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Leveraging public finance for energy-efficient housing

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Summary

The drive for residential energy efficiency presents both a major challenge for climate policy and an important opportunity to gain new economic, social and energy-security benefits for Europe. Yet while there is an urgent need to renovate the building stock to improve its energy efficiency, the scale of the investment this will require cannot be met by public budgets alone. EU member states will also need to use public finance strategically to accelerate renovations and mobilise private investment while balancing competing policy objectives.

Strategic investment in energy efficiency

Our comparative study of selected member states (Italy, Germany, France and Hungary) shows that there is no single best financing model for residential energy-efficiency programmes: the performance of these schemes depends on institutional settings, housing markets and the balance between environmental, social and fiscal objectives. While public finance remains indispensable, its most effective role is often to reduce risks, address market failures and catalyse private capital. It is vital to simultaneously assess programmes in multiple dimensions, including energy savings, cost-effectiveness, private finance mobilisation, market coverage and outreach to vulnerable households.

Residential energy efficiency should be treated as a target for strategic investment in macroeconomic resilience, competitiveness, housing affordability and energy security. At the EU level, this requires embedding energy efficiency in the housing, competitiveness and investment agenda; expanding blended finance and risk-sharing instruments through the Savings and Investment Union; developing a capacity to provide renovation at scale; and establishing a common European benchmarking framework to strengthen policy learning.

Policy recommendations

Member states should provide stable and investable renovation frameworks, adapt their programmes to the characteristics of national housing markets, and strengthen the institutional, technical and market capacity needed to translate finance into renovation activity. Working within their mandates, central banks and prudential regulators should assess whether energy efficiency can be more systematically reflected in monetary and prudential frameworks, including through measures that help incorporate energy efficiency considerations into lending. As member states implement National Building Renovation Plans, systematic benchmarking and the exchange of best practice can help ensure that scarce public resources mobilise greater private investment and provide better environmental, economic and social returns. As part of these efforts, the EU and its member states should consider the following policy options.

Treat energy efficiency as an investment in macroeconomic resilience

Energy-efficiency investments should no longer be assessed solely in terms of emissions reductions or energy savings. They should be recognised as strategic investments that strengthen household resilience against energy price shocks, improve macroeconomic stability, enhance industrial competitiveness and reduce the fiscal costs of future energy crises. As such, investment strategies should evaluate renovation schemes based on these broader economic and social objectives.

Embed energy efficiency in the EU's housing, competitiveness and investment agenda

Energy efficiency should be recognised as the EU's 'first fuel' and treated as a strategic investment in competitiveness, affordability, energy security and climate resilience. Building on the European Affordable Housing Plan, the European Commission should: prioritise the renovation and repurposing of existing buildings above demolition; ensure that energy efficiency remains a central pillar of the

implementation of the revised Energy Performance of Buildings Directive (EPBD); and continue prioritising energy-efficiency investments under the next Multiannual Financial Framework.

Mobilise private capital through blended finance and the Savings and Investment Union

The European Commission, the European Investment Bank and national promotional banks should: expand EU guarantee facilities and risk-sharing instruments to de-risk renovation lending; help national promotional banks develop standardised renovation loan products and portfolio aggregation that can be financed through capital markets; recognise the mobilisation of private capital as a core performance indicator of EU-supported renovation programmes; target grants primarily at vulnerable and energy-poor households while increasingly relying on guarantees and concessional finance to crowd in private capital for the wider market; and rapidly operationalise the Pan-European Investment Platform for Affordable and Sustainable Housing.

Invest in delivery capacity

The European Commission should complement financial instruments for renovation with measures that reduce administrative, regulatory and transaction costs by: helping member states simplify administrative procedures for renovation projects; providing practical guidance to member states on addressing persistent market failures, including split incentives between landlords and tenants, fragmented condominium ownership and limited consumer awareness; and supporting the rollout of dedicated delivery channels with integrated technical, financial and administrative advice.

Establish a European benchmarking framework for renovation programmes

A common European benchmarking framework for residential renovation programmes should combine comparable indicators covering: energy savings and renovation depth; emissions reductions; cost-effectiveness and fiscal efficiency; the mobilisation of private investment; housing affordability and reductions in energy poverty; wider economic benefits, including productivity, health and resilience; programme continuity and long-term policy certainty; and the energy performance and characteristics of the underlying building stock.

Create stable renovation frameworks tailored to national housing markets

EU member states should: implement ambitious National Building Renovation Plans under the revised EPBD with clear long-term investment pipelines; avoid frequent changes to subsidy schemes, tax incentives and eligibility criteria that undermine investor confidence; arrange effective delivery channels either by using existing structures (such as through banks) or establishing new ones (such as one-stop shops) to simplify access to finance and technical assistance for households and SMEs; regularly evaluate programme performance and refine policy design based on evidence rather than repeatedly redesigning support schemes; engage proactively with the European Semester by addressing Country-Specific Recommendations related to housing, energy efficiency and investment, while reporting progress relative to National Building Renovation Plans.

Prioritise more ambitious renovation strategies to address major structural vulnerabilities

Member states with a combination of high residential fossil fuel consumption, ageing building stocks and persistently low renovation rates should adopt more ambitious renovation strategies and accelerate investment in energy efficiency. A group of member states including Italy, Germany and Hungary have several structural characteristics that increase both exposure to fossil fuel price volatility and the potential gains from accelerated renovation. These countries should, therefore, be considered priority candidates for more ambitious policy action.

Explore how to integrate energy efficiency into monetary and prudential frameworks

Energy efficiency influences both macroeconomic conditions and financial stability. By reducing energy consumption and demand, such efficiency can increase resilience against energy price shocks and, therefore, indirectly contribute to price stability. At the same time, more energy-efficient buildings may come with lower transition and physical climate risks. This has potential implications for mortgage credit risk and collateral values.

1. Introduction

Improving the energy efficiency of Europe's buildings is essential to decarbonisation, energy security, housing affordability and other policy objectives. Policymakers need to not only address the inherent trade-offs between these objectives but also understand how to mobilise private capital to this end, since the scale of investment required far exceeds the capacity of public budgets. This policy report examines how public finance can support this mobilisation and develops a framework for assessing different policy approaches and the trade-offs between them.

The energy efficiency of buildings sits at the intersection of climate, fiscal and social policy. Energy efficiency is often referred to as the 'first fuel' because improving the energy performance of assets such as buildings is one of the most cost-effective ways of reducing greenhouse gas emissions, lowering energy demand and reducing fuel-import dependency. Buildings account for around 40% of the EU's energy consumption and greenhouse gas emissions, making them central to both decarbonisation and broader economic policy objectives. This is particularly true of residential buildings, given that their owners often lack both the capital required for renovations and an awareness of the need for such projects.

Achieving the scale of renovation required to meet the EU's climate targets will demand hundreds of billions of euros in investment, far more than public budgets can accommodate. This places public transition finance at the centre of the policy debate. Rather than acting solely as a source of funding, public finance increasingly needs to focus on direct support schemes designed to mobilise private investment, as well as blended finance instruments such as grants, guarantees, concessional lending and risk-sharing mechanisms. This is in line with Europe's renewed focus on the mobilisation of private capital as part of the Savings and Investment Union.

The challenge is, therefore, not only to increase investment volumes but also to use scarce public resources more strategically to maximise their economic, environmental and social impact. Energy-efficiency investments have the potential to deliver a wide range of policy objectives simultaneously. Beyond reducing emissions, they can improve housing affordability, reduce energy poverty, strengthen energy security, support employment and small and medium-sized enterprises (SMEs), contribute to regional development, and generate fiscal returns through higher economic activity. Yet these objectives are not always mutually reinforcing, and energy-efficiency policies are rarely explicit about the trade-offs they entail.

Policymakers may need to choose between supporting a relatively small number of deep renovations with substantial energy savings or a larger number of shallower renovations that reach more households. Similarly, there can be tensions between maximising private finance mobilisation and maintaining affordability, since repayable finance is generally less accessible than grants for vulnerable households. Prioritising bankable projects may improve financial efficiency but exclude households and buildings that face the greatest barriers to renovation. Other trade-offs arise between containing fiscal costs and providing sufficiently ambitious support; between rapid deployment and robust fraud controls; between universal and targeted programmes; and between maximising carbon reductions and promoting broader social equity. Understanding how different programmes navigate these trade-offs is essential to designing effective public policy.

Beyond these trade-offs, policy fragmentation, the differing incentives of property owners and tenants, and underdeveloped financing mechanisms continue to constrain renovation markets. Together, these barriers can lead to suboptimal policy design, inefficient allocation of public resources and lower environmental, social and economic returns on public investment.

We examine how public finance instruments can be designed to accelerate renovations for residential energy efficiency and balance multiple policy objectives through the design of public finance

instruments such as grants, guarantees, concessional lending and other blended finance mechanisms. Drawing on comparative case studies of selected EU member states, we analyse how different financing models mobilise private investment, prioritise competing objectives and provide lessons for future policy design.

Building on these findings, we propose a framework for assessing the dimensions of housing energy efficiency that policymakers should emphasise, helping them manage trade-offs and make more effective use of public finance to support Europe's green transition.

The report is structured as follows:

- Section 2 is a literature review that analyses the state of the art in housing energy-efficiency policy.
- Section 3 provides an overview of the housing energy-efficiency challenge in the EU.
- Section 4 identifies the most important and most common trade-offs between policy objectives in selected EU member states, setting out a simple analytical lens through which we discuss national programmes.
- Section 5 draws on the experiences of these member states collectively to identify common lessons for the design of energy-efficiency measures and the mobilisation of public funds to catalyse private energy-efficiency investments. We discuss how different policy designs implicitly prioritise specific objectives and affect outcomes, before making policy recommendations that set out practical ways in which the EU and its member states can accelerate residential renovation, mobilise private investment, improve policy implementation and strengthen the governance of energy efficiency across Europe.
- Section 6 presents our conclusions, explaining why there is no single optimal model for financing residential energy efficiency.

Throughout, we use the terms 'energy efficiency' and 'renovation' in a broad sense, largely reflecting the approach of the EU's Energy Performance of Buildings Directive (EPBD) and Taxonomy Climate Delegated Act.[1] These terms relate to measures designed to improve the overall energy performance of buildings, which can include upgrades of building materials and the decarbonisation of heating and cooling systems. 'Energy efficiency' can refer to both the renovation of existing buildings and the construction of new, energy-efficient properties.

[1] Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council. This established the technical screening criteria for determining the conditions in which an economic activity qualifies as making a substantial contribution to climate change mitigation.

2. Literature review

This section explores the literature on housing energy-efficiency policies. While such policies have a wide range of benefits, EU member states still face numerous barriers to financing energy renovations, including the efficient mobilisation of private funds. The literature provides guidance on the development and use of diverse individual financial instruments within the wider policy mix, as well as on fairness considerations, particularly those involving lower-income households. However, the literature includes only limited evaluations of housing policies' success in achieving their many objectives.

Energy efficiency in buildings has long been identified as a core policy lever to reduce carbon emissions (Papangelopoulou et al., 2025) and to improve social and health outcomes (International Energy Agency [IEA], 2015). Increasing the energy efficiency of residential buildings can have additional benefits, such as lowering the payment default risk on mortgages, increasing property values (Zancanella et al., 2018) and supporting climate adaptation. With the EU's 2012 Energy Efficiency Directive having laid the foundations of an effort to accelerate energy-efficiency upgrades in EU member states (Economidou, 2019), energy efficiency has become a focus of policymakers: the EU adopted the EPBD in 2024 with a view to fully decarbonising the building stock by 2050, a process that EU member states are now implementing. The European Commission estimates that achieving the EU's 2040 climate targets will require energy-efficiency investments of €370 billion per year between 2021 and 2030, including €242 billion per year directed at buildings (European Commission, 2026c).

Barriers to financing energy efficiency

Fiscal policy plays a major role in supporting the uptake of renovations, with EU member states spending an estimated €360 billion on energy-efficiency projects between 2014 and 2024, an average of €33 billion per year (European Commission, 2026c). More generally, fiscal tools are central to developing the energy-efficiency market (Bertoldi et al., 2020) as they can address market barriers to the implementation of renovations. These barriers commonly include high upfront costs (Papangelopoulou et al., 2025), especially for low-income housing and social housing (Council of Europe Development Bank, 2024); split incentives[2] (Zancanella et al., 2018); a lack of access to finance; and a scarcity of private capital for investment (Bertoldi et al., 2020). An additional barrier is fragmented or complex ownership structures, which can hinder the renovation of multi-flat buildings (Matschoss et al., 2013; Elgendy et al., 2024) and has posed a particular challenge for low-income and older households, notably in post-Soviet countries (Streimikiene and Balezentis, 2019). Such barriers can lead to a sub-optimal trade-off between shallow renovations (broadly defined as achieving savings in primary energy use of less than 60%) and deep renovations (achieving savings of 60% or more). Most energy renovations in Organisation for Economic Co-operation and Development (OECD) countries are mostly shallow single measures (Hanna et al., 2025).

