitacion-de-edificios-programa-pareer/programa-de-ayudas-para-la
33.https://sede.agenciatributaria.gob.es/Sede/vivienda-otros-inmuebles/deducciones-obras-mejora-eficiencia-energetica-viviendas/deduccion-obras-rehabilitacion-energetica/base-deduccion-porcentaje-deduccion.html
34. https://sede.agenciatributaria.gob.es/Sede/vivienda-otros-inmuebles/deducciones-obras-mejora-eficiencia-energetica-viviendas/deduccion-obras-rehabilitacion-energetica/base-deduccion-porcentaje-deduccion.html
35. Guía sobre desgravaciones fiscales para rehabilitación de viviendas y edificios residenciales: https://economistas.es/Contenido/Consejo/Estudios%20y%20trabajos/Gu%C3%ADa%20sobre%20desgravaciones%20fiscales%20rehabilitaci%C3%B3n%20viviendas%20y%20edificios%20residenciales%20mediante%20fondos%20Next%20Generation%20%281%29.pdf
36. https://www.transportes.gob.es/el-ministerio/planes-estrategicos/estrategia-a-largo-plazo-para-la-rehabilitacion-energetica-en-el-sector-de-la-edificacion-en-espana

efficiency solutions in various sectors, demon-strating the viability and effectiveness of contracts with ESCOs as a key tool to achieve significant savings and promote sustainability[36].

2.5.7 On-Bill financing[37]

On-Bill Financing is a financing model in which agreements are established with the electricity company, allowing consumers to finance improvements in energy efficiency and other related projects, with reimbursement through the electricity supply bill. This type of financing offers the advantage of not requiring down payments, as the costs are spread over time in monthly invoices.

A prominent feature of On-Bill Financing is that it allows for credit to be transferred to a new building occupant, making it an attractive option for property owners or land-lords. However, this model has some limitations, such as relatively high interest rates and the restriction of not being able to change electricity supplier while under this agreement.

In addition, the costs associated with upgrading utilities' billing systems to handle these types of agreements could represent an obstacle to their large-scale implemen-tation.

Despite these challenges, On-Bill Financing remains a useful tool to facilitate access to financing for energy improvements without the need for large outlays up-front.

2.5.8 On-tax financing

El *On-Tax Financing*[38] is a financing model that consists of establishing an additional fee or surcharge, the total amount of which is equivalent to the financed investment plus the corresponding interest. This surcharge is applied to the tax associated with the investment and is paid over an established period.

The repayment of this surcharge is made together with the usual tax to which it is linked, using the tax collection mechanisms established by the corresponding Administration. This system allows financing projects or improvements without requiring a high initial outlay, as the payment is spread over time and is conveniently integrating into the tax collection cycle.

This financing model is an effective option for facilitating investment in projects that require external financing, enabling their repayment through the existing tax system.

2.5.9 PACE, Commercial Property Assessed Clean Energy[39]

This financing model was developed in the United States and offers the property own-er a long-term loan of 20 to 25 years with no need for a credit check. The only collat-eral required for this type of loan is the property for which the investment is intended.

One of the outstanding features is that all project costs can be included in the amount to be financed, including both direct and ancillary costs, up to a maximum of 20% of the building value. Additionally, the owner does not need to make any initial contribu-tion to access financing, which makes this option especially attractive for those look-ing to make improvements without a significant initial outlay.

This financing model also offers flexibility if the owner decides to sell the property, as the loan can be transferred to the new owner. The capital needed to finance this type of project comes mainly from institutional funds, such as pension funds, insurance companies and long-term investors interested in investing in sustainable projects. Some challenges associated with this model stem from the high default rates among borrowers, which are significantly higher than those of other financing options. This has at times reduced the interest of local entities in adopting these types of financial models.

This type of financing represents a new class of long-term, fixed-income, green as-sets, which not only promotes sustainability but also offers an attractive and low-risk investment for institutional investors.

Examples in Spain include the EuroPACE Project, which includes a social guarantee fund in the event of default by the vulnerable population, or the Greenward Partners mechanism[40].

2.5.10 Regulated Tariffs

Regulated tariffs are a mechanism in which a price is defined for each kilowatt hour (kWh) saved, allowing the market to determine the amount of savings that can be achieved based on the energy efficiency attained. This system seeks to incentivize re-ducing energy consumption, rewarding users or companies that achieve greater effi-ciency by reimbursing them a portion of the cost based on the savings generated.

In some systems, such as ETS2, emissions reductions and energy savings translate to the possibility of obtaining emission rights certificates that can be transformed into economic benefits in the emissions market and thus allow savings to be monetized in the market.

In Spain, the Secretariat of State for Energy has recently launched a preliminary public consultation for the proposed ministerial order to develop a system of auctions for energy saving needs[41].

2.5.11 Green mortgages

Green mortgages are a financing option that offers reduced interest rates when ener-gy efficiency measures are included in property renovations or improvements. One of the main advantages of this type of mortgage is that the cost of energy improvements can be included in the total amount of the mortgage, without increasing the down payment.

These mortgages allow homeowners to use the savings generated by reduced energy bills to finance improvements, making it easier to invest in energy efficiency projects without the need for a significant immediate outlay. This model is particularly suitable for households with borrowing capacity, as well as for homeowners' associations that wish to improve their buildings' energy efficiency.

37. https://www.idae.es/ayudas-y-financiacion/fondo-nacional-de-eficiencia-energetica
38. https://www.transportes.gob.es/el-ministerio/planes-estrategicos/estrategia-a-largo-plazo-para-la-rehabilitacion-energetica-en-el-sector-de-la-edificacion-en-espana
39. https://observatorio2030.com/sites/default/files/2020-10/Greenwardpapers%20n1%202019%20Ago%20vEsp_0.pdf; https://cordis.europa.eu/article/id/435519-putting-the-cost-of-energy-efficiency-renovations-on-the-meter/es
40. Developing, piloting and standardising on-tax financing for residential energy efficiency retrofits in European cities https://cordis.europa.eu/project/id/785057
41. https://observatorio2030.com/sites/default/files/2020-10/Greenwardpapers%20n1%202019%20Ago%20vEsp_0.pd

Several banks in Spain, such as Banco Santander, CaixaBank, Triodos Bank and Bank-inter, have adopted this type of financial product, offering customers more favourable conditions when investing in energy sustainability as well as long-term savings.

