

NOVEMBER 2022



The EU Renovation Loan:

**a new instrument to fund
the EU Renovation Wave**



**CLIMATE
STRATEGY
&
PARTNERS**

**The EU Renovation loan will broaden
the access to energy efficiency
finance for homeowners**

About Climate Strategy & Partners

[Climate Strategy & Partners](#) (“Climate Strategy”) is a leading policy advisory and consulting firm in climate finance, innovation, energy efficiency investments and the corporate strategies and Government policies required to accelerate the Transition to a net-zero emissions economy. For 13 years, the Climate Strategy team has been providing global companies, banks and Governments advice on how to deliver the economic transition to a low carbon economy. Climate Strategy’s chief executive, Peter Sweatman, has authored or co-authored 19 white papers, and is rapporteur to the EU Commission and UN Environment Finance Initiative’s Energy Efficiency Financial Institutions Group (EEFIG). Climate Strategy has supported energy transition policy development at the G20 and in Spain, Mexico, France, and the UK and continues to implement leading low carbon business solutions for global clients. Climate Strategy also has a subsidiary called Energy Efficiency Capital Advisors which has structured and executed ten energy efficiency placements totalling over Euro 60 mm for Spanish cities, companies and buildings for international investors

About this Report

This report is written by Peter Sweatman, Chief Executive of [Climate Strategy](#), with the support of Mauricio Yrivarren as lead researcher and for graphic design. The report is built upon the inputs of multiple experts and stakeholder meetings, yet the views and conclusions expressed herein are attributable only to Climate Strategy & Partners, and not to the supporting organisations nor reviewers. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the European Climate Foundation nor Climate Strategy & Partners nor the authors concerning the legal status of any country, territory, city or area or of its authorities, or concerning delimitation of its frontiers or boundaries.

Acknowledgements:

This document reflects the views only of the authors and not of the expert reviewers and their respective organisations. The author would like to thank the European Climate Foundation for their support in enabling this report. We would also like to thank Adrian Joyce (EuroACE, Renovate Europe), Sebastian Godinot (WWF), Guillaume Joly and Anna Martin (BEUC), Alexander Barkawi (Council on Economic Policies), Stan Jourdan (Positive Money), Lukasz Krebel (New Economics Foundation), Joost Mulder (Better Europe), Murray Birt and Wolfgang Rothmaier (DWS and Deutsche Bank) and Sarah O’Brien (European Climate Foundation) as expert reviewers; and Bettina Dorendorf (KfW) for just the KfW case study.

Thanks to:



Copyright 2022 © Climate Strategy & Partners.

With acknowledgement of the source, reproduction of all or part of the publication is authorised, except for commercial purposes. More information can be found at www.climatestrategy.com or requested via email info@climatestrategy.com or on Twitter [@ClimateSt](https://twitter.com/ClimateSt)



Table of Contents

Executive Summary for Policymakers	5
Introduction	6
Reading Guide and Methods	7
1. Setting the Scene	9
Describing Energy Performance in Buildings	9
How European Buildings are Owned and Financed	12
Addressing Affordability and Value for Money	16
CASE STUDY – Italy’s polarising Ecobonus programme	18
Dealing with Multiple Sources of Value and Uncertainty	19
2. The EU Renovation Loan (ERL)	26
Building Blocks of the EU Renovation Loan	27
CASE STUDY – France’s Zero-interest eco-loans (“eco-PTZ”)	31
Consumer Perspective: ERL Affordability and Value for Money	32
EU Perspective: Efficient Delivery of EU Renovation Wave	34
CASE STUDY – KfW’s promotional support for energy efficiency in residential buildings	39
EBC stress test – factoring in the energy performance of buildings	42
CASE STUDY – Mortgage Portfolio Standards (MPS)	43
Summary: ERLs can showcase a collaborative, long-term EU Institutional Response to the Energy Crisis	45
3. The ERL Facilitation Framework	48
CASE STUDY - How an ERL can inject much needed energy into Spain’s home renovation market	50
Current Legislative Proposals: Hook for EU Renovation Loan	53
CASE STUDY - Private Finance for Energy Efficiency (PF4EE)	54
Conclusions and Recommendations	57
Works Referenced	61





Executive Summary for Policymakers



Executive Summary for Policymakers

The energy crisis in the winter of 2022 combines a “perfect storm” of conditions that highlight the energy inefficiency of European buildings, and the insecurity and fragilities that stem from this. Nevertheless, decades of expert and technical evidence on the efficiency and successful renovation of buildings shows that things do not have to be this way.

This report describes a new and concerted institutional collaboration and alignment that can be built around the design and launch of a new buildings renovation financing instrument -the “EU Renovation Loan”- that fills a gap and has the potential to address over 50 million EU homeowners. The EU Renovation Loan (“ERL”) combines existing financial elements and components and joins them together in a new instrument designed to deliver finance at the EU Renovation Wave scale.

There are three sections to our analysis:

- 1. Identifying the right 50 million homeowners:** The first section describes the physical state of existing EU buildings and how they are currently financed to find that there are 50 million primary homes lived in by their owners with more than sufficient home equity to afford them a deep renovation. There is a growing concentration of homeowners who cannot finance an energy efficiency renovation who are elderly, and who can’t get a new mortgage; and there are those working families with existing mortgages who have no headroom left as energy bills and interest rates rise.
- 2. Designing the EU Renovation Loan to fill the identified gap:** A move by EU institutions to resolve the deficit in attractive renovation finance alternatives for income-poor, asset-rich homeowners must together address the needs of owner, lender and policymakers – and be cost effective and financially efficient for all. The EU Renovation Loan proposed has a series of unique features: A zero-coupon structure, the lowest 30-year compound interest rate available to the EU, ECB liquidity via a targeted liquidity programme for ERLs (the “eTLTRO”) and an operational structure that makes ERLs uniquely attractive for retail lenders to distribute. These features are explained and assessed from the perspective of each stakeholder group in Section 2.
- 3. Implementing the right enabling framework to ensure ERL’s success:** Resolving homeowners’ financing challenges is not a “silver bullet” and can only unlock the financial barriers to a deep renovation. Efforts are also needed to remove policy and practical barriers. In parallel, the enabling environment and renovation supply chains need to respond to the urgent need to upgrade homes and make them more resilient to energy shocks and higher prices. This requires EU-wide mobilisation of independent home energy advisors and project managers who can organise, identify finance for and deliver high quality and performing deep renovations. Key components of the recast of the Energy performance of buildings directive (EPBD) currently being negotiated on Energy Performance Certificates, upgraded access to data and databases to renovation contractors, minimum energy performance standards and mortgage portfolio standards are designed to align industry and financial stakeholders in a full upgrade of the delivery mechanisms for the EU Renovation Wave. A new EU financial instrument distributed to millions of homeowners through thousands of retail lenders can act as a catalyst to deliver energy efficiency renovations by bringing together policymakers, financial institutions and homeowners with a common interest to make the Renovation Wave a reality. Successful examples and models are reviewed in Section 3.

The report concludes calling for a technical task force to be launched containing senior members of relevant EU institutions to develop this blueprint for the EU Renovation Loan. This envisaged task force would need an initial investment of internal human capital by the EU Commission, central bank officials, and retail bank lenders to, in principle, agree on the design and technical blueprints for the components of the ERL which fall into their competences. It also reflects on the critical role of the “fit-for-55 package” in providing an ERL Facilitation Framework, and the importance of Mortgage Portfolio Standards as a tool to engage EU mortgage lenders as a delivery network for the ERL. Finally, the report calls for an alignment of EU financial and prudential frameworks to ensure they promote and do not inadvertently harm the energy transition, especially at such a critical juncture for Europe.



Introduction

European buildings are inefficient, and unnecessarily expensive to light, heat and cool, and this has been the case for decades. Buildings' inefficiency is the Achilles' heel of Europe's energy security and climate plans, and it exacerbates energy poverty, inequality and our reliance on imported and expensive fossil gas.

Buildings are responsible for 40% of EU final energy consumption and 36% of its greenhouse gas emissions; energy renovation rates are low (at around 1% of the existing stock annually); and most EU Member States are woefully underperforming their own long-term buildings renovation strategies that they launched around a decade ago¹.

For years, buildings inefficiency has been partially obscured by lower energy prices, long paybacks, the panacea of carbon free electricity and a host of intricate behavioural challenges related to the mechanics of getting owners to renovate. However, in October 2020, the EU Commission started to address this by launching a renovation wave that targets the renovation of 35 million building units by 2030, which requires an additional investment of €265 billion per annum. In 2021, EU Member States were offered additional funding for renovation through the "renovate flagship" component of the NextGenerationEU funding package designed to accelerate the economic recovery from covid.

In parallel, the policy focus on energy efficiency and building renovation is changing gear through the "fit for 55" regulatory package, which will see the introduction of higher and binding energy efficiency targets, minimum energy performance standards for different buildings classes, a wider and deeper application of the energy efficiency first principle, and Mortgage Portfolio Standards that can serve to support lenders better align finance for buildings with the EU Green Deal.

Nevertheless, governments struggle to promote efficiency investments as they can't afford to provide grants to everyone. Pushing efficiency directly can be perceived as heavy handed, especially in democracies where populist policies are more popular than thoughtful consequential lines of actions.

Given the scale of the challenge and the high demands for public funding, most of the money required to upgrade our buildings will need to come from their owners, who will then own better, more valuable and cheaper to operate buildings as a result. In fact, most of the multiple benefits of building renovations accrue to their owners and occupants, with the side "societal benefits" of creating jobs, improving public finance flows, lowering emissions and dependence on imported gas. Given all this, why is it that so many homeowners feel that they can't afford an energy renovation?

Climate Strategy fully understands that many homeowners don't have easy access to sufficiently long-term and low cost funding to make the administrative and practical hassle of organising a renovation and managing the risk that it doesn't deliver worthwhile. This paper therefore develops a new public-private financing instrument (the EU Renovation Loan) that is designed to address these underserved homeowners and unlock the Euro 10+ trillion of home equity² which can fund multiple renovation waves.

¹ BPIE. (2021). *The road to climate-neutrality: Are national long-term renovation strategies fit for 2050?* [Website]. Retrieved from <https://www.bpie.eu/publication/the-road-to-climate-neutrality-are-national-long-term-renovation-strategies-fit-for-2050/>

² Home equity is the current market value of your home, minus any liens such as a mortgage. Source: Investopedia. (2022). *What Is Home Equity?* [Website]. Retrieved from https://www.investopedia.com/terms/h/home_equity.asp



Reading Guide and Methods

This report has three sections: The first describes ownership patterns and the current financing of European buildings, together with some examples of successful programmes and instruments that have delivered important numbers of energy efficient renovations. In the second section, we develop the EU Renovation Loan instrument both technically to address the different roles of the public and private actors required in its architecture, and practically in the context of currently under-served property owners by example. Finally, given that even a “perfect” financial instrument can only resolve some of the barriers to buildings renovation, we describe the ways in which a new EU-backed financial instrument can catalyse and become the centre-piece for a new Marshall-plan to renovate millions of buildings annually, as envisaged by the EU Renovation Wave.

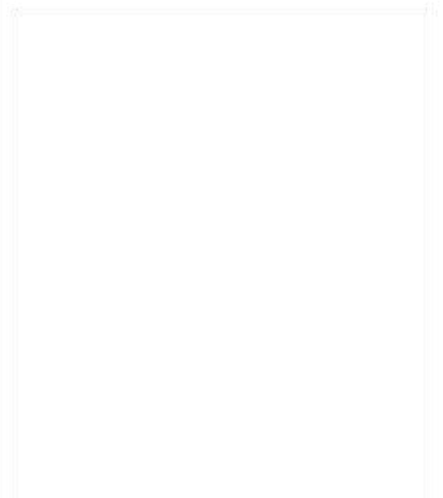
The EU Renovation Loan (“ERL”) has gradually taken shape over two years of meetings with multiple stakeholders across Europe in the financial sector, with policymakers and experts. The ERL concept has also been tested in dialogue with civil society bodies and regulators. This paper has been reviewed by experts covering multiple disciplines including macroeconomic policy, monetary policy, central bank instruments, financial policy, buildings renovation, energy poverty, consumer interests, and climate finance.

The report is written in a “plain English” style, meaning that while it is technical in nature, and evidence based, we strive to make the language accessible to a broad audience. The work is, however, directed at technical policymakers, central bankers, finance professionals and members of the growing buildings renovation finance area to promote action on new ideas and approaches which can break the deadlock and underperformance in funding European building renovation. Both the approach and thesis applied in this report builds on Climate Strategy’s track record of work on financing energy efficiency and building renovation at the European, G20 and global levels. Further detail and questions can be directed at the author by writing an email to info@climatestrategy.com





Setting the scene



1. Setting the Scene

In order to make the case for an EU Renovation Loan, readers must quickly “get onto the same page” with respect to the buildings renovation challenge and the current way in which buildings in the EU are owned and financed. To achieve this, we use existing research to summarise the salient facts that describe buildings’ energy performance, the current renovation activity, and their ownership, investment and finance environment. Climate Strategy, and many others, have written extensively about these in-going assumptions for this report, and while there may be small uncertainties (and age) in some of the figures, we firmly believe that the physical and financial picture provided by these two “quick summaries” are accurate and provide a reliable basis upon which to develop the solutions proposed in later chapters.

Describing Energy Performance in Buildings

The physical characteristics of buildings in Europe, and their energy performance, is well documented and monitored. In addition to regular updates from each Member State, through their long-term renovation strategies³, the Buildings Performance Institute Europe (BPIE)⁴ and an EU Building Stock Observatory⁵ have teams collecting, aggregating and publishing data and reporting on progress. Furthermore, there is little debate on the physical condition and energy characteristics of EU buildings. Here are the salient features:

- **There are around 131 million buildings in the EU.** 90% of these buildings are residential, but by floor area the residential building stock accounts for three quarters of the 25 billion square metres of useful space (64% single family homes, and 36% apartments), with the remaining 25%⁶ being non-residential buildings (28% retail/commercial, 23% offices, 17% education, 11% hospitality, 7% healthcare, 4% sports and 11% other).
- **They have a very long useful life:** Over 85% of Europe’s buildings⁷ will still be standing and occupied well beyond 2050⁸, the point at which EU economies will need to be emissions negative.
- **They use 40% of Europe’s energy, mainly for heating, cooling and hot water:** Buildings are the single largest energy consumer in Europe with 80% of the energy used in buildings for heating, cooling and producing hot water. Two thirds of this energy is used in homes and one third in commercial buildings.

³ European Commission. (2022). *Long-term renovation strategies*. [Website]. Retrieved from https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/long-term-renovation-strategies_en

⁴ BPIE. (2011). *Europe’s Buildings Under the Microscope*. Retrieved from https://bpie.eu/wp-content/uploads/2015/10/HR_EU_B_under_microscope_study.pdf

⁵ European Commission. (2022). *EU Building Stock Observatory*. [Website]. Retrieved from https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/eu-building-stock-observatory_en

⁶ RICS. (2020). *Energy efficiency of the building stock in the EU*. Retrieved from <https://www.rics.org/es/news-insight/latest-news/news-opinion/energy-efficiency-of-the-building-stock-in-the-eu/>

⁷ European Commission. (2022). *Energy performance of buildings directive*. [Website]. Retrieved from https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en#:~:text=At%20present%2C%20about%2035%25%20of,stock%20is%20renovated%20each%20year.

⁸ *ibid.*



- **Home energy needs are determined by geography and building efficiency.** European homes use around 180 kWh/m²/ per annum⁹. In Malta, Portugal and Cyprus it's 50-70 kWh/m²/year¹⁰, but 270-300 kWh/m²/year in Romania¹¹, Latvia¹² and Estonia¹³. Non-residential buildings are 40%¹⁴ more energy intensive than homes (on average), and are more tightly distributed mostly between 200-300 kWh/m²/annum.
- **Heat comes mainly from burning fossil fuels.** Nearly 60% of the heat for European homes comes from fossil fuels: 39% gas, 15% oil and 5% coal¹⁵. The Russian invasion of Ukraine has revealed Europe's fossil (especially Russian) fuel dependency¹⁶ and its untapped energy efficiency potential. The EU Commission maintains that reduced gas demand in homes can reduce overall EU gas use by 10% (a 34 million toe reduction by 2030) and European gas imports from Russia by a quarter¹⁷.
- **Most buildings are inefficient:** 75% of Europe's buildings are considered inefficient¹⁸. Most of these were built before construction codes even considered energy performance (1980s), and there is a performance gap between new build expectations and delivered real energy performance.
- **Nothing technically prevents efficient buildings.** Gradual improvements in construction methods, materials and codes means that new homes now require just 20% of the energy that they needed a hundred years ago in leading countries. Proponents of deep renovation suggest that most buildings can be renovated to achieve energy intensities of 60-80 kWh/m²/year¹⁹. Anecdotally, Sweden's buildings require 18% less energy per m² than Finland's; and Cyprus has over twelve times the amount of solar water heating per capita than Spain.

⁹ ECOFYS. (2017). *Optimising the energy use of technical building systems – unleashing the power of the EPBD's Article 8*. Retrieved from <https://c2e2.unepccc.org/wp-content/uploads/sites/3/2017/03/optimising-the-energy-use-of-tbs.pdf>

¹⁰ BPIE. (2022). *Ready for carbon neutral by 2050? Assessing ambition levels in new building standards across the EU*. Retrieved from https://www.bpie.eu/wp-content/uploads/2021/12/BPIE_Assessing-NZEB-ambition-levels-across-the-EU_HD.pdf

¹¹ European Commission. (2021). *COMMISSION STAFF WORKING DOCUMENT: Analysis of the national long-term renovation strategies*. Retrieved from <https://ec.europa.eu/energy/sites/default/files/swd-on-national-long-term-renovation-strategies.pdf>

¹² Gaglia, Athina & Dialynas, E.N. & Argiriou, Athanassios & Kostopoulou, Effie & Tsiamitros, Dimitrios & Stimoniaris, Dimitrios & Laskos, Konstantinos. (2018). *Energy Performance of European Residential Buildings: Energy Use, Technical and Environmental Characteristics of the Greek Residential Sector – Energy Conservation and CO₂ Reduction*. *Energy and Buildings*. 183, 86-104. 10.1016/j.enbuild.2018.10.042.

¹³ kWh/m²/year figure before renovations, sourced from SEI. (2022). *Reaching climate neutrality in Estonia: a progress update*. Retrieved from <https://www.sei.org/wp-content/uploads/2022/07/reaching-climate-neutrality-in-estonia-a-progress-update-report.pdf>

¹⁴ Ibid.

¹⁵ Odyssee-Mure.(2022). *HEATING ENERGY CONSUMPTION BY ENERGY SOURCE*. [Website]. Retrieved from [https://www.odyssee-mure.eu/publications/efficiency-by-sector/households/heating-energy-consumption-by-energy-sources.html#:~:text=Natural%20gas%20is%20the%20leading,is%20progressing%20\(%2B10%20points\)](https://www.odyssee-mure.eu/publications/efficiency-by-sector/households/heating-energy-consumption-by-energy-sources.html#:~:text=Natural%20gas%20is%20the%20leading,is%20progressing%20(%2B10%20points))

¹⁶ Communication from the Commission. (2022). *REPowerEU: Joint European Action for more affordable, secure and sustainable energy*. Retrieved from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A108%3AFIN>

¹⁷ Ibid.

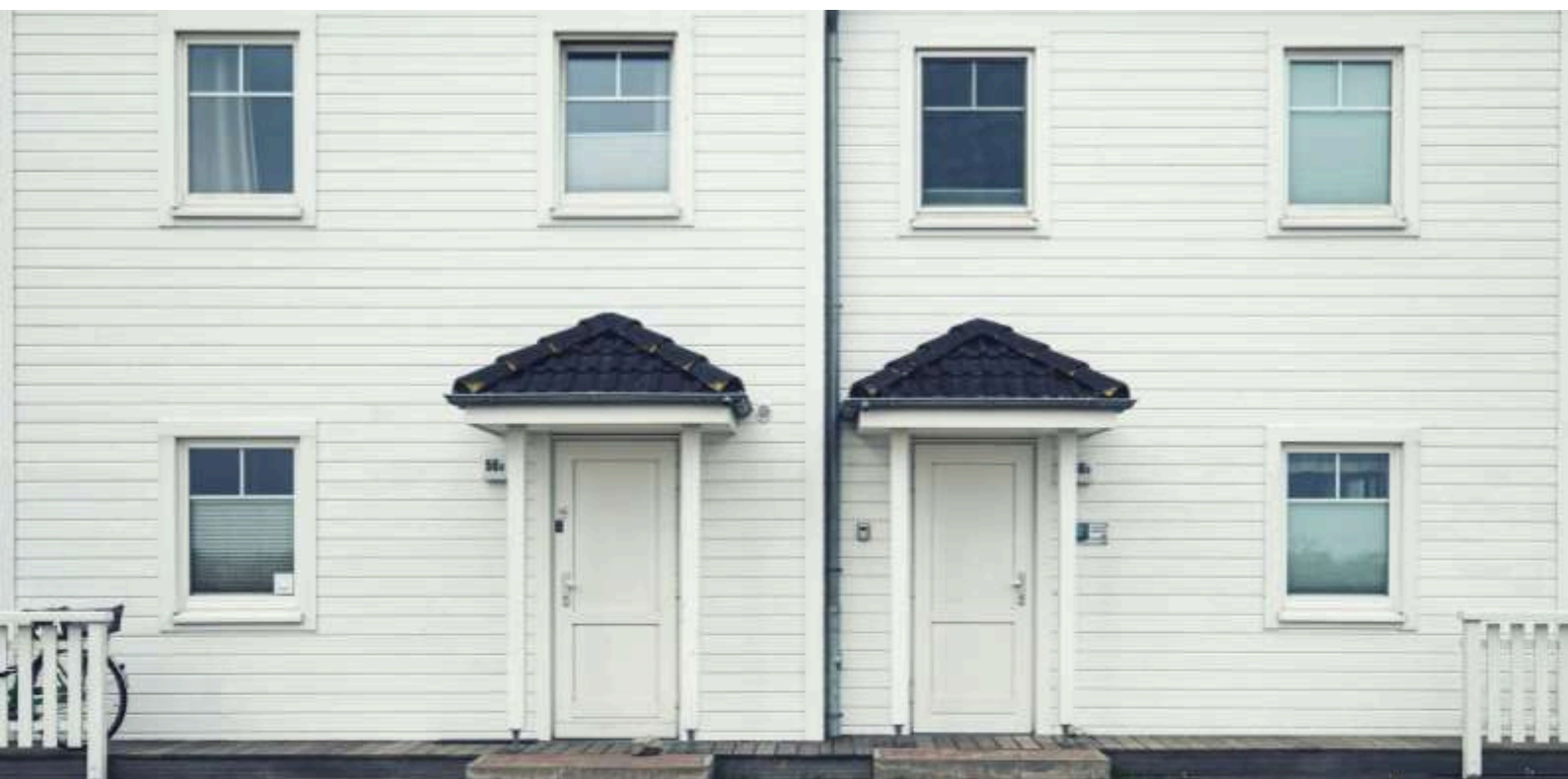
¹⁸ European Commission. (2022). *Energy performance of buildings directive*. [Website]. Retrieved from https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en#:~:text=At%20present%20C%20about%2035%25%20of,stock%20is%20renovated%20each%20year.

¹⁹ BPIE. (2021). *DEEP RENOVATION: SHIFTING FROM EXCEPTION TO STANDARD PRACTICE IN EU POLICY*. Retrieved from https://www.bpie.eu/wp-content/uploads/2021/11/BPIE_Deep-Renovation-Briefing_Final.pdf



- **Around 9% of buildings have some renovation each year, but just over 1% have renovations that impact energy performance, and only 0.2% optimise for energy efficiency²⁰.** Buildings are renovated for many reasons, largely cosmetic, and the “background” renovation rate for micro-upgrades at 9% is reasonably high. Yet, just over one tenth of these (just over 1% of the total stock) improve energy performance. Studies of real projects suggest that it is not unreasonable to think that cost-effective deep renovation of poorly performing buildings can deliver 50-80%²¹ energy savings in all but exceptional cases. Only 0.2% of EU buildings get a deep renovation that delivers the kind of deep renovation which maximises long-term, cost-optimal energy efficiency.

Considering the above, it would appear that nothing short of radical change can deliver energy efficient renovation rates that are consistent with the EU Renovation Wave’s target of 3.5 million significant energy saving renovations per annum. Conservatively, if there are 250,000 “deep renovations” in Europe per annum at present, the deep renovation rate needs to go up by a factor of 14.



²⁰ Energy efficiency is the utilisation of less energy to provide the same service. See additional related definitions in the link below. Sourced from Designing Building. (2022). *Energy efficiency of buildings*. [Website]. Retrieved from https://www.designingbuildings.co.uk/wiki/Energy_efficiency_of_buildings#:~:text=Energy%20efficiency%20is%20the%20utilisation,to%20provide%20the%20same%20service.

²¹ Roberts S. Altering existing buildings in the UK. *Energy Pol* 2008;36(12):4482–6. <https://doi.org/10.1016/j.enpol.2008.09.023>



How European Buildings are Owned and Financed

McKinsey estimates²² that real estate accounts for two-thirds of real global assets, and Savills thinks that half of all global wealth is invested in land and real estate²³. As the largest energy consumers in the European Union, and in the middle of a dramatic energy transition, it is unsurprising that the financial and investment aspects of buildings are critical considerations. After all, most Europeans live in a home they own and this is often their single most valuable asset. This makes home renovation decisions infrequent and important investments, both numerically and emotionally. Finally, in the last year, dramatic energy price increases have also placed energy bills in the centre of a cost of living crisis which is being felt in all European countries. Energy affordability and availability are so much more significant factors in 2022 than they have been in most people's lifetimes.

The financial characteristics of European buildings are known, and yet the data is harder to come-by, less precise and less broadly understood than their physical state. Nevertheless, the following referenced data points define and frame the financial context for European buildings that is necessary to advance ERL analysis:

- **EU residential buildings are worth over Euro 25 trillion.** EU27 commercial real estate value is monitored quarterly by EPRA and was worth just over Euro 6 trillion²⁴ on 31st December 2021. EU28 homes were valued at Euro 25 trillion²⁵ by EU Real Estate Forum in 2019. Savills provided a detailed assessment of UK home values in 2016 placing their aggregate value at Euro 8 trillion. Therefore, we can estimate the value of EU27 homes as Euro 17 trillion in 2019, which when inflated to year-end 2021 prices is around Euro 19 trillion.
- **70% of Europeans live in an owner-occupied home, most without a mortgage²⁶.** While home ownership varies from 96% in Romania to just 50% in Germany, 70% of Europeans live in a home they own. About one third of owner occupiers in Europe have a mortgage, and two thirds²⁷ live in a home free of housing debt.

²² McKinsey Global Institute. (2021). *The rise and rise of the global balance sheet: How productively are we using our wealth?* [Website]. Retrieved from <https://www.mckinsey.com/industries/financial-services/our-insights/the-rise-and-rise-of-the-global-balance-sheet-how-productively-are-we-using-our-wealth>

²³ Savills. (2021). *The total value of global real estate.* [Website]. Retrieved from <https://www.savills.com/impacts/market-trends/the-total-value-of-global-real-estate.html>

²⁴ EPRA. (2022). *Global Real Estate Total Markets Table.* Retrieved from. https://prodapp.epra.com/media/EPRA_Total_Markets_Table_-_Q2-2022_1658221086097.pdf

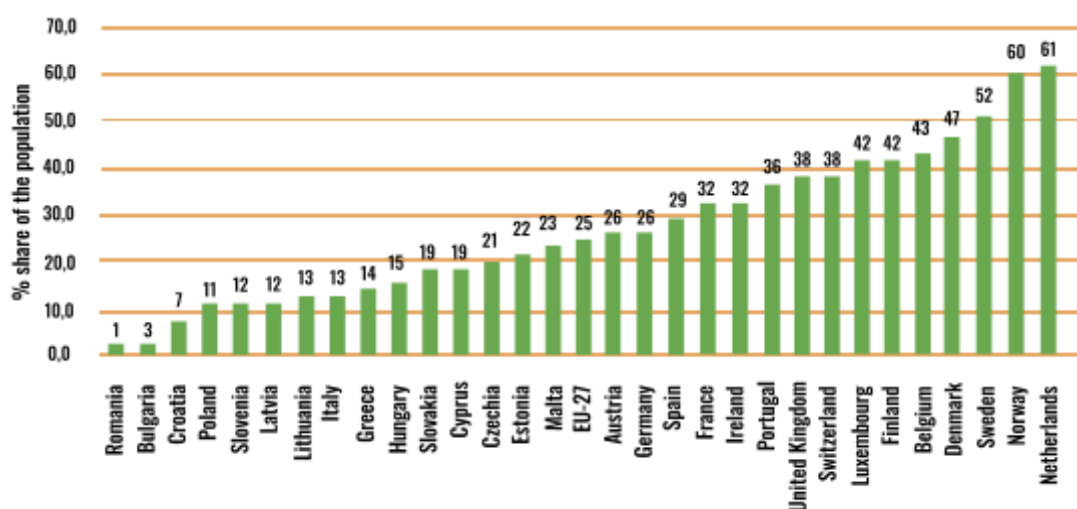
²⁵ European Real Estate Forum. (2022). *REAL ESTATE KEY FACTS.* [Website]. Retrieved from <http://www.europeanrealestateforum.eu/key-facts/>

²⁶ Eurostat. (2022). *Owning or renting? What is the EU's housing situation?* [Website]. Retrieved from [https://ec.europa.eu/eurostat/web/products-eurostat-news/-/wdn-20211230-1#:text=ln%202020%2C%2070%25%20of%20the,and%20Croatia%20\(both%2091%25\)](https://ec.europa.eu/eurostat/web/products-eurostat-news/-/wdn-20211230-1#:text=ln%202020%2C%2070%25%20of%20the,and%20Croatia%20(both%2091%25))

²⁷ These two thirds represent 45% of all homeowners. Sourced from Statista. (2022). *Share of the population in European countries who are owner-occupants in 2019, with or without a mortgage.* [Website]. Retrieved from <https://www.statista.com/statistics/957803/homeowners-with-and-without-an-outstanding-mortgage-in-eu-28-per-country/#:text=42.6%20percent%20of%20the%20total,a%20mortgage%20or%20housing%20loan.>

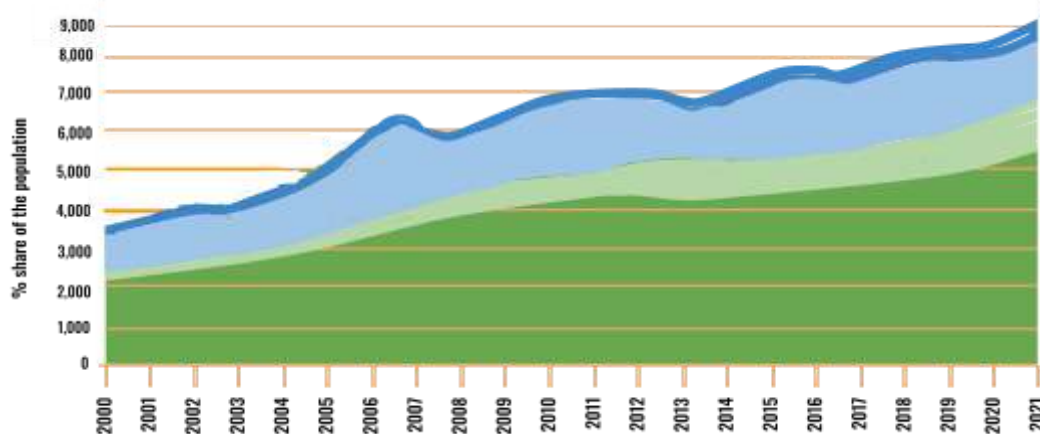


% share of population by tenure status – owner, with mortgage or loan (2018)²⁸



- **EU27 residential mortgages total Euro 6-7 trillion.** The European Mortgage Federation reports the total of outstanding European mortgages annually, and at year-end 2021 this was Euro 6.3 trillion²⁹ (having grown around 5.3% in 2021). This figure reached EUR 8.7 tn outstanding, when adding data from the UK, Norway and Iceland, a record for the region³⁰.