In this context, mobilising private capital is increasingly seen as a necessary objective of housing energy-efficiency policies. Indeed, institutional actors emphasise that public budgets alone can only cover a limited share of the investment needed to meet the EU's 2030 energy-efficiency targets (European Commission, 2026b; Economidou et al., 2019). Long-term renovation strategies need to mobilise both public and private investment, not least because the private sector's involvement is a prerequisite of lasting market activation for energy renovations, meaning that private financing can increasingly drive investment instead of relying on public finance, whose role is limited to starting and scaling the market (Bertoldi et al., 2020). However, the high transaction costs, the difficulty of forecasting returns, and financial institutions' perception of energy-efficiency loans as a high-risk

[2] The energy-efficiency split incentives problem is a market failure stemming from the problem that the person who pays for property upgrades (the landlord) does not receive the financial reward (lower utility bills), which instead go to the tenant.

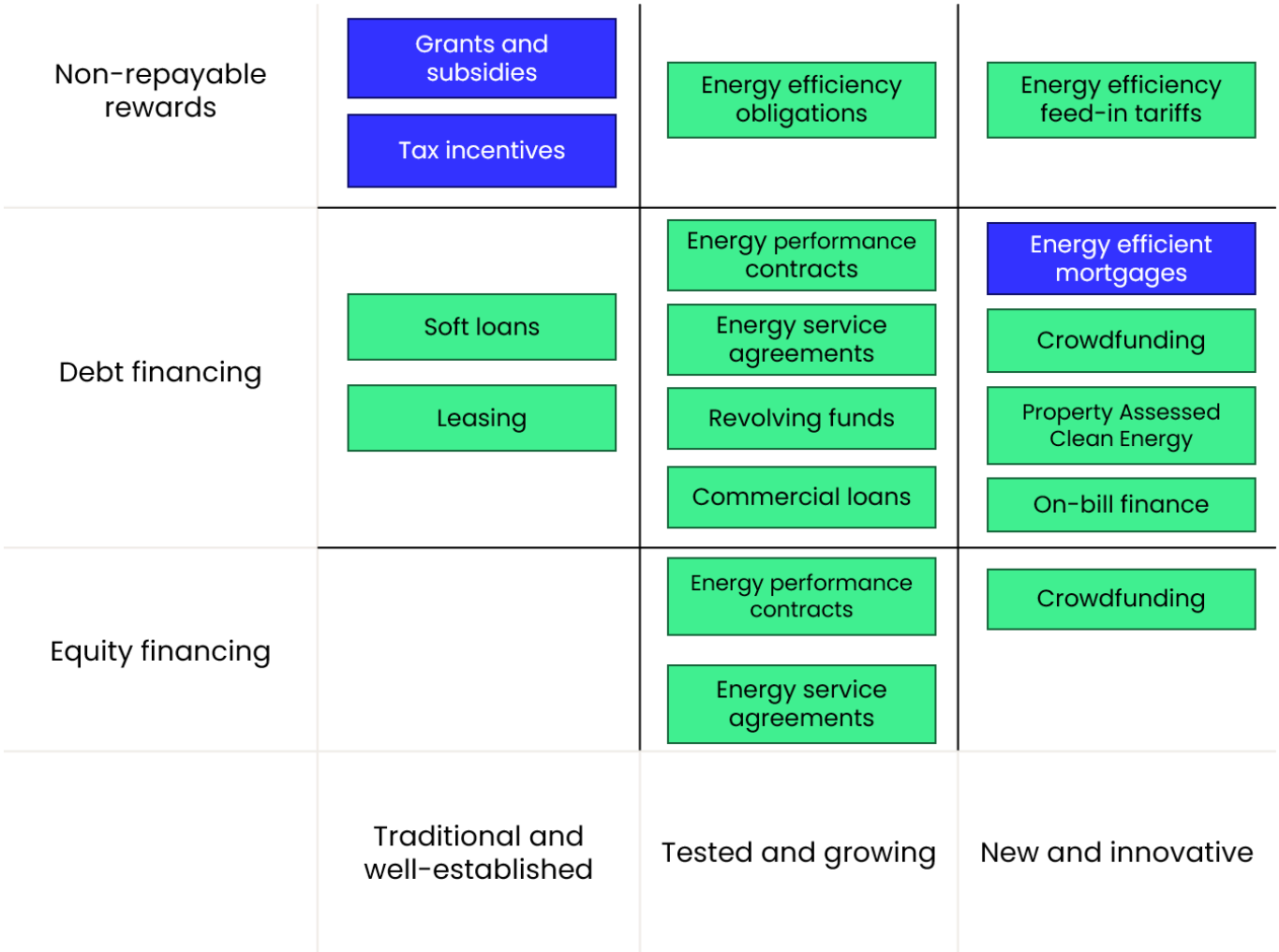
investment (Casalini, 2025) can all act as additional barriers to mobilising private funds (Bertoldi et al., 2020).

While the literature identifies best practice in leveraging private finance for energy-efficiency policies, it lacks robust ex post evaluations of residential energy-efficiency programmes (Council of Europe Development Bank, 2024). Best practice includes targeted programme design, the diversity of financing instruments and the continuity of programmes. For example, it tends to be more cost-effective to combine grants with loans or guarantees, particularly if these grants are reserved for lower-income households (Economidou et al., 2019), while public–private partnerships can help improve project selection and outreach (Díaz and Tucker, 2022). Programmes offering continuity, such as those that follow the German KfW model, are considered particularly replicable as they increase investor confidence (Díaz and Tucker, 2022).

Instruments for financing energy efficiency: a diverse landscape

The variety and range of instruments for financing energy efficiency are well-documented; they include traditional instruments such as grants, subsidies, tax incentives and loans, as well as less common ones such as energy-efficiency obligations, energy services companies, and energy-efficient mortgages (Bertoldi et al., 2020; Economidou et al., 2019). However, the categorisation of these policy instruments is not consistent across studies and countries (Rosenow et al., 2016). One recent proposal suggests that financing mechanisms, models and tools should be organised according to three criteria: the source of financing (public, private or mixed), the contract type (non-repayable, debt, equity, hybrid) and the innovation level of the tool itself (Todeschi et al., 2025).

Figure 2.1. Financial instruments supporting energy renovations in the EU



Note: Blue boxes denote instruments examined in this report. Source: adapted from Bertoldi et al. (2020).

EU member states have predominantly used non-repayable forms of financing schemes to support energy efficiency, while other repayable forms of financing schemes are less common despite being more likely to attract private investment (European Commission, 2026b). This confirms that there is a need to consider which instruments can best help implement energy-efficiency policy objectives, while effectively attracting private finance. The financial instruments used in the EU range from traditional non-repayable instruments, representing over 60% of the schemes in place during 2014–24 and €248 billion, to novel equity financing instruments (European Commission, 2026c). For the purposes of this study, the classification in Figure 2.1 (Bertoldi et al., 2020) is a useful starting point for our analysis.

As discussed, there are various trade-offs associated with the use of individual financing instruments. Indeed, traditional models of financing can provide solid foundations for established projects, whereas emerging challenges and the need to deepen energy-efficiency renovations might require more innovative tools (Todeschi et al., 2025). However, it is more important to carefully consider the policy mix than to focus on individual instruments: policymakers do not start with a blank slate but rather adopt new policy instruments in the context of pre-existing arrangements, which might serve the same policy objectives in a different form.

Policy instruments for energy efficiency include grants, regulations, energy-efficiency obligations and carbon taxes. Arguably, a single policy instrument cannot single-handedly support more complex and costly solution for energy-efficiency improvements, such as whole-house retrofits (Rosenow et al., 2017). Comprehensive instrument mixes are essential to avoid focusing only on the easiest energy-efficiency improvements, despite their economic rationale, as they will be insufficient in themselves to realise the energy transition at scale (ibid.). This is why countries tend to implement different policy mixes that encompass a variety of goals and instruments (see Rosenow et al., 2016; Kern et al., 2017), pointing to the need to consider the national policy landscape when evaluating specific housing energy-efficiency schemes.

The just transition in energy efficiency financing

Energy efficiency in housing has long been linked to fairness considerations, particularly because measures to finance energy-efficiency improvements have important distributional implications (Lekavičius et al., 2020). This has partly been taken into account in recent EU policy decisions, notably with the start of the Social Climate Fund in 2026, which is designed to soften the impact on the most vulnerable households of the Emissions Trading System 2, which puts a price on carbon emissions from buildings, road transport and small industries. The EU's revisions to the Energy Efficiency Directive and the EPBD also have socially just elements, including measures to tackle energy poverty (Ricci et al., 2025).

If the EU is to continue paying close attention to lower-income households, it will need to acknowledge that the effects of energy poverty vary across member states, with countries in Southern Europe bearing a disproportionately heavy burden (see Moleskis et al., 2025; European Commission and Energy Poverty Advisory Hub, n.d.). This region faces notably higher levels of exposure to energy poverty because of the concentration of low-income and vulnerable households in social housing, as well as the low energy efficiency of existing buildings. These factors lead households to consume less energy than theoretical models of retrofitting projects would predict, thereby weakening the economic rationale of such projects (Desvallées, 2022). Energy poverty has been identified as a particular concern in Central and Eastern European countries – where it can result from, for example, inadequate coordination of energy, social welfare and housing policies (Buzar, 2007).

The concept of just energy renovations remains vaguely defined in the literature (Ricci et al., 2025). One helpful framework for conceptualising energy justice is grounded in three dimensions: distributional, in identifying the concern; recognition-based, in identifying who is affected; and procedural, in identifying how to remedy the injustice (Jenkins et al., 2016). While energy justice is not the primary concern of our analysis, we recognise its importance in assessing schemes that seek to improve energy efficiency in residential housing.

Indeed, households that are vulnerable to energy poverty may face specific barriers to energy-efficiency renovations (Moleskis et al., 2025), as they are more likely to focus on immediate needs rather than to engage in the necessary long-term planning. This can result in missed opportunities to engage with the available policy schemes and emphasises the need to specifically target low- and moderate-income groups in policy design (Asensio et al., 2024; Tozer et al., 2023). Moreover, high renovation costs can exclude low-income groups from these policies, as lower-income tenants are particularly affected by split incentives (Bird and Hernandez, 2012). This can also lead to or compound cultural injustices if certain communities or vulnerable groups are unable to access decision-making processes in energy-efficiency projects (Ricci et al., 2025). Indeed, even when lower-income households overcome financial barriers and start energy renovations, they face a higher risk of disengagement in seeing out renovations (Pillai et al., 2021).

Furthermore, there is a potential risk that energy-efficient renovations will trigger 'renovictions', the displacement of vulnerable residents due to rising rents and property values (Martino et al., 2026). While this important social phenomenon is not in the scope of our analysis, it is indicative of yet another possible policy trade-off between climate and social objectives.

The complexity of evaluating housing policies

The diversity of policy objectives linked with housing energy efficiency raises an important question: how should the success of different policy interventions be evaluated? One approach is to identify the instruments of best practice in financing energy efficiency across the EU using 6 criteria: significant impact; high cost-effectiveness; ambitious energy upgrades; funding sustainability and continuity; scalability/replicability; and outreach to hard-to-reach groups (Economidou et al., 2019).

Beyond focusing on programme outcomes, there are proposed frameworks that examine the characteristics and design features of policy interventions. One such framework focuses on the building sector (Xia-Bauer et al., 2024) and is based on an earlier model (Schaffrin et al., 2015) that was originally developed to evaluate climate policy innovation and renewable energy initiatives. Operationalising the concept of policy intensity, this earlier model identifies the ambitions, activities and resources allocated to specific policies by developing six categories of indicators: objectives, scope, integration, budget, implementation and monitoring.

Another approach is to identify practical financing solutions that can be deployed at scale. The Green Finance Institute (2020) and its Coalition for the Energy Efficiency of Buildings created a portfolio of demonstrator projects, which are financial solutions that are commercial and scalable, and that mobilise capital flows to retrofit UK homes to improved energy performance standards. For example, these demonstrators include building renovation passports or a 'Sustainable Housing label'.