2.5.12 Crowdfunding

Crowdfunding has established itself as an effective tool for financing projects, espe-cially at the community level. This model allows a group of people to pool small indi-vidual contributions in support of initiatives that otherwise might not have the neces-sary financial support. It is particularly suitable for projects with local impact, such as those related to sustainability, building retrofitting or green infrastructure promotion.

Platforms such as Housers, Goteo.org and Ecrowd! have been key in financing projects in cities such as Madrid and Barcelona. These examples highlight how crowdfunding can be used to support community initiatives, enabling citizens to actively participate in the development of their environment and contribute to the collective well-being.

In addition to democratizing access to projects of common interest, this type of fi-nancing promotes investment in sustainable solutions and fosters the growth of communities that are more resilient and committed to their future.

2.6 CURRENT WORKSPACES

At the national level, various organizations and platforms are actively working to pro-mote housing Renovation and sustainable project development in the construction sector. The Green Building Council and the Green Finance Institute stand out among them, promoting green financing initiatives and developing more sustainable build-ings.

The Alliance for Housing Renovation that Leaves No One Behind, made up of entities such as ECODES and Provivien-da, seeks to ensure that Renovation processes are inclu-sive and accessible for everyone, including the most vulnerable groups. This initiative is complemented by pro-jects such as the AUNA FORUM, a collaboration between the Green Building Council, the financial sector, the autono-mous regions and social agents, aimed at promoting sustain-able Renovation through a multidimensional ap-proach.

A prominent example of neighbourhood-level Renovation is the Habitares project, promoted by CSIC, which aims to transform entire areas through efficient and sustain-able solutions. Additionally, the Electrical Retrofit of Housing in Spain Observatory (OREVE), created by the private sector, provides key information on best practices and advances in the energy retrofitting of buildings.

Organizations like CONAMA and the Working Group on Renovation (GRT) also play a fundamental role developing sustainable Renovation policies and strategies. The City Observatory 3R and the National Association of Rehabilita-tion and Renovation Com-panies, as well as the Association of Energy Service Companies contribute to forming a collab-oration network between the public and private sectors, facil-itating knowledge exchange and implementing innovative solutions for housing energy retrofitting.

These initiatives show how the building renovation sector is evolving towards greater sustainability, with a strong focus on social inclusion and energy efficiency.

At the European level, several key projects are driving energy retrofitting and the de-velopment of sustainable solu-tions to improve the energy efficiency of buildings. One of the main players in this effort is the European Investment Bank (EIB), which has launched the Helena Project. This project aims to facilitate access to financing for the energy retrofit-ting of buildings, especially for homeowners and companies that wish to improve their properties' energy efficiency. Helena offers flexible and affordable fi-nancing solutions, supporting the transition to a more sustainable built environ-ment across Europe.

Moreover, the Energy Efficiency Financial Institutions Group (EEFIG) is a key initiative that brings together financial insti-tutions, public and private organizations, as well as experts from the energy sector. EEFIG aims to promote investment in energy efficien-cy by developing innovative financial pro-ducts adapted to market needs. Its focus is to overcome barriers to financing energy efficiency projects, such as perceived risks and lack of information, by providing financial institutions with the necessary tools to boost this type of investment.

In addition to these projects, the European Union has launched multiple funding pro-grams and policies to promote the energy retrofitting of buildings, such as the Euro-pean Fund for Strategic Investments (EFSI) and the European Structural and Invest-ment Funds, which support the transi-tion to a low-carbon economy and the improve-ment of energy efficiency in the construction sector.

At the regional and local levels, numerous initiatives aim to accelerate residential buildings and home retrofits. One notable example is the Opengela program[42] in the Basque Country, which promotes urban regeneration by establishing a network of neighbourhood offices acting as one-stop shops to assist local communities. In Na-varre, NASUVINSA (Navarra de Suelo y Vivienda S.A.)[43], provides advisory, support, and management services for individuals, neigh-bourhoods associations, private devel-opers, town councils, and local organizations engaged in housing and building renova-tion projects, as well as broader neighbourhood-level initiatives. It has implemented projects in the Txantrea neigh-bourhood and the Lourdes neighborhood of Tudela, with plans to extend this strategy to other districts of Pamplo-na-Iruña and municipalities across Navarra. At the local level, many additional initiatives share the goal of supporting building renovation. In Zaragoza, a digital platform has been developed to fa-cilitate access to renovation aid, promoting retrofits for homes and residential build-ings with deficien-cies in conservation, accessibility, and energy efficiency by subsidiz-ing necessary interventions[44]. Meanwhile, in Madrid, the Green Office has been estab-lished to raise public awareness about the importance of energy efficiency and sus-tainability in the city's residential sector[45].

42. https://www.transportes.gob.es/el-ministerio/planes-estrategicos/estrategia-a-largo-plazo-para-la-rehabilitacion-energetica-en-el-sector-de-la-edificacion-en-espana
43. https://www.nasuvinsa.es/es/servicios/rehabilitacion-regeneracion
44. https://www.ayudasrehabilitacionzaragoza.es/
45. https://www.madrid.es/portales/munimadrid/es/Inicio/Vivienda-urbanismo-y-obras/Vivienda/Oficina-verde/?vgnextfmt=default&vgnextchannel=533ed3440f982910VgnVCM2000001f4a900aRCRD

3. Compilation of Challenges and Proposals Identified in the Working Group Sessions

3.1 SUMMARY OF THE FINANCING NEEDS OF THE RESIDENTIAL BUILDING RENOVATION SECTOR

Rehabilitating residential buildings and improving their energy efficiency is a complex challenge that involves many stakeholders from both the public and private arenas, as well as social institutions. Addressing this issue effectively requires inter-agency en-gagement that mobilizes both the private sector and homeowners. This commitment is essential to generate the necessary trust that drives investment and the active par-ticipation of all stakeholders.