Outstanding residential mortgage loans in EU 27 and UK, in EUR BN



Source: European Mortgage Federation 2022

²⁸ Authors' own elaboration based on Eurostat, EU-SILC (ilc_lvho02), source: European Parliament. (2020). *Policies to Ensure Access to Affordable Housing*. Retrieved from [https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652729/IPOL_STU\(2020\)652729_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652729/IPOL_STU(2020)652729_EN.pdf)

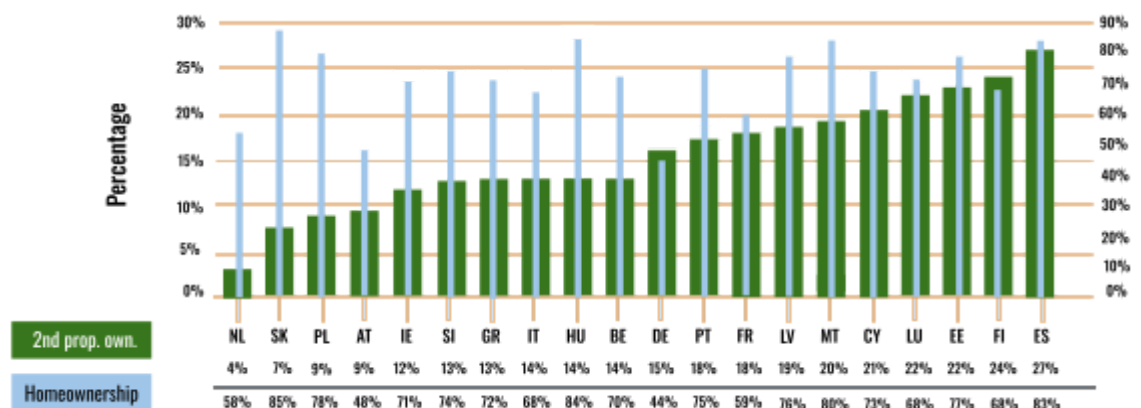
²⁹ The European Mortgage Federation. (2022). *HYPOSTAT 2022*. Retrieved from <https://hypog.org/app/uploads/sites/3/2022/09/HYPOSTAT-2022-FOR-DISTRIBUTION.pdf>

³⁰ Ibid



- **Over Euro 10 trillion of home equity is stored in EU homes, with most held by the over-50s.** Mortgages total around 35% of EU27 home value, with leverage in commercial property being higher at around 50%, in aggregate. UK evidence suggests that the under-35s have an average loan-to-value (LTV) rate of 55%, reducing to 45% for the 35-49 age group, reducing to 17% for 50-65 year olds and standing at just 3% for the over 65s.
- **Institutional real estate investments in the EU27 sum to around Euro 3 trillion³¹.** Buildings are owned by pension funds and asset managers, who traditionally have been more active in the non-residential segments. The top 4,000 real estate asset managers have US\$ 3.6 trillion allocated to European real estate, but while large fund managers have been increasingly targeting EU residential buildings, the majority of institutional investment is in commercial real estate.
- **Around 8% of EU27 homes (21.5 million) are publicly owned.** The percentage of social housing in different European countries varies considerably³². In the Netherlands it is close to 35%, in Austria and Denmark it's over 20%, and between 10-20% in Sweden, Czech Republic, France, and Finland, with all other countries below 10%.
- **15% of European households own a second home³³.** Around 30 million houses in the EU27 are second residences and therefore their owners will save less as they may not use the house for many weeks, or rent it for some of the year.

Secondary property ownership and homeownership in 20 European (EU) countries³⁴.



³¹ THE GREENS/EFA. (2022). *THE FINANCIALIZATION OF HOUSING IN EUROPE*. Retrieved from <http://extranet.greens-efa-service.eu/public/media/file/1/7461>

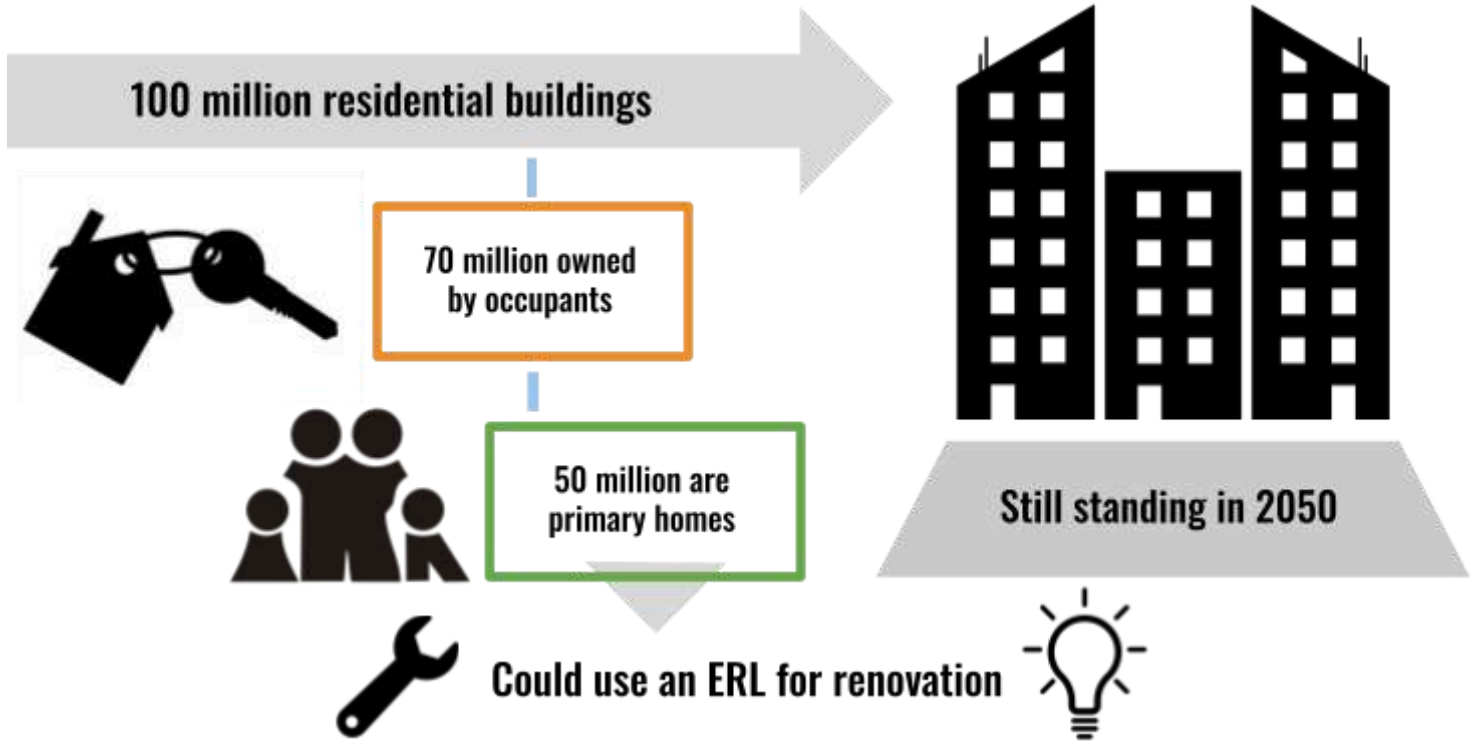
³² OECD. (2022). *PH4.2 SOCIAL RENTAL HOUSING STOCK*. Retrieved from <https://www.oecd.org/els/family/PH4-2-Social-rental-housing-stock.pdf>

³³ Ryan-Collins, J. (2021). Private Landed Property and Finance: A Checkered History. *American Journal of Economics and Sociology* 80(2):465-502 DOI:10.1111/ajes.12387

³⁴ Barend Wind, Caroline Dewilde & John Doling (2019): Secondary property ownership in Europe: contributing to asset-based welfare strategies and the 'really big trade-off', *International Journal of Housing Policy*, DOI: 10.1080/19491247.2019.1573961



Using the data from the above two segments, we calculate that there are 100 million residential buildings that will be still standing in 2050. 70 million of these are owned by their occupants, and over 50 million of these are primary homes, which –subject to social safeguards- could use an ERL for a deep renovation. So how can these opportunities be unlocked to create a Renovation Wave?

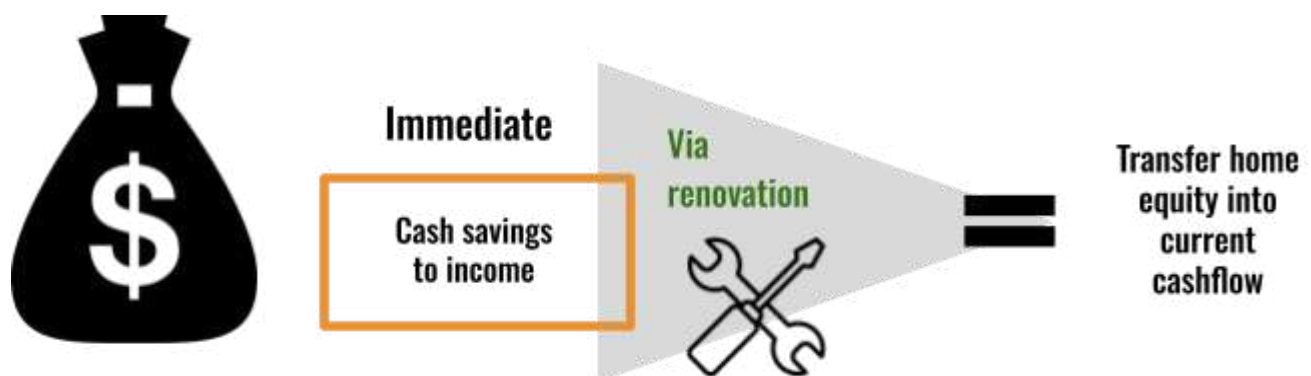


Addressing Affordability and Value for Money

The most extensive, and recent, European homeowner survey on capacity and willingness to renovate was undertaken in 2021 by the International Union of Property Owners who questioned 10,415 owners from 36 European countries³⁵. 71% of these responders were individual owners, 25% were landlords (owning multiple properties) and 2% tenants. A full 77% of the individual homeowners and landlords surveyed believed that it would be beneficial to make their property more energy efficient and sustainable. Many saw an opportunity to increase the rental or property value (59%), save money (57%), live more comfortably (57%) and help the environment (46%). With so much appreciation for the benefits of home renovation, it is reasonable to ask why just 1% of homes end-up being renovated annually.

From the UIPI survey, we learn that 44% of those surveyed don't renovate as they simply don't think they need it, although it is unclear on what informational basis they form this opinion. However, 31% of responders say that they don't have the funds. Interestingly, below 10% of homeowners surveyed (less than one in ten) saw "lack of information" or "lack of qualified" services as significant barriers to their renovation. Together with an ERL to address finance gaps, the "whole package" will require better quality information and service providers, and there is a role for technical assistance and awareness campaigns working to activate the market for ERLs and non-ERL funded deep renovations.

As most European homeowners have more than enough home equity to renovate their homes, we suggest that affordability and value for money are the objective considerations that can help explain the lack of project activity in a market with apparent "pent up" demand. Subjectively, an aversion to indebtedness is also a potential psychological factor that may only be counteracted psychologically, however logically the immediate cash savings to income which are delivered by the successful renovation maybe a powerful driver to transfer home equity into current cashflow.

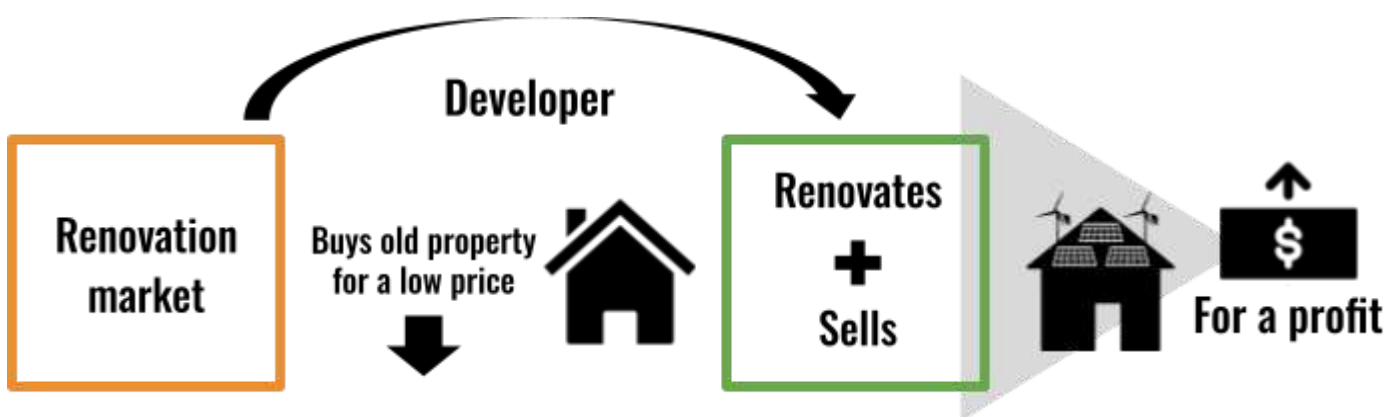


³⁵ International Union of Property Owners. (2021). *UIPI SURVEY FINAL REPORT: European Property Owners' readiness and capacity to renovate*. Retrieved from https://mcusercontent.com/a5e3a108eb8b4fe3f5868c5c8/files/68b1157c-63e7-4393-90c5-7fe4ed524aae/UIPI_Survey_Final_Report.pdf



Researching “affordability”, much academic work defines affordability in the context of “affordable housing” where a classical definition³⁶ states that: “Housing is affordable when housing of an acceptable minimum standard can be obtained and retained leaving sufficient income to meet essential non-housing expenditure”. Fundamentally, the concept of affordability relates to householder income sufficiency – or operating cash flow. It can therefore be argued that a retrofit should always be considered “affordable” if the post-renovation net cash outflows (debt service and repayment costs less cash saved from energy efficiency) are positive. The renovation world understands the importance of “affordability” as illustrated by “pay as you save” products and the UK’s use of a “golden rule” that was built into its green deal to guarantee net positive cash outcomes of those renovations.

In addition to affordability, there is another economic driver for mainstream renovation, and that is “value for money”, as illustrated by the nearly 60% of would-be UIPI homeowner renovators who expect increased rental or property value from a renovation. Simply put, “value for money” for a renovation is when the market value of a property increases by at least (and ideally more than) the cost of the renovation. In a traditional sense, renovation markets exist where a developer buys an old property for a low price, renovates it, and sells it for a profit (sale price less renovation costs).



“Value for money” is addressed directly by Italy’s Ecobonus scheme³⁷ which offers a tax credit for 110% of the cost of green home renovations. The Ecobonus has turned home-renovation into a fashion in Italy, but is also the cause of renovation price inflation, speculation and has given rise to fraud. We examine the programme and the lessons for new renovation finance instruments in a case study below.

The 54% of UIPI survey responders looking for subsidies to kick-start their renovation project are also revealing a “value for money” preference. Interestingly, value for money appears a stronger driver for renovation than affordability, which perhaps is better cast as a potential barrier, rather than a direct driver (after all, who buys jeans just because they can afford them?). Essentially, homeowners seem to have a keen appreciation for a renovation which delivers very clear value for money, if they can afford it and have access to the cash. Unsurprisingly, if Governments can guarantee both value for money and affordability, then renovation surges as it has in Italy.

³⁶ Bergensträhle, S. (2018). *How to define, achieve and measure affordability in rental housing*. Retrieved from https://ec.europa.eu/futurium/en/system/files/ged/background_paper_on_affordability_iut_2018.pdf

³⁷ The Guardian. (2022). *Italy’s superbonus 110% scheme prompts surge of green home renovations*. <https://www.theguardian.com/world/2022/apr/13/italys-superbonus-110-scheme-prompts-surge-of-green-home-renovations>



CASE STUDY – Italy’s polarising Ecobonus programme

Energy renovation rates for Italian residential and overall building stock were low. To address this, in 2020 the Italian government initially allocated €15.36 billion³⁸ of its ‘Green revolution and ecological transition’ funds for ‘Energy efficiency and building redevelopment’ through the Ecobonus and Sismabonus tax deduction programmes. The programs had a target of 100,000 buildings, with a floor area of 36 million m² (3.8 million m² also made anti-seismic). Energy savings of 191 Ktep/year with a reduction in greenhouse gas emission of around 667 KtCO₂/annum are anticipated³⁹.

The Ecobonus is a fiscal instrument with a 50-65% tax reduction⁴⁰ for energy efficiency related renovation works⁴¹, and a maximum deductible of €100,000. Coupled with the Sismabonus, they became the Superbonus -which can provide deductibility for a maximum of 110% of both energy efficiency and structural seismic improvements of buildings⁴². Thermal insulation, PV and replacement of boilers with centralised condensing systems or heat pumps, inter alia, are Ecobonus deductible if the costs were invoiced between 1st July 2020 and 30th September 2022. All resulting renovations must achieve an improvement of at least 2 classes of energy ratings to qualify. Non-tax payers, and non-Italian owners, can also benefit as bonus customers can⁴³:

- Pay the intervention costs directly and obtain a 110% tax deduction, spread over 5 years (four years for expenses incurred from 2022 onwards).
- Transfer the tax credit to third parties (ie sell it to a bank if you don’t pay enough tax);
- Exercise the intervention invoice discount (*Sconto in fattura*) option (up to a maximum of 100% of the invoice amount). Firm(s) contracted will receive a tax credit amounting to 110% of the discount applied.

Lessons we are learning⁴⁴:

The Superbonus scheme has been fraught with definitional issues, fraud and is implicated in a shortage of energy specialists, materials and renovation price inflation. Just in August 2022, the Treviso Finance Police uncovered fraudulent activity around Superbonus’ activities costing € 24 million⁴⁵ where a consortium had closed 500 contracts without carrying out more than half of the intended works. The prevalence of cases of Superbonus fraud led the Italian government to approve an anti-fraud decree in November 2021⁴⁶.

These concerns have caused secondary market buyers of Superbonus credits to pay much less than their value (as fraud protection) and recent estimates also suggest a significant (35%) budget overrun to Euro 21bn. This talks to the future need to build on success (reduce step-changes) and ensure that new instruments build market capacity alongside incentives and contain social safeguards ensuring that target beneficiaries benefit, and speculation is minimised.

³⁸ Housing Europe. (2021). *IMPACT OF THE RECOVERY PLANS ON THE SOCIAL & AFFORDABLE HOUSING SECTOR*. Retrieved from <https://www.housingeurope.eu/file/1056/download>

³⁹ Italian Government. (2022). *Presidency of the Council of Ministers. Ecobonus and Sismabonus up to 110% for energy efficiency and safety of buildings*. [Website]. Retrieved from

<https://italiadomani.gov.it/en/Interventi/investimenti/ecobonus-e-sismabonus-fino-al-110-per-efficienza-energetica-e-la-sicurezza-degli-edifici.html>

⁴⁰ IEECP. (2022). *Status of energy poverty and policies to address it in CEE/SEE countries*. Retrieved from

<https://europeanclimate.org/wp-content/uploads/2022/05/ieecp-policies-to-decarbonise-residential-buildings-ws1-report-2022.pdf>

⁴¹ Including: thermal insulation, change of boilers with at least co-generation or heat pumps, micro-generation, PV systems, automation systems, and others.

⁴² European Commission. (2021). *COMMISSION STAFF WORKING DOCUMENT Analysis of the national long-term renovation strategies*. Retrieved from <https://ec.europa.eu/energy/sites/default/files/swd-on-national-long-term-renovation-strategies.pdf>

⁴³ Green Home. (2022). *Superbonus 110% - here: Super Ecobonus*. Retrieved from

https://www.green-home.org/wp-content/uploads/2022/05/6_GREEN-Home_GP_Superbonus-IT_en.pdf

⁴⁴ Ibid.

⁴⁵ Il Gazzettino. (2022). *Superbonus 110%: maxi frode da oltre 24 milioni di euro scoperta dalle Fiamme Gialle*. Retrieved from

https://www.ilgazzettino.it/nordest/treviso/superbonus_frode_indagini_guardia_di_finanza_24_milioni_euro_immobili-6847389.html?refresh_ce

⁴⁶ Idealista. (2022). *Superbonus 110 tra proroga, novità e scadenze: cos’è cambiato e le ultime sorprese*. [Website]. Retrieved from

<https://www.idealista.it/news/finanza/fisco/2021/11/18/156602-superbonus-110#simple-table-of-contents-6>



Dealing with Multiple Sources of Value and Uncertainty

One issue with buildings renovations is that their economic value comes from multiple sources⁴⁷ some of which are tangible (cash from energy savings and increased market value) and others are highly subjective non-cash benefits (e.g. comfort, improved health, noise reduction, “feeling green”). Many argue that it’s the non-cash benefits that are the “true” drivers for renovation to date. Yet even the objective tangible outcomes require the building owner to “believe in” a future increased property price and a projected set of expected cash savings derived from energy savings. While Governments can partially underwrite these sources of uncertainty and improve renovations’ value for money with tax rebates or subsidies, this takes a lot of public budget and can create speculative bubbles, if not done carefully.

To build a financial model for the EU Renovation Wave, and therefore assess economic value for money for millions of homeowners, we need to understand the real cost of deep renovation and the genuine financial results of its execution. Renovations are location and building specific, and their performance depends upon specification, starting point, future energy prices and specific property value increase. To resolve this complexity, we consider an average 100 square metre dwelling in four European economic zones: Northwest and West, Northeast and Central, South, and Southeast. While the average dwelling size across these areas is reasonably stable⁴⁸, property values⁴⁹ and the cost of renovations vary significantly⁵⁰, yet they vary in a correlated manner (as the cost of renovation works is higher where homes are worth more). Property values also positively correlate with energy prices (i.e. home values tend to be higher in countries with higher energy prices).



⁴⁷ European Commission, Directorate-General for Energy, Rohde, C., Toth, Z., Glenting, C., et al., *Multiple benefits of energy efficiency investments for financial institutions : final report : October 2021*, Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2833/205185>

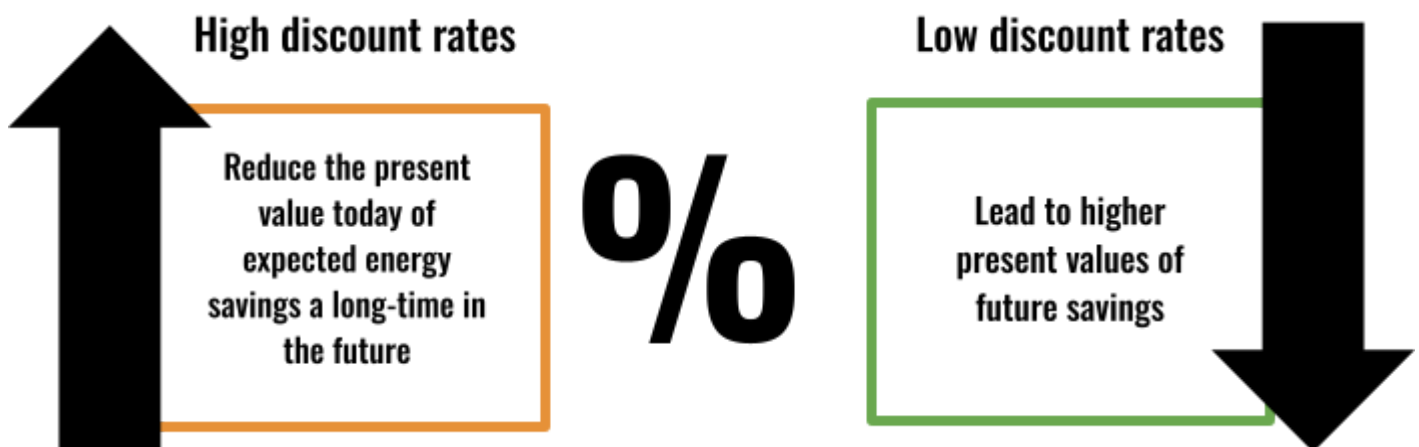
⁴⁸ Appolloni L, D'Alessandro D. Housing Spaces in Nine European Countries: A Comparison of Dimensional Requirements. *Int J Environ Res Public Health*. 2021 Apr 17;18(8):4278. doi: 10.3390/ijerph18084278. PMID: 33920693; PMCID: PMC8073340.

⁴⁹ Deloitte. (2021). *Property Index 2021 How Europeans live and what it costs them*. [Website]. Retrieved from <https://www2.deloitte.com/ce/en/pages/real-estate/articles/property-index-2021.html>

⁵⁰ BPIE. (2020). *COVID-19 RECOVERY: INVESTMENT OPPORTUNITIES IN DEEP RENOVATION IN EUROPE*. Retrieved from https://www.bpie.eu/wp-content/uploads/2020/05/Recovery-investments-in-deep-renovation_BPIE_2020.pdf



Things that happen in the future (like higher property sale proceeds and lower energy bills) are valued very differently by different people, in different circumstances in different countries. For example, a dual-income family in a stable democracy with good job security that allows for long-term financial planning is well placed to think in “logical” economic terms. Yet, a vulnerable family in a country with more volatile politics and reliant upon unstable income (gig-economy) will be less likely to make investment decisions that pay-out in the longer term. Economic modellers resolve these different views of the future using “discount rates”. High discount rates (those applicable to families with more uncertain futures) reduce the perceived value today of expected savings a long-time in the future (e.g. cash savings from energy bill reductions after 2040). Low discount rates lead to higher perceived values of future savings.



While discount rates seem a slightly clinical way to resolve the decision making complexity of renovation, and they do not consider important non-economic drivers (like access, safety, health, feel-good factor or keeping-up with the neighbours), they can help explain an observed fundamental reluctance to invest in deep renovations by many, without huge up-front bonuses or grants. Further, it provides the central logic for a key design feature in any EU Renovation Loan, which can provide more certainty to personal discount rates and lower them by offering guaranteed low-cost debt.

In March 2022, Allianz – the world’s largest insurance company – projected the impact of the Ukraine war on European household energy bills. In their report, Allianz projected at least a 30% increase in 2022 energy bills with an average of €3,400 in Germany⁵¹, €3,000 in the UK, €2,800 in France and around €2,000 in Italy and Spain. In November 2022, this now looks very conservative with UK bills projected to exceed €4-6,000 in recent projections⁵². However, this is important to enable an improved understanding of economic motivations to renovate, which have clearly also increased dramatically since the invasion.



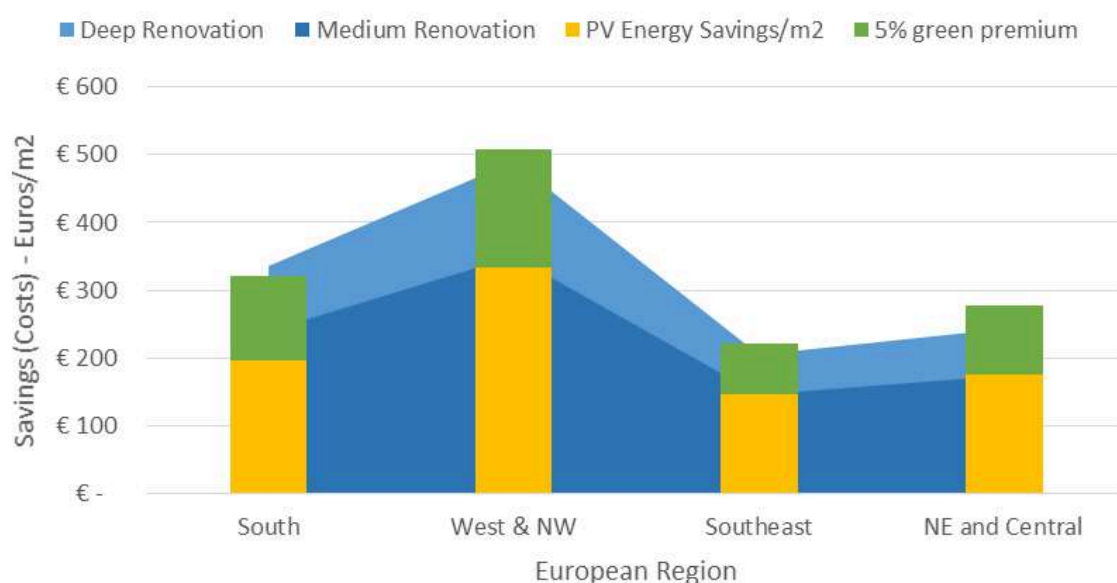
⁵¹ Allianz SE. (2022). *The (energy) price of war for European households*. Retrieved from https://www.allianz.com/en/economic_research/publications/specials_fmo/2022_03_04_Energyinflation.html

⁵² Bloomberg. (2022). *UK Households Get Fresh Warning of Energy Bills Topping £4,000*. Retrieved from <https://www.bloomberg.com/news/articles/2022-08-09/uk-households-get-fresh-warning-of-energy-bills-topping-4-000#:~:text=UK%20households%20received%20yet%20another,analysis%20from%20Cornwall%20Insight%20Ltd>



Table 1.1 shows this economic trade-off for the median 100m² home in our four geographic regions. The yellow bars represent a present-day valuation of 30 years-worth of energy savings (the discounted value of saving half the household energy bills using a discount rate of 3%) plus a green bar that shows a 5% increase in property value. Except for Southern Europe (where average bills obscure a dramatic difference in heat demand between the colder north and wMediarmer south), the present value of the expected economic benefits exceeds the investment cost of delivering them (shown by the blue wedges recognising that a deep renovation targets 70% energy savings, and a medium renovation may struggle to deliver 50% cuts in energy bills). This means that it makes “long-term economic sense” for homeowners to invest in a renovation which cuts bills in half and delivers a 5% property value increase, if they can finance it at a cost of 3% or less.