Nonetheless, there is some debate about whether commonly used indicators are suitable for evaluating policy success. For example, to analyse performance gaps, one study of Energy Performance Certificates (EPCs) in the EU concluded that they are ill-suited to evaluating the effectiveness of energy-efficiency policies (Geijtenbeek et al., 2026).

Another study examines sustainable financing practices for energy-efficiency projects in EU member states, using the following five criteria to evaluate the replication potential of specific schemes with a weighted scoring model: regulatory compatibility, private sector engagement, technical feasibility, EU funding independence,[3] and scalability (Karakosta et al., 2025). The OECD evaluation criteria for policy programmes also provides helpful guidance in these areas, and overlaps with the framework proposed by Economidou et al. (2019). Arguably, the degree of leverage in publicly funded programmes can be used as an indicator of a housing retrofit programme's effectiveness, with 'leverage' referring to mobilising private funding using public funds (Kerr and Winskel, 2020). In line with this, we added the criterion of 'private funding leverage' to our framework.

[3] In our analysis, this criterion assesses reliance on EU grants/structural funds relative to domestic or private funding.

3. The housing and energy-efficiency challenge in the EU

In recent years, the EU has developed several initiatives to address rising housing costs and poor energy efficiency. Recognising the complexity of residential energy-efficiency policies and their fragmentation across national contexts, we develop an analytical framework to compare how different national approaches prioritise different policy objectives and draw out best practice to inform future policy design.

Key conceptualisation

The EU housing challenge is defined by the twin crises of rising costs and poor energy efficiency, which are now affecting millions of vulnerable households even more due to global fuel price volatility. The EU building stock is dominated by old houses: roughly 50% of houses were constructed before 1979 and around 20% before 1945. Almost half of the 215 million houses in the EU have an energy rating performance of D or below (Copenhagen Economics and Housing Europe, 2021).[4] With such an outdated building stock, the EU has prioritised combating high utility bills and energy poverty through multiple initiatives, mobilising investments for cost-effective renovations and new sustainable construction.

Our analysis builds on two initiatives that are particularly relevant for the intersection of housing and energy efficiency: the Renovation Wave Strategy (2020) and the European Affordable Housing Plan (European Commission, 2025). The Renovation Wave Strategy aims to "double the annual energy renovation rate of residential and non-residential buildings by 2030 and to foster deep energy renovations", as part of an effort to achieve the ultimate goal of EU-wide climate neutrality by 2050 (European Commission, 2020). Beyond the headline commitment, the strategy also mentions objectives such as the creation of jobs in the construction sector. The EU has taken several legislative steps to implement the Renovation Wave Strategy, among which the revised EPBD and the recast Energy Efficiency Directive are the most relevant to our analysis.

The European Affordable Housing Plan (European Commission, 2025) highlights the need to integrate the following three policy objectives with one another:

- **Affordability.** While this is an overarching objective, the plan specifically addresses young, disadvantaged and homeless people.
- **Sustainability.** Linked to this objective, the plan emphasises energy-efficiency and resiliency, focusing on homes with low maintenance costs and the lowest possible carbon footprint.
- **Quality**. This refers to providing healthy, safe and dignified living conditions.

The plan is based on four pillars: boosting housing supply by improving productivity and innovation in construction, and by simplifying administrative requirements; mobilising investment by revising state aid rules and creating a new Pan-European Housing Investment Platform (in cooperation with the European Investment Bank and national and regional promotional banks); enabling immediate support while driving reforms; and supporting the most affected.

Energy efficiency also features in the European Semester, the EU's annual framework for coordinating economic and social policies. Through this framework, the European Commission issues Country-

[4] Energy Performance Certificate ratings run from A (best) to G (worst).

Specific Recommendations, including those on structural barriers related to buildings, renovation and energy performance. For instance, in recent years, Hungary has consistently received Country-Specific Recommendations with energy efficiency elements (European Commission, 2026a).

In line with these EU-level policy directions, many member states have introduced national-level programmes that are characterised by a combination of environmental, social and economic policy objectives, and that use a wide range of financial instruments. At the same time, member states are currently preparing (or have recently prepared) their draft National Building Renovation Plans under the revised EPBD, including dedicated financing chapters, in close dialogue with the European Commission (see Box 3.1). These programmes often reflect different policy priorities and approaches to managing the trade-offs discussed above. Based on these considerations, we analyse the selected national cases through the following analytical lens.

Box 3.1. National Building Renovation Plans

Under the EPBD, which was revised in 2024, member states must submit a National Building Renovation Plan to the European Commission every five years. These plans should align with the wider National Energy and Climate Plans for 2021–30 that each member state submitted to outline its trajectory towards achieving the 2030 EU climate and energy targets. National Building Renovation Plans, which must be finalised by the end of 2026, include:

- A roadmap with targets for 2030, 2040 and 2050 in areas such as renovation rates, greenhouse gas emissions and primary energy consumption.
- The investment required to implement the plan, as well as its planned source of financing and administrative resources.
- A national trajectory for the renovation of the residential building stock.

An initial assessment by the European Commission of the 16 submitted draft plans (Maduta et al., 2026) highlights that, while National Building Renovation Plans generally set out comprehensive packages of policies and measures, they lack quantifiable objectives, assessments of the expected impact of these policies, and clarity on investment needs and financing sources.

Analytical lens: what defines success?

Our analytical framework draws on academic literature, grey literature and policy documents to answer the following questions about energy efficiency programmes:

- Which criteria should be used to analyse and compare policies designed to foster energy efficiency in residential housing across different national contexts?
- How do different schemes prioritise policy objectives, and what evidence is available on their performance against these objectives?
- Which elements of good practice from these cases should future policy design draw on?

The study we build on (Economidou et al., 2019) highlights six criteria to determine instruments of best practice:

- Significant impact.
- High cost-effectiveness.
- Ambitious energy upgrades.
- Funding sustainability and continuity.

- Scalability/replicability.
- Outreach to hard-to-reach groups.

To ensure that our analysis is comprehensive, we have expanded this framework by incorporating additional dimensions that are particularly relevant to the current European policy context.

Given the increasingly limited fiscal space in EU member states' budgets, and the development of innovative approaches to mobilising private capital for housing renovations, we added a criterion for examining the effectiveness of private capital mobilisation in relation to public investment. Inspired by Kerr and Winskel (2020), this criterion reflects the extent to which public resources succeed in mobilising additional private investment.

Moreover, because residential building markets within the EU differ greatly in their types of ownership structures and geographical contexts, it is essential to consider which tenure-specific barriers residential housing policies implicitly or explicitly address. To this end, we followed the broad categories used by the Green Finance Institute (2020): owner-occupied homes, the private rental sector and the social rented sector, adding market coverage as an additional criterion.

Drawing on the existing literature, we developed the following methodology for comparing energy-efficiency schemes in residential housing across different national contexts (see Table 3.1 and Box 3.2 below). We selected eight criteria covering the impact, cost-effectiveness, ambition, sustainability, scalability, inclusiveness, financing characteristics and housing market coverage of the schemes. To guide the analysis in our country spotlights in Section 4, we considered for each criterion some of the guiding questions presented below for each country (where possible). Our analysis confirms that data availability remains a major challenge in cross-country comparisons.

Table 3.1. Analytical framework for determining energy-efficiency schemes' focus on eight criteria

Criteria	Guiding questions and indicators considered
Significant impact	• How many households benefitted from the scheme? • Was job creation or an increase in GDP growth linked to the scheme? • Did the scheme support the achievement of the policy's objectives, according to available evaluations of the policy?
High cost-effectiveness	• Emissions reductions divided by public investment or energy savings divided by public investment • Number of households benefitting from the scheme divided by public investment • Has fraud been detected in this scheme, and what percentage of renovation projects does it affect?
Ambitious energy-efficiency improvements	• Estimated reduction in emissions or energy savings per square meter • Improvement in energy performance (energy-use intensity, if available, or alternatively the number and scope of interventions)
Funding sustainability and continuity	• Stability and predictability of funding source • Evolution of programme uptake over time • Long-term fiscal sustainability of the scheme
Scalability/replicability	• Has the scheme been taken up in a different region to the one it was first applied to? • Is the scheme connected to other public planning tools that are already available, and is it part of a set of policies?

	• In principle, could the same programme be run with a higher budget?
Outreach to hard-to-reach groups	• What is the target group for this scheme? • What is the percentage of lower-income households who have taken up the scheme? • Administrative simplicity and accessibility
Private finance leverage	• What is the ratio of private investment to public investment? • Does the public subsidy result in the subsidised household investing more in energy-efficiency retrofits later on?
Housing market coverage	• Breadth of housing market coverage: does the scheme cover different building types and tenure structures (such as owner-occupied properties, private rental properties, social housing, multi-family buildings and single-family homes)? • Concentration: was a specific housing type overrepresented in the uptake of the scheme?

To facilitate comparison between different national contexts, we assess each scheme against the eight analytical dimensions presented above.

Box 3.2. Methodology of our scoring framework

We assigned a score between 1 (limited emphasis/evidence) and 5 (strong emphasis/evidence) to each dimension based on the available evidence and our analysis (see more details in the Appendix). Our assessment draws on both quantitative indicators (where available) and qualitative evidence derived from programme documentation, evaluations and academic literature, guided by the questions and indicators set out in Table 3.1.[5]

The scoring framework is intended to be a structured analytical tool for illustrating programme profiles, priorities and trade-offs. It is not designed to produce a definitive ranking of programmes. The scores should be interpreted primarily as a comparative indication of the relative emphasis and observed characteristics of each programme across analytical dimensions rather than as absolute performance ratings against a universal benchmark.

A higher score, therefore, does not necessarily indicate a 'better' programme overall. Different score profiles may reflect legitimate differences in programme objectives, national contexts and policy choices. Importantly, for 'significant impact', our assessment considers delivery relative to the programme's stated objectives and scale rather than attempting to estimate absolute economy-wide impact.

Therefore, as discussed, the purpose of the scoring exercise is not to provide a definitive 'ranking' of the selected national schemes. Rather, the scores should be interpreted as reflecting the extent to which a scheme focuses on a particular criterion, allowing for the identification of policy priorities, strengths, limitations and trade-offs across schemes.

We summarise the evidence collected in each dimension in spider charts that highlight the different policy profiles, priorities and trade-offs observed across the schemes. These charts are a stylised, simplified representation of how different programmes balance policy objectives related to areas such as impact, cost-effectiveness, social inclusion, private finance mobilisation and housing market coverage.

[5] The scores were initially assigned by the author responsible for each case on the basis of the available evidence. They were subsequently reviewed by all authors with the aim of improving consistency in the interpretation of the analytical framework. As this was a qualitative cross-check rather than a formal calibration exercise, the final scores are not averages of independently assigned ratings.

4. Spotlights on practices in selected EU member states

This section examines residential energy-efficiency programmes in Italy, Germany, France and Hungary. It covers a diverse range of housing systems, institutional setups and financing instruments. Our country spotlights assess how varying combinations of grants, tax incentives, concessional lending and other public finance instruments operate across a common set of analytical dimensions.

The four national cases were selected to capture variations across European housing regimes and the institutional conditions under which residential energy-efficiency policies operate. Our analysis includes countries that differ in tenure structure, the size and role of social housing, the balance between multi-family and single-family housing, and the maturity of mortgages and housing finance markets. This comparative logic is informed by the literature on housing regimes, which shows that housing systems differ not only by tenure mix but also by relationships between the state, households, credit markets and rental institutions (European Commission, 2021; Flynn and Montalbano, 2023; Ubarevičienė et al., 2026).

Italy, Hungary, Germany and France were chosen for our country spotlights because they represent markedly different configurations of these analytical dimensions. Germany has a rental-oriented housing system, with comparatively strong tenant protections, a large private rental sector and a relatively restrained home-ownership model. France combines a substantial owner-occupied sector with a more institutionally developed social housing tradition and stronger public financial infrastructures around housing provision. Italy has a typically Southern European, family-centred and owner-occupied housing regime, with limited social rental provision and a strong reliance on household assets and property ownership. Hungary, by contrast, has followed a typically post-socialist housing trajectory marked by very high homeownership, residual social housing and a housing stock shaped by both socialist-era multi-family estates and post-1990 marketisation. Taken together, these cases allow us to draw lessons from countries with different housing stocks, welfare traditions, credit systems and degrees of housing financialisation.

We adopted a diverse case selection approach with the objective of maximising variation in institutional, economic, political and housing market characteristics while focusing on member states that have achieved comparable outcomes in residential energy efficiency. This approach increases our confidence that any common explanatory factors we identify are likely to apply to different national contexts rather than to be contingent on a particular institutional or socio-economic setting (see the Appendix for table summarising the schemes in each country).