Multiple public administrations participate in this process, each with varying levels of competencies that must be coordinated to achieve a shared goal. Coordination between these administrations is essential to avoid duplicities and ensure efficient use of resources. Furthermore, the complexity of the process necessitates clear and detailed information on its stages, along with effective coordination and dialogue among all stakeholders. This encompasses entities ranging from government agencies to pri-vate companies and neighbourhood associations.

Although the return on investment in these projects is evident, quantifying it in mone-tary terms is challenging. Reducing energy costs is a key factor and can be monetized.

However, enhancements in housing value and quality of life are also significant but are not easily translated into financial terms unless the property is sold or transferred. This adds an extra layer of complexity to the process.

Aggregating projects is crucial for attracting new investments and establishing a sus-tainable long-term business model. To achieve this, fostering trust among stakeholders is essential, as it contributes to generating substantial business volume. Trust is cultivated through process transparency, clear communication, and adherence to commitments.

For homeowners to be willing to take on debt to renovate their homes, they must have confidence that the entire process will proceed smoothly. Providing adequate supporto address any concerns that arise along the way is essential. Additionally, homeowners need access to financing with favourable repayment terms and grants that are disbursed before the work begins. Currently, the structure of grants maybe hindering business development, as homeowners often struggle to cover upfront costs and must wait until project completion to receive the financial aid.

Moreover, it is essential to achieve meaningful emissions reductions in alignment with the objectives of the National Integrated Energy and Climate Plan (PNIEC) and to scale up efforts to meet housing Renovation targets. Energy retrofitting not only sup-ports environmental sustainability but also enhances residents' quality of life and can lead to substantial long-term energy savings.

A fundamental shift in grant management is also essential. First, priority access must be guaranteed for vulnerable groups, ensuring that those most in need can benefit from energy efficiency improvements. Additionally, it is crucial to implement reforms that enable grants to be disbursed before work begins.

Finally, drawing from successful practices at both national and international levels is key to continuously enhancing processes and outcomes. Collaboration and knowledge exchange with other countries and regions can offer valuable insights and adaptable strategies to better address local needs.

3.2 KEY CHALLENGES IDENTIFIED BY THE WORKING GROUP

1. Regarding project costs

- The social benefits of energy renovation, such as enhanced quality of life and re-duced energy poverty, are often overlooked in business models, which typically focus solely on financial aspects.

- Homeowners' associations encounter challenges in reaching collective decisions, leading to delays in renovation projects and adding complexity to the process.

- Energy renovation projects tend to be costly, with expenses increasing as the pro-ject scale decreases, discouraging individual homeowners from undertaking reno-vations. Collective renovation of the residential sector—whether through neigh-bourhood communities, districts, or other organizational structures—is more eco-nomically viable due to cost reductions achieved through economies of scale.

However, it also complicates decision-making, as it requires consensus among a larger group of stakeholders.

● While part of the return on investment in building renovation is evident through reduced energy bills, other benefits—such as improved indoor comfort and in-creased property value—are neither immediate nor easily monetized. As a result, although the economic, social, and quality-of-life improvements are clear, they are typically considered key factors in decision-making only by those with sufficient fi-nancial resources to take on the associated debt. For this reason, many proposed financial solutions focus either on increasing home equity through renovation or on offering long-term, low-interest loans to ease the repayment burden.

● The reforms introduced by RD Law 19/2021[46] have enabled homeowners' commu-nities to access financing for building retrofitting. This change has been instrumen-tal in accelerating the number of projects funded.

● Some past decisions, such as VAT reduction on gas, may deter investment in build-ing energy retrofitting by making energy efficiency measures less economically competitive compared to other alternatives.

2. Regarding default and the need for guarantees

● A solution is needed for financing projects where uncertainties exist, particularly in small communities and for property owners facing loan repayment difficulties. Al-ternative public guarantee mechanisms beyond the ICO must also be explored.

● Lenders and creditors face default risks due to borrowers' levels of indebtedness, increasing risk perception and discouraging participation in renovation projects. The process is highly complex, time-consuming, and involves a diverse range of stakeholders. For potential renovation beneficiaries, challenges arise from the di-verse income levels within neighbourhood associations, requiring all residents—regardless of their financial situation—to collectively bear the costs of building renovation. To address this, some recommendations focus on streamlining and simplifying the process by fostering trust among stakeholders and minimizing the time between the different phases of the renovation.

● For financial institutions to fund operations, a very low risk of default is required to ensure their bankability. Therefore, some recommendations focus on reducing op-erational risk (de-risking) by enhancing payment guarantees through public entities and implementing other risk-mitigation measures.

● Although the Official Credit Institute (ICO) offers a guarantee program, its adop-tion has been limited for several reasons. Many financial institutions perceive the program's adherence process as overly complex due to the low level of debt guar-antees, the high costs associated with approval, the time-consuming nature of the application process, and the overall bureaucratic burden. As a result, some finan-cial institutions believe that the economic and human resources required for par-ticipation are not justified, particularly given the difficulties in executing the com-mitted guarantees. Therefore, we recommend reviewing and refining the charac-teristics of the ICO guarantee process to enhance its effectiveness and accessibility.

● At present, through an agreement with MIVAU, the ICO has opened a financing framework to guarantee loans at 50% in the long term (15 years), which is longer than usual for homeowners or homeowners' associations that undertake Renova-tion works on residential buildings located in national territory and have received aid from the Autonomous Communities or the Cities of Ceuta and Melilla where the building is located[47]. The effectiveness of this funding framework can be as-sessed after November 2025 once the application period has.

● In the same vein, we propose exploring the possibility of local or regional public entities also serving as financing guarantors. This mechanism could be viable if the entity has a strong credit rating to effectively act as a guarantor; however, if the entity has high levels of debt, this option would not be feasible. Therefore, we rec-ommend analysing the regulations that define the debt limits of public entities—particularly local ones, given that housing competencies are managed at the local level. If necessary, regulatory changes should be considered to enable and promote the role of local entities as guarantors.