Table 1.1: Renovation Value for Money (Euro/m²)



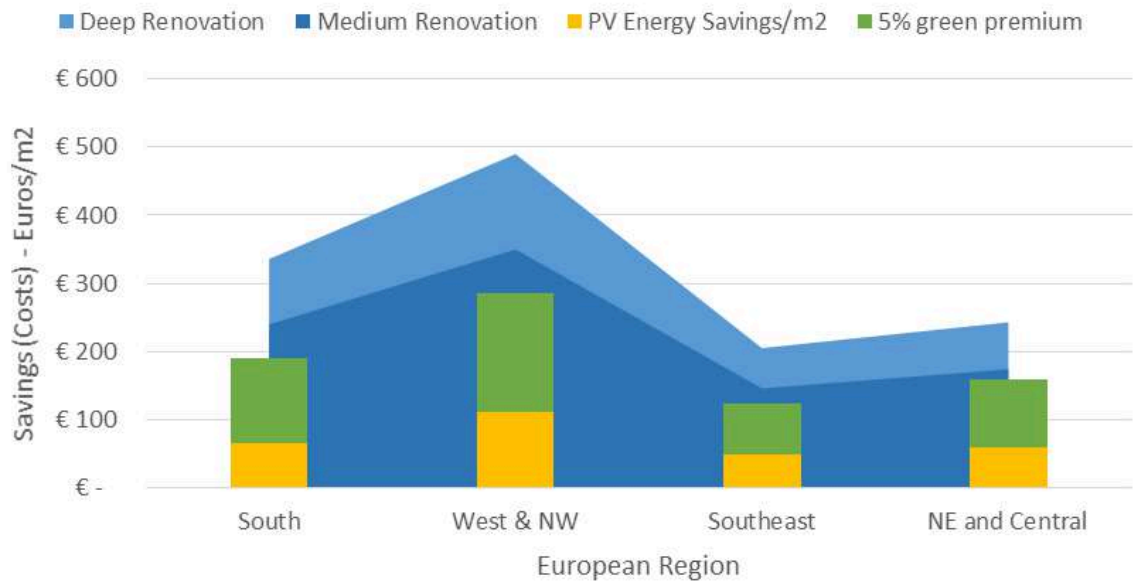
The problem is that when deciding to invest (or not) in a deep renovation, most homeowners do not value future energy savings so highly. Extensive research suggests that consumers act as if they have implied discount rates of 20-25%⁵³. In the EU Commission’s PRIMES model the discount rates which support policy scenarios that rely on consumer technology choices were 17.5% in 2014, and moved to 12-14.75% in 2016⁵⁴. If we re-run the above analysis using a 15% discount rate to provide a present value for the same future energy savings we get Table 1.2, where it appears even medium renovations (if they deliver a 50% reduction in energy costs) don’t make economic sense. It also sheds light on why these “heavy discounting homeowners” place greater importance on home value increase, as with higher discount rates the “certainty” of property value enhancement is “worth more” today than the energy savings for the next 30 years (green blocks bigger than yellow blocks below).

⁵³ Kristoffer Steen Andersen, Catharina Wiese, Stefan Petrovic, Russell McKenna, Exploring the role of households’ hurdle rates and demand elasticities in meeting Danish energy-savings target, Energy Policy, Volume 146, 2020, 111785, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2020.111785>.

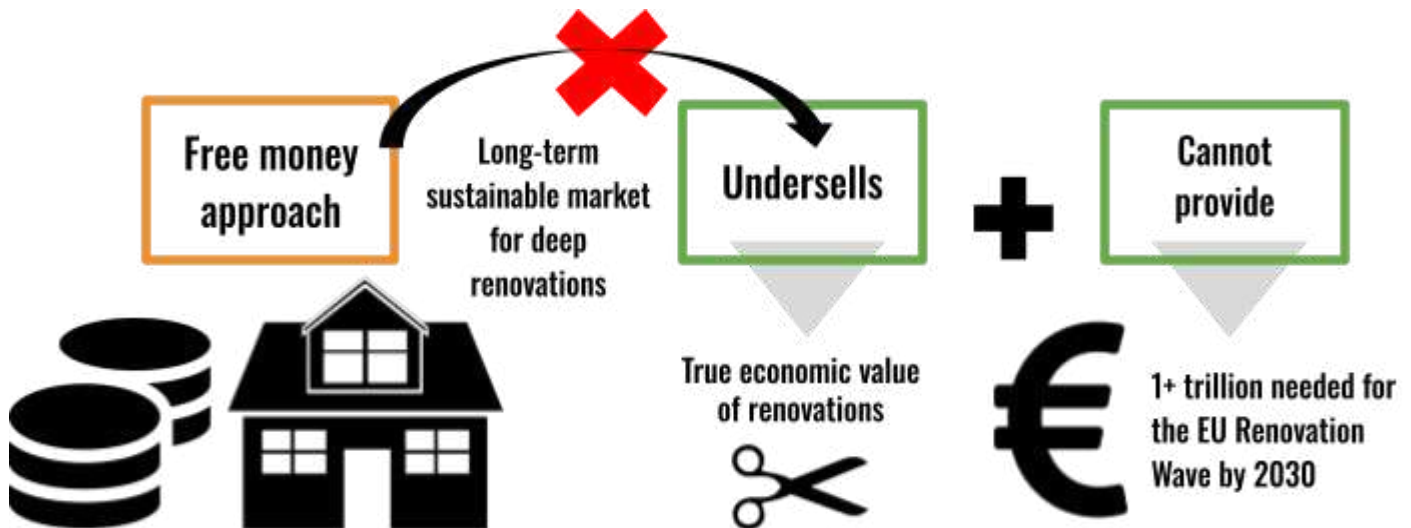
⁵⁴ Ibid.



Table 1.2: Renovation Value for Money (Euro/m2)



One way of seeing this is that consumers view undertaking an energy efficient home renovation as more risky than “they should”, given access to low-cost debt, and this explains why Governments have discovered that to promote deep renovation they need to provide so many up-front subsidies that “sweeten” the economics of deep renovations.

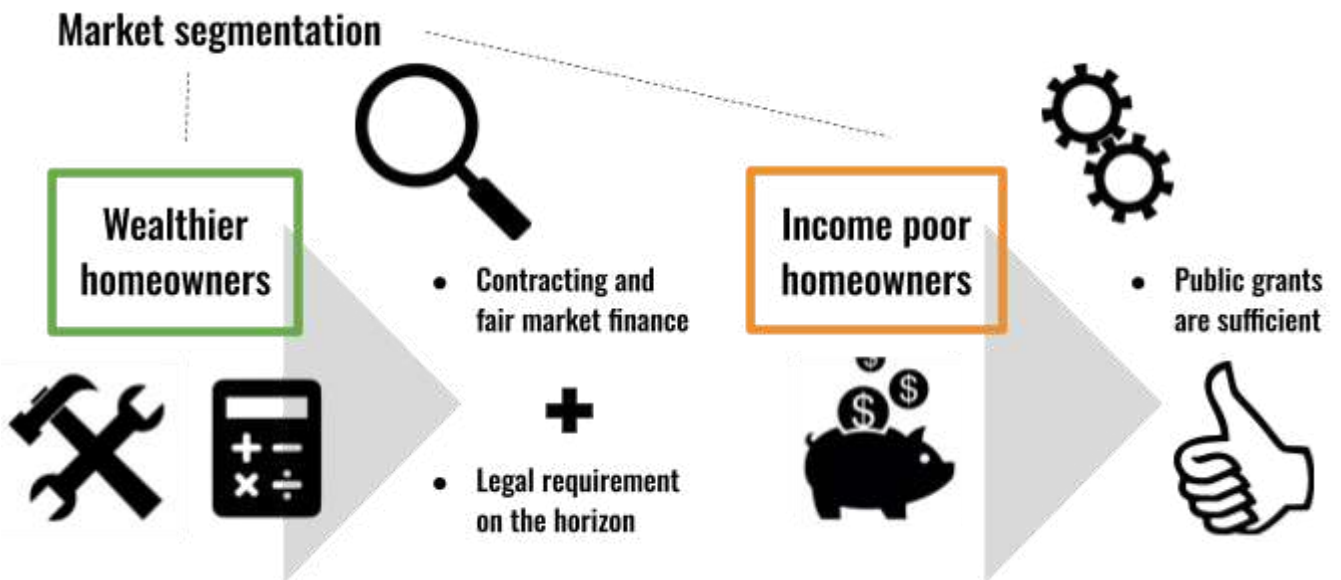


We argue that the “free money” approach cannot build a long-term sustainable market for deep renovations, as it structurally undersells the true economic value of renovations and – of course – public budgets cannot provide the Euro 1+ trillion needed for the EU Renovation Wave by 2030. Analysis by CEE Bankwatch⁵⁵ suggests that even the Euro 50-55 billion set aside for buildings renovation by Member States from the €672.5 billion NextGenerationEU recovery fund falls 5-10 times short of own Government long-term buildings renovation strategy objectives in central and eastern European countries, and this pattern is consistent across much of the EU27.

⁵⁵ Bankwatch. (2021). *Energy efficiency and renewables in buildings in national recovery and resilience plans*. Retrieved from https://bankwatch.org/wp-content/uploads/2021/07/2021-07-14_Energy-efficiency-recovery-funds_final.pdf



This paper argues that the better segmentation of would-be renovators is the solution to the fashionable yet over-simplified “one size fits all” approach. For wealthier homeowners a combination of tools to simplify contracting and fair market finance with a legal requirement on the horizon should be sufficient to promote action. At the other end of the spectrum, public grants are sufficient for and can deliver basic services (efficient heat and hot water) to the energy poor and vulnerable. This leaves a large segment of “income poor homeowners with low/no savings” in the middle and for these EU guarantees can be combined with ECB liquidity to provide an EU Renovation Loan distributed to millions by retail lenders.



Retail lenders are keen to ensure that rising energy bills do not create a cascade of defaults and arrears on their mortgage portfolios. This matter has been extensively addressed by one of the groups leading the technical work on the economics of energy efficiency: the European Commission and United Nations Environment Program’s Finance Initiative (UNEP FI)’s Energy Efficiency Financial Institutions Group⁵⁶ (EEFIG). In 2018, the EEFIG launched a working group to research the increased value and decreased credit risks associated with buildings of higher energy efficiency. The 2022 EEFIG report⁵⁷, and the Joint Research Council⁵⁸, conclude that energy efficient properties command a 3-8% value premium over inefficient equivalents, and that rents can be up to 10% higher for the most energy efficient commercial properties.

Lenders looking to “green” their mortgages, according to the EU Taxonomy, need to reduce at least 30% of a building’s primary energy⁵⁹ demand to qualify by delivering a significant contribution to climate mitigation. However, energy savings of 60% are possible in many homes, are needed to meet EU Climate and Energy targets and are promoted by leading stakeholders in the EU renovation industry⁶⁰.

⁵⁶ European Commission. (2022). *EEFIG: About us*. [Website]. Retrieved from https://eefig.ec.europa.eu/about-us_en - Over 200 financing experts that have been working together since 2013 to address some of these questions.

⁵⁷ European Commission, Directorate-General for Energy, *The quantitative relationship between energy efficiency improvements and lower probability of default of associated loans and increased value of the underlying assets : final report on risk assessment*, Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2833/532126>

⁵⁸ Zancanella, P., Bertoldi, P. and Boza-Kiss, B., *Energy efficiency, the value of buildings and the payment default risk*, EUR 29471 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-97751-0 (online), doi:10.2760/267367 (online), JRC113215.

⁵⁹ fi compass. (2022). *Model for a financial instrument with a grant component to support energy efficiency: a fi-compass model*. Retrieved https://www.fi-compass.eu/sites/default/files/publications/energy-efficiency-model_0.pdf

⁶⁰ Renovate Europe. (2020). *Taxonomy risks undermining Renovation Wave*. Retrieved from https://glassforeurope.com/wp-content/uploads/2020/12/Taxonomy_VicePres_Timmermans_Com_Simson.pdf





Finally, the homeowners with the most home equity are those over 65 years old. Aside from having more home equity, the older generations are also those most adversely impacted by rising energy prices⁶¹, and increasingly inflation. Further, the health and wellbeing improvements⁶² that are delivered with a deep renovation are also welcome “side benefits” especially for those who spend more time at home. With an ageing population⁶³, and more people wanting to get old at home⁶⁴, it is surprising that there isn’t more discussion of energy efficiency renovations in “age friendly living” forums across the EU⁶⁵.

Increasingly, those 75% of Europeans planning to age-at-home⁶⁶ are encouraged to undertake home renovations to improve the safety and security of their homes, as well as to consider their accessibility and comfort. There is UK evidence to suggest that already 80% of home renovators are over 40 years old and 37% are aged over 55⁶⁷. With median budgets of around £18,000, 86% of these British home renovators are using cash or savings, and they largely focus on decoration, as opposed to home energy dynamics – or access/ old age⁶⁸. 37% of these renovators are finally undertaking their projects because they now have the financial means to do so, and just 5% of those over 55 are refinancing or using re-mortgages to renovate. In Denmark, as in most EU27 countries, the over-50s struggle to get mortgages⁶⁹, and many are refused fair finance. We argue that the provision of fair finance to elderly homeowners to address energy, inflation and access concerns is a genuinely underserved market across all of Europe.

To bridge these gaps, lower implied discount rates and deliver fair finance to those keen to renovate, we examine whether an attractively structured renovation loan exclusively usable to deliver a deep renovation, that delivers at least a 50-60% reduction in energy consumption, and a green labelled property, could encourage the 50+ million homeowners with substantial home equity to become the EU Renovation Wave.

⁶¹ Age UK. (2022). Fuel stress set to soar from April to impact one in four older households and four in five of the poorest - and it could get worse in October. Retrieved from

<https://www.ageuk.org.uk/latest-press/articles/2022/fuel-stress-set-to-soar-from-april-to-impact-one-in-four-older-households-and-four-in-five-of-the-poorest---and-it-could-get-worse-in-october/>

⁶² IEA. (2022). *Multiple Benefits of Energy Efficiency: Health and wellbeing*. [Website]. Retrieved from <https://www.iea.org/reports/multiple-benefits-of-energy-efficiency/health-and-wellbeing>

⁶³ Eurostat. (2022). *Population structure indicators at national level*. [Dataset]. Retrieved from https://ec.europa.eu/eurostat/databrowser/view/DEMO_PJANIND_custom_964289/bookmark/table?lang=en&bookmarkId=599174db-325f-429b-87ba-6af6b18e9ca9

⁶⁴ CISION. (2019). Should I Stay or Should I Go? Aging in Place has a New Meaning for Seniors [Website]. Retrieved from <https://www.prnewswire.com/news-releases/should-i-stay-or-should-i-go-aging-in-place-has-a-new-meaning-for-seniors-300817785.html>

⁶⁵ AGE. (2022). *The voice of older persons at EU level*. [Website]. Retrieved from <https://age-platform.eu/special-briefing/adequate-housing-older-age>

⁶⁶ Mortgage Introducer. (2021). *OneFamily: Over-50s using equity release to stay in homes*. [Website]. Retrieved from <https://www.mpamag.com/uk/mortgage-types/equity-release/onefamily-over-50s-using-equity-release-to-stay-in-homes/390981>

⁶⁷ houzz. (2020). *2020 UK Houzz & Home Renovation Trends Study*. [Website]. Retrieved from [https://www.houzz.co.uk/magazine/2020-uk-houzz-and-home-renovation-trends-stsetivw-vs-135007985](https://www.houzz.co.uk/magazine/2020-uk-houzz-and-home-renovation-trends-study-stsetivw-vs-135007985)

⁶⁸ houzz. (2022). *2022 Houzz & Home UK: Overview of Home Renovation in 2021 and 2022*. [PPT presentation]. <https://st.hzcdn.com/static/econ/UKHH2022.pdf>

⁶⁹ Taenk. (2022). *Ældre har svært ved at få boliglån*. [Website]. Retrieved from <https://taenk.dk/presse/aeldre-har-svaert-ved-faa-boliglaan>





The EU Renovation Loan



2. The EU Renovation Loan (ERL)

The EU Renovation Loan (“ERL”) is *“an EU-backed, privately contracted, collateralised loan that provides all homeowners fair and equal access to long-term financing for the deep renovation of their home. The funding is provided on a zero-coupon basis with repayment of principle and accrued interest at EU-borrowing costs upon the earlier of transfer, sale or its 30 year maturity.”*

To double the rate of buildings renovation, or multiply by a factor of ten those undertaking a deep renovation, and deliver the EU Renovation Wave, 35 million Europeans need to have access to €235 billion annually to be able to pay for their renovations, **and they need to want to do it.** Homeowners’ desire for an energy efficient renovation needs to both “make sense” and be powerful enough to overcome administrative hassles (filling in finance forms, finding and contracting the right project manager or contractor) and significant disruption – even relocation – during the renovation works. To address these non-financial realities of renovation, we believe the financing should be a “no brainer” for homeowners, and simple to contract with guaranteed fair conditions. Further, we believe that an EU-led and supported instrument can deliver this through retail lenders and help consolidate, professionalise and improve the market for renovations.

We believe that the specific design and provision of a new financial instrument (the EU Renovation Loan) can cost-effectively unlock trillions of euros of stored home-equity to offer up to 50 million homeowners the necessary funds for a deep renovation with the kind of highly attractive economic conditions, and supportive retail distribution channel, to overcome many of the significant hurdles facing homeowners today. The ERL is one of the few untried, innovative and high potential options remaining to European policymakers that can provide options to financially underserved communities, especially older homeowners and working-poor families.

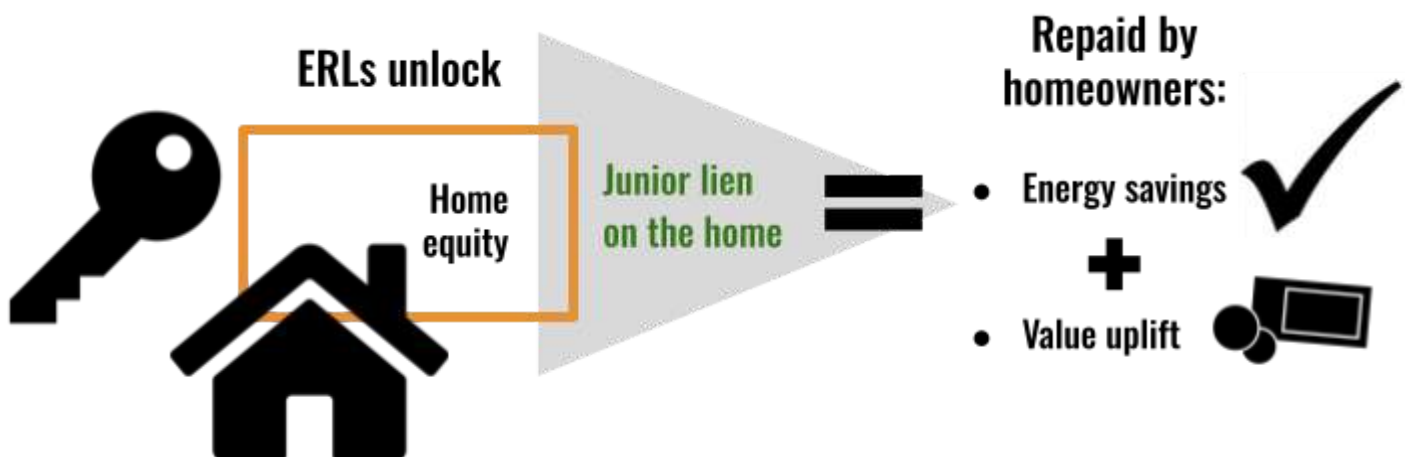
The following sections provide an overview of the ERL and offer a technical analysis of some of its key differentiating features from different stakeholder perspectives. Finally, given the levels of institutional cooperation required to create and launch such an instrument, there are sections that address the advantages of an ERL from the specific perspective of each of the key institutional actors required to engage in its design and implementation.



Building Blocks of the EU Renovation Loan

The “EU Renovation Loan” (ERL) is a new financial instrument that can be created at the EU-level, distributed by thousands of retail lenders and can allow homeowners to cost effectively unlock their home-equity for a deep renovation with no interest to pay until the earlier of sale, transfer, or 30 years. The core building blocks of the ERL are these:

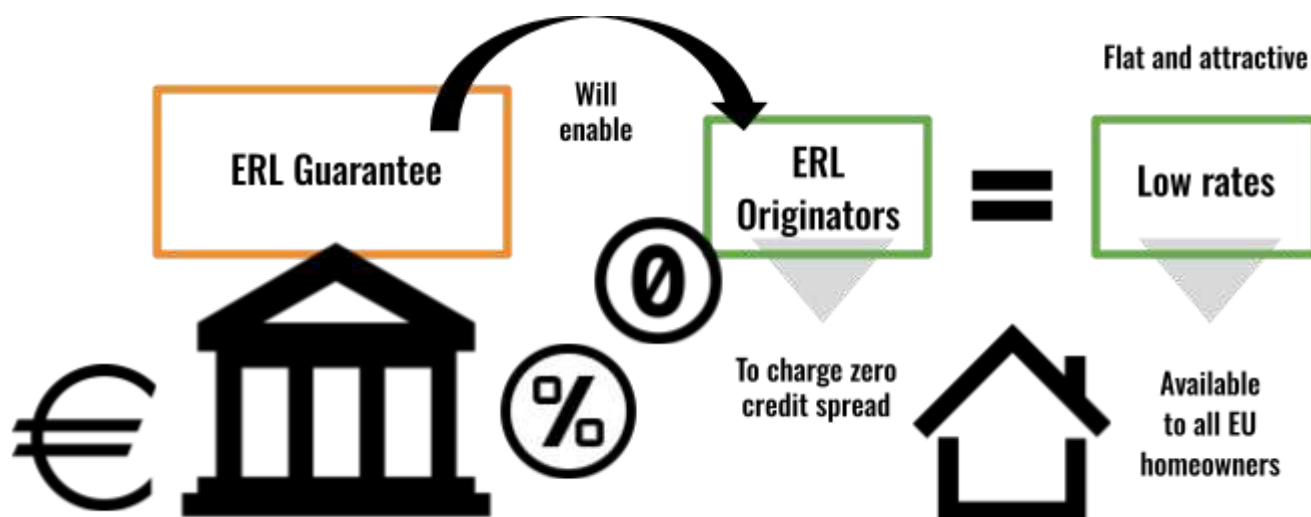
- **Zero-coupon structure:** Zero-coupon loans accrue interest, all of which is paid back, alongside the amount borrowed, upon maturity or early repayment. Unlike loans with 0% interest rates (like France’s EcoPTZ loans – see case study below), which are cheaper for borrowers, zero-coupon loans don’t require subsidies (depending upon interest rate). Zero subsidy allows the creation of a trillion euro market that is not limited by constrained public budgets, and complex, administratively burdensome subsidy programmes.
- **Junior second mortgage on home:** ERLs unlock home equity, and their proceeds fund deep renovations that deliver over 50% energy cost savings⁷⁰, and “green” the underlying property, giving it enhanced sale value, and cheaper access to primary (now green) mortgage debt. The ERL has a junior lien (the right to possess property under specific circumstances, with rights to repayment from its sale after senior creditors are paid) and is junior (or subordinated) to any existing mortgage. The risk of ERL-repossession (forced sale of the property due to non-payment) is restricted due to its zero-coupon structure. In many jurisdictions this second mortgage will need to be registered (notarised) with a public notary.
- **30 year maturity, repayable without penalty on home sale or transfer:** Deep renovations do not pay-back in the short term, even at today’s elevated energy prices, and so ERLs need to offer a 30 year mortgage-equivalent funding term. ERLs unlock home equity, with a junior lien on the home, and are designed to be repaid by homeowners through a combination of energy savings and value uplift. Average home tenure is, in fact, much shorter than 30 years, and often sales relate to upgrade or equity-release, both opportune moments to reveal the “green premium” and reduce risk.



⁷⁰ While EU Taxonomy allows a green label to renovations which generate 30% primary energy reductions, ERLs are designed to increase ambition and deliver value for money to homeowners. As illustrated in chapter 1, VFM only comes with significant energy bill reductions and to have EU guarantee and ECB liquidity renovations must be “fit for 55” and align with Paris trajectories.



- **ERL interest rates set at the EU's 30 year borrowing costs:** Interest on an EU Renovation Loan would accrue at EU borrowing costs (2.4% for 30 years at the time of writing⁷¹) providing access to Europe's lowest cost of funds (that of the Union) to homeowners participating in the EU Renovation Wave.
- **EU Guarantee:** ERLs should benefit from an EU guarantee in cases where non-repayment triggers the sale of the underlying property and the proceeds of such sale are insufficient to repay all senior debt and ERL outstanding balance. The EU guarantee will enable ERL originators to charge zero credit spread (as the customer credit is backed by the EU). This provides a flat and attractive, low rate to all EU homeowners that makes ERLs fully accessible to all at the same interest rates regardless of credit score. The EU guarantee also reduces the capital cost for holding ERLs on balance sheets and enables originators to save administration costs on credit assessments of ERL borrowers and loan operational costs, as there are no interest payments to collect and track.



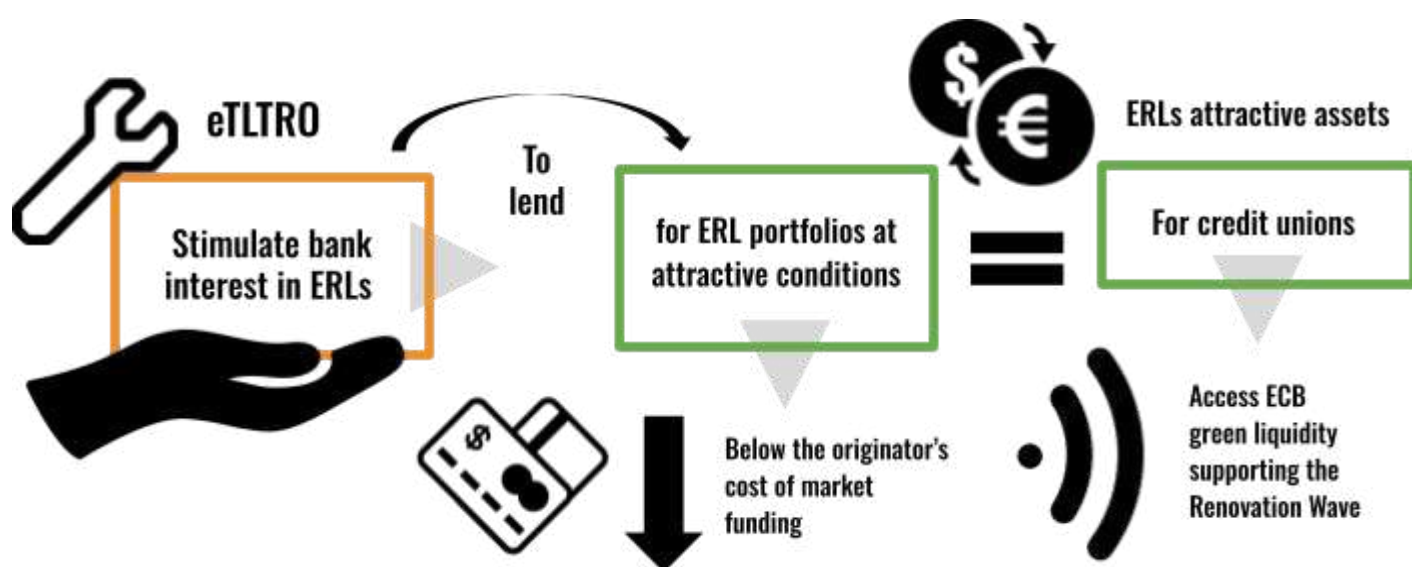
- **Size equal to (or less than) the cost of a deep home renovation:** The ERL is designed to fund a deep renovation in the home to which it is attached that cuts home energy consumption by at least a half. While there is no reason that ERL size cannot also cover onsite energy production, like rooftop PV, to benefit from the EU guarantee (see below) energy cost savings must also be below half the pre-renovated state.
- **Use of Proceeds is restricted to deep home renovation:** Restricted use of proceeds is the first principle of the ICMA Green Bond Principles⁷² that underpin the trillion-dollar global green bond markets. The use of the proceeds of an ERL are restricted to the investment in the deep home renovation of its property collateral, plus onsite power (if requested). The compliance regime for use of proceeds sits with the ERL originator (eg. Retail lender). Non-compliant ERLs will not benefit from EU guarantee, nor ECB liquidity (see below).

⁷¹ European Central Bank. (2022). *Euro area yield curves*. [Website]. Retrieved from https://www.ecb.europa.eu/stats/financial_markets_and_interest_rates/euro_area_yield_curves/html/index.en.html

⁷² ICMA Green Bond Principles. (2021). [Brochure]. Retrieved from <https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Green-Bonds-brochure-150616.pdf>



- **ECB Liquidity:** ERLs should be eligible for a newly (ERL-) targeted longer-term refinancing operation (eTLTRO) by the ECB. eTLTROs reflect the central bank's mandate and the precautionary approach⁷³ by providing lenders with term liquidity for their ERL portfolio (size calculated at face value plus accrued interest, i.e., market value) at a spread below the ERL accrual rate (say, minimum of ERL interest rate minus 1-2% and other ECB facilities). TLTROs are the Eurosystem operations that provide financing to credit institutions that lend to the real economy. In this case, the eTLTRO programme will stimulate bank interest in using ERLs to lend, providing funding for ERL portfolios at attractive conditions, very likely below the ERL originator's cost of market funding. This will make ERLs attractive assets for credit institutions that wish to access this new form of ECB green liquidity in support of the EU Renovation Wave. Finally, there is broad civil society support⁷⁴ for green TLTROs and an eTLTRO would deliver against recent ECB recent climate-alignment pronouncements.



- **ERL Origination:** ERLs can be distributed by any qualified and accredited retail or consumer financial institution with an established business lending to homeowners. ERL originators can earn fair and transparent pre-agreed fees for successful distribution of ERLs to cover their administrative costs and the cost of ensuring that proceeds are invested in a qualifying renovation that delivers the minimum energy consumption reduction. The review of the Mortgage Credit Directive can also support the uptake of ERLs through the financial regulatory framework, by improving the mortgage credit disclosure rules in parallel to nudge consumers toward ERLs as an additional support to green mortgages⁷⁵.