Italy

Overview of the Superbonus 110% programme

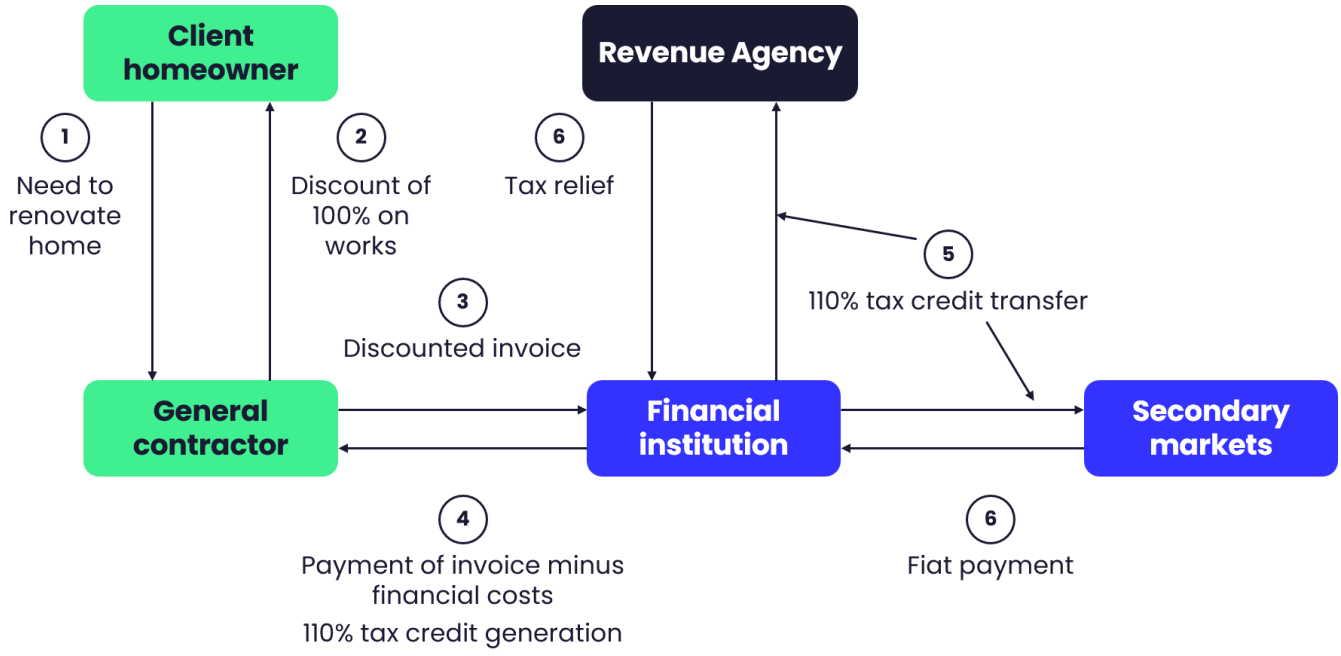
Italy's residential energy-renovation framework has historically been dominated by tax incentives. These are complemented by instruments with different financing mechanisms and target groups, including Conto Termico for renewable heating and selected efficiency measures; the National Energy Efficiency Fund, which provides concessional loans and guarantees primarily to firms, energy service companies and public authorities; and targeted public-investment programmes for social and public housing. The resulting policy mix is asymmetric: conventional tax deductions depend on households' tax capacity and ability to finance works upfront, while more targeted grants and financing instruments address specific technologies, beneficiaries or market barriers. Therefore, we examine the Superbonus 110%, Italy's flagship residential energy renovation instrument, as an exceptionally generous and temporary component of this wider framework.

The Superbonus was introduced by Decree-Law 34/2020 to accelerate energy-efficient building renovation, address seismic risk and support the post-pandemic recovery of the construction sector. The scheme was designed as a tax-credit-based fiscal incentive. Eligible households could claim a tax deduction equal to 110% of qualifying expenditure over several years or, alternatively, opt for *sconto in fattura* (invoice discounting) or transfer the tax credit to third parties, including banks and other financial intermediaries. Beyond subsidising renovation works, these mechanisms were intended to remove liquidity constraints on households and, in practice, contributed to the emergence of a secondary market for tax credits that facilitated implementation (Accetturo et al., 2026).

The scheme covered a broad range of residential buildings and renovation measures. Eligible interventions included the replacement of heating and cooling systems and the installation of thermal insulation, photovoltaic systems, solar thermal systems and electric vehicle charging infrastructure. A central eligibility requirement was that renovations must achieve an improvement of at least two energy performance classes, where technically feasible. Therefore, the programme incentivised deep energy renovations rather than incremental upgrades, combining energy-efficiency objectives with the broader goals of decarbonisation and an improvement in housing quality. The Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) monitored completed interventions, investment volumes and regional uptake across condominiums, single-family houses and functionally independent residential units, illustrating the scheme's broad coverage of housing typologies.

Institutionally, the programme relied on a multi-actor administrative process. Technical compliance was certified by accredited professionals, documentation was submitted electronically to ENEA, and tax claims were processed through the Italian Revenue Agency, with tax credits subsequently becoming transferable to financial intermediaries and other eligible purchasers. Although this architecture was considerably more complex than a traditional grant scheme, it enabled the programme to operate through the tax system while expanding households' access to financing. As participation increased, however, the complexity of the system also created significant monitoring, verification and fraud-control challenges. Figure 4.1 provides a simplified representation of the main actors and financial flows in the scheme.

Figure 4.1. Superbonus operational scheme



Source: Authors' analysis, adapted from De Gasperis et al. (2024). Note: Circled numbers indicate the main steps and financial flows of the programme mechanism, as described in the figure.

Originally conceived as a temporary emergency measure, the Superbonus was repeatedly amended as fiscal pressures mounted. The scheme evolved from the initial 110% deduction to progressively lower

subsidy rates and tighter eligibility conditions, while restrictions on credit transfers and invoice discounting were introduced to limit public expenditure. Official evaluations and subsequent analytical studies have generally concluded that the programme led to an unprecedented number of deep residential renovations and measurable improvements in buildings' energy performance. At the same time, these achievements came at the cost of substantial fiscal liabilities, significant windfall effects and considerable administrative complexity. Italy, therefore, provides a particularly valuable case study in examining the trade-offs between policy ambition, large-scale uptake and long-term fiscal sustainability in residential renovation policy (Codogno, 2024).

Assessment

The Superbonus achieved substantial scale. By May 2026, ENEA monitoring had recorded interventions in more than half a million residential buildings. Estimates by the Italian Court of Auditors indicate that the programme exceeded its energy-saving and emissions-reduction benchmarks: estimated annual energy savings reached 214.5 kilotonnes of oil equivalent (ktoe), compared with a target of 191 ktoe, while annual carbon reductions reached approximately 745 $ktCO_2$, compared with a target of 667 $ktCO_2$. The scheme also supported activity in the construction sector and employment during the post-pandemic recovery. Overall, these results indicate a strong performance under the *significant impact* criterion, as the programme fulfilled its principal objectives of expanding residential renovation and reducing building-related energy consumption, albeit at a high fiscal cost.

The programme's *cost-effectiveness* was considerably weaker than its aggregate impact. The high subsidy rate led to rapid uptake but limited the need for households to contribute their own resources to renovations and created substantial windfall effects. Available estimates suggest that the scheme resulted in a high level of public expenditure per renovated building and per unit of emissions reduction. Fraud also became a significant concern, particularly in relation to transferable tax credits, with enforcement authorities identifying several billion euros in fraudulent or non-existent credits. As a consequence, successive governments introduced tighter verification requirements and restrictions on credit transfers. Therefore, the Superbonus delivered a large volume of renovation but, as discussed, did so at a comparatively high cost, reducing its performance under this criterion.

The scheme performed strongly in terms of the depth and ambition of the renovations it supported. For renovations to be eligible under the scheme, they generally required an improvement of at least two energy-performance classes, encouraging packages of interventions rather than isolated measures. Supported works included building-envelope insulation, the replacement of heating and cooling systems, window upgrades and renewable-energy installations, as well as the installation of energy-storage systems and electric-vehicle charging infrastructure. This design made the Superbonus one of Europe's most ambitious residential retrofit programmes and contributed to *ambitious energy-efficiency improvements* that resulted in measurable reductions in energy consumption and emissions.

Funding sustainability was one of the programme's principal weaknesses. The Superbonus was supported by the allocation of national fiscal resources and substantial funding from the EU's Recovery and Resilience Facility, but the fact that it was designed around open-ended tax credits made total expenditure difficult to control. Uptake initially expanded rapidly and exceeded government expectations, creating significant long-term fiscal liabilities. Repeated amendments to subsidy rates, eligibility conditions, invoice discounting and credit-transfer rules reduced the predictability of the programme for households, contractors and financial intermediaries. Although these reforms were intended to contain budgetary exposure, they also disrupted implementation and resulted in stranded tax credits and stalled projects. The scheme, therefore, combined strong initial uptake with limited continuity and weak long-term fiscal sustainability.

As for *scalability and replicability,* the Superbonus demonstrated that a highly subsidised programme could be rapidly scaled up across an entire national housing market. The scheme achieved uptake in all Italian regions and across several residential building types. Its integration into existing tax administration processes, energy-certification procedures and professional verification systems also facilitated national implementation. However, it would be difficult to replicate the programme in its original form due to its exceptional subsidy rate, fiscal cost, administrative burden and exposure to fraud. The basic instruments of the scheme (tax credits, invoice discounting and transferable claims)

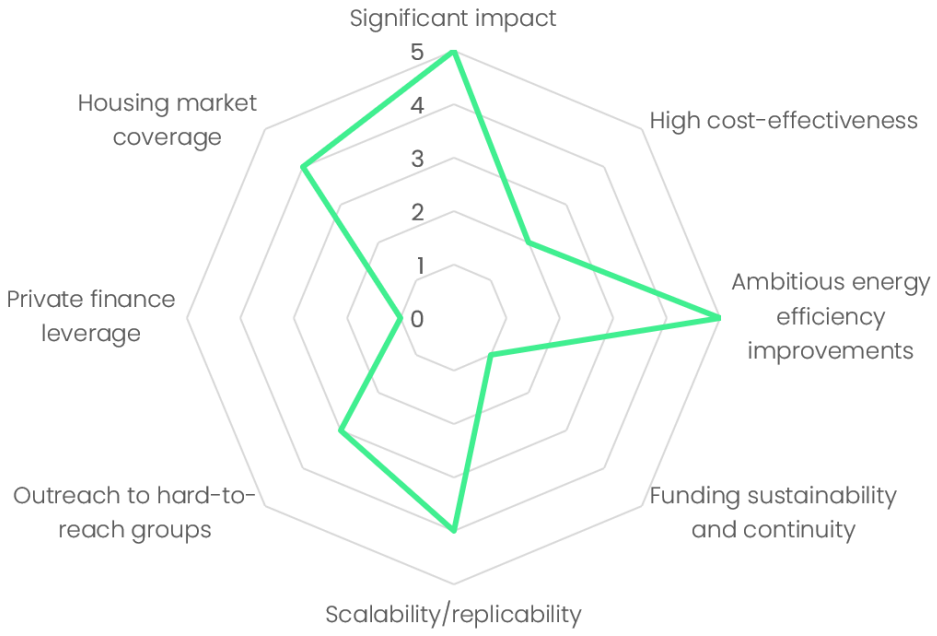
could be adopted elsewhere, but only with tighter expenditure controls, stronger targeting, more stable rules and more robust monitoring mechanisms.

Regarding *outreach to hard-to-reach groups*, the programme was formally open to a broad range of residential property owners but was not specifically designed to target low-income or energy-poor households. Participants in the scheme needed to own property, coordinate with contractors and technical professionals, and manage a complex administrative process. The evidence suggests that the benefits of the scheme were disproportionately captured by middle- and higher-income property owners, particularly those able to organise extensive renovation projects. Therefore, the scheme provided broader access than a conventional tax deduction but remained weakly targeted towards households facing the greatest financial and administrative barriers.

The transferability of tax credits brought banks and other financial intermediaries into the renovation-finance process and helped mobilise private capital, thereby contributing to *private finance leverage*. In some years, the ratio of private investment to public expenditure was approximately 2:1. However, the exceptionally generous public subsidy meant that private finance often served primarily to advance or purchase publicly backed tax credits rather than to share a substantial proportion of project costs. Moreover, there is little evidence that participation led households to undertake additional unsubsidised energy renovations later. In other words, the scheme generated some private-finance leverage, but this was moderate relative to the scale of public support.