3. Regarding the role of grants

● There is a broad consensus among working group members that grant programs require restructuring. It is believed that higher-income homes receive a dispropor-tionate share of grants, preventing these funds from effectively addressing the needs of the most vulnerable homes and buildings, where financing renovation projects is more challenging. The group also feels that a change is needed in grant taxation. In general, the recommendation is to shift from grants to alternative fi-nancial mechanisms such as soft loans, bridge loans, building passports, green mortgages, on-bill financing, and enhanced collaboration with financial institu-tions, such as the European Coalition for Energy Efficiency Finance.

● Additionally, low- and middle-income households often struggle to benefit from tax deductions, which once again results in higher-income households receiving the greatest advantages. Tax deductions should be leveraged primarily to incentivize spending among high-income households, while grants should be reserved for lower-income households.

● The availability of public grants from PRTR funds has led to an increase in the number of communities applying for financial aid in recent years, although the ex-act number of requests remains unknown. However, the available funds are insuf-ficient to cover all requests, which may result in project rejections by communities that do not receive public aid and are unwilling to bear the costs of private financ-ing. This, in turn, could slow down progress toward retrofit targets. Additionally, communities with negative past experiences contribute to a broader scepticism about energy renovation, further hindering the acceptance and implementation of new projects.

● Some working group members advocate for restructuring public grant distribution to prevent the current imbalance, where a small number of beneficiaries receive a high percentage of renovation cost grants. Instead, they suggest that priority should be given to directing these grants toward households in vulnerable situa-tions.

47. https://www.madrid.es/portales/munimadrid/es/Inicio/Vivienda-urbanismo-y-obras/Vivienda/Oficina-verde/?vgnextfmt=default&vgnextchannel=533ed3440f982910VgnVCM2000001f4a900aRCRD

● Financial institutions should finance the full cost of renovations upfront, including the grant amount, even if it has been approved. Under the current system, home-owners' associations only receive the grant after project completion, at which point they must settle the debt. It is a lengthy process that involves multiple stakeholders. The working group recommends disbursing grants directly to finan-cial institutions, thereby lowering interest rates and the overall cost of financing.

● The current energy retrofitting business model is highly dependent on public grants, making it vulnerable to policy shifts. This reliance on grants is unsustaina-ble in the long term and discourages private financing from entering the sector. Therefore, it is essential to explore alternative financing mechanisms, such as soft loans or green mortgages, which are still perceived as underdeveloped. Additionally, some social groups advocate for prioritizing grants for vulnerable populations experiencing energy poverty.

4. Regarding the need to coordinate the process

● The lack of clear leadership and inconsistencies between different levels of public administration create confusion and policy fragmentation, making it difficult to im-plement effective measures.

● The process must be coordinated. While the roles of Renovation agents and territorial or neighbourhood offices are essential, they are currently insufficient. There must be a centralized platform where all relevant information is accessible and regularly up-dated, including details on grants, certified construction companies ensuring work quality, financing options from financial institutions, procedures for obtaining CAEs and their economic benefits, and energy company offers. Additionally, the presence of a designated "master of ceremonies" is suggested to oversee each phase of the process, providing guidance and solutions to the challenges encountered along the way.

5. Regarding CAES

● In general, CAEs are recognized as a key tool, but a lack of awareness among both the private sector and public administrations limits their potential.

● CAEs should prioritize long-term savings, with a focus on improvements that pro-vide lasting benefits, such as building envelope enhancements.

● There is a perception that CAE implementation lacks transparency and fails to pri-oritize higher-cost projects that could generate greater long-term savings.

● While CAEs have the potential to support building retrofitting, they are not yet seen as a true catalyst for change due to their limited economic impact. For this reason, several recommendations focus on reformulating them to increase their financial value, particularly for buildings owned or occupied by vulnerable popula-tions. This includes the possibility of multiplying the value of CAEs in such cases to enhance their effectiveness.

6. On the feasibility and limited interest in building retrofit opera-tions

● While the introduction of a TLTRO[48] (targeted longer-term refinancing opera-tions) for ecological transition projects, including building renovation, is an in-teresting prospect with potential benefits for financing operations, it is not yet seen as a compelling incentive for residential building owners. The estimated reduction in financing costs remains minimal, limiting its appeal. Additionally, some financial institutions point out that the current program does not func-tion as a liquidity program, an issue that a TLTRO-type mechanism could ad-dress. Therefore, we propose quantifying the impact of this mechanism on standard financing operations. At present, financial institutions estimate that they approve around 80% of building renovation financing proposals, while the remaining 20% are rejected due to perceived high default risk, primarily in small neighbourhood communities.

● Furthermore, the green taxonomy regulation for financial institutions has not been an effective driver of change, as compliance is not mandatory, leading many institutions to deprioritize it.

● Although the European Central Bank (ECB) permits interest rate reductions for loans linked to ecological transformation, this option is not currently being uti-lized in housing Renovation budgets. We recommend conducting a market analysis on green mortgages and low-interest loans to identify existing barriers to their adoption and explore potential opportunities for growth.

7. On the interest in sovereign wealth funds

● Pension funds and sovereign wealth funds could be valuable sources of financing for these types of operations, as they typically seek longer-term investments com-pared to other investment funds. However, these funds operate through funding buckets, meaning they are only viable if there is aggregated demand. Currently, the scale of aggregated demand for such projects in Spain remains very limited. Therefore, a key objective of this proposal is to increase the demand.

8. Sobre la necesidad de acceder a información y formación

● Al estar el sector en las primeras etapas de desarrollo, aún persiste una falta de experiencia y conocimiento técnico que limita el crecimiento del mercado y la maduración del sector.

● La falta de conocimiento sobre ejemplos de éxito previos impide que los individuos y las empresas vean el valor y las ventajas de invertir en eficiencia energética, lo que genera una resistencia al cambio.