⁷³ New Economics. (2022). *GREEN CREDIT GUIDANCE: A green term funding scheme for a cooler future*. [Website]. Retrieved from <https://neweconomics.org/2022/09/green-credit-guidance> and

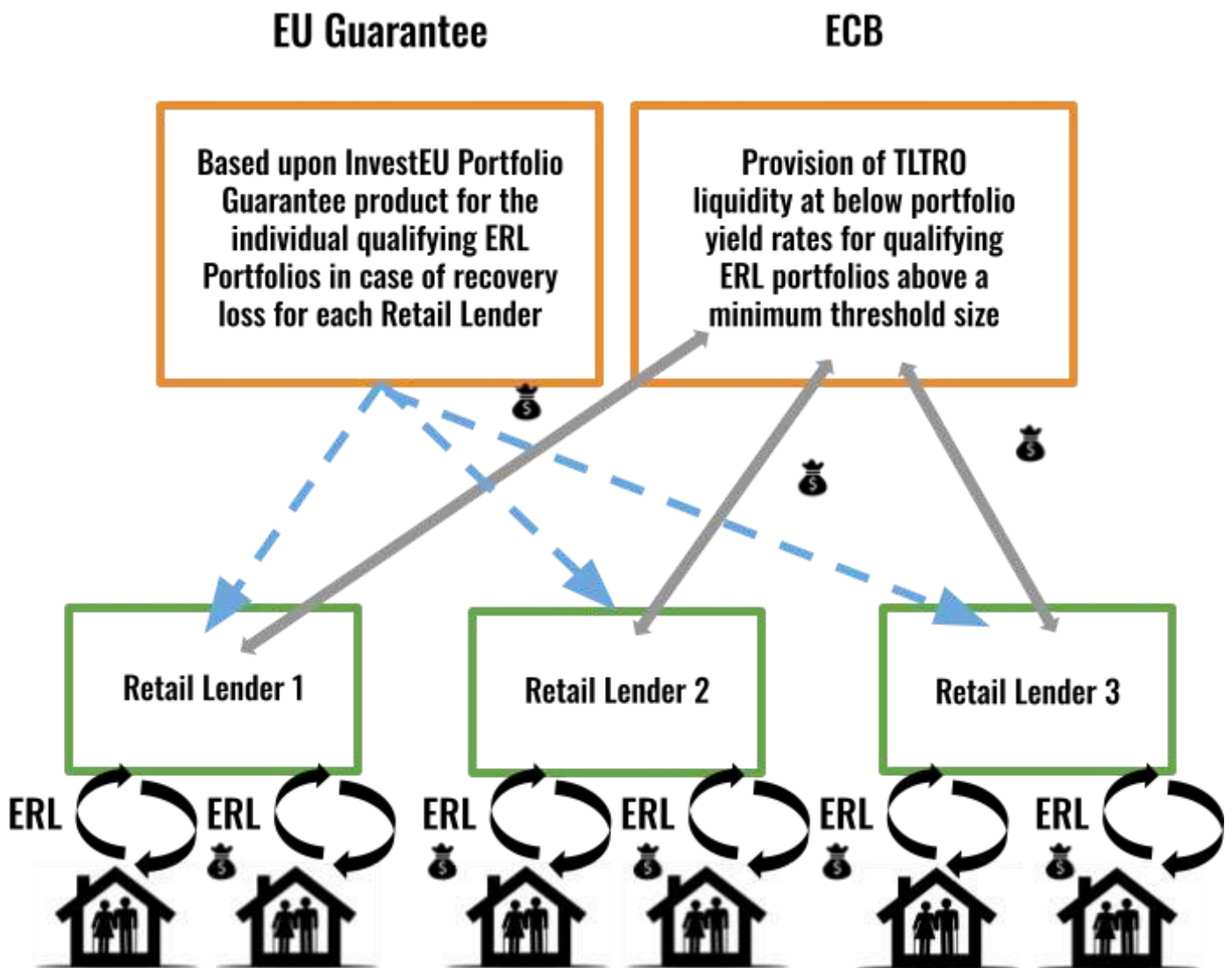
Hugues Chenet, Josh Ryan-Collins, Frank van Lerven, Finance, climate-change and radical uncertainty: Towards a precautionary approach to financial policy, *Ecological Economics*, Volume 183, 2021, 106957, ISSN 0921-8009, <https://doi.org/10.1016/j.ecolecon.2021.106957>

⁷⁴ New Economics. (2022). *CLIMATE ROADMAP: Next steps for the European Central Bank to support the low-carbon transition*. [Website]. Retrieved from <https://neweconomics.org/2022/04/climate-roadmap>

⁷⁵ In line with the MCD roadmap found here: European Commission. (2022). *Mortgage credit – review of EU rules*. [Website]. Retrieved from https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13090-Mortgage-credit-review-of-EU-rules_en



The chart below provides a summary picture of the institutional relationships and funds flows that support the EU Renovation Loan:



CASE STUDY – France’s Zero-interest eco-loans (“eco-PTZ”)

France’s eco-PTZ is an interest-free government subsidised soft loan⁷⁶ for homeowners or renters to finance energy efficiency renovations. Launched in 2009, the ECO-PTZ has three options⁷⁷:

- **One-off.** This allows for the renovation of specific sections of the property, and the funds are divided as follows: For this category of work, the maximum amount of the eco-PTZ is:
 - €7,000 for glass doors
 - €15,000 other areas (insulation of roof, change of windows and/or heating, and others⁷⁸)
 - €25,000 for a batch of 2 elements
 - €30,000 for a batch of 3 elements or more
- **Global renovation** for homes to achieve a minimum energy performance. Maximum loan amount €50,000.
- **Rehabilitation work on your non-collective sanitation installation** using a device that does not consume energy. Maximum loan amount €10,000.

The repayment period of the loan cannot exceed 15 years, and 20 years for the global renovation eco-loans. The repayment period can be reduced up to 3 years at the request of the customer. The loan is delivered through partner banks including Crédit Agricole, La Banque Postale, Banques Populaires, Caisses d'Épargne, Crédit Mutuel and CIC. As example, from January 2021 and until the end of September 2021, Crédit Agricole⁷⁹ Regional branches processed 15,955 renovation loans totalling over €194 million.

Contracting for an eco-PTZ: The renovation works must be carried out by qualified professionals⁸⁰ recognized as guarantors of the environment (*Garant de l'Environnement* - RGE). Once the customer has contacted the RGE and wants to move forward with the renovation works, they must then contact a partner bank. Upon reviewing the application the bank will decide to lend the amount requested with a maximum of Euro 50,000. Historically, administration costs relating to eco-PTZ were high (to include forms signed by the companies carrying out the work, invoices and estimates).

Improvements to eco-PTZ: In 2022, the French Government committed to work with banks to simplify eco-PTZ administrative burdens through pooled verifications, and also launched a “renovation advance loan” (*prêt avance renovation*) enabling a deferral of renovation repayment until sale or an inheritance. In addition, the revised Climate and Resilience Law provides for a state guarantee fund for energy renovation (FGRE) to cover up to 75% of the bank’s risk of credit losses granted to poor and vulnerable households. This support is means tested and is targeted to help the elderly and low income families.



⁷⁶ Coolproducts. (2022). *IMPACT OF A BAN OF FOSSIL HEATING TECHNOLOGIES ON NECPS AND NATIONAL ENERGY DEPENDENCY*. Retrieved from https://www.coolproducts.eu/wp-content/uploads/2022/07/Coolproducts-gas-boiler-ban-2022_11-July-22.pdf

⁷⁷ French government. (2022). *Éco-prêt à taux zéro (éco-PTZ)*. [Website]. Retrieved from <https://www.service-public.fr/particuliers/vosdroits/F19905>

⁷⁸ Including: thermal insulation; installation, adjustment or replacement of heating systems or production of domestic hot water; installation of heating systems using a renewable energy source; installation of equipment for production of domestic hot water using a renewable energy source. Also condensing gas boilers are included.

⁷⁹ Crédit Agricole. (2021). *2021 ANNUAL FINANCIAL REPORT UNIVERSAL REGISTRATION DOCUMENT*. Retrieved from <https://www.credit-agricole.com/en/pdfPreview/192553>

⁸⁰ French Ministry of Energy Transition. (2022). *Éco-prêt à taux zéro (éco-PTZ)*. [Website]. Retrieved from <https://www.ecologie.gouv.fr/eco-pret-taux-zero-eco-ptz>

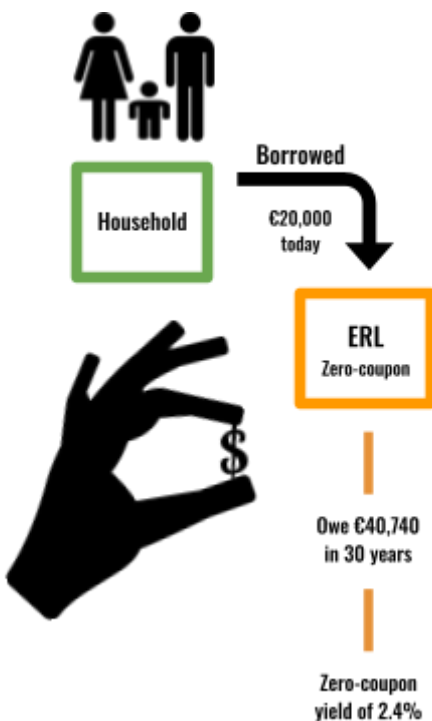


Consumer Perspective: ERL Affordability and Value for Money

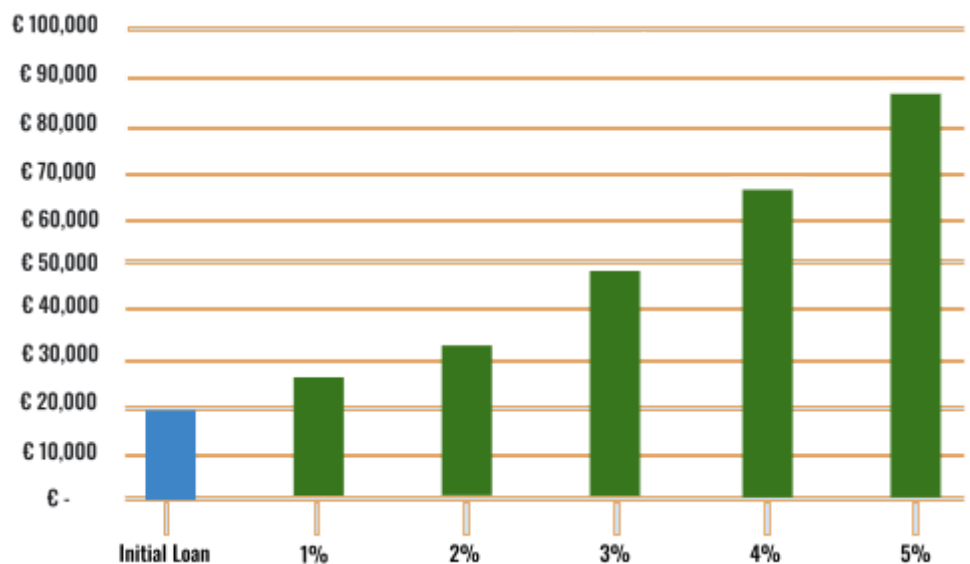
The ERL's affordability, defined as additional running (or monthly) costs for the household, is guaranteed through its zero-coupon structure. Until maturity, ERLs are net-income positive, as they fund a deep renovation (certified to save at least half of household energy consumption), and there are no cash payments required until the earlier of home sale, transfer or the 30 year maturity. For these reasons, ERLs are a way to alleviate increasingly income constrained homeowners, those newly at risk of energy poverty in these extraordinarily high energy prices, and pensioners for whom inflation and increasing energy prices are eating into their limited income flows.

An ERL's value for money (as introduced in the prior section) is related to its interest rate, the economic value of the energy savings generated, the green premium attracted by the home after the renovation and the rate at which the property itself increases in value over the life of the ERL. The following chart shows the final repayments after 30 years of €20,000 borrowed through an ERL at a series of cumulative interest rates from 1% to 5%. The power of cumulative interest rates is exponential, which means that the higher the rate the exponentially higher the final payment becomes.

At the time of writing, the EU's cost of 30 year debt is 2.4%⁸¹ on a current coupon yield-to-maturity basis (meaning normal yield with regular interest payments). If a household borrowed €20,000 today under an ERL zero-coupon structure, it would owe €40,740 in 30 years with a zero-coupon yield of 2.4%. Of course, with eTLTRO liquidity at rates set by the ECB, the ERL rate could be reduced further with extra ECB support.



ERL Repayments after 30 years vs Interest Rate



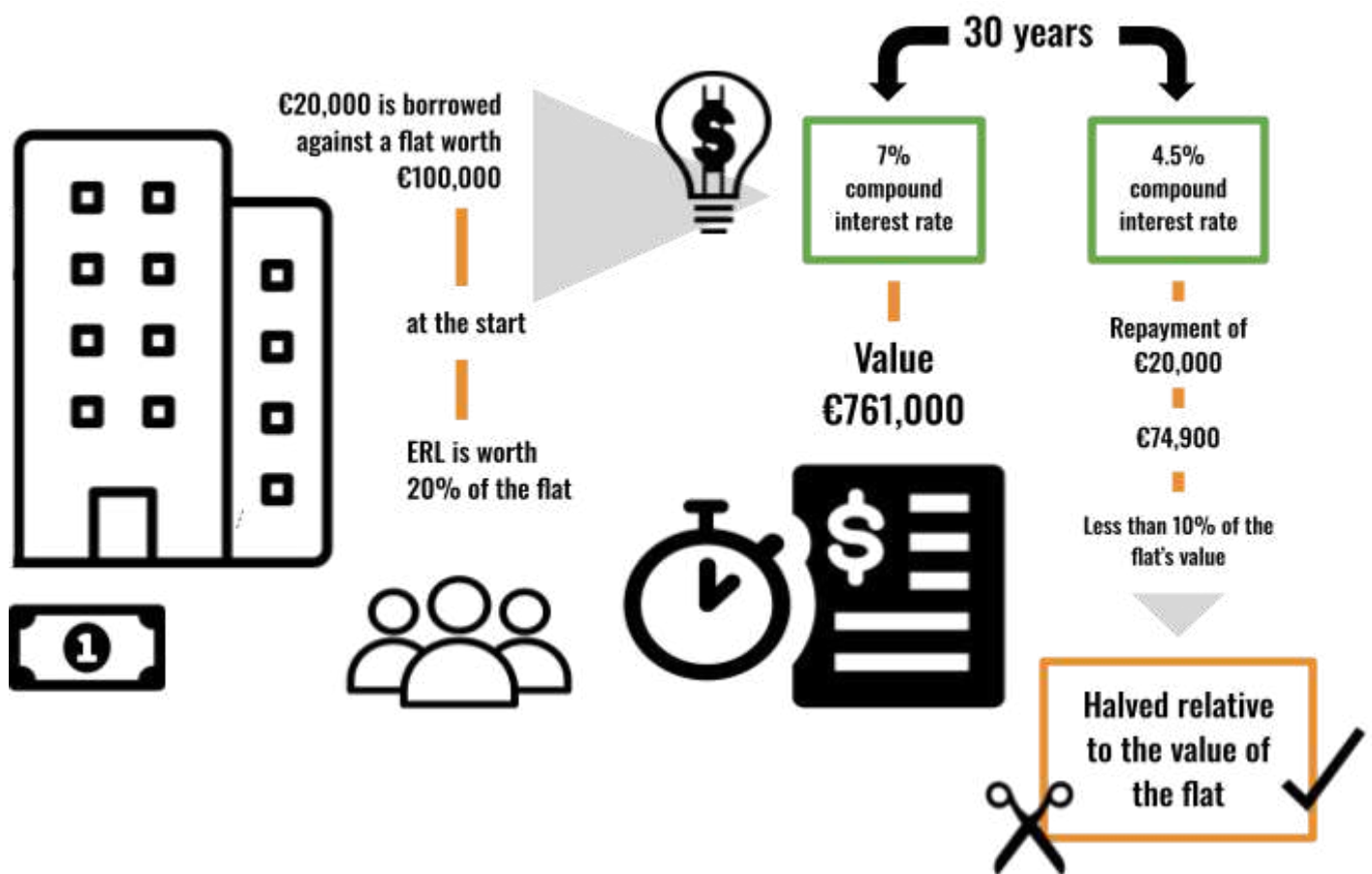
⁸¹ YCharts. (2022). *30-Year Eurozone Central Government Bond Par Yield Curve. 2.54% for Aug 25 2022*. [Website]. Retrieved from https://ycharts.com/indicators/30year_eurozone_central_government_bond_par_yield_curve#:text=30%20Year%20Eurozone%20Central%20Government%20Bond%20Par%20Yield%20Curve%20is, long%20term%20average%20of%203.08%25.



We argue that given long-term historical real rates of return on global housing of 7%, as shown in the longest data series' available to academia⁸², a collateralised ERL rate that is set below 7% is likely to generate a net positive “value-for-money” benefit for the homeowner. This will only be increased if high inflation rates continue in Europe. Clearly there may be exceptions, such as rural areas suffering de-population, but as an asset class, property has tended to rise in price aligned with other real assets (land, infrastructure, etc.) over the long-term.

However, the “sticker shock” of agreeing to repay €86,400 in 30 years for borrowing €20,000 (the repayment at 5% compound zero-coupon yield), may deter homeowners. Mathematically, if the difference between the rate at which the property increases is 2.5% higher than the ERL, the real amount of the ERL loan will halve over 30 years (relative to the then value of the home).

Capping the ERL fixed rate at 7% less 2.5% = 4.5% would ensure that half the ERL should be covered by property increases over 30 years even without “green premium”. In our prior example, where €20,000 is borrowed against a flat in Spain worth €100,000 – at the start the ERL is worth 20% of the flat. In thirty years, at a 7% compound interest rate, the flat will be worth €761,000. At a 4.5% compound rate the €20,000 borrowed as ERL would require a repayment of €74,900, this is less than 10% of the flat’s value – so it halved relative to the value of the flat. Given the possibility for the ECB to improve eTLTRO funding rates to enable lenders to lower ERL rates, it may make more sense to cap ERL rates at the ECB’s long-term inflation rate of 2%. As interest rates rise, ECB can decide to provide greater or lesser support to the ERL.

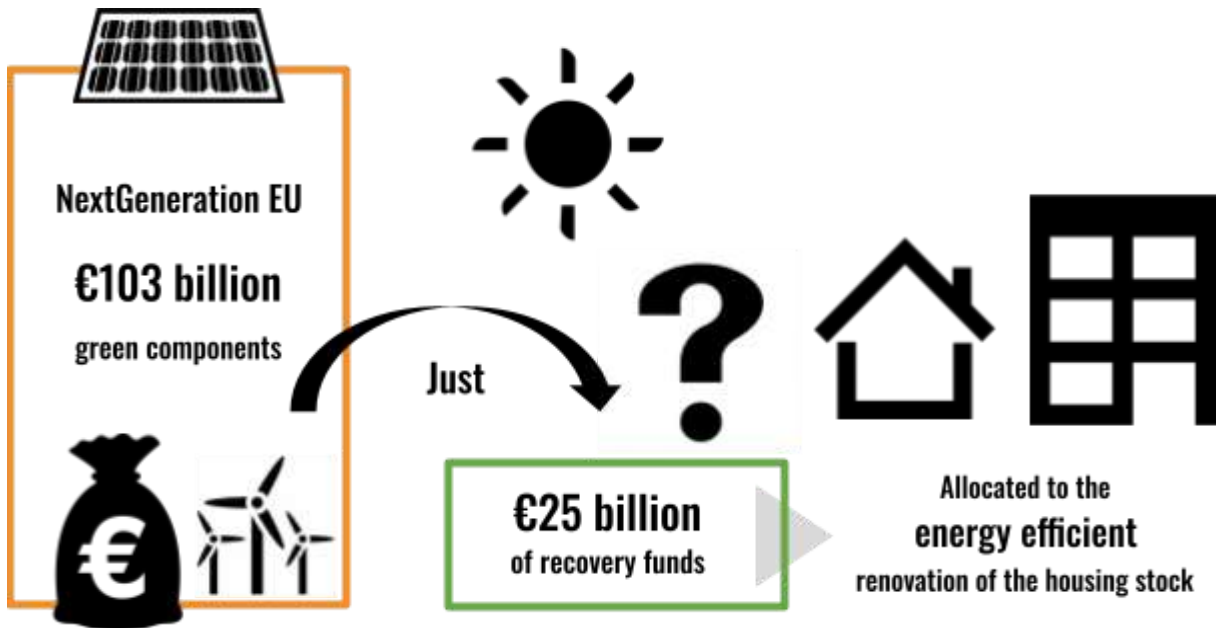


⁸² Jordà, Òscar, Katharina Knoll, Dmitry Kuvshinov, Moritz Schularick, Alan M. Taylor. 2017. “The Rate of Return on Everything, 1870–2015” Federal Reserve Bank of San Francisco Working Paper 2017-25. <https://doi.org/10.24148/wp2017-25>



EU Perspective: Efficient Delivery of EU Renovation Wave

Delivery of the EU Renovation Wave requires the deep renovation of more than 3.5 million building units a year, with an annual investment of €235 billion. In June 2020, the EU Commission estimated the energy efficiency investment gap in the EU as €185 billion⁸³. Even if the entirety of the €103 billion green components⁸⁴ of the NextGenerationEU recovery package were dedicated to just renovating buildings, there would be less than one year's supply of the required investment gap. At the time of writing, just €25 billion⁸⁵ of recovery funds have been allocated to the energy efficient renovation of the housing stock.



As shown during the financial crisis, in the Eurozone debt crisis and again to recover from covid-19, the EU has a powerful and low-cost access to the international debt capital markets, and the ECB can reduce borrowing rates in euro through quantitative easing, and provides liquidity to banks and stability to markets. The EU institutions can focus on the long-term, and – we argue – are therefore uniquely positioned to help Member States address a decade-long energy renovation investment gap of nearly a trillion euros. The success of the EU Renovation Wave, and through deep renovation, the provision of higher quality, more affordable and resilient homes, can help the millions of households at risk of energy poverty and in the midst of a cost-of-living crisis. The stimulation of local employment and a modernisation of the supply chain for deep renovation are other key benefits that accrue to the EU and its Member State governments.

⁸³ fi compass. (2020). *The potential for investment in energy efficiency through financial instruments in the European Union: Executive summary*. [Website]. Retrieved from

<https://www.fi-compass.eu/erdf/potential-investment-energy-efficiency-through-financial-instruments-european-union#:~:text=The%20renovation%20of%20buildings%20to,EUR%20185%20billion%20per%20annum>

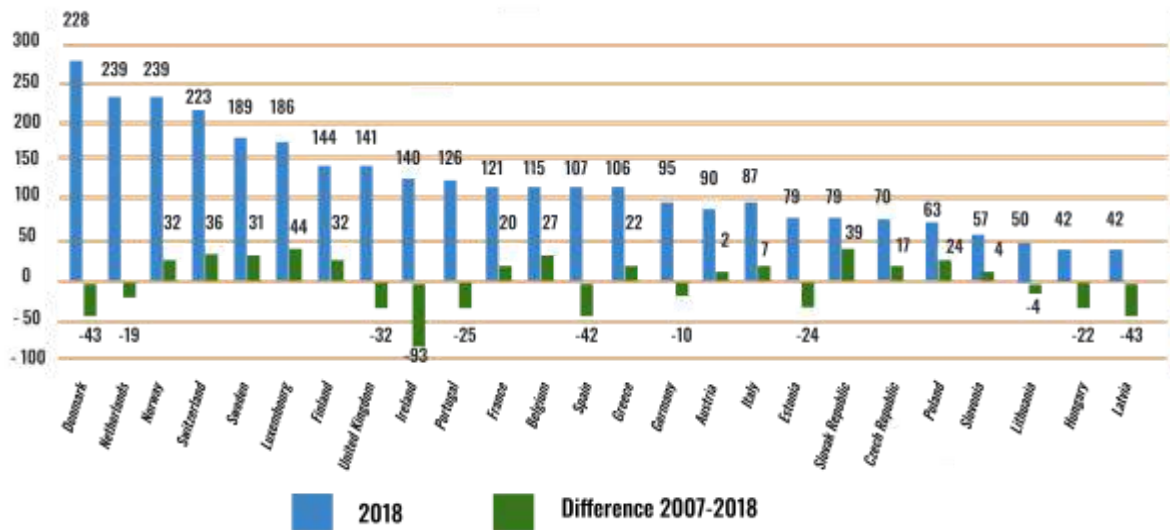
⁸⁴ European Commission. (2022). *NextGenerationEU Green Bond Dashboard*. [Website]. Retrieved from https://ec.europa.eu/info/strategy/eu-budget/eu-borrower-investor-relations/nextgenerationeu-green-bonds/dashboard_en

⁸⁵ Renovate Europe. (2022). *Monitoring the National Recovery and Resilience Plans*. [Website]. Retrieved from: <https://www.renovate-europe.eu/monitoring-the-national-recovery-and-resilience-plans/> and

E3G. (2021). *Renovate2Recover: How transformational are the National Recovery Plans for Buildings Renovation?* Retrieved from https://www.renovate-europe.eu/wp-content/uploads/2018/09/Renovate2Recover_Full-Study-1.pdf



Household debt (average levels and growth, 2007–2018)⁸⁶



Source: Author's own elaboration based on OECD, available at <https://data.oecd.org/hha/household-debt.htm>

For years, pundits have said “energy efficiency will be undertaken more when energy prices rise and the economic incentives to renovate become more appealing”. However, as we have explained, that would require homeowners to be logical economists with a good grip of financial maths, and to have an investment horizon of thirty years (for a deep renovation). Further, the knee-jerk reaction by Governments to rising prices has been to cap them (a largely fossil fuel subsidy for the most profligate energy users). While this may be the least bad option for the most vulnerable this winter, buildings renovation alone reaches into the core question of housing quality and long-term economic sustainability, rather than the band-aid of subsidised price subsidy. The ERL needs to provide lending conditions which up-scale consumer demand and bring high-street lenders to the table in segments that today are poorly served (elderly homeowners and young families who cannot access affordable finance for deep renovations).

Having identified the gap in the market, the EU can develop a new guarantee-based instrument that enables these homeowners, with no cash savings, nor current income repayment capacity, to unlock a deep renovation, without the need for a grant or direct subsidy. This has the potential to accelerate renovation action by over 50 million homeowners and encourage them to participate in the EU Renovation Wave, to improve energy security and support the cost effective delivery of EU Climate and Energy targets.



⁸⁶ Authors' own elaboration based on OECD data, source: European Parliament. (2020). *Policies to Ensure Access to Affordable Housing*. Retrieved from [https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652729/IPOL_STU\(2020\)652729_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652729/IPOL_STU(2020)652729_EN.pdf)



The two components of the ask at the EU level are: 1) Guarantee against non-repayment by borrowers if collateral is insufficient; and 2) Targeted longer-term refinancing operation (TLTRO) liquidity provision for ERLs when on lenders balance sheets. Both components are highly efficient alternatives to cash grants, and energy subsidies, of which there is insufficient overall long-term availability, and for which those with sufficient home equity saved can invest to avoid.



The proposed repayment guarantee will be called upon where the sale of the property, either voluntarily or as collateral in transfer or non-repayment, is insufficient to repay the principal mortgage (if present) and the outstanding balance of the ERL. From the EU perspective, the thinking behind and rationale for the provision of these credit and liquidity enhancements is as follows:

- **Risk of the EU Guarantee and its counterfactual:** With long-term returns on residential real estate being in the region of 7%⁸⁷, and providing there is initially sufficient home equity to cover the ERL amount, then claims under the guarantee are likely to be limited to properties which are stranded in the shifting patterns of regional populations, and malfeasance. While the chance of a call on the guarantee is limited, it is certainly non-zero, and with millions of ERLs extended each year, there will be problem loans that will require recovery, management and guarantee coverage – all undertaken by the lender (as well described in the InvestEU example guarantee term sheet⁸⁸). Even if this amount were 1% of the total and the loss rate on those ERLs was 100% (meaning that the sale of the collateral generated no returns to debt holders outside the principle mortgage), this still appears a small price to pay for the economic activity, increased taxation and delivery of the EU's climate and energy security objectives. The counterfactual alternative has public sources providing grants of 10-100x the size of that expected loss to make the economic returns at homeowner discount rates seem like a good deal.

⁸⁷ Jordà, Òscar, Katharina Knoll, Dmitry Kuvshinov, Moritz Schularick, Alan M. Taylor. 2017. "The Rate of Return on Everything, 1870–2015" Federal Reserve Bank of San Francisco Working Paper 2017-25. <https://doi.org/10.24148/wp2017-25>

⁸⁸ European Investment Fund. *Annex II: Direct Guarantee Termsheet*. Retrieved from https://www.eif.org/InvestEU/guarantee_products_calls/annex-ii-direct%20guarantee-termsheet.pdf



Backgrounder: The ECB's Targeted Longer-Term Refinancing Operations (TLTROs) programme is at present lending €1.75 trillion to banks at a negative interest rate. Although this programme is providing a subsidy to banks without environmental provisions, it can trigger energy efficiency lending for housing. The third TLTRO III programme's characteristics are:

- Consists of ten targeted longer-term refinancing operations.
- Maturity of three years.
- Borrowing rates can be as low as 50 basis points below the average interest rate on the deposit facility (from June 2020 to June 2022).
- As low as the average interest rate on the deposit facility, calculated over the life of the respective TLTRO III during the rest of the life of the same operation.

As of September 2021, TLTRO uptake reached €2.2 trillion, equalling close to 50% of the current liquidity excess in the Eurosystem. ECB President Christine Lagarde has expressed the bank's interest in considering a 'greening' of the TLTRO programme. If the EU were to establish a framework standardising energy efficiency renovation loans, this would be a precursor to this.

- **ECB Liquidity:** Since the euro-crisis, the ECB has provided liquidity to markets and banks with specific instruments that favour lending to the productive segments of the economy and households. Targeted longer-term refinancing operations (TLTROs) are the ECB's instruments that offer longer-term liquidity at favourable costs to lenders at favourable costs to boost their lending to businesses and consumers. As proposed by other authors and organisations, the TLTRO programme can be tweaked in order to support the EU's climate objectives⁸⁹. In this case, a new eTLTRO programme⁹⁰ could be specifically targeted at ERLs – boosting lenders' provision of deep renovation loans to homeowners. The eTLTRO programme would provide funding against pledged ERL collateral. The eTLTRO would offer lenders long-term refinancing loans at a cost below the ERL interest rate, meaning that while the ERL value increases at a zero-coupon compound interest of say 2.4%, the TLTRO line could provide funding for ERLs at a spread below that rate (e.g., say 1.5%), but with these interest payments paid to ECB in cash. This provides an attractive short-term liquidity facility to incentivise retail lenders to hold ERLs. ERLs have no cash interest income and to match fund ERLs, a lender would otherwise need to issue 30 year zero-coupon debt.