On *housing market coverage*, the Superbonus supported the renovation of a broad range of residential building types, including condominiums, single-family houses and functionally independent residential units. This allowed the programme to reach both individual homeowners and multi-family buildings, although access to it was primarily structured around owner-occupied and owner-controlled property. Private rental and social housing were not central to the programme's design. The available evidence indicates comparatively strong participation in the Superbonus by owner-occupiers, owners of condominiums, and middle- and higher-income households, with higher uptake in parts of northern Italy. The programme consequently achieved broad coverage of building types but more limited coverage of the full range of housing tenures and vulnerable population groups.

Figure 4.2. Relative emphasis on analytical dimensions: Italy



Source: Authors' analysis. See the Appendix for further details.

Germany

Overview of the Energy-Efficient Refurbishment programme

Germany's residential-renovation framework relies more on a combination of direct grants and subsidised lending than on tax deductions. The framework distinguishes between support for comprehensive renovations and support for more individual measures. Germany's housing renovation policy is built around a centralised model implemented through KfW (primarily) and the Federal Office for Economic Affairs and Export Control (BAFA). The Energy-Efficient Refurbishment (BEG) programme combines subsidised loans (at below-market interest rates) with grants and repayment subsidies. Eligibility for the scheme is explicitly linked to technical performance standards (e.g. defined efficiency levels and verified reductions in primary energy demand). The Federal Funding for Efficient Heating Networks (BEW) helps finance efforts to green heating networks (such as district heating facilities) while the Federal Funding for Energy and Resource Efficiency in Business (EEW), a separate programme, helps companies green other elements of their businesses (such as manufacturing equipment or energy management).

The BEG consists of three main pillars:

- BEG Residential Buildings (BEG WG), covering complete renovation of residential buildings to energy-efficient house standards.
- BEG Non-residential Buildings (BEG NWG), covering complete renovation of non-residential buildings to energy-efficient building standards.
- BEG Individual Measures (BEG EM), covering renovation with individual measures for residential and non-residential buildings.

BEG is the responsibility of the German Federal Ministry for Economic Affairs and Energy (BMWE).[6] BAFA is a federal agency under the purview of the BMWE. Meanwhile, KfW is a centralised national promotional bank that operates as a public-law institution under the KfW Act. It is jointly owned by the Federal Republic of Germany (80%) and the Länder (20%), and benefits from an explicit federal guarantee, which underpins its high credit rating and enables low-cost borrowing on international capital markets. KfW does not operate like a retail bank. Instead, it finances its activities primarily through large-scale bond issuances, aligning market-based funding with public policy objectives. Its mandate is tightly integrated into the federal government's priorities. Ministries often define investment programmes' objectives, such as supporting energy-efficient building renovation, and KfW oversees the financial arrangements required to achieve these objectives. Operationally, KfW generally employs an on-lending model in which subsidised or concessional loans are channelled through commercial banks – which, in turn, manage client relationships and credit assessments.

There are several benefits to KfW's approach (Saffar and Gonzalez Islas, 2026). These relate to areas including co-financing, risk-sharing, efficiency and capacity to operate at scale. Finance partners can mobilise their own capital along with that provided by KfW where clients require credit in excess of the maximum available under the institution's schemes. While mitigation via guarantees or other measures is common, private banks often bear the credit/default risks. Furthermore, by getting private banks to arrange loans, KfW is able to draw on their origination capacity and direct client relationships, which public banks often lack.

Under the BEG, public finance is mainly channelled through commercial banks via KfW's on-lending model, in which applicants for its loans are required to go through financing partners. The federally funded credit support that KfW provides includes loans at lower interest rates (subsidised loans that often have grace periods) and repayment subsidies, which reduce the amount payable by the recipient of the loan. Moreover, in programmes that provide grant-style support, KfW makes payments directly to the applicant's bank account. BEG Residential Buildings and BEG Non-residential Buildings provide credit and subsidies, and are administered primarily by KfW. BEG Individual Measures provides

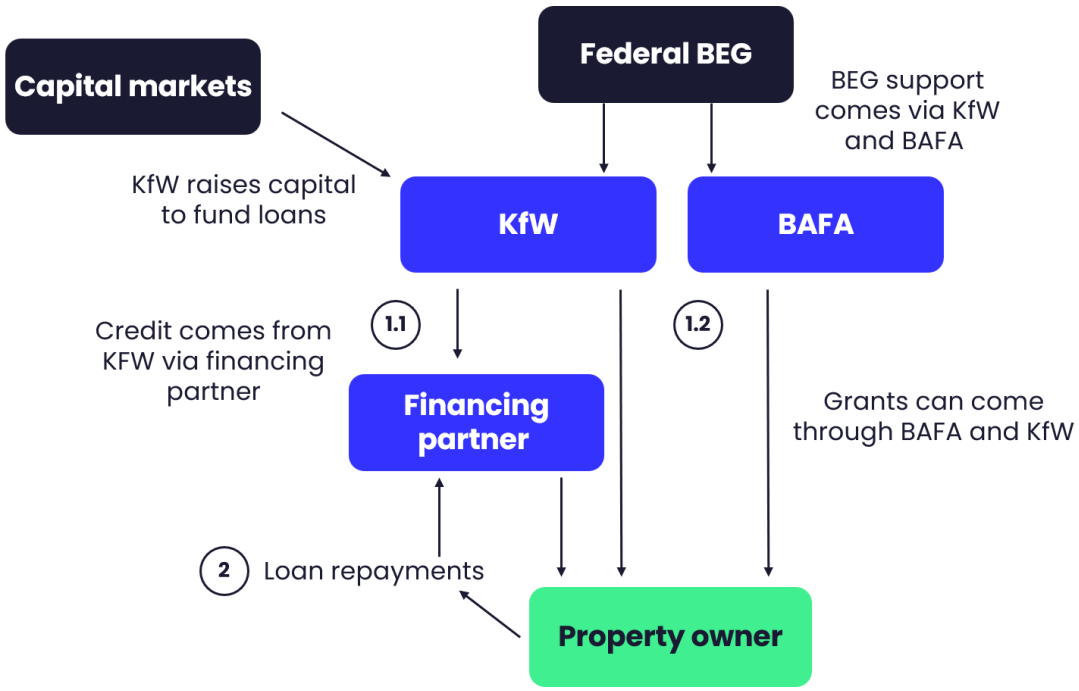
[6] Formerly known as the Ministry for Economic Affairs and Climate Action.

additional subsidies in specific areas such as heating and windows. In this, KfW is responsible for heating subsidies while BAFA is responsible for subsidies for other efficiency measures, including building envelope (covering areas such as windows and doors), plant engineering and optimising heat systems to improve their efficiency and reduce emissions (Heinrich et al., 2026a).

The money expended by the BMWE will not be repaid by the ultimate beneficiary and, therefore, constitutes an investment by the state. In practice, this means that grants, interest rate subsidies and loan repayment subsidies are covered by federal funds (Heinrich et al., 2026b). BEG is funded by Klima- und Transformationsfonds (the Climate and Transformation Fund), which receives part of its financing from the EU emissions trading scheme and Germany's CO_2 pricing (Federal Ministry of Finance, 2026; Climate Policy Database, 2026). KfW's financing partner issues the loan to the recipient after the institution has made a refinancing commitment for the relevant amount. Following the initial transaction, the financing partner manages the loan on the borrower side in the same way that it manages other loans.

KfW raises the money for lending to Eligible Green Projects through bond issuances within its Green Bonds – Made by KfW Framework 2024 (KfW, 2023). This covers not only BEG loans but also Klimafreundlicher Neubau (Climate-friendly New Build) and other green schemes financed by KfW, such as its standard renewable energies loan (Cr. No. 270) (KfW, 2023). In 2023, KfW issued a total of 22 green bonds, with aggregate net proceeds of €12.9 billion (KfW, 2025).[7] The institution makes payments on its green bonds from general funds without tying these payments to the performance of specific projects. Figure 4.3 provides a simplified representation of the main actors and financial flows in the scheme.

Figure 4.3. Overview of Germany's programmes



Source: Authors' analysis. Note: Circled numbers indicate the main steps and financial flows of the programme mechanism, as described in the figure.

Assessment

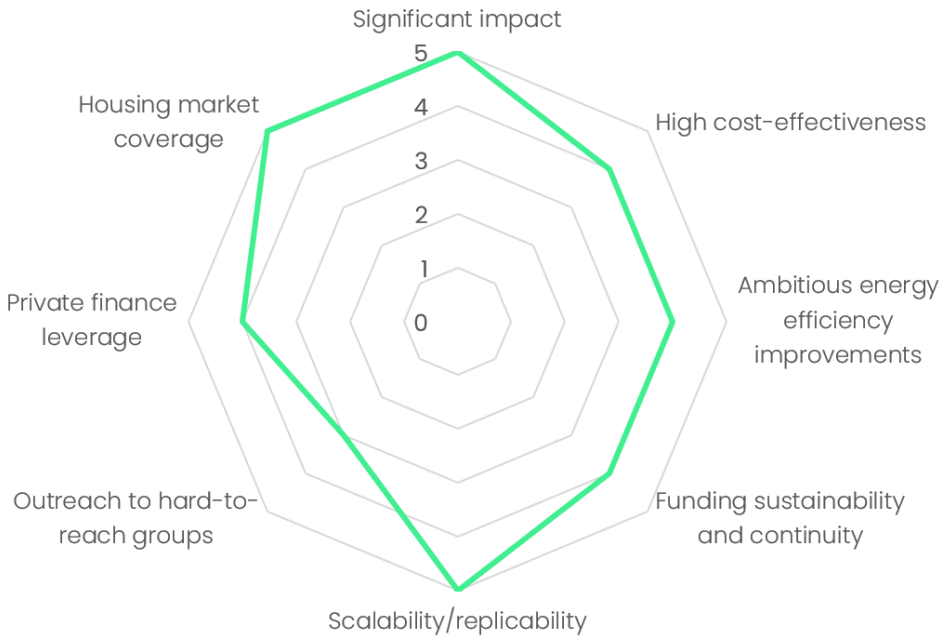
In funding year 2024, BEG supported around 358,000 renovation projects, some of which contained multiple residential units. Approximately 96% of the projects BEG funded were renovations based on

[7] These were classified as green bonds in the framework in place during 2023.

individual measures (see Table 4.1 for an overview of the costs of BEG programmes). BEG Individual Measures has provided relatively good value for money, with costs of about €107 per tonne of CO_2 equivalent in emissions reductions, compared to around €808 for BEG Residential Buildings. The difference in costs reflects the nature of the renovations they fund (specific enhancements compared to complete building renovations).

Around €6.9 billion in federal funding for BEG resulted in total investment of just under €30 billion in 2024 (Heinrich et al., 2026a). The BEG funding programme had the ambitious target of achieving emissions reductions of 3.2 million tonnes of CO2 equivalent (MtCO2e) gross in 2024 but fell short of that at 2.6 $MtCO_2e$ (81% of target). Nonetheless, these were still significant reductions given that, collectively, all buildings in Germany produced 100.5 $MtCO_2e$ in emissions that year (Wehnemann et al., 2025). BEG Individual Measures was responsible for reductions of 76% of the overall target, with the remaining 5% coming from the other two BEG programmes (Heinrich et al., 2026a).

Figure 4.4. Relative emphasis on analytical dimensions: Germany



Source: Authors' analysis.

In terms of *outreach*, BEG Individual Measures is dominated by residential property. Almost all the renovations it supports involve a combination of measures that includes work to the building envelope; building services (such as ventilation and smart home technology); and heating technology or optimisation. The beneficiaries of these individual measures are spread across the socio-economic spectrum (Heinrich et al., 2026c). BEG Residential Buildings supported around 13,000 renovations covering more than 42,000 residential units. Most applicants to the programme were private building owners. Commercial building owners accounted for 14% of the total but just over one-third of funding (reflecting the fact that they take on bigger projects that, accordingly, affect more residential units). Most private grant recipients were of working age and had high levels of income and education (Heinrich et al., 2026b).

Overall, Germany's BEG programme has achieved large-scale uptake. It has mobilised substantial *private capital* alongside federal support by using capital KfW has raised on the market and working with finance partners who can provide additional credit to clients where renovation costs exceed what is available under BEG schemes. In terms of *scale and stability,* the programme is nationwide, institutionally embedded and provided through established KfW, BAFA and energy-advice systems. BEG covers residential, non-residential and individual-measure routes that involve private, commercial, municipal and other owners. It requires recognised efficiency standards for whole-building renovations while also funding substantial heating, building-envelope and systems upgrades under BEG EM. Together, these initiatives provide *coverage* for a significant share of the housing market. Overall, BEG appears to be relatively *cost-effective,* even if whole-building residential and non-residential

renovations involve higher public costs per tonne of CO_2 reductions. The scheme also includes some social targeting through income bonuses, but uptake remains stronger among owner-occupiers and higher-income households.