9. On solutions for households in vulnerable situations

● Full grants (100%) could be allocated for the Renovation of highly vulnerable neighbourhoods, as identified by municipalities. In such cases, the grant could be transferred directly to the financial institution to repay the loan or processed through alternative payment mechanisms, such as public urban development companies. These types of agreements could also be beneficial for households with limited debt repayment capacity, where 30% of the financing is covered through structured payment solutions, while the remaining 70% is advanced by the financial institution

● As demonstrated by the Santa Coloma de Gramenet city council in Barcelona[49], public entities can take an active role

48. Oficina COAM sobre rehabilitación: RD Ley 19/2021 de Impulso a la Actividad de Rehabilitación- Derogada y tácitamente SUSTITUIDA por Ley 10/2022 https://oficinarehabilitacion.coam.org/wp-content/uploads/2024/10/RD-ley-19_2021-de-5-de-octubre.pdf

49. ICO MIVAU Rehabilitación de Edificios Residenciales https://www.ico.es/ico-mitma-rehabilitaci%C3%B3n-de-edificios-residenciales

in the Renovation process, acting as Ren-ovation agents, financiers and legislators, among other functions. Key aspects of their program include:

- Municipal Renovation initiative targeting 4,000 homes between 2021 to 2027, with a budget of €18 million.
- The municipality takes responsibility for conducting preliminary as-sessments of the building's initial conditions and energy certification.
- A collaboration agreement is established with residents outlining planned works and maximum costs as well as granting City Council au-thorisation for grant applications.
- The municipality oversees the contracting process, finances inspections and project study, manages grant applications, and formalizes urban planning agreements with community associations.
- Signs the Conservation and Renovation Area declaration, assuming the role of Acting Administration. This urban planning tool allows the mu-nicipality to require property owners to bear the costs of Renovation necessary to address building deficiencies.
- Launches an urban landscape competition to define chromatic and de-sign guidelines for building façade renovations.
- Implements flexible payment options, offering three different methods for urban development fees, tailored to homeowners' financial capabili-ties: the first is a 50-50 split: 50% paid at the start of renovations and 50% upon project completion, applicable to legal entities or residents who do not opt for other arrangements. The second payment method entails 60 monthly instalments deferred over five years, for individuals who must pay by direct debit. The third and most flexible payment method ensures that no one is excluded from the retrofitting. It allows homeowners who cannot afford retrofit costs to receive an advance payment, which they can repay when their financial situation improves or upon the sale or transfer of the property.
- The municipality consolidates all Renovation projects into a single pub-lic works tender.

10. On the need to combine obligations and incentives for the dif-ferent stakeholders in the process

● In general, there is a lack of mechanisms that effectively integrate obligations with in-centives. One possible approach is the introduction of a non-Renovation tax, whereby any home that is sold, rented, or inherited without undergoing Renovation would be required to either carry out the necessary renovations or pay a tax. The funds collect-ed from this tax would then be used to support the Renovation of other housing units. Public administrations at various levels, including local governments, can design and implement such measures. However, concerns about potential negative public per-ception of mandatory obligations often discourage authorities from pursuing them. Therefore, we recommend analysing successful case studies where similar mechanisms have led to positive outcomes in building retrofitting. Based on these findings, specific proposals can be developed. In any case, we must consider the potential impact of this type of measure on other aspects of the residential sector, such as access to rent-al housing.

11. On the need to communicate better

● Society in general is not fully aware of the social benefits derived from energy ret-rofitting, such as job creation, climate change mitigation, energy bills reduction, and the positive impact on public health.

● The lack of robust and verifiable data on actual project outcomes and impacts makes it difficult to effectively communicate the achievements and benefits of energy renovation policies.

● The lack of media coverage on the benefits of energy renovation and successful case studies limits public awareness, hindering the growth of demand and reducing social support.

● Effective communication: Create marketing strategies that actively promote ener-gy renovation and garner homeowner interest

.

● Involve key professionals: Engage property managers, architects, and doctors to improve perception and highlight the benefits.

● Work with the media to publicise advantages and success stories to change per-ceptions about energy efficiency. Use media to inform and raise public awareness on achievements and benefits.

3.3 RECOMMENDATIONS

Objective: The primary aim of this proposal is to simplify and enhance the efficiency of the resi-dential sector Renovation process, facilitating demand aggregation. To achieve this, every beneficiary must have access to both public and private financing options, tai-lored to their socioeconomic status and the condition of the building. Additionally, to accelerate building renovation efforts, adequate incentives must be in place to en-courage private sector participation. Moreover, the process should be straightforward for all stakeholders involved in this complex ecosystem. Participants must have clear access to information and training on available financial instruments, as well as the economic, social, and other risks associated with decision-making, and mechanisms should exist to help effectively mitigate and manage these risks.

1. Institutionalize the process and secure commitment from public administrations

This point is key to providing certainty to all stakeholders—especially final beneficiaries and financial institutions—regarding the commitment of each level of public administra-tion to the success of process. To achieve this, we propose the following steps:

- **Creation or adaptation of a dedicated institution:** We propose creating or adapting an institution in charge of the building reno-vation process, hosted within either the Ministry of Ecological Transition and Demographic Challenge (MITECO) or the Ministry of Transport, Mobility and Urban Agenda (MIVAU). This institution will act as planner, coordinator be-tween institutions and stakeholders, renovation ecosystem mobiliser, and fi-nally as a source of information and support. Its mission will be to ensure effi-cient and coherent management of Renovation projects while facilitating col-laboration among all stakeholders.

50. ¿Qué son las operaciones de financiación a plazo más largo con objetivo específico (TLTRO)? https://www.ecb.europa.eu/ecb-and-you/explainers/tell-me/html/tltro.es.html
51. Liderazgo público de la rehabilitación privada: el proyecto "Renovem els barris" de Santa Coloma de Gramenet https://www.observatoriociudad3r.com/wp-content/uploads/2018/03/Jordi-Mas-Presentaci%C3%B3n_Pirineos_zgz.pdf

- **Institutionalization coordination between public administrations:** To ensure ef-fective coordination across national, regional, and local governments, we pro-pose signing Joint Action Protocols. These agreements will establish a frame-work of collaboration and commitment for building retrofitting, ensuring that all administrations work in a coordinated and aligned manner. One of the op-tions could be signing joint action protocols. The objective of this first step would be establishing an agreement between the General State Administra-tion (AGE), the Autonomous Communities (CC.AA.) and the local administra-tions to unify efforts across all public entities involved in residential building retrofitting. The commitment could be formalised by signing another type of agreement.