Retail lenders are unlikely to be able to raise 30 year zero-coupon debt at rates that match the EU's cost of funds, i.e. the rate at which their customers' interest is accruing. So rather than fund ERLs through relatively expensive capital markets operations which will lock-in a negative funding spread on the income generated by ERLs, guaranteed TLTRO liquidity can generate a positive funding spread (say 1-2%) and can provide liquidity based upon the market value of the ERL when used as collateral for TLTRO.

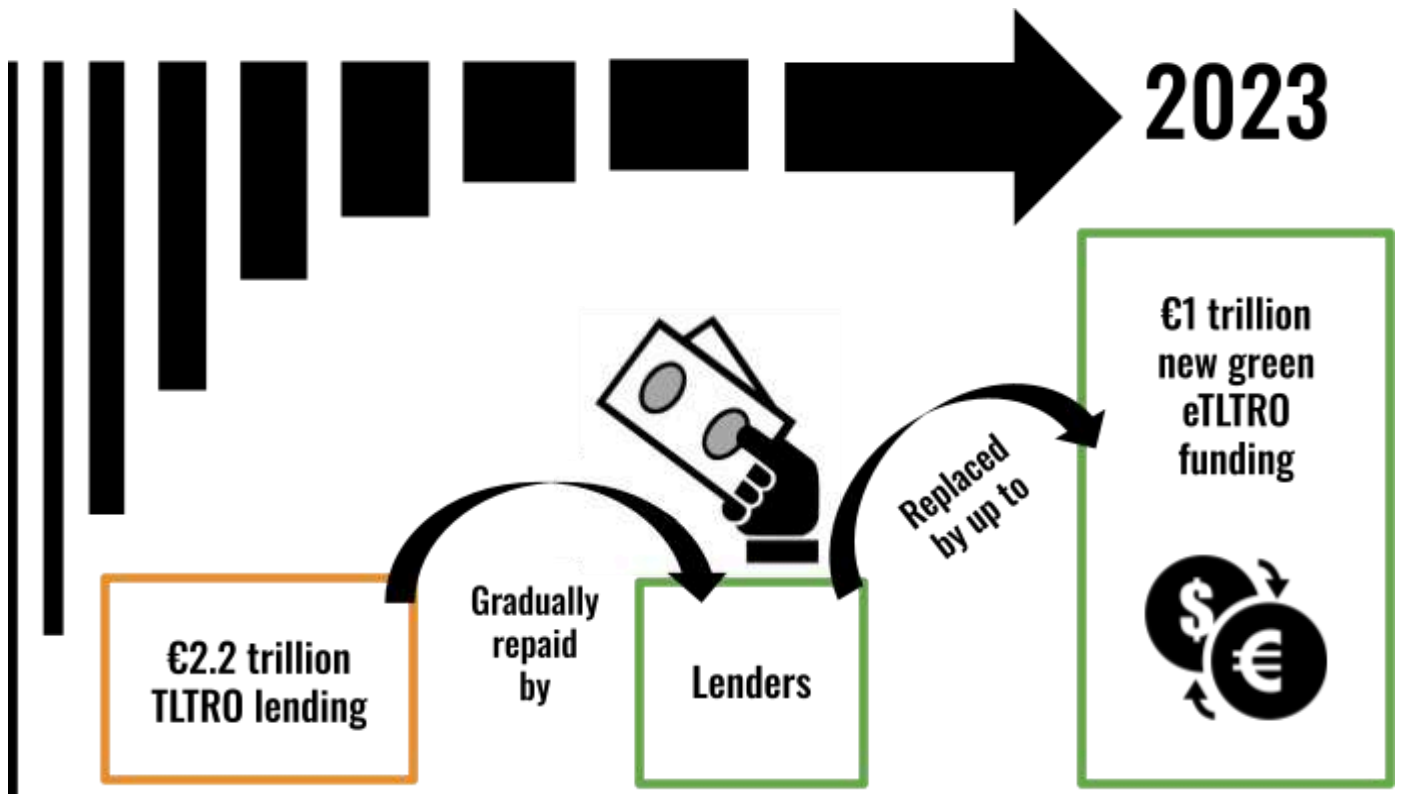
⁸⁹ Van 't Klooster, J. and van Tilburg, R. (2020). *Targeting a sustainable recovery with Green TLTROs*. [Website]. Retrieved from <https://www.positivemoney.eu/2020/09/green-tltros/>

⁹⁰ New Economics Foundation. (2022). *GREEN CREDIT GUIDANCE A GREEN TERM FUNDING SCHEME FOR A COOLER FUTURE*. Retrieved from https://neweconomics.org/uploads/files/NEF_GCG.pdf



This, of course, will expand the targeted use of the ECB's balance sheet by a maximum of the aggregate size of the present value of the outstanding ERLs. We argue that there is no better use for additional ECB liquidity than to support the deep renovation of Europe's homes, and that the targeting of a specific eTLTRO-qualifying ERL will have a more significant, material and targeted real economy and climate positive impact. We can project a period to 2030, where the existing €2.2 trillion TLTRO lending is gradually repaid by lenders to be replaced by up to €1 trillion new green eTLTRO funding.

Neither the EU, its institutions, nor Member State governments are operationally established to provide collateralised loans to tens of millions of EU citizens and recover that lending with accrued interest. Most public and National Policy Banks are wholesale lenders and are not set-up to efficiently lend to millions of homeowners. The EU Renovation Loan design draws upon the success and leadership of Germany's KfW in developing distribution relationships with German retail lenders for existing KfW renovation loans. However, not all banks and banking systems have the experience and capacities developed between German retail lenders and the KfW, and yet all retail lenders can distribute ERLs by combining the tools of EU Guarantee and ECB eTLTRO liquidity. The EU Renovation Loan, in effect, seeks to replicate and enhance the very successful KfW experience and extend it to all EU Member States, especially those without retail operationally equipped NPBs, to efficiently and innovatively finance an EU Renovation Wave.



CASE STUDY – KfW’s promotional support for energy efficiency in residential buildings

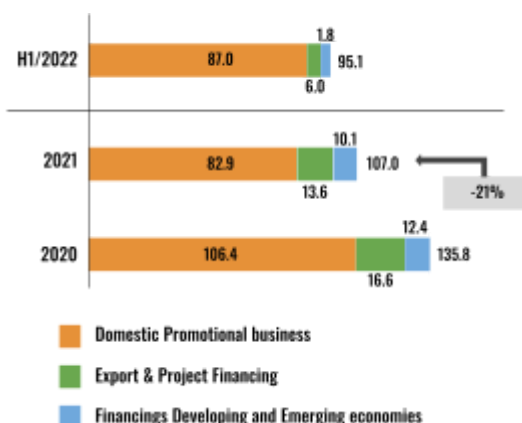
Germany is recognised as a benchmark for public-private collaboration in buildings energy renovation through its state backed KfW’s retail programme which widely became known under the name Energy Efficient Construction and Refurbishment, now the Federal Funding for Energy Efficiency in Buildings”. As a basic principle, the higher the efficiency level reached, the higher the promotional incentive granted. This drives customers to higher energy efficiency standards directly through collaboration with all German retail banks (via an on-lending model). The advantages of this KfW-model include:

1. No need for KfW to establish its own branch or customer network
2. Broad regional product availability
3. Neutrality with regard to competition with financing partners
4. Broad risk diversification

Launched in 2006, KfW has deployed close to €180 billion⁹¹ (loans and grants). As of 2021, the investment volume triggered by supporting energy efficiency in residential and non-residential buildings in Germany was €480 billion⁹² in total, benefiting 6 million housing units and securing 6 million jobs. The basic principles of the programme are:

- **Main reference point is prevailing building code.**
- **Scope of financial support linked to energy efficiency level.** The more ambitious the energy efficiency level reached with the investment measures, the higher the level of financial support from the programme.
- **Blending loans and grants:** The loans bear a very low interest rate. Although there have been changes over time in the bank’s promotional level, at the onset of the programme, an important promotional element stemmed from a grant component blended with the loan.
- **Mandatory involvement of an energy expert:** Applying for public financial support for residential as well as non-residential buildings requires the involvement of an energy expert from a dedicated pool of experts⁹³. This ensures that customers are comfortable with the steps to take for the success of the energy efficiency works, as well as the proper use of public funds to achieve a high degree of energy efficiency quality in buildings.
- It is to be noted that the promotional product offer will experience structural changes in 2023.

KfW financings (in EUR bn) highlights⁹⁴:



H1/2022

- Very strong increase in new lending volume (+91% YOY)
- Domestic lending increased significantly due to **strong demand for energy efficient housing** and short-term financial assistance to secure liquidity of energy utilities

FY 2021

- KfW’s domestic lending increased significantly YOY due to **strong demand for energy efficient housing**.

⁹¹ KfW. (2021). *Start of the year press conference*. [PPT presentation]. Retrieved from <https://www.kfw.de/Presse-Newsroom/Pressetermine/JAPK-2021/Presentation.pdf>

⁹² Ibid.

⁹³ Energie Effizienz Experten. (2022). [Website]. Retrieved from <https://www.energie-effizienz-experten.de>

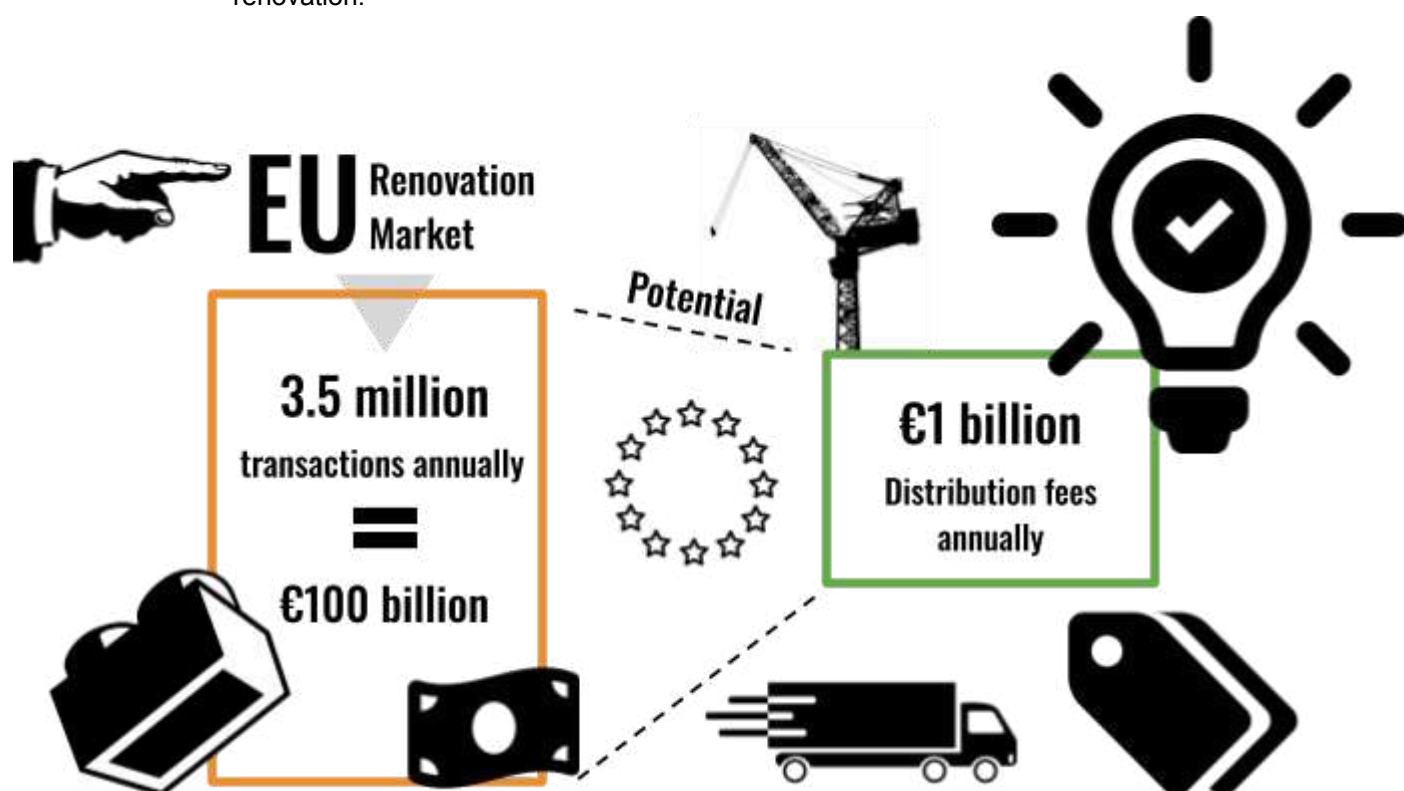
⁹⁴ KfW. (2022). *Rely on the safe haven*. [PPT presentation]. Retrieved from <https://www.kfw.de/PDF/Investor-Relations/Pdf-Dokumente-Investor-Relations/KfW-Investor-Presentation.pdf>



Lenders' Perspective: Portfolio greening, risk reduction and origination fees

The ERL provides retail lenders the opportunity to collect fees for distributing ERLs to customers who otherwise cannot access mortgages or who don't have any income headroom to be able to afford traditional monthly interest payments. Further, the ERL provides lenders a product to "green" their existing property collateral against which their current mortgages are lent – improving credit quality and energy performance of the whole portfolio. Given evidence⁹⁵ to suggest that defaults and arrears are less probable for energy efficient homeowners, this can free-up existing regulatory capital provisions and open windows for more collateralised green mortgage bond issues, thereby lowering cost of funds⁹⁶. Finally, the capital weighted returns on ERLs should be attractive given the EU guarantee against recovery losses, and the low cost liquidity provided for ERL portfolios from ECB via a targeted eTLTRO programme that provides an additional upside from cheap funding.

Leading lenders should want to be the first to offer such appealing ERL financing conditions to their homeowner customers before a competitor does. In the EU, the energy renovation market potential is 3.5 million transactions annually valued at over €100 billion. In fee terms that is around €1 billion of distribution fees annually, assuming a one-time origination, structuring and administration fee of 1% - which can be set competitively to cover these transaction costs, as well as verification that the use of proceeds is for a deep renovation.



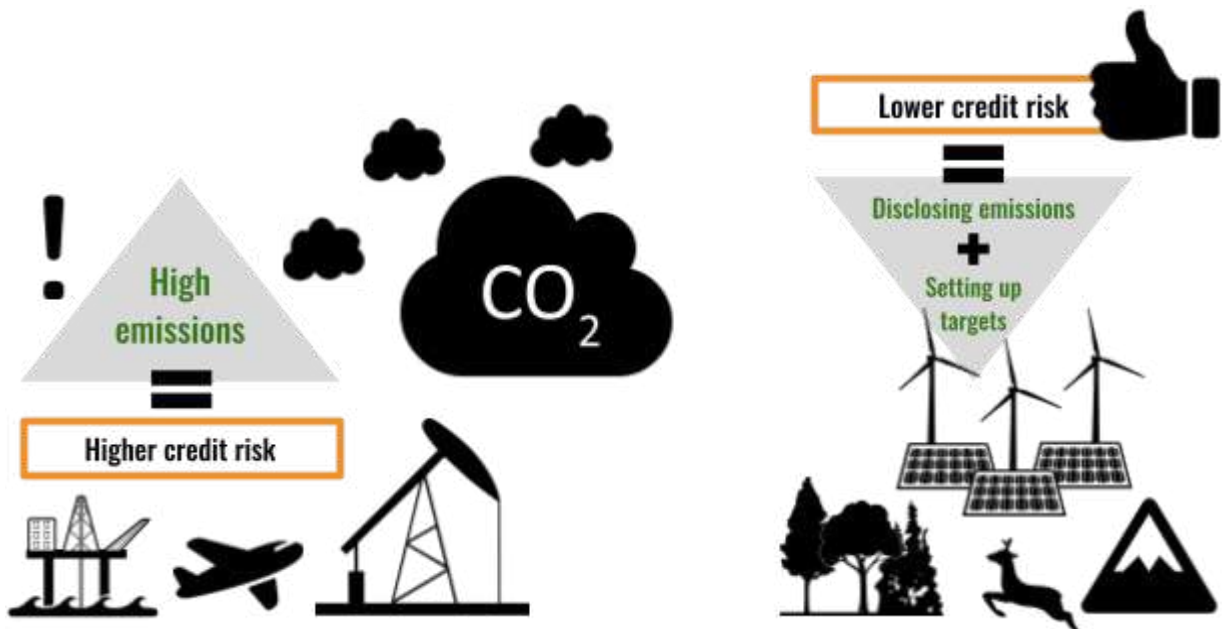
⁹⁵ European Commission, Directorate-General for Energy, *The quantitative relationship between energy efficiency improvements and lower probability of default of associated loans and increased value of the underlying assets : final report on risk assessment*, Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2833/532126>

⁹⁶ Dorfleitner, G., Utz, S. & Zhang, R. The pricing of green bonds: external reviews and the shades of green. *Rev Manag Sci* 16, 797–834 (2022). <https://doi.org/10.1007/s11846-021-00458-9>



Finally, with many new buyers requesting reasonably high loan-to-value (LTVs), under the Capital Requirements Directive IV (CRD4) these are more "expensive" on bank capital (given a gradual change in the LTV/risk weights ratio under Basel/CRD) and high LTVs are also excluded from "prime" mortgage securitisations. This could potentially be addressed by offering lower primary LTVs plus ERLs to cover the renovation package provided the ERL second mortgage is not included in the calculation of the primary LTV. This aligns with Capital Risk Requirements assertion that "Modifications made to the property that improve the energy efficiency of the building or housing unit shall be considered as unequivocally increasing its value."⁹⁷

Recent ECB research⁹⁸ discovered that high emissions tend to be associated with higher credit risk, and that disclosing emissions and setting a forward-looking target to cut emissions were both associated with lower credit risk, and with the effect of climate commitments tending to be stronger for more ambitious targets. Further, it is already apparent to those lenders running climate risk assessments of their mortgage portfolios that real estate is uniquely exposed to climate risks⁹⁹.



When asked by the ECB to provide the EPC data on mortgages, only 37% of data could be provided by banks and much relied on proxies for EPCs (and not the real thing). In August 2022¹⁰⁰, the ECB said that while there are some structural challenges preventing the collection of all data, certain banks were not doing everything they can to collect data, within these structural constraints. This directly speaks to the need to include a greater focus on the energy transition risks of mortgaged property, and for the inclusion of EPCs in the standard data and documents regulated by the Mortgage Credit Directive.

⁹⁷ "Modifications made to the property that improve the energy efficiency of the building or housing unit shall be considered as unequivocally increasing its value.," Sourced from: European Commission. (2021). Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulation (EU) No 575/2013 as regards requirements for credit risk, credit valuation adjustment risk, operational risk, market risk and the output floor. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0664>

⁹⁸ European Central Bank. (2020). *Working Paper Series Whatever it takes to save the planet? Central banks and unconventional green policy.* Retrieved from <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2500-f7a50c6f69.en.pdf>

⁹⁹ S&P. (2022). *A Bank Evaluates the Impact of Physical Climate Risk to its Mortgages.* [Website]. Retrieved from <https://www.spglobal.com/esg/case-studies/a-bank-evaluates-the-impact-of-physical-climate-risk-to-its-mortgages>

¹⁰⁰ European Central Bank. (2022). *Commercial real estate: connecting the dots.* [Website]. Retrieved from <https://www.bankingsupervision.europa.eu/press/publications/newsletter/2022/html/ssm.nl220817.en.html>



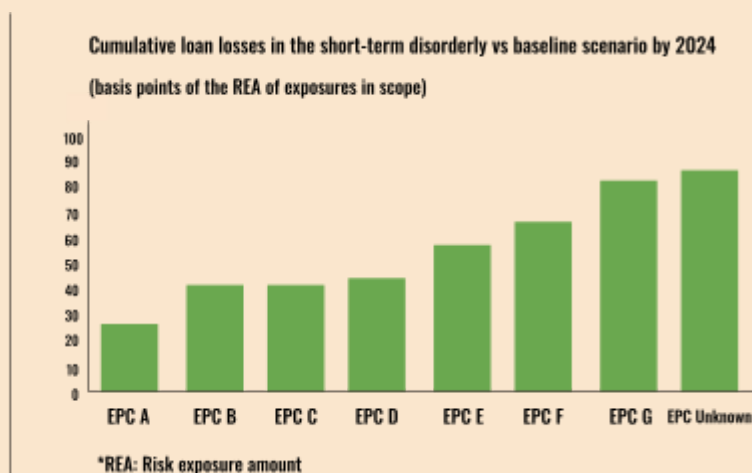
EBC stress test – factoring in the energy performance of buildings¹⁰¹

The July 2022 EBC results of their climate stress test incorporated for the first time the analysis of banks' exposure to risks of mortgage default by taking into account the energy performance of buildings. 108 participating banks shared their data into the stress test model. This included the energy efficiency of the houses they mortgage namely:

- Energy performance certificates (EPCs)
- Or by using proxy data: energy bill payments, date of construction, or the size of the property

The test results indicate that banks are not paying enough attention to climate risks. Little improvements have been made since the 2020 exercise. Moreover, the results highlight the strong correlation between the energy efficiency of properties and credit risks. As shown in the chart, impairment losses are three times higher for those properties with an “G”-rated EPC than for those with an “A”:

Impairment losses for each EPC rating class higher in the short-term disorderly scenario than in the baseline



Source: Bank submissions and ECB calculations

European lenders who are committed under the UN's net-zero banking alliance¹⁰² (via GFANZ), or who have Science Based Decarbonisation targets¹⁰³, need to provide support to their customers to improve the energy efficiency and resilience of their homes. This requires an individual risk assessment of the transition and physical risks to each property, and then a funded solution package. Such alignment processes of mortgage portfolios with decarbonisation and climate commitments is underway among leading banks¹⁰⁴, and increasingly encouraged through a standardised approach referred to in the recast European Buildings Performance Directive as a Mortgage Portfolio Standard, as explained in the next page,

¹⁰¹ Postive Money. (2022). *TO AVOID ANOTHER SUBPRIME CRISIS, BANKS MUST HELP CONSUMERS TO RENOVATE THEIR HOMES*. [Website]. Retrieved from <https://www.positivemoney.eu/2022/07/ecb-climate-stress-test-energy-efficiency/>

¹⁰² UNEP FI. (2022). *Net-Zero Banking Alliance*. [Website]. Retrieved from <https://www.unepfi.org/net-zero-banking/members/>

¹⁰³ Science Based Targets. (2022). *FINANCIAL INSTITUTIONS*. [Website]. Retrieved from <https://sciencebasedtargets.org/sectors/financial-institutions>

¹⁰⁴ Climate Strategy & Partners. (2021). *Underwriting the Renovation Wave with Mortgage Portfolio Standards for Energy Efficiency*. Retrieved from https://climatestrategy.com/en/informe_20.php



CASE STUDY – Mortgage Portfolio Standards (MPS)

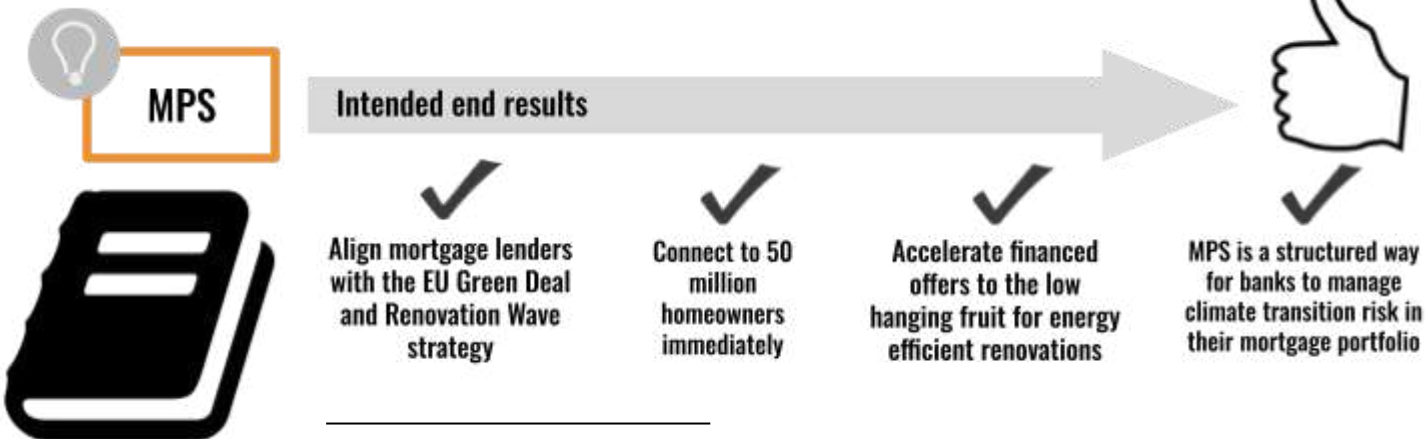
A Mortgage Portfolio Standard (MPS)¹⁰⁵ is a regulatory mechanism that requires and supports mortgage lenders to work with their clients to increase the energy performance of the buildings which back their mortgages along a science-based trajectory. MPS was introduced in the December 2021 recast of the EPBD¹⁰⁶ and has been amended in Parliamentary debates and the EP version reads as follows:

EPBD amended Definition 36. 'mortgage portfolio standards' means mechanisms **requiring any** mortgage lenders **including banks, investors, mortgage debt holders, and any other relevant financial institutions** to increase the median energy performance of the portfolio of buildings covered by their mortgages and to **ensure affordable and evidence-based solutions for their** potential clients to make their property more energy-performant **and less carbon emitting while factoring in improved solvency from energy retrofit to assess the resulting debt ratio, with particular regard to the worst performing buildings, in accordance with** the Union's decarbonisation ambition and relevant energy targets in the area of energy consumption **and the life-cycle GWP of buildings provided for in this Directive;**

Portfolio standards are proven regulatory tools that have been deployed in reducing US power (via RPS) and EU and US transport emissions (via fleet emissions standards (FES)). FES in Europe are expected to reduce car and van emissions by 15% by 2025 (and over 30% by 2030),¹⁰⁷ and Renewable Portfolio Standards (RPS) are responsible for around half of all US renewable energy production (some 82 GW¹⁰⁸).

MPS are being used voluntarily to reduce climate transition risks in mortgages by leading banks in the Netherlands and in the UK. With a loan portfolio of €185 billion¹⁰⁹ for residential and commercial property (2/3 of its balance sheet), ABN AMRO finances over 10% of the buildings in the Netherlands. By 2030, ABN AMRO intends for its commercial real estate and entire residential mortgage portfolios, and branch network, to have an "A" weighted average energy performance label. Its interim goal for 2025 is for the bank's real estate portfolio to have a "C" label.

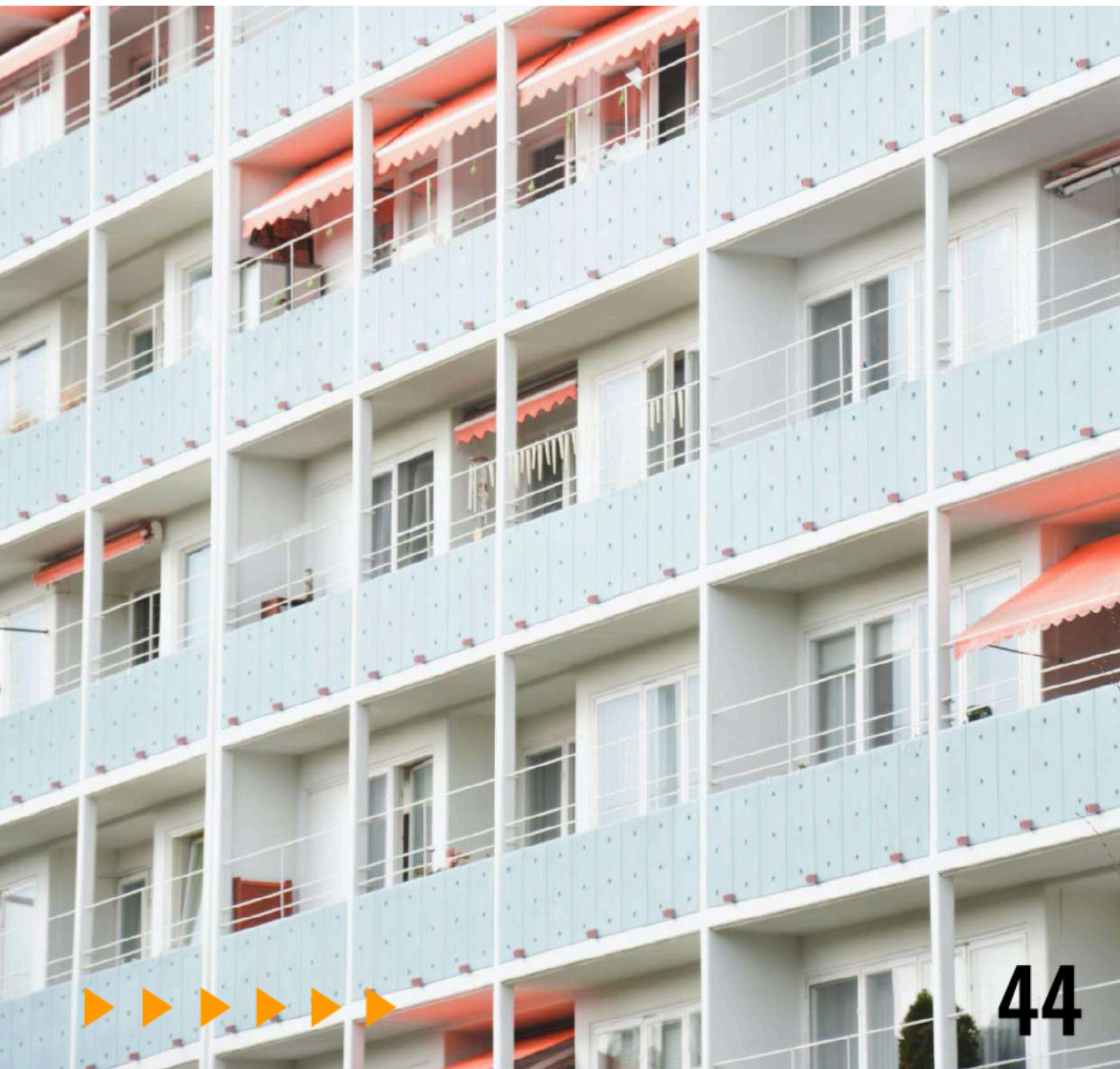
The UK Government recognises the unique position that lenders have to influence their clients' perspective on energy performance at critical trigger points, such as home purchase, upgrade, or re-mortgage. Moreover, UK lenders are developing a renovation market as a way of reducing the risk of homes becoming stranded assets as minimum energy performance standards become stricter. In the UK, mandatory disclosure of energy performance for all registered mortgage lenders will be required on their websites (and to Government) annually, and UK lenders are expected to agree to voluntarily meet an average MPS of EPC level C by 2030.