Table 4.1. BEG Overview				
Category	Funding cases	Residential units	Investments (€m)*	Federal funds (€m)
BEG Residential Buildings	12,941	43,372	9,790	1,795
BEG Non-residential Buildings	675	-	1,977	487
BEG Individual Measures: Residential Buildings	331,319	668,538	15,698	4,227
BEG Individual Measures: Non-residential Buildings	13,396	-	2,476	412
Total	**358,331**	**711,910**	**29,941**	**6,921**

*Source: Heinrich et al. (2026a). Note: Figures for 2024; *investments made by grantees.*

France

Overview of the MaPrimeRénov' programme

France's housing renovation policy relies on a varied mix of instruments. It is more centred on direct subsidies, credit and other such measures than on tax deductions. Since 2020, the newest instrument, MaPrimeRénov', has provided grants based on factors such as household income, the type of intervention, and the energy performance this intervention can achieve. The instrument is complemented by the Certificats d'économies d'énergie (CEE), which was created in 2005 as an obligation-based mechanism under which energy suppliers finance efficiency measures through grants and other incentives. The éco-prêt à taux zéro (éco-PTZ) also provides interest-free financing for eligible renovation works.

Designed for private homeowners (both owner-occupiers and landlords), MaPrimeRénov' is a state-funded grant administered by the National Housing Agency (Agence Nationale de l'Habitat [ANAH]), which receives financing from a range of sources that includes the central government budget and some revenue from the EU Emissions Trading System. MaPrimeRénov has two main streams[8]:

- MaPrimeRénov' Parcours par geste for relatively minor works such as insulation and heating.
- MaPrimeRénov' Parcours accompagné for major renovation projects.

The scheme covers a certain percentage of the pretax cost of renovation works, which is paid after they are carried out. The major renovation stream is available to properties with a lower efficiency rating only and requires an increase of at least two levels of energy efficiency. A ceiling of €30,000 or €40,000 typically applies, depending on whether the works increase the efficiency by two or three levels. Minor renovations follow a similar system, with a list of spending caps linked to specific actions covered by the scheme.

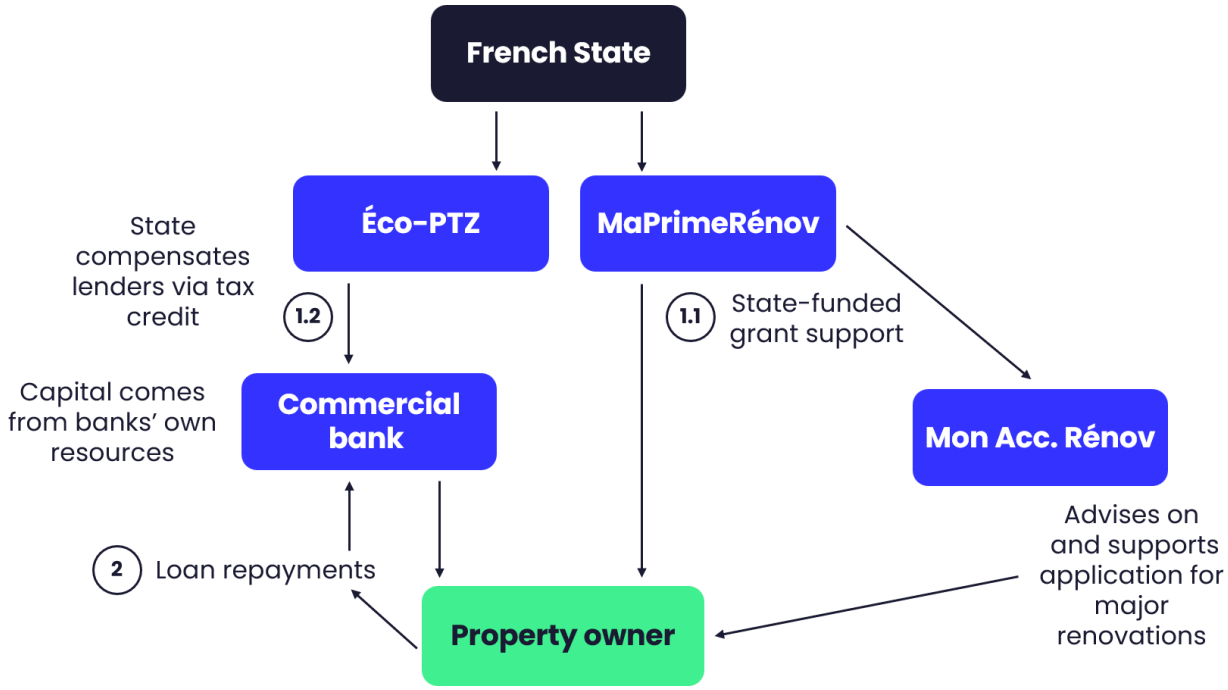
The level of support within the two main streams depends on several factors. The primary factors are income (categorised in four groups), household size and location. For example, in a major renovation, the threshold is €17,363 for a one-person household outside Île-de-France and €96,817 for a five-person household within Île-de-France. The level of coverage declines as income increases. For major renovations, the four income groups, from lowest to highest, are covered by reimbursements of 80%, 60%, 45%, and 10%, respectively. For minor renovations, the reimbursement caps for specific actions

[8] Another scheme for condominiums is also available.

covered by the scheme depend on location and income group (Service Public, 2026a). The major renovation pathway requires engagement with a Renovation Support Specialist under an additional programme called Mon Accompagnateur Rénov'. This specialist provides advice on works and costs while helping with the MaPrimeRénov' application. The cost of this service is covered to varying degrees depending on income group (Service Public, 2026a)

MaPrimeRénov' was temporarily suspended between June and September 2025 due to concerns about fraud and high application volumes. During this suspension, the regulatory framework of the programme was revised once again to introduce stricter eligibility requirements, cap the number of grants, reduce the size of grants and postpone application processing. In 2025, the Government did not pass a budget for the following year, effectively resulting in the suspension of the scheme in January and February 2026 (Court of Auditors, 2026). Between 2020 and 2025, fraudulent claims accounted for €85 million of the over €19 billion in assistance distributed under the scheme. Increased checks resulted in the detection of 21,439 cases of attempted fraud for a total of €174m (National Housing Agency (ANAH, 2026a). The Court of Auditors did not detect widespread fraud in the Mon Accompagnateur Rénov' programme (Court of Auditors, 2026).

Figure 4.5. Overview of France's programmes



Source: Authors' analysis. Note: Circled numbers indicate the main steps and financial flows of the programme mechanism, as described in the figure.

MaPrimeRénov' is complemented by several other schemes.[9] Households can also receive credit through the éco-PTZ scheme, an interest-free renovation loan provided by a commercial bank or financial institution with state backing. Eco-PTZ, whose loans are regulated, provides financing that is not linked to income for energy renovation work on private homes and condominiums. These loans can be worth up to €50,000 over a maximum of 20 years and can be used to support improvements in areas such as insulation, glazing, doors and heating, with the work itself carried out by certified companies (Société de Gestion des Financements et de la Garantie de l'Accession Sociale à la Propriété [SGFGAS], 2026). Participating financial institutions provide these loans using their own resources and charge the borrower no interest, as the state provides them with compensation through a corporate tax credit (over five years). SGFGAS administers the scheme and calculates the tax credit.

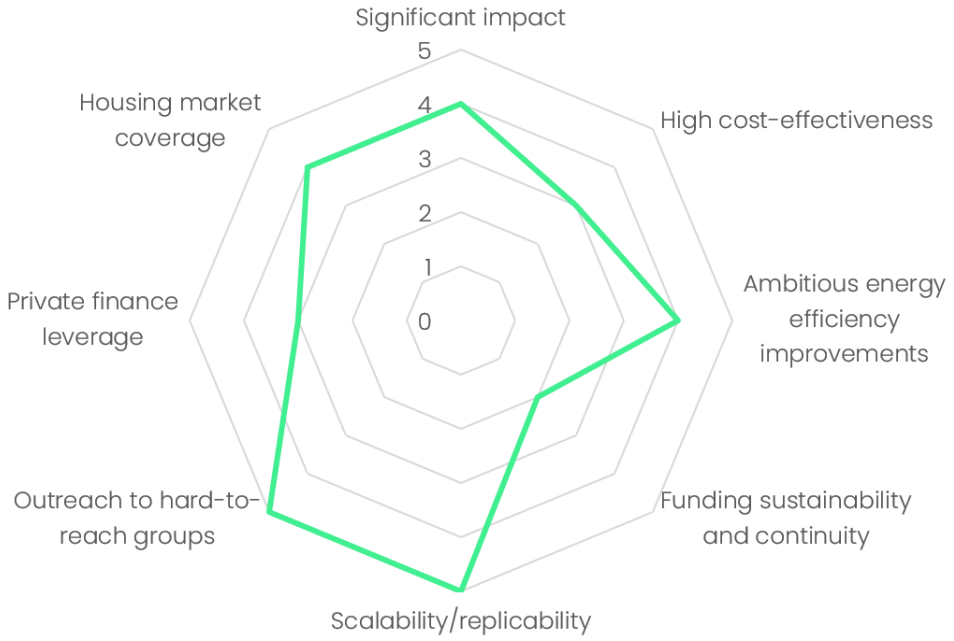
[9] For example, one such scheme is the Coup de pouce Chauffage programme for upgrading heating systems.

The Par+ is another type of loan that targets low-income households who could be described as asset-rich but cash-poor. This mortgage-backed loan requires repayment only when the property is sold or the borrower's estate is settled. The government covers interest payments for the first 10 years, after which the lender's agreed interest rate applies (Service Public, 2026b). Figure 4.5 provides a simplified representation of the main actors and financial flows in the scheme.

Assessment

In terms of impact, between 2020 and 2025, MaPrimeRénov' helped renovate nearly 2.8 million homes (of which more than 459,000 were major renovations) and supported nearly €44 billion in works. Beneficiaries of the scheme reported very high levels of satisfaction with it: 94% said that they would recommend it to friends or family (ANAH, 2026b). Over 70% of households that received support were low- or very-low-income (ANAH, 2026c). It is estimated that MaPrimeRénov' has resulted in emissions reductions of over 7 $MtCO_2e$ per year since 2020 (ANAH, 2026c). To put that in perspective, the use of residential and services buildings in 2024 produced 47.9 $MtCO_2e$ (General Commission for Sustainable Development 2025). In 2025, these major renovations achieved an average energy saving of 69%, up from 65% in 2024, and improved the energy efficiency of 59,708 homes by at least three energy-performance classes (ANAH, 2026b; 2026c).

Figure 4.6. Relative emphasis on analytical dimensions: France



Source: Authors' analysis. See the Appendix for further details.

ANAH set out targets of 100,000 major renovations and 250,000 minor renovations for 2025 (Court of Auditors, 2026; ANAH, 2024). While these *targets were ambitious,* they were less so than those in previous years, down from a target of 200,000 major renovations in 2024. In 2025, at a *cost* of around €3.8 billion, the MaPrimeRénov' programme awarded just over 120,000 major renovation grants and over 187,000 minor renovation grants (ANAH, 2026b). The French Government's 2026 budget provides €3.6 billion to the MaPrimeRénov' programme to fund at least 120,000 major renovations and 150,000 individual renovation projects (Court of Auditors, 2026).

In 2024, éco-PTZ provided €1.67 billion in loans in response to 112,632 applications (SGFGAS, 2025). The scheme is expected to have 130,000 and 146,000 beneficiaries, and to result in tax expenditure of €178m and €255m, in 2025 and 2026, respectively (Government of France, 2026). In terms of *private finance*, while Éco-PTZ mobilises substantial household and bank resources, it continues to have a far

smaller uptake than other such forms of support (the MaPrimeRénov' programme generates additional investment and economic activity but is funded directly by the state).

MaPrimeRénov' has achieved national *scale* and is integrated into France Rénov', ANAH operational structures and eco-PTZ finance, but it has not hit all its renovation targets. The scheme funds ambitious whole-home renovations and provides good *housing market coverage*. Although uptake is shaped by tenure type and households' financing capacity, it is available to occupied housing, condominiums and rental properties. MaPrimeRénov's *outreach* is income-targeted and designed to support households of modest means, while offsetting upfront costs and administrative complexity through supplementary schemes. In terms of *stability*, repeated rule changes, budget pressures and temporary pauses in the programme have also reduced its predictability for households and firms. Eco-PTZ supports renovations through bank loans, but its overall model still relies heavily on public grants.