- **Coordination and establishment of territorial offices:** The organization respon-sible for the housing renovation process will oversee the establishment of ter-ritorial offices, facilitating fieldwork and ensuring that the Renovation process covers all areas, including rural regions. These offices will be responsible for executing and overseeing Renovation projects in their respective areas, provid-ing support and guidance to the beneficiaries. These offices can establish in-formation points managed by public-private partnerships, involving community stakeholders who already have the trust of residents to streamline project im-plementation and management.

- **Development of a clear roadmap for building renovations:** A well-defined roadmap for building renovations will be established, outlining specific objec-tives based on building typologies and clear role assignments for all partici-pants. This roadmap will include targets for the financial, energy, and construc-tion sectors, ensuring a holistic and coordinated approach to Renovation ef-forts. The ARCE 2030 process recently launched by the Ministry of Housing and Urban Agenda (MIVAU) is moving in this direction[50].

- **Promotion of agreements with key sectors:** Institutionalizing the process will enable agreements with all stakeholders, including the construction, financial, and the energy sectors. In addition, partnerships will be pursued with trade un-ions, social entities and professional associations to ensure broad and effective collaboration. These agreements will facilitate renovation measure implemen-tation and ensure commitment from all involved parties.

- **Exploration of a more active role for the energy sector**: The potential for a greater role for the energy sector in the Renovation process will be examined. This includes exploring large-scale building envelope renovations through man-datory demand reduction measures. Additionally, the possibility of offering tenders for demand reduction projects will be assessed to enhance energy effi-ciency in buildings. · The recent preliminary public consultation[51] for the pro-posed ministerial order establishing an auction system for energy saving requirements is a step in this direction.

2. Creation of a coordinating agency

One of the main goals of the proposal is to create an agenda with several objectives:

- **State agency to act as an information access space (One-stop-shop) and as a coordinating entity:** To facilitate building retrofitting, it is essential to provide clear information on the different grant lines available and how to combine them. Grants can come from European, regional and local funds, and are intended to finance various actions such as replacing boilers, windows and major Renovation projects (works on the building envelope). It is crucial to standardize the criteria for ac-cessing these grants to reduce evaluation times and streamline the process. There is a good example of this type of agency exists in Ireland . SEAI is the National Sustainable Energy Authority of Ireland[52]. They work with households, businesses, communities and government to create a cleaner energy future.

• **Offer information on individual and collective financing possibilities (neigh-bourhood communities):** The entity will offer updated information on existing lines of financing and financing options offered by financial entities. There are several options for both individual and collective financing. These include tax deductions, a reduction in the Property Tax (IBI), green mortgages, and low-interest loans. It is important to provide a detailed guide on how to process shared loans at the homeowners' association level and to clarify any doubts about possible defaults. In addition, information should be provided on the fi-nancial instruments available to the sector.

- **Facilitate the Renovation of buildings with similar characteristics through in-tervention standardization and by estimating cost and savings:** To facilitate the planning and execution of Renovations, for example at the neighbourhood level, interventions should be standardized and the associated costs and sav-ings estimated. This includes providing information on technical construction solutions and economic improvements (energy, CAE certificates, among oth-ers). These interventions can be carried out at the neighbourhood level, ensur-ing aesthetic equality among the renovations. It is useful to classify the measures by degree of complexity and provide a guide to evaluate the best op-tions for each building.

- **Ensure professional support throughout the process:** Professional support is es-sential to ensure the success of Renovation projects. The agency staff must ad-vise the beneficiaries throughout the entire process. In addition, Renovation agents should be trained, and an installer certification program should be es-tablished. Providing information on certified installers and developing training programs for stakeholders (architects, property managers, financial institu-tions, etc.) is essential to guarantee the quality and efficiency of interventions.

- **Consider the different benefits derived from building retrofitting to determine the return on investment:** It is important to note that the return on investment in building retrofitting does not only come from energy savings. Other benefits include increasing home values, improving resilience to the impacts of climate change, and creating healthier homes. Quantifying these additional benefits and considering them in the restoration process can help justify the investment and attract further financial support.

- **Facilitate territorial office implementation:** The coordinating office will also help establish territorial offices (also

50. ¿Qué son las operaciones de financiación a plazo más largo con objetivo específico (TLTRO)? https://www.ecb.europa.eu/ecb-and-you/explainers/tell-me/html/tltro.es.html
51. Liderazgo público de la rehabilitación privada: el proyecto "Renovem els barris" de Santa Coloma de Gramenet https://www.observatoriociudad3r.com/wp-content/uploads/2018/03/Jordi-Mas-Presentaci%C3%B3n_Pirineos_zgz.pdf
52. MIVAU presenta ARCE 2050 para liderar la descarbonización del parque inmobiliario y adaptar la normativa a la nueva Directiva de Eficiencia Energética. https://www.mivau.gob.es/el-ministerio/sala-de-prensa/noticias/jue-30012025-1352

called neighbourhood offices) which will oversee the process, providing technical guidance and facilitating access to necessary information and best practices for this type of institution. Network-ing and coordination are essential to ensure efficiency and good results.

- **The territorial offices should be implemented in both urban and rural areas:** this will allow all areas, regardless of their location, to benefit from energy ef-ficiency upgrades to improve their quality of life.

3. Creation of a network of territorial offices

The territorial offices will carry out the following functions:

- **Propose neighbourhood-level, comprehensive inter-vention:** To maximize impact and maintain a common aesthetic, comprehensive inter-vention projects should be proposed at the neighbourhood level. This strategy enables access to a greater number of homes and ensures that all renovations maintain visual and structural cohe-rence.

- **Community-based support and coordination between stakeholders:** continuous support must be provided throughout the Renovation process. To ensure effi-cient and collaborative management, the public authority must coordinate with all stakeholders, including administrations, construction companies, financial entities and neighbour-hood associations.

- **Process standardization and grant allocation criteria:** Award processes must be standardized and criteria com-bined to reduce the time devoted to reviewing grant appli-cations. This will permit faster and fairer application assessment, facilitating access to the funds needed for Renovation.