¹⁰⁵ Climate Strategy & Partners.. (2021). *Underwriting the Renovation Wave with Mortgage Portfolio Standards for Energy Efficiency*. Climate Strategy & Partners. Retrieved from: https://climatestrategy.es/en/informe_20.php
¹⁰⁶ European Commission. (2021). *Questions and Answers on the revision of the Energy Performance of Buildings Directive*. [Website]. Retrieved from https://ec.europa.eu/commission/presscorner/detail/en/QANDA_21_6686
¹⁰⁷ European Commission. (2021). *CO₂ emission performance standards for cars and vans (2020 onwards)*. Retrieved from: https://ec.europa.eu/clima/policies/transport/vehicles/regulation_en
¹⁰⁸ Berkeley Lab. (2021). *U.S. Renewables Portfolio Standards 2021 Status Update: Early Release*. [PPT presentation] Retrieved from https://eta-publications.lbl.gov/sites/default/files/rps_status_update-2021_early_release.pdf
¹⁰⁹ ABN AMRO. (2017). *ABN AMRO helps clients improve the sustainability of their homes*. Retrieved from <https://www.abnamro.com/en/newsroom/press-releases/2017/abn-amro-helps-clients-improve-the-sustainability-of-their-homes.html>



From a lender's perspective, the current energy crisis is also arguably an ideal time to launch a deep renovation finance support programme that targets client segments who would not qualify for, or who could not afford, traditional mortgage or renovation products. This can provide the elderly and families starting on the housing market a unique opportunity to renovate today to cut energy consumption in half and pay later when they sell or transfer their homes. ERLs can surely be dressed-up in a lender branded programme which allows the ERL originator to benefit from the positive reputational benefit of providing needy clients with a highly affordable way to upgrade their homes, as a way to insulate them from the unravelling cost of living crisis.

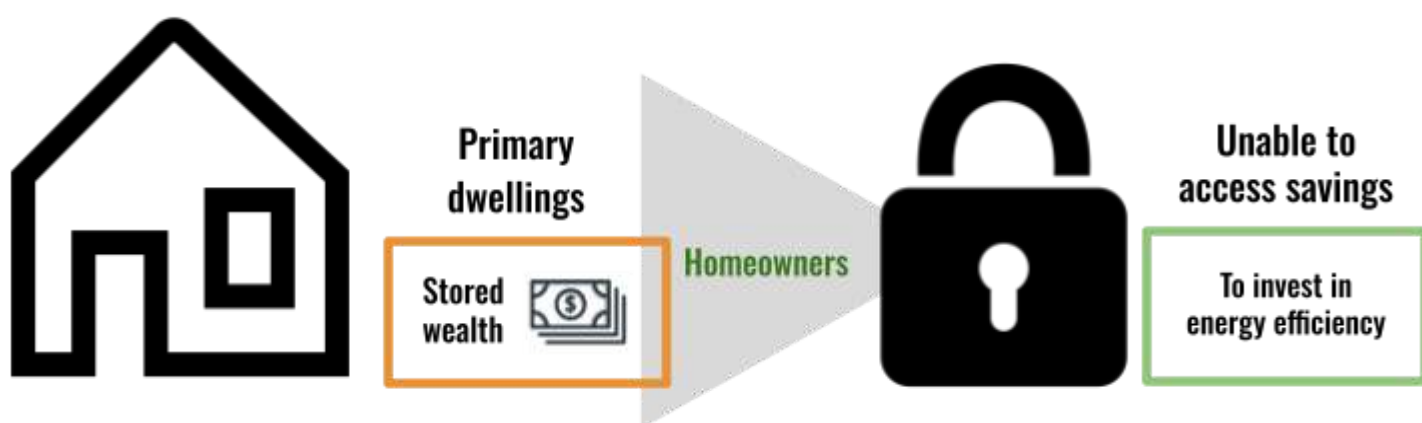


Summary: ERLs can showcase a collaborative, long-term EU Institutional Response to the Energy Crisis

Europe's energy crisis clearly highlights the continent's dependence on energy imports, but it also highlights two decades of lack-lustre investment in buildings' energy efficiency. The average EU home still uses up to four times the amount of energy as a new near-zero energy building (nZEB) built in the same location¹¹⁰. As energy prices spiral up, homeowners are surrounded by ways to reduce their energy bills from LEDs, intelligent thermostats, heat pumps, onsite solar water heating, PV, improved insulation, load shifting and smart controls.

In this context, and to re-power the EU in the winter of 2022, individual Governments are preparing subsidy and sufficiency measures including energy caps, VAT holidays for electricity and imposing temperature controls. This may be the only way to support the energy poor at such short notice, but it is not economically sustainable, and it's not energy efficiency. Sufficiency and subsidy can only buy time to establish a more concerted, long-term response to address the root-cause of energy dependency and inefficiency, and directly address out-of-control household bills through permanent demand reduction.

Homeowners with stored wealth in their primary dwellings are currently unable to efficiently access these savings to invest to upgrade the energy performance of their home. Many homeowners do not make these changes as they can't get or afford additional consumer debt, or they view the additional debt service costs of traditional borrowing as too costly compared to the uncertain returns on a deep renovation. This presents a unique opportunity for EU institutions to collaborate to fill this market-failure and affordable renovation financing gap in the same way as the EU supported Member States through a concerted financial response to boost a common covid-19 economic recovery. Even undrawn recovery loans and EU borrowing capacity could be converted into guarantees for ERL funding. An EU Renovation Loan can extend EU-credit to the elderly and hard working families to upgrade their homes and thereby enable them to act to insulate themselves from the cost of living crisis and further energy shocks.



¹¹⁰ Ener Data. (2022). *Evolution of households energy consumption patterns across the EU*. [Website]. Retrieved from <https://www.enerdata.net/publications/executive-briefing/households-energy-efficiency.html>



The components of the ERL are already documented and being used for other purposes, and we argue that the concerted building and promotion of a new EU-back financial instrument for citizens, promoted by all retail lenders operating in the EU can spur new engagement from the 35 million households required for a EU Renovation Wave. It will require an historic degree of institutional collaboration between EU Commission, the ECB and private lenders to launch and market the ERL, but this can largely be done within the supportive framework of the “fit for 55” package and without drawn-out legislative procedures. Alongside instrument design, the distribution of the ERL and the provision of support to homeowners in the contracting and delivery of a deep renovation also requires upgraded intra-governmental collaboration. For these reasons the next chapter describes an ERL Facilitation Framework which can be developed in parallel and can ensure value for money and the achievement of the outcomes anticipated by policymakers in the EU Renovation Wave.



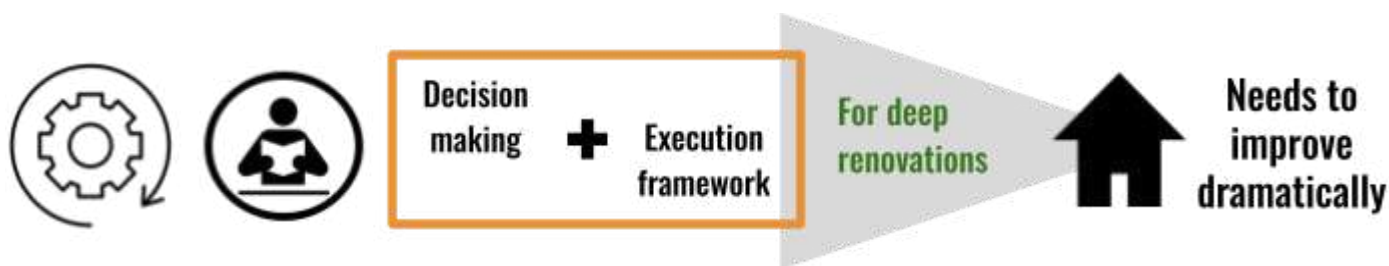


The ERL Facilitation Network

3. The ERL Facilitation Framework

The housing sector has the largest investment needs in the EU because it has a low energy performance and the rate of deep renovation remains very low. A recent study¹¹¹ suggests that the total investment in the greening of buildings needs to reach around €300 billion per year by 2030, over twice the current levels, and more focused on energy performance. Yet, consumers perceive renovation as complex¹¹², time-consuming and pricey. Homeowners are generally unable to appreciate and understand the multiple elements of a deep renovation, and so they need a party they can trust¹¹³ to manage and carry out the renovation process. These hurdles must be addressed through an appropriate operational and support framework in the context of the promotion of the EU Renovation Loan, to deliver its full potential.

The EU Renovation Loan instrument has the capacity and features to appeal and, when supported by local mortgage lenders, can address over 50 million homeowners. Yet, for the ERL to be a success, the decision making and execution framework for deep renovations needs to improve dramatically to be able to process and deliver millions of deep renovations annually that save over 60% of individual home energy use per project. Through the ERL, the 5,000+ credit institutions¹¹⁴ operating in Europe can provide much-needed rationalisation resources that are key to supporting the roll-out of the ERL.



In interviews over years with successful renovation lenders, we repeatedly noticed two core successes of those businesses from Pennsylvania to Paris: Firstly, the lender needs a specialist central team that understands renovation (like they may have a renewables team), and secondly they need to build-out a trusted network of local contractors. Renovation isn't rocket-science, but it isn't as easy as installing rooftop PV. Internal and external momentum are created by a lender positioning itself ahead of a renovation marketing drive to support customers and green a mortgage book.

One example can be seen with mortgage lenders using AI-machine learning to build 3D models, and estimate the energy performance of the homes they lend against, especially in countries where the Energy Performance Certificate (EPC) wasn't publicly available for all buildings, like Germany¹¹⁵ and Spain¹¹⁶. Furthermore, many lenders (including ING, BBVA, Banco Santander) provide renovation and visualisation tools to their customers. We further expect EU Member States to increasingly develop and certify independent experts (like

¹¹¹ Centre for European Reform. (2022). *How to make EU fiscal rules compatible with net zero*. Retrieved from https://www.cer.eu/sites/default/files/pbrief_fiscal_rules_9.5.22.pdf

¹¹² IEA. (2022). *Accelerating energy efficiency: What governments can do now to deliver energy savings*. [Website]. Retrieved from <https://www.iea.org/commentaries/accelerating-energy-efficiency-what-governments-can-do-now-to-deliver-energy-savings>

¹¹³ Ibid.

¹¹⁴ European Banking Federation. (2020). *Banking in Europe: EBF Facts & Figures 2021*. Retrieved from <https://www.ebf.eu/wp-content/uploads/2022/01/FINAL-Banking-in-Europe-EBF-Facts-and-Figures-2021.-11-January-2022.pdf>

¹¹⁵ Skendata. (2022). *About us*. [Website]. Retrieved from <https://www.skendata.de/about-us/?lang=en>

¹¹⁶ Sociedad de Tasación de España. (2022). [Website]. Retrieved from <https://www.st-tasacion.es/es/inicio.html>

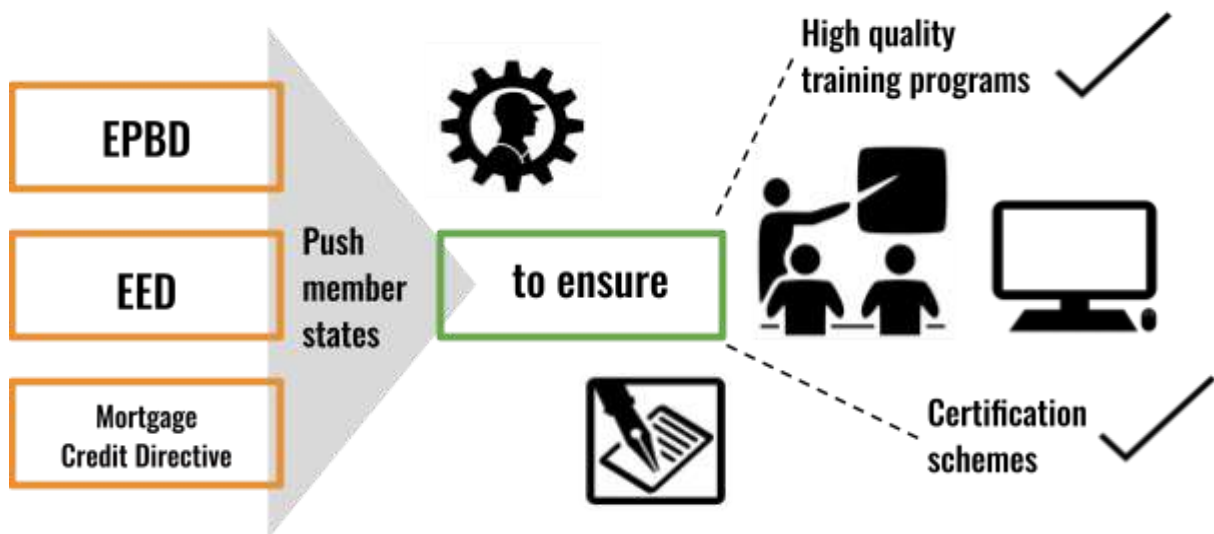


Germany does) and renovation professionals who can undertake energy audits and also access buildings energy data to prepare, price and execute a deep renovation.

German energy agency DENA has built a network of 13,000 Government accredited energy experts¹¹⁷ that work with retail banks and state bank KfW to prepare home renovation projects and finance them. These “independent renovation advisors” prepare a technical project, can help arrange financing and are required to co-sign loans as testament to their inputs, interest and as a reference in case the project doesn’t deliver. This network is in part funded by the Government and is an invaluable tool for those German lenders without technical experience who need to ensure that the renovations offered to their clients meet certain standards. To ensure an ERL actually delivers the 50%+ energy cost saving promised in order to qualify for the EU guarantee, these expert networks need to be extended across all Member States. For example, if we assume a qualified renovation project manager could deliver, say, ten deeply renovated buildings per year, then the renovation wave of 35 million European building units, over a decade, will require several hundred thousand accredited project managers across the 27 EU Member States. We are far away from this reality today.

Growing the market for ERLs to fund deep renovations requires the upskilling of the EU renovation workforce, as well as new certified renovation advisors. EU legislation, including EPDB, EED and the Mortgage Credit Directive, can together push Member States to ensure that a sufficient number of high-quality training programs and certification schemes are made available, but these local teams will need better digital structures and coordination to deliver millions of deep renovations annually. Again, retail lenders offering ERLs will be incentivised to identify and support those agents (with product maps, financial training, and technical tools) and networks doing a good job and the design and refit needs of different regions where their homeowner clients are concentrated.

Project managers and firms who successfully complete high performing energy efficient renovations funded by ERLs and have satisfied customers should benefit from publicity (potentially through a TrustMark, one-stop shop or rating service) and from a stronger pipeline from local ERL originators. This will help create a drive for quality, stimulating innovation, accelerating the uptake of new smart technologies and materials to reduce deep renovation costs, improve execution processes and make success more evident and measurable.



¹¹⁷ DENA. (2022). Retrieved from *Expertinnen und Experten für effiziente Gebäude finden*. [Website]. <https://www.dena.de/themen-projekte/energieeffizienz/gebaeude/beraten-und-planen/energieeffizienz-expertenliste/>



CASE STUDY - How an ERL can inject

much needed energy into Spain's home renovation market

After buying a home, the purchase of a new car is the single most valuable household transaction. In Spain in 2020, over one million new cars were purchased, and 20% of these were financed at point of sale through a “renting” contract¹¹⁸. With an average value of €19,000, Spanish residents spent over €17 billion on new cars in 2020¹¹⁹, yet the Spanish market for home renovations didn't reach €1 billion. Even at its theoretical peak in the 2014 Government submitted long-term renovation strategy (ERESEE) home renovation investment was expected to reach €10 billion per year, for 300-400,000 integral home renovations. Buying a new car is clearly easier, and more desirable, than home energy renovation for Spaniards even though the car leasing costs are 7-10% per annum and a new car's value depreciates immediately as you drive away from the dealer. There is clearly no strong “savings” motive to new car acquisition.

Surveys undertaken in Spain, and other EU member states¹²⁰ suggest that access to finance is the main obstacle to undertaking building renovation. In Spanish town Olot, 70% of all respondents reported that lack of financing and of technical knowledge about the complexity of the works prevented them from renovating their homes¹²¹. Clearly, something needs to be done to support the identification of the funding and financing for integrated deep home renovation, and to smooth the execution of a massive emergency renovation response to the energy security crisis created by the conflict in the Ukraine.



Looking back, Spain (as documented in its ERESEE 2014) had expected to renovate 2 million homes by 2020 with €9.5 billion of public funds and €45.4 billion of private finance¹²². €9.5 billion of public funds were never made available to homeowners, and even the most successful renovation programme (PAREER-CRECE) managed by IDAE allocated just a few hundred million euros. Now, Spain has access to historic European recovery Next Generation EU funds and its Recovery Plan has set the objective to target €6.8 billion of these funds for building renovation in the next 3 years¹²³. While this must address energy poverty, which is only exacerbated during times of high prices¹²⁴, it can also be used to engage other actors in the private sector whose interests are increasingly aligned to enable building renovations to save gas and provide energy security. To improve the rate of financing and funding integrated energy renovations, the following actions will help:

¹¹⁸ Asociación Española de Renting de Vehículos. (2020). *Memoria Anual*. Retrieved from: <https://www.ae-renting.es/libros2021/index.html#p=56>

¹¹⁹ Agencia Tributaria. (2021). *Matriculación de vehículos por origen y cilindrada*. Retrieved from: https://www.agenciatributaria.es/AEAT/Contenidos_Comunes/La_Agencia_Tributaria/Estadisticas/Publicaciones/sites/matriculaciones/mes/jrubikf6a241f294349b5d223669fa3fbc23f77e77db4d0.html

¹²⁰ European Climate Foundation. (2022). *European citizens willing to renovate their home but held back by investments to be made*. [Website]. Retrieved from

<https://europeanclimate.org/resources/european-citizens-willing-to-renovate-their-home-but-held-back-by-investments-to-be-made/>

¹²¹ Ipsos. (2019). *Uncover the underlying motivations and barriers for energy efficient renovations*. Retrieved from:

<https://www.ipsos.com/sites/default/files/2019-03/ipsos-full-report-en.pdf> and Klimovich, K. (2020). *Accelerating Home Renovation*. C4E. Retrieved from: https://c4eforum.net/kristina-klimovich-accelerating-home-renovation/#_ftn4

¹²² MITMA. (2014). *Long-term Strategy for Energy Renovation in the Building Sector in Spain pursuant to Article 4 of Directive 2012/27/UE*.

Retrieved from: https://www.mitma.gob.es/recursos_mfom/paginabasica/recursos/esart4enener2014010090000entra00.pdf

¹²³ La Moncloa. (2021). *Plan de Recuperación, Transformación y Resiliencia. Componente 2*.

<https://www.lamoncloa.gob.es/temas/fondosrecuperacion/Documents/16062021-Componente2.pdf>

¹²⁴ Gumbau, A. (2022). *Spain's rising energy poverty: A cautionary tale for Europe*. *Energy Monitor*. Retrieved from:

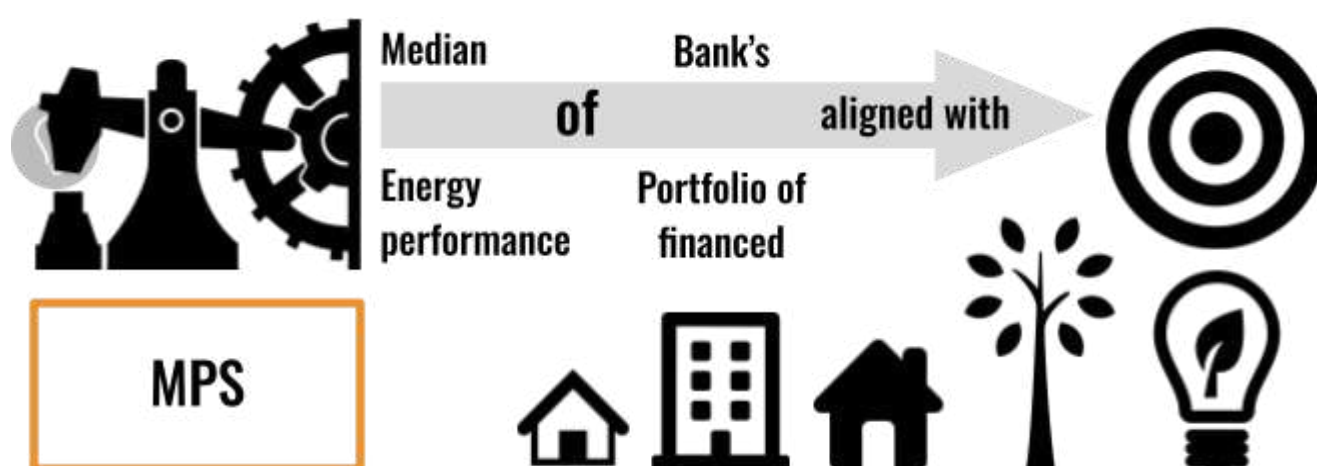
<https://www.energymonitor.ai/policy/just-transition/spains-rising-energy-poverty-a-cautionary-tale-for-europe>



- Lever bank-homeowner relationships through Mortgage Portfolio Standards for Spanish lenders:** Over 300,000 new mortgages are signed each year in Spain for an average of €135,000 each providing a total of over €40 billion a year to house buyers¹²⁵. While Energy Performance Certificates are required to be disclosed to these purchasers, the reality is that their considered importance by lenders, public notaries and estate agents is low. Even upon request in the public notary with the lending bank, having a home energy performance explained or addressed is usually greeted with blank faces. This is a missed opportunity, as great care is taken to educate home buyers on the characteristics of mortgages, and this time could and should also be dedicated to energy matters. We estimate that there are over 3 million Spanish mortgage clients living in inefficient buildings that could improve their economics and allow their lenders to “green” their mortgages through positive engagement¹²⁶.

Mortgage lenders are among the most powerful stakeholders in Spanish real estate and most have identified significant climate transition risk in their lending books. There are 3 million mortgage clients living in properties they own with low energy performance to whom lenders can offer new products to address these inefficiencies and climate risks. A Mortgage Portfolio Standard (MPS¹²⁷) is a regulatory mechanism that requires the median energy performance of a bank’s portfolio of financed buildings to meet specific targets, by specific dates that are aligned with Spain’s decarbonisation objectives.

MPS were introduced in the EU Commission’s recast EU Energy Performance of Buildings Directive¹²⁸ (EPBD) and will promote engagement by Member States with financial institutions to help identify and finance those buildings in their portfolios with the highest energy savings potential. This, in turn, will unlock financial opportunities for their homeowners to renovate, and accompany them in the process with the ultimate aim of achieving the bank-wide portfolio performance targets.



¹²⁵ Idealista. 2021. *La firma de hipotecas retrocede casi un 8% en el año del covid y sufre su primera caída desde 2013*. Retrieved from: <https://www.idealista.com/news/finanzas/hipotecas/2021/02/26/789273-la-firma-de-hipotecas-cae-en-el-ano-del-covid>

¹²⁶ “According to the data from the 2018 Continuous Household Survey, the tenure status of 76.7% of Spanish main dwellings is in ownership (14.2 million of a total of 18.5), compared with 17.8% in rental (3.3 million) and 5.5% under other forms of tenure (1.2 million; made available free of charge or for a price by another household, the company, etc.). Of the owned dwellings, 9.1 million (64%) no longer have ongoing mortgage payments, compared with 5.1 million (36%) that do” (MITMA. (2020). 2020 Update of the Long-term Strategy for Energy Renovation in the Building Sector in Spain. Retrieved from: https://cdn.mitma.gob.es/portal-web-drupal/planes_estategicos/en_itserb.pdf).

¹²⁷ Climate Strategy & Partners. (2021). *Underwriting the Renovation Wave with Mortgage Portfolio Standards for Energy Efficiency*. Climate Strategy & Partners. Retrieved from: https://climatestrategy.es/en/informe_20.php

¹²⁸ European Commission. (2021). *Proposal for a Directive of the European Parliament and of the Council on the energy performance of buildings (recast)*. COM(2021) 802 final. Retrieved from: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0802>

- **Dedicate recovery grants towards and set targets for acceleration of deep renovations for the energy poor.** Spain had in 2020 between 10 and 15% of its population suffering from energy poverty¹²⁹, for which long-term renovation is an identified solution. Furthermore, the 15-30% (0.5-2.5 million) of the energy poor living in cold climatic regions (ERESEE 2020 gives 2.7 million in North Atlantic zone¹³⁰) should be prioritised for deep renovations especially as energy prices spiral upwards. Given the heritage for the energy poverty indicators, we believe that it would be useful for Spanish regions could apply these criteria to identify the buildings which require renovation and proactively share these lists with renovation contractors and lenders to ensure immediate focus.

To facilitate the access to these grants, massive awareness campaigns can be used as effective tools together with programmes that accompany vulnerable groups in the application to and implementation of the grants (see below the recommendation on one-stop-shops). These campaigns have been shown to positively feed into regulatory initiatives like renovation strategies and subsidies, leading to greater social acceptance and behavioural change¹³¹.

- **Work with Bank of Spain to launch an EU Renovation Loan instrument designed for the millions of low income, no savings “just able to pay” households.** Hardworking and older homeowners with low incomes and no savings need a cost-effective way to unlock their stored home-equity for a deep renovation. An EU Renovation Loan¹³² (ERL) would provide a form of state-backed borrowing for older or low income homeowners who may not qualify for new or extended green mortgages. ERLs would complement the incentives created by a Mortgage Portfolio Standard offering client facing financial institutions another instrument to improve their stake in customers’ renovations journey, and helping to reduce transaction costs for a speedier emergency response¹³³.
- **Grow Spain’s Independent Renovation Agent Network:** In Spain the figure of Renovation Agent (*Agente Rehabilitador*) is more recent and less well developed than in Germany. In October 2021, the Spanish government approved a Royal Decree that gives a general definition of this agent in its Article 8, delegating to Autonomous Communities the competence of further defining its functions. This person, or entity, can carry out actions to promote, monitor, manage public aid and access to financing, as well as the preparation of documentation or technical renovation projects¹³⁴.

The Next Generation EU recovery packages are a unique opportunity to access public money (grants and loans recast into ERLs) that, in the light of a critical geopolitical situation, can be urgently executed to accelerate the renovation of the identified hotspots with occupants that lack savings, or access to traditional finance. An ERL would be a huge complement and improve the economics for those “just able to pay” and retail banks can help segment the homeowners into components where grants, ERLs and regular financing products can be deployed together. Recovery grants should be available to those suffering from energy poverty¹³⁵.

¹²⁹ Romero Mora, J.M. et al. (2022). *Informe de Indicadores de Pobreza Energética en España 2020*. Universidad Pontificia Comillas. Retrieved from: <https://repositorio.comillas.edu/xmlui/handle/11531/65128>

¹³⁰ MITMA. (2020). *2020 Update of the Long-term Strategy for Energy Renovation in the Building Sector in Spain*. Retrieved from: https://cdn.mitma.gob.es/portal-web-drupal/planes_estategicos/en_itserb.pdf

¹³¹ Escribano, G. (2022). *Diez contribuciones de España a una seguridad energética europea autónoma de Rusia*. Real Instituto Elcano. Retrieved from: <https://www.realinstitutoelcano.org/analisis/diez-contribuciones-de-espana-a-una-seguridad-energetica-europea-autonomade-rusia/> and

Cores. (2021). *Importaciones y exportaciones de gas natural por países: Diciembre 2021*. Retrieved from <https://www.cores.es/sites/default/files/archivos/icores/i-cores-imp-export-gn-dic21.pdf>

¹³² Sweatman, P. (2021). *The European Renovation Loan: a new instrument to fund the renovation wave*. *Agir pour le Climat*. Retrieved from: <https://www.agirpourleclimat.net/14387/> and Sweatman, P. (2022). *The European Renovation Loan: An innovative financial instrument to Repower EU*. Climate Strategy & Partners. Retrieved from: <https://www.climatestrategy.com/press/EURenovationLoanSummApr2022>

¹³³ Sweatman, P. (2021). *Finance & Investing in Decarbonising Europe’s buildings*. *Climate Strategy & Partners*. Retrieved from: https://climatestrategy.es/en/informe_19.php

¹³⁴ Real Decreto 853/2021, de 5 de octubre, por el que se regulan los programas de ayuda en materia de rehabilitación residencial y vivienda social del Plan de Recuperación, Transformación y Resiliencia. Gobierno de España. (2021). *Real Decreto 853/2021, de 5 de octubre, por el que se regulan los programas de ayuda en materia de rehabilitación residencial y vivienda social del Plan de Recuperación, Transformación y Resiliencia*. Retrieved from <https://www.boe.es/buscar/doc.php?id=BOE-A-2021-16233>

¹³⁵ Ecodes. (2022). *La factura de la electricidad: Un tema crucial*. *Algunas Propuestas de ECODES*. Retrieved from: https://ecodes.org/images/que-hacemos/03.Energia_y_personas/pdf/Propuestas_Ecodes_Factura_electricidad_13032022.pdf

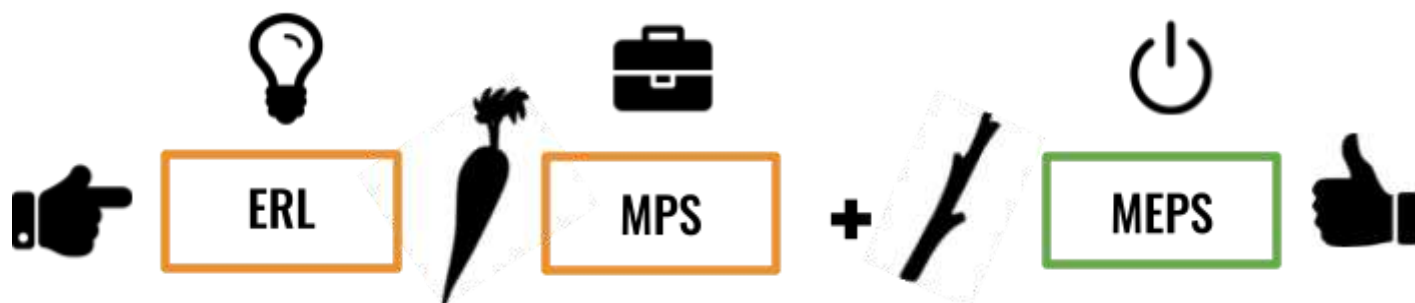


Current Legislative Proposals: Hook for EU Renovation Loan

The EU Renovation Loan has been referenced in the EU Parliamentary debates on the recast Energy Performance of Buildings Directive in draft amendments to recital 46a¹³⁶ which reads:

*(46a) Member States should provide guarantees to financial institutions, in order to promote targeted financial products, grants and subsidies, for enhanced energy performance of buildings for people in energy poverty, vulnerable and low-income households, and other groups having difficulty to access finances or get traditional mortgages. Member States should ensure that those groups benefit from cost neutral renovation schemes, for instance through fully subsidised renovation schemes, or blends between grants and energy performance contracting and on-bill schemes. **At Union level, a special renovation instrument (the "EU Renovation Loan") should be established to provide homeowners with access to Union, long-term borrowing costs for deep renovation.***

The notion of a new EU-level instrument that finds new ways to ensure that EU households can access attractively structured funding for deep renovations has been clearly identified. The key ingredients for the ERL as proposed in this report: An EU Guarantee (against lender collateral recovery losses) and eTLTRO liquidity are both existing financial tools which have already been deployed to support the EU Green Deal and bank recovery. While their coordinated deployment to finance the urgent renovation of EU homes is a new concerted purpose, there is a new imperative to plug inefficiency as exposed this winter with record energy prices and limited gas availability.