Hungary

Overview of the Green Home Programme

The Green Home Programme of the central bank is best understood in the context of Hungary's broader residential renovation policy landscape, which includes a wide range of government programmes that use different instruments and funding sources. Since the mid-2010s, the support these programmes provide has included direct grants, zero-interest loans, combined grant-and-loan schemes, and targeted financing for solar photovoltaic (PV), heating upgrades and broader home renovation. Examples of this include the Warm Homes grant programme; zero-interest residential loan schemes under the Economic Development and Innovation Operational Programme (GINOP/VEKOP), which are provided through the Hungarian Development Bank; the 2021–22 general Home Renovation Programme and, more recently, other EU-funded schemes. In parallel, dedicated programmes have supported household-scale solar PV and battery storage. In sum, Hungary's approach to residential energy efficiency involves multiple channels, often combining national and EU resources and involving different public institutions.

At the same time, the overall policy mix has lacked continuity and a consistently defined energy-efficiency objective. Programmes in this area have frequently been introduced for limited periods and then suspended or redesigned, creating an intermittent pattern that can encourage households to postpone investment while they wait for the next support window. Grant-based support has generally played a dominant role in such programmes, while links to commercial lending and other forms of private finance have been sporadic at best. Moreover, several broader renovation programmes required no measurable improvements in energy performance and supported expenditure unrelated to energy renovation. Even where these programmes had energy objectives, their requirements were often relatively modest, while the eligibility of rooftop solar PV shifted a large part of the investment demand of households away from reducing household energy consumption and towards replacing grid electricity consumption with on-site generation.

In other words, this fragmented policy landscape is characterised by substantial public support but little consistency in how to address renovation depth, private finance mobilisation and long-term market development (Pálffy and Kőrösi, 2025; Egyensúly Intézet, 2023; Odyssee-Mure, 2026). Against this background, the policy measures discussed below are particularly relevant, as they were introduced not by the government, and sought to mobilise private finance through green mortgages rather than relying on direct public subsidies.

Green or energy-efficient mortgages have been widely used internationally since the 2010s. The European Mortgage Federation (EMF) founded an initiative – supported by the EU's Horizon Europe programme – to establish a common definition for energy-efficient mortgages. Accordingly, an Energy Efficient Mortgage (EEM) finances:

> The purchase/construction and/or renovation of both residential (single family and multi-family) and commercial buildings where there is evidence of: (1) energy performance which meets or exceeds relevant market best practice standards in line with current EU

legislative requirements and/or (2) an improvement in energy performance of at least 30% (EMF, 2018).

EEMs are not inherently linked to any national housing or energy-efficiency schemes or support programmes. Banks can include EEMs in their product offerings and freely decide what discount they might be offering to increase consumer demand. The EMF itself noted that the incentives for borrowers could be favourable mortgage financing conditions and/or an increased loan amount at origination to finance the energy-efficiency improvement of the property and enhance its Energy Performance Certificate (EPC) level. Furthermore, these favourable risk characteristics could also encourage banks to offer better conditions for borrowers. Many empirical studies indicate that, in certain conditions, energy-efficient mortgages have a lower probability of default and/or loss given default, the two most important dimensions of credit risk (Baccega et al., 2019).

EEMs are offered in many European countries, with so-called national market hubs established in Belgium, Germany, Hungary, Italy, the Netherlands, Nordic nations, Spain and Scotland (EMF).

In Hungary's case, the central bank incentivised the rollout of EEMs by commercial banks as part of its Green Programme. The main policy considerations behind this were:

- The low energy efficiency of the domestic building stock.
- One of the lowest housing renewal rates in Central and Eastern Europe.
- A very high homeownership rate of 91%.
- Limited incorporation of green considerations into the mortgage products offered by banks.

Taking these factors into account, the central bank decided to support green mortgage lending in a manner that aligned with its primary objective: price stability (Varga, 2023). Three schemes were launched as part of the programme:

- The Green Preferential Capital Requirements Programme (since 2020).
- The Green Home Programme (2021–22), which is the focal point of our study.
- The Green Mortgage Bond Purchase Programme (2021–22).

The Green Preferential Capital Requirements Programme offered reduced Pillar 2[10] capital requirements for eligible green mortgages that finance either energy-efficiency renovations or the construction of new energy-efficient buildings.

The Green Home Programme was designed to promote the development of a green housing loan market and strengthen the integration of environmental sustainability considerations into the Hungarian housing market. The favourable green loans available under the programme contributed to increasing demand for energy-efficient homes, thereby indirectly encouraging the development of energy-efficient apartment buildings and houses. Beyond the housing market, the programme also introduced a new approach to retail lending by significantly improving financing conditions for energy-efficient residential properties.

Under the Green Home Programme, the central bank provided refinancing funds to credit institutions at a 0% interest rate, which participating banks could on-lend to households at a maximum interest rate of 2.5%. Initially launched with a total envelope of Ft300 billion (around €820 million at the time), the programme financed the purchase or construction of new energy-efficient apartments and family houses. Eligible properties were required to have an energy rating of at least BB and a primary energy

[10] The Pillar 2 requirement is a bank-specific capital requirement that supplements the minimum capital requirement, known as the Pillar 1 requirement. Accordingly, Pillar 2 covers cases where the Pillar 1 requirement underestimates or does not account for certain risks.

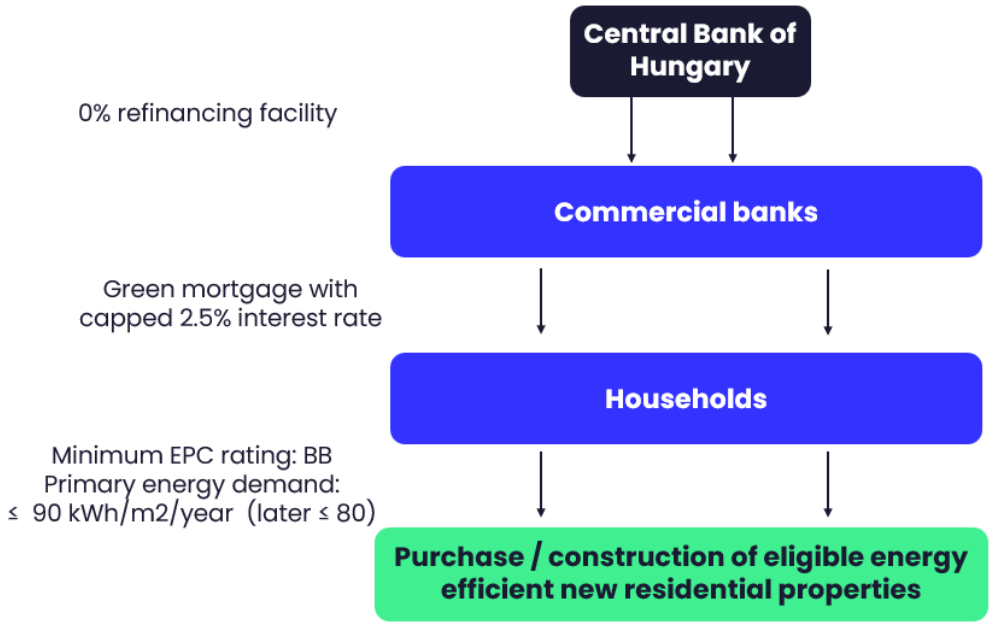
demand of no more than 90 kilowatt-hours per square meter (kWh/m^2), a criterion that was later lowered (making it stricter) to 80 kWh/m^2.

This primary energy demand (PED) requirement of 90 (later 80 kWh/m2) of the programme significantly exceed the average PED value of financed single-family houses in the country. The average PED was between 149 kWh/m^2 and 384 kWh/m2 (depending on district) for such houses and between 146 kWh/m^2 and 319 kWh/m^2 for apartment buildings (Ritter and Várgedő, 2025).

The scheme had a very high rate of uptake and was fully drawn down in less than a year. In terms of EPCs, the most important energy-efficiency performance indicator, 79% of homes financed by the scheme had a BB energy rating while 21% had a higher rating. Among those that had an EPC rating of only BB, 71% had an annual energy consumption below the 80 kWh/m^2 threshold (equating to a better performance). Some of these properties would have also likely met the requirements for the higher energy category, and may have only not obtained an AA rating due to the higher cost of certification (Komlóssy, 2023).

While the Green Preferential Capital Requirements Programme extended to renovation loans, the Green Home Programme only covered loans financing newly constructed properties. Figure 4.7 provides a simplified representation of the main actors and financial flows in the scheme.

Figure 4.7. Overview of the Green Home Programme

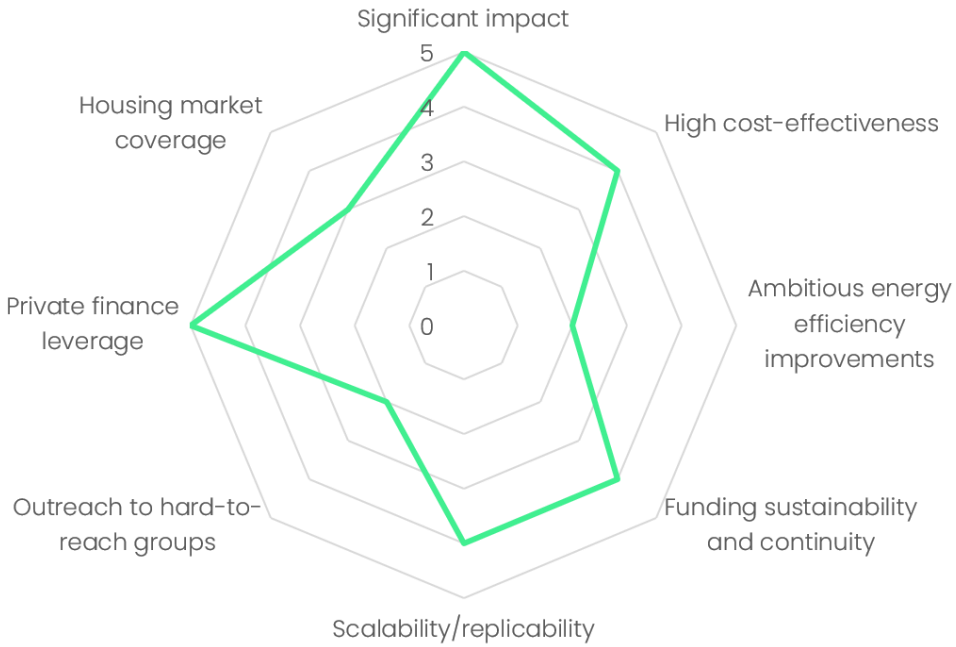


Source: Authors' analysis.

Assessment

The Green Home Programme differed to more traditional public energy-efficiency schemes. One of its most notable features was its ability to mobilise substantial private investment while relying on a relatively limited public intervention. Rather than providing grants, the programme operated through a concessional refinancing that the central bank made available to commercial banks, which then offered households long-term fixed-rate mortgages with capped interest rates. From a public finance perspective, this design enabled the programme to prioritise a *high level of private finance leverage* while maintaining comparatively favourable *cost-effectiveness*. The scheme had rapid uptake in the market. The fact that the available funding envelope was fully used within a relatively short period suggested a strong demand for energy-efficient mortgages and an effective alignment between programme design and market needs.

Figure 4.8. Relative emphasis on analytical dimensions: Hungary



Source: Authors' analysis.

At the same time, the programme also illustrated some of the trade-offs often encountered in housing energy-efficiency policies. Eligibility was restricted to newly constructed residential properties that met ambitious energy performance requirements. While this ensured a high level of energy efficiency among supported buildings, the scheme did not address the renovation of the existing housing stock, where a large share of potential energy savings can typically be found and where most substantial greenhouse-gas-emissions avoidance can be achieved from the perspective of a building's life cycle. Furthermore, while the capped mortgage interest rate improved affordability for eligible households, the focus on new-build properties likely *limited access for lower-income groups* and other hard-to-reach segments of the population. The programme, therefore, demonstrated how a policy can be highly effective in mobilising private capital and accelerating market uptake, while placing less emphasis on social targeting and the renovation of existing buildings.