- **Cost estimation by housing type:** preliminary cost estimates for upgrades based on housing type in each territory can be a significant driver in the Reno-vation process. To ensure adequate and realistic financial plan-ning, the institu-tion may make minor contract cost estimates to upgrade the building's enve-lope or replace windows, boilers or other elements.

- **Simple and effective communication:** Communication about Renovation pro-grams should be clear and accessi-ble. Using local radio and press outlets can be more effec-tive in reaching the target population. The information must be understandable and available in multiple formats and channels.

- **Facilitate professional support throughout the process:** This role can be devel-oped by current Renova-tion agents, who will be able to collaborate with terri-torial agencies and are responsible for informing and advising property owners about Renovation needs and available financing options. In Germany, for ex-ample, there are building retrofit experts who perform this function. A good example of this support prior to and during the Renovation process is the pro-gramme developed by the municipality of Santa Coloma de Gramenet, in Barcelona[53].

- **Networking and Trust building:** Networking with public and private entities ac-tive in the sector and trust building are crucial to address other issues related to the energy transition, such as creating energy communities and promoting electric vehicles. Exploring synergies with IDAE's Network of Community Trans-formation Offices[54] can be an effective strategy to expand the reach and im-pact of these programs.

4. Changes in criteria for awarding grants

Grants should be disbursed before work begins, with priority criteria set to favour housing in vulnerable situations and social protection measures integrated into the eligibility requirements.

5. Improvements in Renovation financing

In addition to the financial mechanisms considered in EPBD (see section), other op-tions that require public funding are suggested:

- **Public financing with repayment through property tax (IBI) or upon ownership transfer:** We propose a PACE-type program, with long-term repayment (up to 20 years), where public financing is recovered either through IBI payments or upon property transfer.

- **Large-scale public tenders:** Explore the potential for large-scale public tenders to enhance energy efficiency at the neighbourhood level, incorporating renew-able energy production and consumption.

- **"Subsidized" rentals and personal income tax deductions:** Offer subsidized rental schemes in homes that have undergone energy efficiency improvements and provide personal income tax deductions for such improvements.

- **Public funds to cover financing interest:** Allocate public funds to subsidize in-terest payments on financing for renovation projects.

- **Partial public financing with property registry entry:** Cover a portion of the renovation costs using public funds and record the improvement in the proper-ty regis-try.

Some financial mechanisms that do not require public financing are also included:

- **Redevelopment:** This approach involves constructing new housing under the ownership and management of the homeowners' association, generating capi-tal to finance the renovation of existing buildings.

- **Finance Envelope Renovation in Exchange for Own-ership Access:** This measure proposes financing improvements to a building's envelope in exchange for par-tial ownership rights over it. Such financing could also be provided by a public entity. Related to this type of mechanism is the Buildenerskin concept, sug-gested by Emilio Miguel Mitre.

- **Multiply the Value of the CAE:** This measure involves multiplying the value of the CAE (Energy Efficiency Certificate) by a factor when it results from a comprehen-

53. https://www.miteco.gob.es/es/energia/participacion/2025/detalle-participacion-publica-k-727.html
54. https://www.seai.ie/

sive renovation (envelope), so that the savings are reflected over the entire lifespan of the investment, rather than just a single year. Related to this type of financing is the concept of Envolwatio, suggested by Emilio Miguel Mitre.

- **Dividing the total loan into phases:** In line with the European Directive on hous-ing passports, establish a pre-arranged financing schedule that segments the total loan into smaller parts, making it easier to manage and repay over time.

6. Encourage a more active role for the energy sector:

- **Evaluate the feasibility of energy savings auctions in the building renovation sector:** Demand reduction auctions, also known as Energy Saving Tenders and Auctions, are tools used in Switzerland, Germany, and Denmark to promote energy efficien-cy. Although not widely applied to the building sector, when implemented, these mechanisms cover a percentage of the CAPEX (capital expenditure) for energy-saving measures. Payments are processed through electricity bills, facilitating sav-ings management and monitoring. A public hearing process on this mechanism has recently been launched by the Secretary of State for Energy (MITERD)[55]. To en-hance its effectiveness, it is recommended that the administration conduct addi-tional studies to assess energy consumption reduction potential and identify the necessary measures for different building types or at a regional level (by neigh-bourhood or by region). These insights will allow for the design of more precise and effective auctions, tailored to the specific needs of each area.

- **Enhancing Energy Saving Certificates (CAEs):** Energy Saving Certificates (CAEs) remain a relatively new tool in building retrofitting. Currently, the value of CAEs covers only a small percentage of renovation costs, as it is based on an-nual energy savings, favouring quick-saving measures such as technology up-grades rather than deeper, long-term improvements like building envelope renovations. Energy service companies are already acting as aggregators of CAEs, facilitating their implementation. Proposed improvements include ex-tending the savings measurement period to better reflect long-term benefits and increasing the value of CAEs for buildings housing vulnerable populations. The Secretary of State for Energy (MITERD)[56] has launched a prior public hear-ing process aimed at refining the CAE system to enhance its effectiveness in promoting comprehensive energy efficiency measures.

- **Analyse the impact of ETS2 on building retrofitting:** The expansion of the Euro-pean Union Emissions Trading Scheme (ETS2), planned for 2027, will cover critical sectors such as road transport and buildings. ETS2 will have a signifi-cant impact on increasing fossil fuel energy

EPBC ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE- ARTICLE 17

Reasons why there is currently a limited supply of financial vehicles for renovations:

Risk of defaults against financial institutions: To address the risk of default against fi-nancial institutions, it is essential to develop alternative financing proposals that reach owners and buildings with some level of default risk. Financial institutions often have an interest in projects with low default risk, as this is crucial to maintaining their cred-it rating. Therefore, mechanisms must be designed that offer additional security to fi-nancial institutions, allowing them to participate in Renovation projects with greater confidence.

Risk of default among residents: The risk of default among residents in the same homeowners' community is managed directly by the community. However, it is possi-ble to facilitate this process in case of Renovation by implementing support and medi-ation mechanisms. For example, community contingency funds or flexible payment agreements could be established to help mitigate the impact of defaults and ensure the continuity of Renovation projects.