The same legislation is set to introduce Mortgage Portfolio Standards for EU mortgage lenders (as described in the case study in the previous chapter). The data, review and operationalisation of a Mortgage Portfolio Standard will naturally help lenders identify qualifying ERL customers. The existence of the ERL provides a funding source for the offer of a deep renovation to those clients for whom previously the conversation was limited by the inability to offer attractive finance, or finance at all. This approach feels like an appropriate deployment of carrot (ERL) with an implementation framework (MPS) and the regulatory stick of Minimum Energy Performance Standards (MEPS) looming in the latter part of this decade.

There are multiple formulas which have also front-run the deployment of some of the components of the ERL, and indeed the European Investment Bank (EIB) has been addressing building renovation together with retail partner banks through its PF4EE instrument described in the next page.

¹³⁶ European Parliament. (2022). *DRAFT REPORT on the proposal for a directive of the European Parliament and of the Council on the energy performance of buildings (recast) (COM(2021)0802 – C9-0469/2021 – 2021/0426(COD))*. Retrieved from https://www.europarl.europa.eu/doceo/document/ITRE-PR-732742_EN.pdf



CASE STUDY - Private Finance for Energy Efficiency (PF4EE)

Launched in 2014, the PF4EE instrument is managed by the EIB and funded by the European Commission’s Programme for the Environment and Climate Action (LIFE Programme¹³⁷) under the Directorate General for Climate Action. PF4EE promotes private and public sector partner banks to offer energy efficiency financing in their national markets to¹³⁸:

- Make energy efficiency financing a more sustainable activity across European financial institutions; and
- Increase the availability of debt financing for energy efficiency investments



The PF4EE Instrument illustrates how portfolio-based credit risk for energy efficiency operations can be removed by the provision of cash-collateral (the “Risk Sharing Facility” RSF) and long-term financing from the EIB (the “EIB Loan for Energy Efficiency”). To support the implementation of the PF4EE Instrument, expert support services for the Financial Intermediaries (the “Expert Support Facility” ESF) is also made available.

While much smaller than the ERL seeks to be, the EC uses its LIFE Programme to provide EUR 80 million¹³⁹ to fund the instrument’s credit risk protection and expert support services. The EIB then levers this amount to enable EUR 480 million¹⁴⁰ of long-term financing. PF4EE also operates through financial intermediaries¹⁴¹ across MS, which - as of December 2021 - included:

Again, looking for an example, Banco Santander in collaboration with the EIB and the European Commission have launched “Préstamo BEI Eficiencia Energética”¹⁴². This loan scheme is designed to foster energy efficiency investments in companies. Selected measures available include¹⁴³:

- Replacement of lighting equipment inefficient by LED lighting
- Thermal insulation of roofs and facades
- Installation of thermostatic valves in radiators
- System replacement air conditioning

Name & Country	Type of support received	Amount of RSF financial support received
Komerční Banka, Czechia	RSF and ESF	EUR 6.0m
Banco Santander, Spain	RSF and ESF	EUR 3.6m
Crédit Coopératif, France	RSF and ESF	EUR 4.5m
Banco BPI, Portugal	RSF and ESF	EUR 4.0m

¹³⁷ European Commission. (2022). *Range of LIFE funding has been expanded*. [Website]. Retrieved from https://ec.europa.eu/clima/news-your-voice/news/range-life-funding-has-been-expanded-2014-12-09_en

¹³⁸ PF4EE. (2022). *Why PF4EE*. [Website]. Retrieved from <https://pf4ee.eib.org/about>

¹³⁹ EIB. (2022). *PF4EE - Private Finance for Energy Efficiency*. [Website]. Retrieved from <https://www.eib.org/en/products/mandates-partnerships/pf4ee/index.htm>

¹⁴⁰ Ibid.

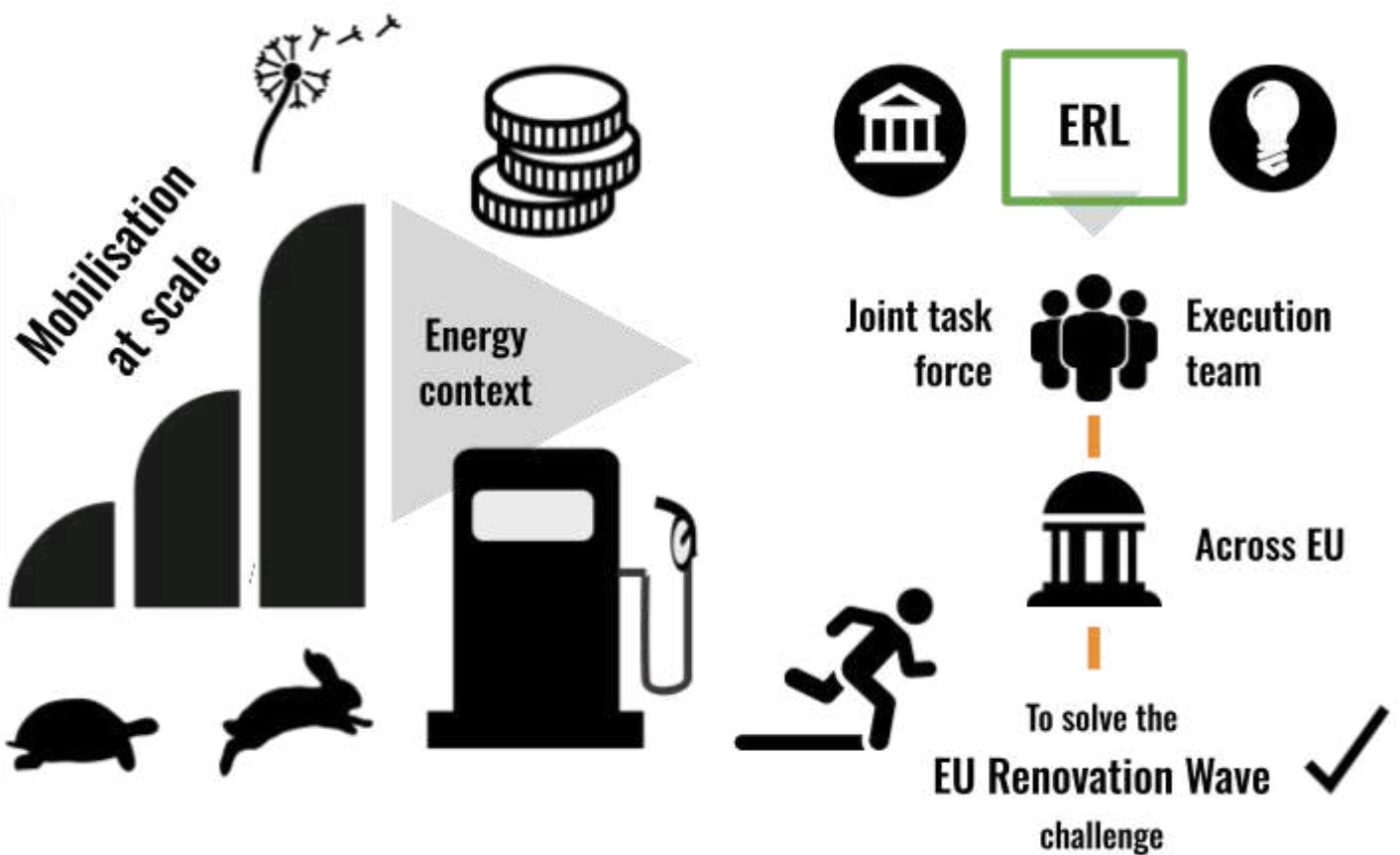
¹⁴¹ fi compass. (2020). *The potential for investment in energy efficiency through financial instruments in the European Union: Executive summary*. [Website]. Retrieved from <https://www.fi-compass.eu/erdf/potential-investment-energy-efficiency-through-financial-instruments-european-union#:~:text=The%20renovation%20of%20buildings%20to,EUR%20185%20billion%20per%20annum>

¹⁴² EIB. (2022). *Préstamo BEI Eficiencia Energética*. [Website]. Retrieved from <https://pf4ee-webcheck.eib.org/santander>

¹⁴³ Banco Santander. (2022). *Préstamo BEI Eficiencia Energética*. [PPT]. Retrieved from https://www.bancosantander.es/wcm/connect/www.bancosantander.es24647/72adc25d-b33d-450c-a684-9944cd541ec7/Prestamo+BEI+Eficiencia+?MOD=AJPERES&CONVERT_TO=url&CACHEID=ROOTWORKSPACE.Z18_01A0HJ8200E160Q2H3HV972000-72adc25d-b33d-450c-a684-9944cd541ec7-ncf wu7n

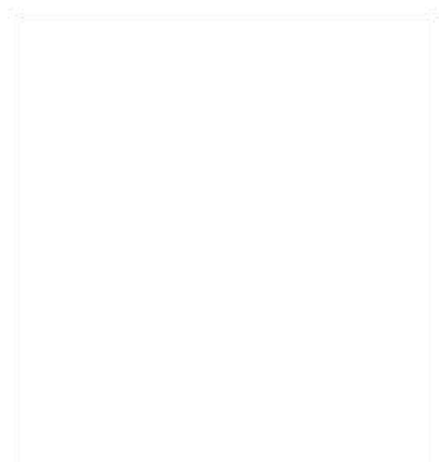


The difference is that an EU-level instrument which is opened directly to possible thousands of EU mortgage lenders simultaneously, with a structure designed to provide the most competitive funding to the deep renovation targets of the EU Renovation Wave cuts through the administrative structures of existing programmes and can provide a new level of priority to home renovation. There is potentially a role for the EIB's experience in the distribution and management of the EU Guarantee, however, as noted, there needs to be a new vehicle to deliver the scale required by the EU Renovation Wave and that can focus only on the flow of millions of deep renovations working in coordination with ECB and Member States. We think that there is an urgency to the external environment and a degree of "mobilisation at scale" required by the current energy context that the ERL requires a dedicated and considerable joint task force and execution team across the EU institutions to ensure full focus and the appropriate priority to resolve the EU Renovation Wave challenge.





Conclusions and Recommendations



Conclusions and Recommendations

This study concludes by highlighting the following seven key messages from work developing an EU Renovation Loan:

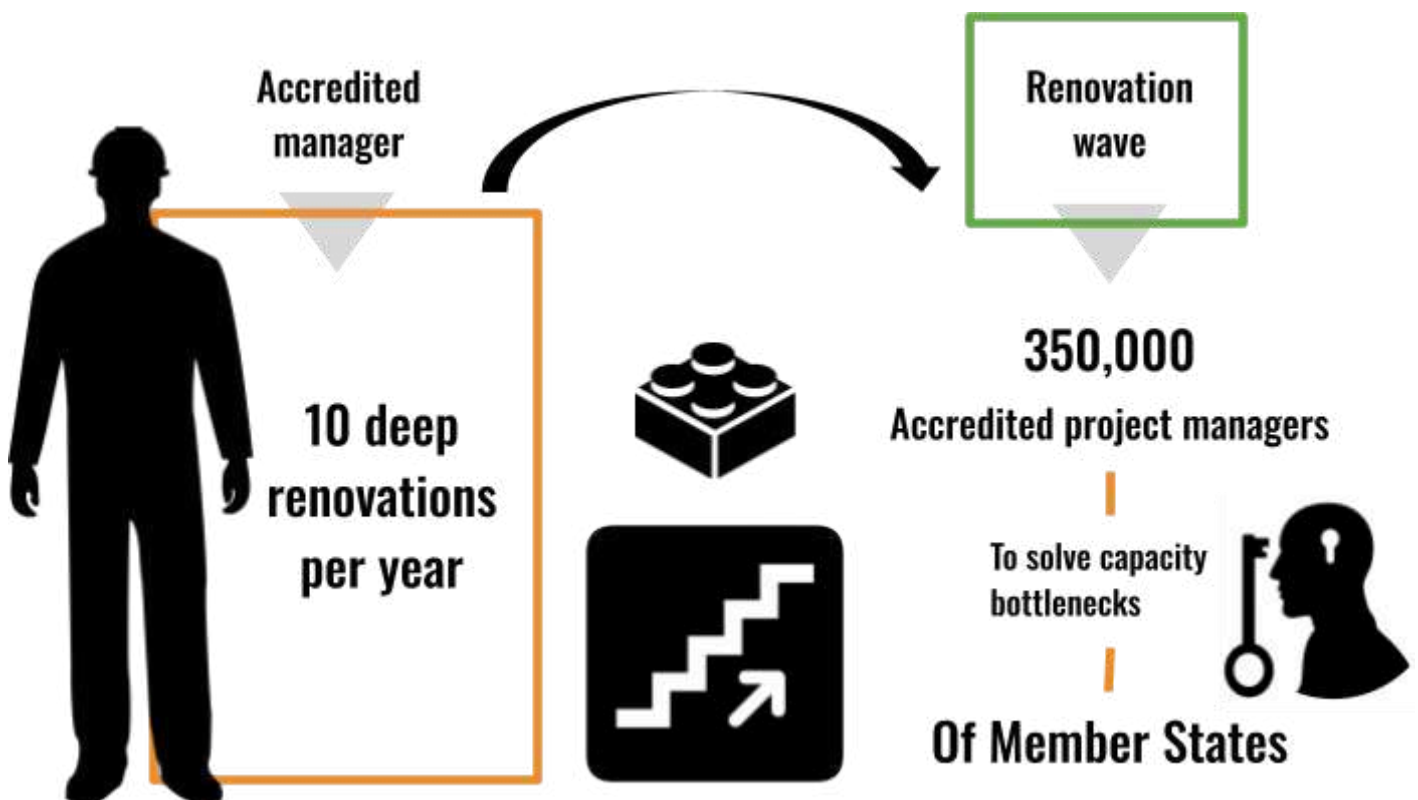
- **Europe must deliver 3.5 million deep renovations annually to address energy security, affordability and to deliver a net-zero emissions economy by 2050:** We are unable to conclude that any of the current instruments, programmes and approaches are able to deliver nearly a trillion euros of deep renovations in 35 million buildings in less than a decade.
- **EU homeowners have trillions locked-up in home equity that can be levered to reduce energy consumption and increase home value:** Over 50 million Europeans live in homes they own and have enough home equity to be able to afford a deep renovation of up to 10% of their home's value, subject to financing conditions and high quality renovation delivery, reducing over 60% of consumption and substantially cutting energy bills.



- **An EU Renovation Loan can solve the renovation finance gap at the right scale:** At present, there are no commercial banks in the EU offering a zero-coupon accrual renovation loan product for deep renovations to all their customers. With an EU Renovation Loan there is an unique opportunity for retail lenders, the EU and ECB to work together and design a new financing instrument to cut home energy use by more than half, funded at EU cost of funds, and make a deep renovation attractive to borrowers who cannot access traditional sources. The junior status and EU guarantee makes the ERL accessible to all homeowners who demonstrate their home has sufficient home equity. At EU-borrowing rates the rolled-up cost is guaranteed less than the long-run house price inflation by a clear margin over the next 30 years, and so ERLs can “part-pay for themselves” over time, along with the value drivers of green premium and cash savings from energy bills.
- **The ERL’s components are already in use, but have not been gathered together at the right scale to deliver the EU Renovation Wave:** The InvestEU programme has developed a template guarantee for financial institutions, the TLTRO programme has been actively supporting EU bank liquidity since 2014, and leading mortgage lenders have implemented voluntary Mortgage Portfolio Standards and are engaging their customers to encourage them to renovate. The timing and external imperatives create the market signals for an ERL as a renewed offering from the Union to deliver fair finance for all homeowners who wish to renovate. A new level of concerted effort is required between institutions while preserving the individual and independent character of each.

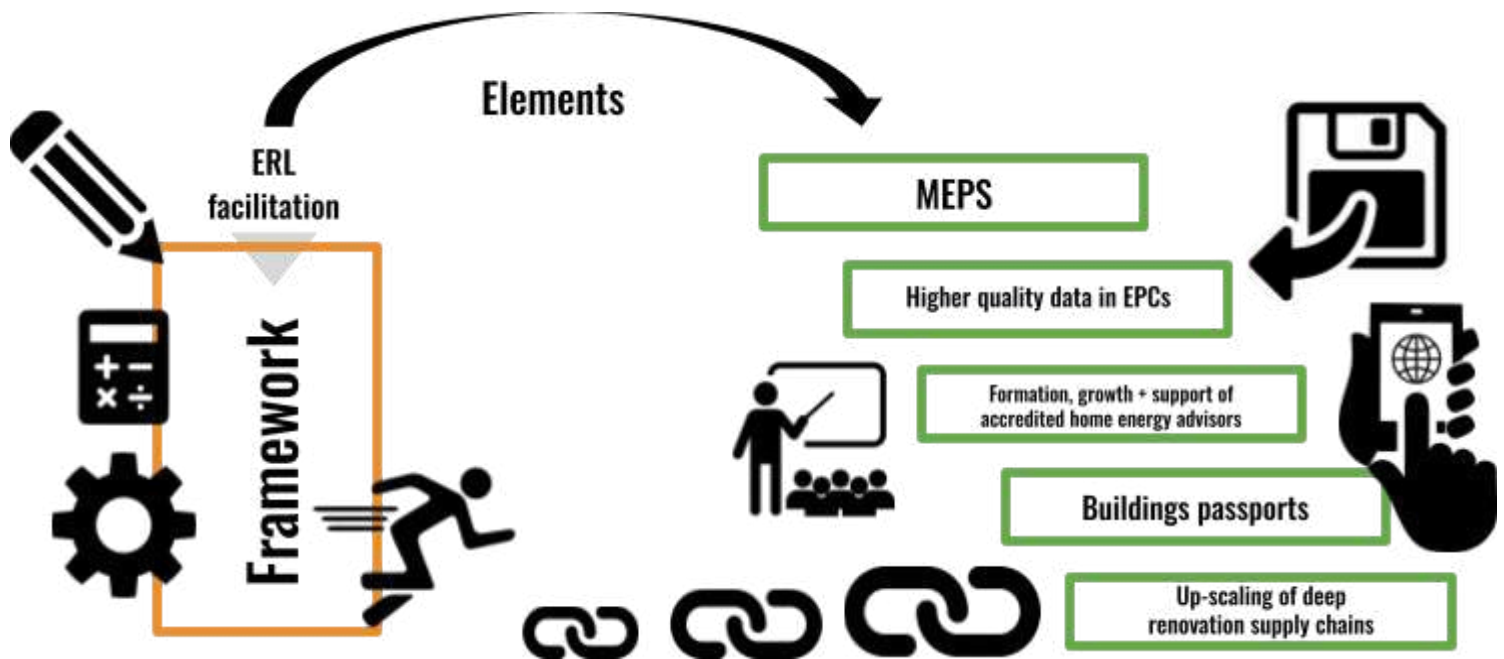


- **An alignment of interests is required between EU institutions and all retail lenders in Europe to unlock distribution channels for millions of ERLs:** Notwithstanding many successful grant-backed energy renovation programmes often targeting the energy poor, hundreds of retail mortgage lenders across the EU are yet to engage in a concerted manner with their portfolios of clients. The combination of legal Minimum Energy Performance Standards with the offer of an ERL, promoted through the application of a Mortgage Portfolio Standard, is a combination which has the capacity to deliver a new level of activity in energy renovation assuming strong alignment between EU institutions and lenders.
- **Hundreds of thousands of new renovation project managers and revitalised deep renovation supply chains are needed in all Member States:** If each accredited project manager can deliver 10 deep renovations per year, the EU Renovation Wave would require 350,000 accredited project managers to solve the capacity bottlenecks in Member States. These professionals require training, need to accredit real energy savings and may benefit from engagement with ERL originators, as is the case in Germany with the 13,000 accredited renovation managers connected to the existing KfW home renovation programmes. These individuals serve a critical role for homeowners to remove the “hassle factor” of deep renovation and also will provide the certification required by ERL originators that energy demand is reduced by over half.
- **Renovation supply chains of contractors and materials will need to “step-up” to the newly required levels of activity and delivery quality.** The scale of activity demanded by the EU Renovation Wave and as activated by the marketing of ERLs by thousands of retail lenders will put pressure on local contractors and energy renovation materials. Under inflationary pressure and energy crisis stress, these supply chains will need specific Member State attention, and the human and financial resources required of energy agencies and related ecosystems are non-trivial.



The recommendations that follow from the above conclusions can be summarised as:

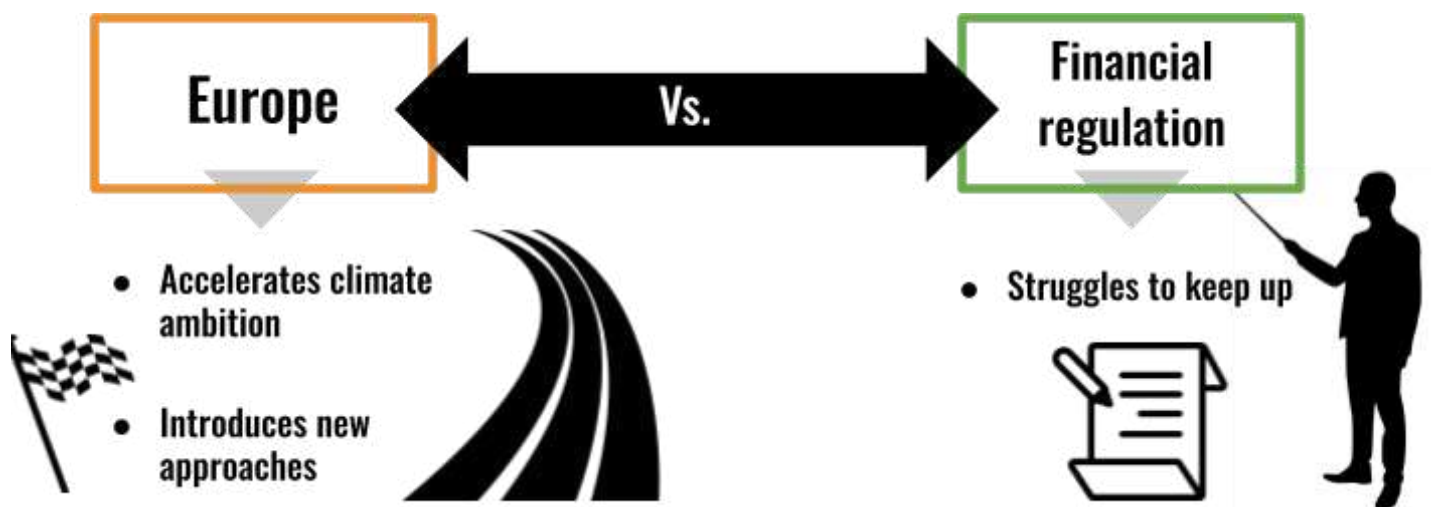
- **A technical task force must be launched containing senior members of relevant EU institutions to deliver a blueprint for the EU Renovation Loan:** Conceptually, as described here, existing EU tools and components can be used to build and offer an ERL through retail lenders to EU homeowners. This will require an initial investment of internal human capital by the EU Commission, central bank officials, and retail bank lenders to, in principle, agree to the design and technical blueprints for the components of the ERL which fall into their competences. While notionally, and to the customer, the ERL is a single instrument – it comprises three “key elements” (the EU Guarantee, the eTLTRO facility and the retail and operational pricing and execution mechanisms). Each of these needs further expert and connected design work to build the blueprints to execute the ERL.
- **The “fit-for-55 package”, especially the Energy Performance of Buildings Directive and Energy Efficiency Directive, must provide the outlined “ERL Facilitation Framework”:** Among the key elements of this ERL facilitation and enabling framework are: Minimum Energy Performance Standards, higher quality data in Energy Performance Certificates, formation, growth and support of accredited home energy advisors, buildings passports and the up-scaling of deep renovation supply chains.



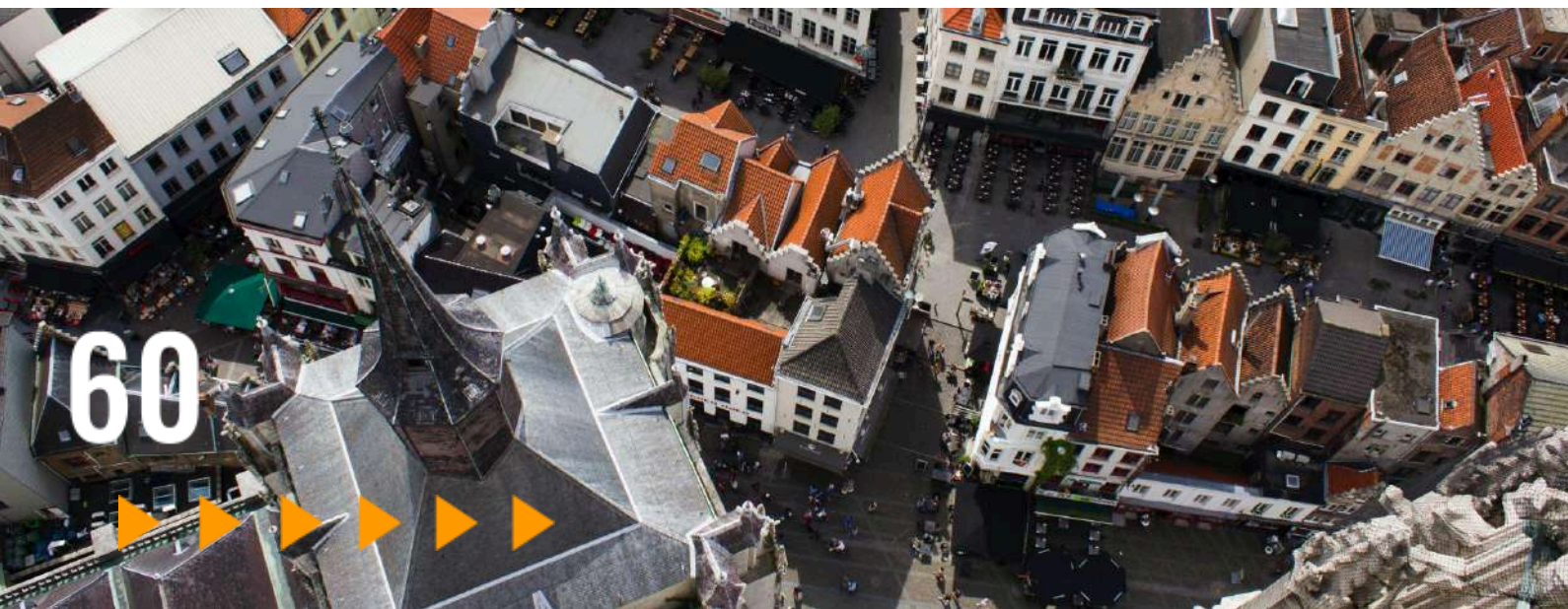
- **Retail lenders must urgently address mortgage portfolio climate risks and support their customers renovate to mitigate energy transition risks and build resilience to future energy shocks:** Adopting a Mortgage Portfolio Standard is the first step to identifying a mortgage portfolio’s climate risks and the lowest hanging fruit of homeowners who can most benefit from a deep renovation. Trusted energy renovation execution networks must be built-out to ensure smooth delivery of client contracts, and ERL financed, renovations, and operational procedures must be developed and launched to service these new financial products. Staff will require training and new energy data models and fields will need to be included in mortgage records. Bank regulators will need to upgrade their vigilance on these energy transition risks and look at providing carrots and sticks to lenders which respectively over or under-perform.



- **EU Financial and Prudential frameworks must be fully reviewed to see that they are not inadvertently doing harm to the energy transition:** Financial regulations governing capital adequacy and mortgages have a significantly slower review cycle than energy and climate regulations. This means that while Europe accelerates its climate ambition and introduces new approaches to bolster energy security and protect citizens against energy shocks, financial regulation struggles to keep-up. Mortgage Credit Directive is silent on energy-related risks and would-be borrowers are kept in the dark on the energy performance risks of their homes and the financial impacts of that. Further, notwithstanding growing evidence that demonstrates value shifts and risk correlations in the most valuable and extensive store of wealth (or collateral) Europe has, this remains largely invisible to lenders in contacts with their financial controllers. Wholesale alignment of finance with the energy transition will not be possible until the finance and prudential systems become more agile and include new and emerging future risks in their extensive models and assessments.



Clearly, the above recommendations need to be executed in parallel and are connected, and not sequential. Works referenced in this report can be found in the appendix and comments and questions are encouraged to be sent to info@climatestrategy.com for immediate response.



Works Referenced

- ABN AMRO. (2017). *ABN AMRO helps clients improve the sustainability of their homes*. Retrieved from <https://www.abnamro.com/en/newsroom/press-releases/2017/abn-amro-helps-clients-improve-the-sustainability-of-their-homes.html>
- AGE. (2022). *The voice of older persons at EU level*. [Website]. Retrieved from <https://age-platform.eu/special-briefing/adequate-housing-older-age>
- Age UK. (2022). *Fuel stress set to soar from April to impact one in four older households and four in five of the poorest - and it could get worse in October*. Retrieved from <https://www.ageuk.org.uk/latest-press/articles/2022/fuel-stress-set-to-soar-from-april-to-impact-one-in-four-older-households-and-four-in-five-of-the-poorest---and-it-could-get-worse-in-october/>
- Agencia Tributaria. (2021). *Matriculación de vehículos por origen y cilindrada*. Retrieved from: https://www.agenciatributaria.es/AEAT/Contenidos_Comunes/La_Agencia_Tributaria/Estadisticas/Publicaciones/sites/matriculaciones/mes/jrubikf6a241f294349b5d223669fa3fbc23f77e71db4d0.html
- Allianz SE. (2022). *The (energy) price of war for European households*. Retrieved from https://www.allianz.com/en/economic_research/publications/specials_fmo/2022_03_04_Energyinflation.html
- Appoloni L, D'Alessandro D. *Housing Spaces in Nine European Countries: A Comparison of Dimensional Requirements*. *Int J Environ Res Public Health*. 2021 Apr 17;18(8):4278. doi: 10.3390/ijerph18084278. PMID: 33920693; PMCID: PMC8073340.
- Asociación Española de Renting de Vehículos. (2020). *Memoria Anual*. Retrieved from: <https://www.ae-renting.es/libros2021/index.html#p=56>
- Banco Santander. (2022). *Préstamo BEI Eficiencia Energética*. [PPT]. Retrieved from https://www.bancosantander.es/wcm/connect/www.bancosantander.es/24641772adc25d-b33d-450c-a684-9944cd541ec7/Prestamo+BEI+Eficiencia+?MOD=AJPERES&CONVERT_TO=url&CACHEID=ROOTWORKSPACEZ18_01A0HJ8200E160Q2H3HV972000-72adc25d-b33d-450c-a684-9944cd541ec7-ncfwu7n
- Bankwatch. (2021). *Energy efficiency and renewables in buildings in national recovery and resilience plans*. Retrieved from https://bankwatch.org/wp-content/uploads/2021/07/2021-07-14_Energy-efficiency-recovery-funds_final.pdf
- Barend Wind, Caroline Dewilde & John Doling (2019): *Secondary property ownership in Europe: contributing to asset-based welfare strategies and the 'really big trade-off'*, *International Journal of Housing Policy*, DOI: 10.1080/19491247.2019.1573961
- Bergenstråhle, S. (2018). *How to define, achieve and measure affordability in rental housing*. Retrieved from https://ec.europa.eu/futurium/en/system/files/ged/background_paper_on_affordability_iut_2018.pdf
- Berkeley Lab. (2021). *U.S. Renewables Portfolio Standards 2021 Status Update: Early Release*. [PPT presentation] Retrieved from https://eta-publications.lbl.gov/sites/default/files/rps_status_update-2021_early_release.pdf
- Bloomberg. (2022). *UK Households Get Fresh Warning of Energy Bills Topping £4,000*. Retrieved from <https://www.bloomberg.com/news/articles/2022-08-09/uk-households-get-fresh-warning-of-energy-bills-topping-4-000#:~:text=UK%20households%20received%20yet%20another,analysis%20from%20Cornwall%20Insight%20Ltd>
- BPIE. (2020). *COVID-19 RECOVERY: INVESTMENT OPPORTUNITIES IN DEEP RENOVATION IN EUROPE*. Retrieved from https://www.bpie.eu/wp-content/uploads/2020/05/Recovery-investments-in-deep-renovation_BPIE_2020.pdf
- BPIE. (2021). *DEEP RENOVATION: SHIFTING FROM EXCEPTION TO STANDARD PRACTICE IN EU POLICY*. Retrieved from https://www.bpie.eu/wp-content/uploads/2021/11/BPIE_Deep-Renovation-Briefing_Final.pdf
- BPIE. (2011). *Europe's Buildings Under the Microscope*. Retrieved from https://bpie.eu/wp-content/uploads/2015/10/HR_EU_B_under_microscope_study.pdf
- BPIE. (2022). *Ready for carbon neutral by 2050? Assessing ambition levels in new building standards across the EU*. Retrieved from https://www.bpie.eu/wp-content/uploads/2021/12/BPIE_Assessing-NZEB-ambition-levels-across-the-EU_HD.pdf
- BPIE. (2021). *The road to climate-neutrality: Are national long-term renovation strategies fit for 2050?*. [Website]. Retrieved from <https://www.bpie.eu/publication/the-road-to-climate-neutrality-are-national-long-term-renovation-strategies-fit-for-2050/>
- Centre for European Reform. (2022). *How to make EU fiscal rules compatible with net zero*. Retrieved from https://www.cer.eu/sites/default/files/pbrief_fiscal_rules_9.5.22.pdf
- CISION. (2019). *Should I Stay or Should I Go? Aging in Place has a New Meaning for Seniors* [Website]. Retrieved from <https://www.prnnewsire.com/news-releases/should-i-stay-or-should-i-go-aging-in-place-has-a-new-meaning-for-seniors-300817785.html>
- Climate Strategy & Partners. (2021). *Underwriting the Renovation Wave with Mortgage Portfolio Standards for Energy Efficiency*. Retrieved from https://climatestrategy.com/en/informe_20.php
- Communication from the Commission. (2022). *REPowerEU: Joint European Action for more affordable, secure and sustainable energy*. Retrieved from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A108%3AFIN>
- Coolproducts. (2022). *IMPACT OF A BAN OF FOSSIL HEATING TECHNOLOGIES ON NECPS AND NATIONAL ENERGY DEPENDENCY*. Retrieved from https://www.coolproducts.eu/wp-content/uploads/2022/07/Coolproducts-gas-boiler-ban-2022_-11-July-22.pdf



- Crédit Agricole. (2021). *2021 ANNUAL FINANCIAL REPORT UNIVERSAL REGISTRATION DOCUMENT*. Retrieved from <https://www.credit-agricole.com/en/pdfPreview/192553>
- Cores. (2021). Importaciones y exportaciones de gas natural por países: Diciembre 2021. Retrieved from <https://www.cores.es/sites/default/files/archivos/icores/i-cores-imp-export-gn-dic21.pdf>
- Deloitte. (2021). *Property Index 2021 How Europeans live and what it costs them*. [Website]. Retrieved from <https://www2.deloitte.com/ce/en/pages/real-estate/articles/property-index-2021.html>
- DENA. (2022). Retrieved from *Expertinnen und Experten für effiziente Gebäude finden*. [Website]. <https://www.dena.de/themen-projekte/energieeffizienz/gebaeude/beraten-und-planen/energieeffizienz-expertenliste/>
- Designing Building. (2022). *Energy efficiency of buildings*. [Website]. Retrieved from https://www.designingbuildings.co.uk/wiki/Energy_efficiency_of_buildings#:~:text=Energy%20efficiency%20is%20the%20utilisation,to%20provide%20the%20same%20service.
- Dorflleitner, G., Utz, S. & Zhang, R. The pricing of green bonds: external reviews and the shades of green. *Rev Manag Sci* 16, 797–834 (2022). <https://doi.org/10.1007/s11846-021-00458-9>
- E3G. (2021). *Renovate2Recover: How transformational are the National Recovery Plans for Buildings Renovation?* Retrieved from https://www.renovate-europe.eu/wp-content/uploads/2018/09/Renovate2Recover_Full-Study-1.pdf
- Ecodes. (2022). *La factura de la electricidad: Un tema crucial. Algunas Propuestas de ECODES*. Retrieved from: https://ecodes.org/images/que-hacemos/03.Energia_y_personas/pdf/Propuestas_Ecodes_Factura_electricidad_13032022.pdf
- ECOFYS. (2017). *Optimising the energy use of technical building systems – unleashing the power of the EPBD's Article 8*. Retrieved from <https://c2e2.unepccc.org/wp-content/uploads/sites/3/2017/03/optimising-the-energy-use-of-tbs.pdf>
- EIB. (2022). *Préstamo BEI Eficiencia Energética*. [Website]. Retrieved from <https://pf4ee-webcheck.eib.org/santander>
- EIB. (2022). *PF4EE - Private Finance for Energy Efficiency*. [Website]. Retrieved from <https://www.eib.org/en/products/mandates-partnerships/pf4ee/index.htm>
- Ener Data. (2022). *Evolution of households energy consumption patterns across the EU*. [Website]. Retrieved from <https://www.enerdata.net/publications/executive-briefing/households-energy-efficiency.html>
- Energie Effizienz Experten. (2022). [Website]. Retrieved from <https://www.energie-effizienz-experten.de>
- EPRA. (2022). *Global Real Estate Total Markets Table*. Retrieved from. https://prodapp.epra.com/media/EPRA_Total_Markets_Table_-_Q2-2022_1658221086097.pdf
- Escribano, G. (2022). *Diez contribuciones de España a una seguridad energética europea autónoma de Rusia*. Real Instituto Elcano. Retrieved from: <https://www.realinstitutoelcano.org/analisis/diez-contribuciones-de-espana-a-una-seguridad-energetica-europea-autonomade-rusia/>
- European Banking Federation. (2020). *Banking in Europe: EBF Facts & Figures 2021*. Retrieved from <https://www.ebf.eu/wp-content/uploads/2022/01/FINAL-Banking-in-Europe-EBF-Facts-and-Figures-2021.-11-January-2022.pdf>
- European Central Bank. (2022). Commercial real estate: connecting the dots. [Website]. Retrieved from <https://www.bankingsupervision.europa.eu/press/publications/newsletter/2022/html/ssm.nl220817.en.html>
- European Central Bank. (2022). *Euro area yield curves*. [Website]. Retrieved from https://www.ecb.europa.eu/stats/financial_markets_and_interest_rates/euro_area_yield_curves/html/index.en.html
- European Central Bank. (2020). *Working Paper Series Whatever it takes to save the planet? Central banks and unconventional green policy*. Retrieved from <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2500-f1a50c6f69.en.pdf>
- European Climate Foundation. (2022). *European citizens willing to renovate their home but held back by investments to be made*. [Website]. Retrieved from <https://europeanclimate.org/resources/european-citizens-willing-to-renovate-their-home-but-held-back-by-investments-to-be-made/>
- European Commission. (2021). *COMMISSION STAFF WORKING DOCUMENT: Analysis of the national long-term renovation strategies*. Retrieved from <https://ec.europa.eu/energy/sites/default/files/swd-on-national-long-term-renovation-strategies.pdf>
- European Commission. (2022). *EFFIG: About us*. [Website]. Retrieved from https://eefig.ec.europa.eu/about-us_en
- European Commission. (2021). *CO₂ emission performance standards for cars and vans (2020 onwards)*. Retrieved from: https://ec.europa.eu/clima/policies/transport/vehicles/regulation_en
- European Commission, Directorate-General for Energy, *The quantitative relationship between energy efficiency improvements and lower probability of default of associated loans and increased value of the underlying assets : final report on risk assessment*, Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2833/532126>
- European Commission. (2022). *Energy performance of buildings directive*. [Website]. Retrieved from https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en#:~:text=At%20present%2C%20about%2035%25%20of,stock%20is%20renovated%20each%20year.



- European Commission. (2022). *EU Building Stock Observatory*. [Website]. Retrieved from https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/eu-building-stock-observatory_en
- European Commission. (2022). *Mortgage credit – review of EU rules*. [Website]. Retrieved from https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13090-Mortgage-credit-review-of-EU-rules_en
- European Commission. (2022). NextGenerationEU Green Bond Dashboard. [Website]. Retrieved from https://ec.europa.eu/info/strategy/eu-budget/eu-borrower-investor-relations/nextgenerationeu-green-bonds/dashboard_en
- European Commission. (2022). *Long-term renovation strategies*. [Website]. Retrieved from https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/long-term-renovation-strategies_en
- European Commission. (2021). Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulation (EU) No 575/2013 as regards requirements for credit risk, credit valuation adjustment risk, operational risk, market risk and the output floor. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0664>
- European Commission. (2021). *Proposal for a Directive of the European Parliament and of the Council on the energy performance of buildings (recast). COM(2021) 802 final*. Retrieved from: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0802>
- European Commission. (2021). *Questions and Answers on the revision of the Energy Performance of Buildings Directive*. [Website]. Retrieved from https://ec.europa.eu/commission/presscorner/detail/en/QANDA_21_6686
- European Commission. (2022). *Range of LIFE funding has been expanded*. [Website]. Retrieved from https://ec.europa.eu/clima/news-your-voice/news/range-life-funding-has-been-expanded-2014-12-09_en
- European Commission, Directorate-General for Energy, Rohde, C., Toth, Z., Glenting, C., et al., *Multiple benefits of energy efficiency investments for financial institutions : final report : October 2021*, Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2833/205185>
- European Commission, Directorate-General for Energy, *The quantitative relationship between energy efficiency improvements and lower probability of default of associated loans and increased value of the underlying assets : final report on risk assessment*, Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2833/532126>
- European Investment Fund. *Annex II: Direct Guarantee Termsheet*. Retrieved from https://www.eif.org/InvestEU/guarantee_products_calls/annex-ii-direct%20guarantee-termsheet.pdf
- The European Mortgage Federation. (2022). *HYPOSTAT 2022*. Retrieved from <https://hypo.org/app/uploads/sites/3/2022/09/HYPOSTAT-2022-FOR-DISTRIBUTION.pdf>
- European Parliament. (2022). *DRAFT REPORT on the proposal for a directive of the European Parliament and of the Council on the energy performance of buildings (recast) (COM(2021)0802 – C9-0469/2021 – 2021/0426(COD))*. Retrieved from https://www.europarl.europa.eu/doceo/document/ITRE-PR-732742_EN.pdf
- European Parliament. (2020). *Policies to Ensure Access to Affordable Housing*. Retrieved from [https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652729/IPOL_STU\(2020\)652729_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652729/IPOL_STU(2020)652729_EN.pdf)
- European Real Estate Forum. (2022). *REAL ESTATE KEY FACTS*. [Website]. Retrieved from <http://www.europeanrealestateforum.eu/key-facts/>
- Eurostat. (2022). *Owning or renting? What is the EU's housing situation?*. [Website]. Retrieved from [https://ec.europa.eu/eurostat/web/products-eurostat-news/-/wdn-20211230-1#:text=ln%202020%20%2070%25%20of%20the,and%20Croatia%20\(both%2091%25\)](https://ec.europa.eu/eurostat/web/products-eurostat-news/-/wdn-20211230-1#:text=ln%202020%20%2070%25%20of%20the,and%20Croatia%20(both%2091%25))
- Eurostat. (2022). *Population structure indicators at national level*. [Dataset]. Retrieved from https://ec.europa.eu/eurostat/databrowser/view/DEMO_PJANIND_custom_964289/bookmark/table?lang=en&bookmarkId=599174db-325f-429b-87ba-6af6b18e9ca9
- fi compass. (2022). *Model for a financial instrument with a grant component to support energy efficiency: a fi-compass model*. Retrieved from https://www.fi-compass.eu/sites/default/files/publications/energy-efficiency-model_0.pdf
- fi compass. (2020). *The potential for investment in energy efficiency through financial instruments in the European Union: Executive summary*. [Website]. Retrieved from <https://www.fi-compass.eu/erdf/potential-investment-energy-efficiency-through-financial-instruments-european-union#:text=The%20renovation%20of%20buildings%20to,EUR%20185%20billion%20per%20annum>
- French government. (2022). *Éco-prêt à taux zéro (éco-PTZ)*. [Website]. Retrieved from <https://www.service-public.fr/particuliers/vosdroits/F19905>
- French Ministry of Energy Transition. (2022). *Éco-prêt à taux zéro (éco-PTZ)*. [Website]. Retrieved from <https://www.ecologie.gouv.fr/eco-pret-taux-zero-eco-ptz>
- Gaglia, Athina & Dialynas, E.N. & Argiriou, Athanassios & Kostopoulou, Effie & Tsiamitros, Dimitrios & Stimoniaris, Dimitrios & Laskos, Konstantinos. (2018). *Energy Performance of European Residential Buildings: Energy Use, Technical and Environmental Characteristics of the Greek Residential Sector – Energy Conservation and CO₂ Reduction*. *Energy and Buildings*. 183. 86-104. 10.1016/j.enbuild.2018.10.042.
- Gobierno de España. (2021). *Real Decreto 853/2021, de 5 de octubre, por el que se regulan los programas de ayuda en materia de rehabilitación residencial y vivienda social del Plan de Recuperación, Transformación y Resiliencia*. Retrieved from <https://www.boe.es/buscar/doc.php?id=BOE-A-2021-16233>
- THE GREENS/EFA. (2022). *THE FINANCIALIZATION OF HOUSING IN EUROPE*. Retrieved from <http://extranet.greens-efa-service.eu/public/media/file/1/7461>
- Green Home. (2022). *Superbonus 110% - here: Super Ecobonus*. Retrieved from https://www.green-home.org/wp-content/uploads/2022/05/6_GREEN-Home_GP_Superbonus-IT_en.pdf



- The Guardian. (2022). *Italy's superbonus 110% scheme prompts surge of green home renovations*. <https://www.theguardian.com/world/2022/apr/13/italys-superbonus-110-scheme-prompts-surge-of-green-home-renovations>
- Gumbau, A. (2022). *Spain's rising energy poverty: A cautionary tale for Europe*. *Energy Monitor*. Retrieved from: <https://www.energymonitor.ai/policy/just-transition/spains-rising-energy-poverty-a-cautionary-tale-for-europe>
- Housing Europe. (2021). *IMPACT OF THE RECOVERY PLANS ON THE SOCIAL & AFFORDABLE HOUSING SECTOR*. Retrieved from <https://www.housingeurope.eu/file/1056/download>
- houzz. (2020). *2020 UK Houzz & Home Renovation Trends Study*. [Website]. Retrieved from <https://www.houzz.co.uk/magazine/2020-uk-houzz-and-home-renovation-trends-study-stsetiw-vs-135007985>
- houzz. (2022). *2022 Houzz & Home UK: Overview of Home Renovation in 2021 and 2022*. [PPT presentation]. <https://st.hzcdn.com/static/econ/UKHH2022.pdf>
- Hugues Chenet, Josh Ryan-Collins, Frank van Lerven, Finance, climate-change and radical uncertainty: Towards a precautionary approach to financial policy, *Ecological Economics*, Volume 183, 2021, 106957, ISSN 0921-8009, <https://doi.org/10.1016/j.ecolecon.2021.106957>
- ICMA Green Bond Principles. (2021). [Brochure]. Retrieved from <https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Green-Bonds-brochure-150616.pdf>
- Idealista. 2021. *La firma de hipotecas retrocede casi un 8% en el año del covid y sufre su primera caída desde 2013*. Retrieved from: <https://www.idealista.com/news/finanzas/hipotecas/2021/02/26/789273-la-firma-de-hipotecas-cae-en-el-ano-del-covid>
- Idealista. (2022). *Superbonus 110 tra proroga, novità e scadenze: cos'è cambiato e le ultime sorprese*. [Website]. Retrieved from <https://www.idealista.it/news/finanza/fisco/2021/11/18/156602-superbonus-110#simple-table-of-contents-6>
- IEA. (2022). *Accelerating energy efficiency: What governments can do now to deliver energy savings*. [Website]. Retrieved from <https://www.iea.org/commentaries/accelerating-energy-efficiency-what-governments-can-do-now-to-deliver-energy-savings>
- IEECP. (2022). *Status of energy poverty and policies to address it in CEE/SEE countries*. Retrieved from <https://europeanclimate.org/wp-content/uploads/2022/05/ieecp-policies-to-decarbonise-residential-buildings-ws1-report-2022.pdf>
- Il Gazzettino. (2022). *Superbonus 110%: maxi frode da oltre 24 milioni di euro scoperta dalle Fiamme Gialle*. Retrieved from https://www.ilgazzettino.it/nordest/treviso/superbonus_frode_indagini_guardia_di_finanza_24_milioni_euro_immobili-6847389.html?refresh_ce
- IEA. (2022). *Multiple Benefits of Energy Efficiency: Health and wellbeing*. [Website]. Retrieved from <https://www.iea.org/reports/multiple-benefits-of-energy-efficiency/health-and-wellbeing>
- Ipsos. (2019). *Uncover the underlying motivations and barriers for energy efficient renovations*. Retrieved from: <https://www.ipsos.com/sites/default/files/2019-03/ipsos-full-report-en.pdf>
- and Klimovich, K. (2020). *Accelerating Home Renovation*. C4E. Retrieved from: https://c4eforum.net/kristina-klimovich-accelerating-home-renovation/#_ftn4
- International Union of Property Owners. (2021). *UIPI SURVEY FINAL REPORT: European Property Owners' readiness and capacity to renovate*. Retrieved from https://mcsusercontent.com/a5e3a108eb8b4fe3f5868e5c8/files/68b1157c-63e7-4393-90c5-7fe4ed524aae/UIPI_Survey_Final_Report.pdf
- Investopedia. (2022). *What Is Home Equity?* [Website]. Retrieved from https://www.investopedia.com/terms/h/home_equity.asp
- Italian Government. (2022). *Presidency of the Council of Ministers.Ecobonus and Sismabonus up to 110% for energy efficiency and safety of buildings*. [Website]. Retrieved from <https://italiadomani.gov.it/en/Interventi/investimenti/ecobonus-e-sismabonus-fino-al-110-per-efficienza-energetica-e-la-sicurezza-degli-edifici.html>
- Jordà, Òscar, Katharina Knoll, Dmitry Kuvshinov, Moritz Schularick, Alan M. Taylor. 2017. "The Rate of Return on Everything, 1870–2015" Federal Reserve Bank of San Francisco Working Paper 2017-25. <https://doi.org/10.24148/wp2017-25>
- KfW. (2022). *Rely on the safe haven*. [PPT presentation]. Retrieved from <https://www.kfw.de/PDF/Investor-Relations/Pdf-Dokumente-Investor-Relations/KfW-Investor-Presentation.pdf>
- KfW. (2021). *Start of the year press conference*. [PPT presentation]. Retrieved from <https://www.kfw.de/Presse-Newsroom/Pressetermine/JAPK-2021/Presentation.pdf>
- Kristoffer Steen Andersen, Catharina Wiese, Stefan Petrovic, Russell McKenna, Exploring the role of households' hurdle rates and demand elasticities in meeting Danish energy-savings target, *Energy Policy*, Volume 146, 2020, 111785, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2020.111785>.
- Mckinsey Global Institute. (2021). *The rise and rise of the global balance sheet: How productively are we using our wealth?* [Website]. Retrieved from <https://www.mckinsey.com/industries/financial-services/our-insights/the-rise-and-rise-of-the-global-balance-sheet-how-productively-are-we-using-our-wealth>
- MITMA. (2020). *2020 Update of the Long-term Strategy for Energy Renovation in the Building Sector in Spain*. Retrieved from: https://cdn.mitma.gob.es/portal-web-drupal/planes_estategicos/en_Itserb.pdf
- MITMA. (2014). *Long-term Strategy for Energy Renovation in the Building Sector in Spain pursuant to Article 4 of Directive 2012/27/UE*. Retrieved from: https://www.mitma.gob.es/recursos_mfom/paginabasica/recursos/esart4ener201401009000entra00.pdf
- La Moncloa. (2021). *Plan de Recuperación, Transformación y Resiliencia. Componente 2*. <https://www.lamoncloa.gob.es/temas/fondosrecuperacion/Documents/16062021-Componente2.pdf>



- Mortgage Introducer. (2021). *OneFamily: Over-50s using equity release to stay in homes*. [Website]. Retrieved from <https://www.mpamag.com/uk/mortgage-types/equity-release/onefamily-over-50s-using-equity-release-to-stay-in-homes/390981>
- New Economics. (2022). *CLIMATE ROADMAP: Next steps for the European Central Bank to support the low-carbon transition*. [Website]. Retrieved from <https://neweconomics.org/2022/04/climate-roadmap>
- New Economics. (2022). *GREEN CREDIT GUIDANCE: A green term funding scheme for a cooler future*. [Website]. Retrieved from <https://neweconomics.org/2022/09/green-credit-guidance>
- Odyssee-Mure. (2022). *HEATING ENERGY CONSUMPTION BY ENERGY SOURCE*. [Website]. Retrieved from [https://www.odyssee-mure.eu/publications/efficiency-by-sector/households/heating-energy-consumption-by-energy-sources.html#:~:text=Natural%20gas%20is%20the%20leading,is%20progressing%20\(%2B10%20points\)](https://www.odyssee-mure.eu/publications/efficiency-by-sector/households/heating-energy-consumption-by-energy-sources.html#:~:text=Natural%20gas%20is%20the%20leading,is%20progressing%20(%2B10%20points))
- OECD. (2022). *PH4.2 SOCIAL RENTAL HOUSING STOCK*. Retrieved from <https://www.oecd.org/els/family/PH4-2-Social-rental-housing-stock.pdf>
- PF4EE. (2022). *Why PF4EE*. [Website]. Retrieved from <https://pf4ee.eib.org/about>
- Positive Money. (2022). *TO AVOID ANOTHER SUBPRIME CRISIS, BANKS MUST HELP CONSUMERS TO RENOVATE THEIR HOMES*. [Website]. Retrieved from <https://www.positivemoney.eu/2022/01/ecb-climate-stress-test-energy-efficiency/>
- Renovate Europe. (2022). *Monitoring the National Recovery and Resilience Plans*. [Website]. Retrieved from: <https://www.renovate-europe.eu/monitoring-the-national-recovery-and-resilience-plans/>
- Renovate Europe. (2020). *Taxonomy risks undermining Renovation Wave*. Retrieved from https://glassforeurope.com/wp-content/uploads/2020/12/Taxonomy_VicePres_Timmermans_Com_Simson.pdf
- RICS. (2020). *Energy efficiency of the building stock in the EU*. Retrieved from <https://www.rics.org/es/news-insight/latest-news/news-opinion/energy-efficiency-of-the-building-stock-in-the-eu/>
- Roberts S. Altering existing buildings in the UK. *Energy Pol* 2008;36(12):4482–6. <https://doi.org/10.1016/j.enpol.2008.09.023>
- Romero Mora, J.M. et al. (2022). *Informe de Indicadores de Pobreza Energética en España 2020*. Universidad Pontificia Comillas. Retrieved from: <https://repositorio.comillas.edu/xmlui/handle/11531/65128>
- Ryan-Collins, J. (2021). *Private Landed Property and Finance: A Checkered History*. *American Journal of Economics and Sociology* 80(2):465-502 DOI:10.1111/ajes.12387
- S&P. (2022). *A Bank Evaluates the Impact of Physical Climate Risk to its Mortgages*. [Website]. Retrieved from <https://www.spglobal.com/esg/case-studies/a-bank-evaluates-the-impact-of-physical-climate-risk-to-its-mortgages>
- Savills. (2021). *The total value of global real estate*. [Website]. Retrieved from <https://www.savills.com/impacts/market-trends/the-total-value-of-global-real-estate.html>
- Science Based Targets. (2022). *FINANCIAL INSTITUTIONS*. [Website]. Retrieved from <https://sciencebasedtargets.org/sectors/financial-institutions>
- SEI. (2022). *Reaching climate neutrality in Estonia: a progress update*. Retrieved from <https://www.sei.org/wp-content/uploads/2022/07/reaching-climate-neutrality-in-estonia-a-progress-update-report.pdf>
- Skendata. (2022). *About us*. [Website]. Retrieved from <https://www.skendata.de/about-us/?lang=en>
- Sociedad de Tasación de España. (2022). [Website]. Retrieved from <https://www.st-tasacion.es/es/inicio.html>
- Statista. (2022). *Share of the population in European countries who are owner-occupants in 2019, with or without a mortgage*. [Website]. Retrieved from <https://www.statista.com/statistics/957803/homeowners-with-and-without-an-outstanding-mortgage-in-eu-28-per-country/#:~:text=42.6%20percent%20of%20the%20total,a%20mortgage%20or%20housing%20loan.>
- Sweatman, P. (2021). *Finance & Investing in Decarbonising Europe's buildings*. *Climate Strategy & Partners*. Retrieved from: https://climatestrategy.es/en/informe_19.php
- Sweatman, P. (2021). *The European Renovation Loan: a new instrument to fund the renovation wave*. *Agir pour le Climat*. Retrieved from: <https://www.agirpourleclimat.net/14387/>
- Sweatman, P. (2022). *The European Renovation Loan: An innovative financial instrument to Repower EU*. *Climate Strategy & Partners*. Retrieved from: <https://www.climatestrategy.com/press/EURenovationLoanSummApr2022>
- Taenk. (2022). *Ældre har svært ved at få boliglån*. [Website]. Retrieved from <https://taenk.dk/presse/aeldre-har-svaert-ved-faa-boliglaan>
- UNEP FI. (2022). *Net-Zero Banking Alliance*. [Website]. Retrieved from <https://www.unepfi.org/net-zero-banking/members/>
- Van 't Klooster, J. and van Tilburg, R. (2020). *Targeting a sustainable recovery with Green TLTROs*. [Website]. Retrieved from <https://www.positivemoney.eu/2020/09/green-tltros/>
- YCharts. (2022). *30-Year Eurozone Central Government Bond Par Yield Curve, 2.54% for Aug 25 2022*. [Website]. Retrieved from https://ycharts.com/indicators/30year_eurozone_central_government_bond_par_yield_curve#:~:text=30%20Year%20Eurozone%20Central%20Government%20Bond%20Par%20Yield%20Curve%20is,long%20term%20average%20of%203.08%25.
- Zancanella, P., Bertoldi, P. and Boza-Kiss, B., *Energy efficiency, the value of buildings and the payment default risk*, EUR 29471 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-97751-0 (online), doi:10.2760/267367 (online), JRC113215.



Picture Credits

Cover photo courtesy of Canva

Page 4, photo by Durian-Bullet on Unsplash

Page 8, photo by Marcus Lenk on Unsplash

Page 10, photo by Oscar Nord on Unsplash

Page 12, photo by Eric Masur on Unsplash

Page 12, photo by Milan Gaziev on Unsplash

Page 16, photo by Alexander Andrews on Unsplash

Page 19, photo by Roman Wimmers on Unsplash

Page 20, photo by Daria Nepriakhina on Unsplash

Page 24, photo by format arw on Unsplash

Page 25, photo by Linda Tate Wolfbard on Unsplash

Page 26, photo by Tom Podmore on Unsplash

Page 30, photo by Christian Lue J on Unsplash

Page 31, photo by Nathan Staz on Unsplash

Page 35, photo by Riccardo Annandale on Unsplash

Page 37, photo by Klim Musalimov on Unsplash

Page 45, photo by Juan Giraud on Unsplash

Page 47, photo by Kraken images on Unsplash

Page 49, photo by Chris Caines on Unsplash

Page 54, photo by Aboodi Vesakaran on Unsplash

Page 55, photo by Julian Gentilezza on Unsplash

Page 59, photo by Thomas Konings on Unsplash

Page 61, photo by Zach Rowlandson on Unsplash

This paper has been supported by the European Climate Foundation (ECF). The European Climate Foundation cannot be held responsible for any use which may be made of the information contained or expressed therein.





CLIMATE & STRATEGY
PARTNERS

www.climatestrategy.com

 **@Climatest**



Supported by:

European
Climate
Foundation