Lack of sufficient guarantees and sureties - role of public entities: proposing a system of guarantees and sureties for communities at medium risk of default is a key meas-ure to facilitate Renovation project financing. The possibility of local governments as-suming default guarantees should be explored, providing an additional layer of securi-ty for financial institutions. This could involve changes to the Public Finance Act to en-able local governments to effectively take on this role.

Need for guarantees and sureties: The Official Credit Institute (ICO) can play a decisive role in the Renovation process, as long as the related bureaucracy does not add anoth-er level of complexity. When funds come from Europe, the process tends to be more complex, so simplifying administrative procedures is essential. We are currently wait-ing for the results of the agreement between the ICO and MIVAU to evaluate their ef-fectiveness in this context. Furthermore, programs such as InvestEU, the European In-vestment Bank (EIB) and the European Investment Fund (EIF) can provide additional financial support. Mutual Guarantee Societies can also play an important role by offer-ing additional guarantees to financial institutions.

55. Liderazgo público de la rehabilitación privada: el proyecto "Renovem els barris" de Santa Coloma de Gramenet https://www.observatoriociudad3r.com/wp-content/uploads/2018/03/Jordi-Mas-Presentaci%C3%B3n_Pirineos_zgz.pdf

56. El IDAE publica el mapa de Oficinas de Transformación Comunitaria (OTC) https://www.idae.es/noticias/el-idae-publica-el-mapa-de-oficinas-de-transformacion-comunitaria-otc

prices in residential buildings, which may drive energy retrofitting.

- **Role of the Social Climate Fund:** The Social Climate Fund, established under the European Union's 'Fit for 55' package, aims to mitigate the impact of the costs of new emissions trading on vulnerable households, micro-enterprises and transport users. This fund will finance measures and investments aimed at reducing emissions in the road transport and buildings sectors, as well as tem-porary direct income support for vulnerable households. The implementation of this fund will be crucial to ensure a just and equitable transition to a low-carbon economy. The prior public consultation of the Social Climate Fund has recently been opened by the Secretary of State for Energy of MITERD.

7. Training programs:

- **Establish training programs:** Training programs on energy efficiency and other topics related to climate change mitigation and adaptation must be established at the national, Europe-an and international levels. These programmes should be for all process stake-holders including construction companies, energy companies and energy ser-vice providers, architectural firms, local authorities involved in housing, energy and green finance, regional administrations (fund management, housing, en-ergy and climate), property managers, social organisations and resident asso-ciations. Adequate training of these stakeholders is essential to ensure effec-tive and consistent implementation of Renovation and energy efficiency measures.

- **Engage key institutions in developing a specialized training portfolio:** To create sector-specific training programs, it is essential to involve key institutions, includ-ing the State Public Employment Service (SEPE), the Ministry of Education and Vo-cational Training, Autonomous Communities (CC.AA.), the Ministry of Transport, Mobility and Urban Agenda (MIVAU), vocational training centres, and universities. Collaboration among these entities will allow for the design of targeted training initiatives that address the needs of each sector in the Renovation chain, ensuring comprehensive and up-to-date professional development.

- **Establish certification programs for Renovation companies and agents:** Implement-ing certification programs for Renovation companies and agents is essential to en-sure qualified guidance throughout the Renovation process. These programs will guarantee that professionals have the necessary expertise and skills to carry out renovations efficiently and in compliance with quality standards. Additionally, partnerships with Professional Associations should be encouraged to support the recognition and widespread adoption of these certification programs.

8. Planning and classification of renovation needs:

- **Classification of building renovation needs:** To determine the most appropriate type of grant and financing, it is essential to classify the renovation needs of buildings in at least two criteria: energy sit-uation and socio-economic situation of the property. The energy situation is evaluated using the building's energy certificates, while the socioeconomic sit-uation is based on the owners' income tax level. This classification will make it possible to identify the most interesting grants and financing options for each case. It is important to assess whether sufficient data exists to make this clas-sification effectively.

- **Financial institution obligations:** Financial entities must assess the energy effi-ciency of the mortgages they issue and, in alignment with green taxonomy, set clear sustainability targets. This includes designing specialized financial in-struments that drive the sector toward greater energy efficiency. Green mort-gages, which offer preferential conditions for energy-efficient properties, serve as a key mechanism for financial institutions contribute to this goal.

- **Construction sector obligations:** Specific obligations should be defined for the construction sector. For example, the obligation to rehabilitate another build-ing could be established for each new building permit. Another option is to de-velop Renovation certification markets, encouraging builders to actively partic-ipate in improving the existing building stock.

- **Exploring AI and the use of big data:** Artificial intelligence (AI) and big data an-alytics can be powerful tools for classifying homes and proposing access to grants and financing. AI can help identify specific patterns and needs, facilitat-ing informed and efficient decision making.

- **Homeowner obligations:** Minimum energy efficiency standards must be estab-lished for homeowners, including the obligation to implement energy im-provements before a property can be sold or rented—a measure already in place in France. Additionally, requirements for maintaining a building mainte-nance logbook and compliance with the delegated act on Minimum Energy Performance Standards (MEPS) by June 2025 could be introduced. Specific obliga-tions should also be defined for large property owners.

- **Role of public housing authorities:** Local and regional public housing authorities can mobilize neighbourhood offices to coordinate Renovation efforts. At the state level, entities such as SAREB and SEPES could play key roles in facilitating these initiatives. Additionally, public energy companies could contribute signifi-cantly to implementing energy efficiency measures.

- **Lessons from experience with affordable housing and single bidding:** Experi-ence with affordable housing development and management highlights the benefits of single bidding to ensure project quality and efficiency. The possibil-ity of bidding for energy efficiency services at the neighbourhood level should be explored, using the Energy Service Companies (ESCOs) model. This approach can facilitate the implementation of large-scale energy efficiency measures and ensure comprehensive project management. Additionally, any necessary regulatory adjustments—such as modifications to the Local Tax Law—should be proposed to facilitate these initiatives.