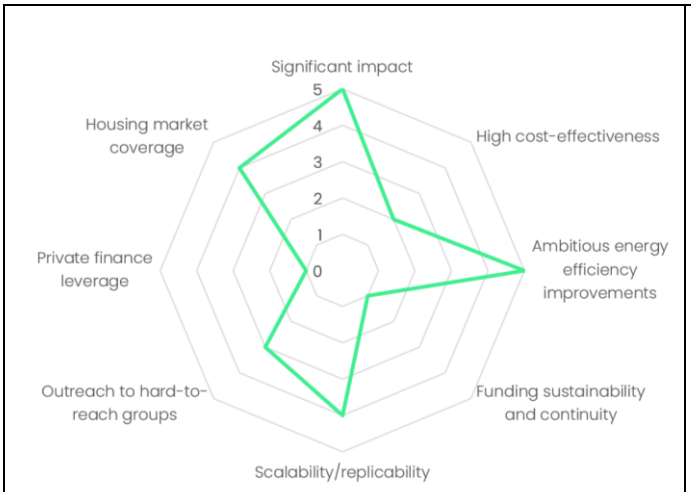
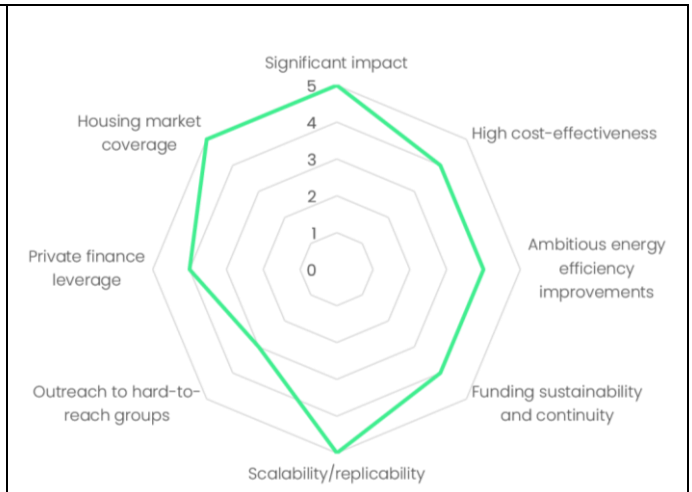
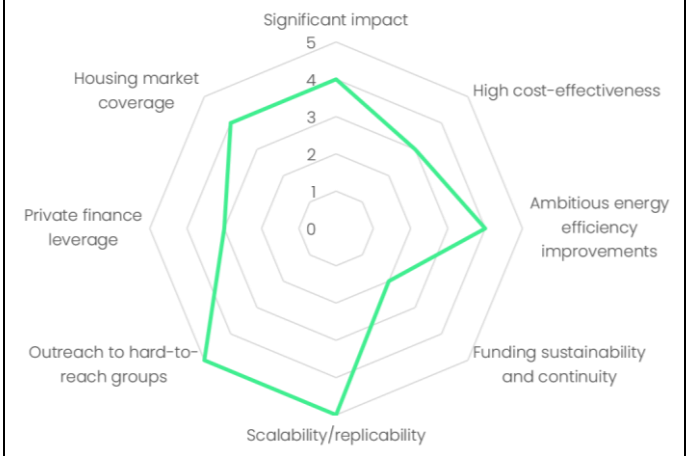
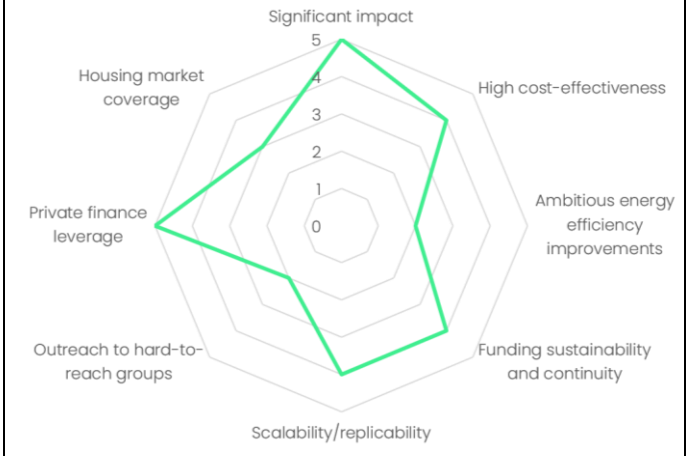
5. Analysis and policy recommendations

In this section, we bring together the four national case studies, identifying common patterns and important trade-offs between policy objectives. We draw on these findings to make high-level recommendations to the EU, its member states and financial regulators, focusing on how public resources can be used more effectively to accelerate renovation and mobilise private investment.

Patterns in the four cases

Our objective is not to rank the national programmes, given that they differ substantially in their policy objectives, institutional settings, market characteristics and fiscal contexts. Rather, Figure 5.1 and the analysis that follows provide an overview of how the programmes prioritise competing policy objectives, have differing strengths and involve distinct trade-offs. This, in turn, provides the basis for identifying several important patterns that emerge across the four national case studies.

Figure 5.1. Comparison of programme profiles across analytical dimensions

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All four programmes have a relatively strong emphasis on *significant impact*, suggesting that they are material interventions relative to the size of their countries' respective housing renovation markets. This reflects both their financial scale and their ability to influence renovation and energy-efficient development during their implementation periods.

The greatest variation occurs in *private finance leverage*. This is understandable, given that some programmes were explicitly designed to mobilise commercial lending and private investment, while others relied predominantly on public subsidies. The difference between them highlights an important policy choice rather than a universally superior design.

All four schemes scored relatively high on *scalability and replicability*, even though their underlying mechanisms differed considerably. In some cases, scalability stemmed from market-based financing structures, while in others it depended on the sustained availability of the public budget.

However, no one programme has a strong profile in every analytical dimension. Instead, each scheme reflects different policy priorities and trade-offs between objectives such as *rapid deployment, fiscal efficiency, social targeting* and *private capital mobilisation.*

Common patterns

The four cases demonstrate that **there is no single best model**: different schemes are optimised to achieve different policy objectives. In other words, the four schemes have differing priorities rather than differing levels of quality. The fact that housing energy-efficiency policies inevitably involve trade-offs rather than universally optimal solutions reflects the considerable diversity of housing markets, building stocks, ownership structures, financing conditions and institutional settings across the EU. This suggests that a one-size-fits-all approach is unlikely to be effective. Indeed, policy design needs to remain sufficiently flexible to accommodate national and local circumstances, while providing a common European framework that can guide and coordinate action on shared energy-efficiency objectives.

A common pattern across the case studies is that **mobilising private finance substantially extends the reach of public policy**. All the schemes used public interventions to catalyse greater private investment or delegated parts their implementation to private actors, even while relying on instruments as different as tax credits, promotional bank lending, private bank intermediation and, as in the Italian case, concessional refinancing and grants. The cases demonstrate that public finance can be most effective when used to reduce risks and address market failures rather than simply to replace private funding. At the same time, the degree of private finance leverage differs considerably across instruments and depends on programme design and institutional delivery. In particular, the cases of Germany and Hungary illustrate blended finance's potential to mobilise private capital by combining public or concessional funding with commercial bank lending. However, the extent of this mobilisation depends on how effectively public support addresses the specific barriers to private investment, as well as on institutional capacity and wider market conditions. The objective should, therefore, be not only to maximise leverage but also to ensure that public finance generates genuine additionality and crowds in private investment where it would not otherwise occur.

Strong financial incentives can rapidly accelerate the uptake of energy renovations, but they also tend to increase fiscal and governance risks. Across the national cases, the most generous support schemes generally achieved the highest market uptake, but this came at the cost of higher public expenditure, greater administrative complexity and, at times, increased exposure to fraud. These findings underline the importance of carefully balancing policy ambition with fiscal sustainability and robust implementation. They also highlight the fact that poorly calibrated or frequently revised support schemes can become a source of transition risk, creating uncertainty for households, financial institutions and investors.

Italy's Superbonus provides the clearest illustration of these trade-offs, demonstrating how a highly generous incentive can generate rapid renovation activity while also creating substantial fiscal costs, implementation challenges and uncertainty when the scheme is subsequently revised. As such, the case highlights the importance of designing incentives that are sufficiently attractive to change

investors' behaviour but sufficiently predictable and fiscally sustainable to support a stable renovation market over time.

Another important lesson is that **programmes' design determines who actually benefits from them, and does so not only through their explicit eligibility criteria**. Programmes can unintentionally favour particular groups, such as households with greater access to upfront capital, borrowing capacity or administrative resources, or owner-occupiers. At the same time, schemes can unintentionally exclude lower-income households, renters or parts of the existing building stock. Importantly, therefore, social outcomes depend not only on the size of subsidies but also on how programmes are designed and implemented. In this respect, the French scheme appears to have been the most strongly oriented towards lower-income households, with a greater emphasis on accessibility and inclusivity. This group was supported not only through the structure of the financial support but also through targeted communication and outreach campaigns designed to raise awareness among, and facilitate the participation of, households that may otherwise have been less likely to engage with the programme.

It is also important to emphasise that **the governance and institutional delivery arrangements matter just as much as financial instruments**. The national cases suggest that implementation capacity is a critical factor in success. The examples of national development banks (Germany), central banks working through commercial banks (Hungary), tax authorities (Italy) and dedicated housing agencies (France) together illustrate that different models can work. The effectiveness of a scheme depends not only on the financial instrument itself but also on the institutions responsible for delivering, monitoring and adapting it. This is especially important in relation to households, for which behavioural and awareness challenges constitute a major hurdle for renovation programmes. Households require trusted intermediaries that can translate financial instruments into actionable renovation decisions. At the same time, the German case illustrates the risks of fragmented institutional delivery. The involvement of too many actors can blur their responsibilities while making coordination more difficult and the user journey more complex. Clear institutional ownership and a well-defined division of responsibilities are, therefore, important to ensuring that financial support translates effectively into actual renovation activity.

Policy recommendations

The recent global energy crisis has exposed the vulnerability of many European households to fossil fuel price shocks. It has also demonstrated that improving the energy efficiency of the residential building stock should become a central pillar of the EU's competitiveness, housing affordability and energy security agenda, as this will reduce Europe's dependence on imported fossil fuels.

Our comparative analysis suggests that not all successful housing energy-efficiency programmes follow the same model. Rather, they can draw on different financial instruments and institutional arrangements that reflect national policy priorities. As such, our recommendations do not intend to prescribe one optimal design but to build on the strengths common to the national cases we analysed. In other words, there is no single best renovation programme. Successful policy design depends on balancing multiple objectives and adapting financial and regulatory instruments to the characteristics of the national housing market. The following recommendations translate the report's findings into actionable proposals for the EU and its member states.

Overarching recommendation

1. Treat energy efficiency as an investment in macroeconomic resilience

The national cases illustrate that energy-efficiency programmes are rarely designed solely to reduce emissions. Objectives related to areas such as housing affordability, economic activity and financial stability also played an important role in the schemes we analysed, illustrating the need for broader policy evaluation frameworks.

Energy-efficiency investments should no longer be assessed solely in terms of emissions reductions or energy savings. They should instead be recognised as strategic investments that strengthen household resilience against energy price shocks, improve macroeconomic stability, enhance industrial competitiveness and reduce the fiscal costs associated with future energy crises. Future EU

and national investment strategies should, therefore, evaluate renovation programmes against these broader economic and social objectives.

Recommendations for the EU

2. Embed energy efficiency in the EU's housing, competitiveness and investment agenda

Energy efficiency should be recognised as the EU's 'first fuel' and treated as a strategic investment in competitiveness, affordability, energy security and climate resilience. Building on the European Affordable Housing Plan, the European Commission should:

- Prioritise the renovation and repurposing of existing buildings above demolition, making a renovation-first approach the default principle for EU-supported housing investment.
- Ensure that energy efficiency remains a central pillar of the implementation of the revised EPBD, particularly through ambitious National Building Renovation Plans. Ahead of the 2028 EPBD review, the EU should prepare the ground for effective fine-tuning of the financial architecture envisaged under the Directive, including measures to facilitate greater retail investment in renovation and to scale up green loans. Because energy efficiency can act as a buffer to macro-relevant energy price shocks, it should be integrated into housing affordability more systematically in the European Semester using, where appropriate, Country-Specific Recommendations to identify structural barriers to renovation.
- Continue prioritising energy-efficiency investments under the next Multiannual Financial Framework, particularly through the Social Climate Fund, InvestEU and future EU investment instruments (such as the proposed European Competitiveness Fund). As part of this, it will be important to view building renovation as a productive investment that strengthens long-term competitiveness rather than simply as a fiscal cost.

3. Mobilise private capital through blended finance and the Savings and Investment Union

One of the clearest differences between the national cases concerns the role assigned to private finance. While the Italian and French schemes relied primarily on grants or tax incentives, the German and particularly the Hungarian approaches demonstrated how concessional lending and public financial institutions could mobilise substantial private capital.

Closing Europe's renovation investment gap will require significantly greater mobilisation of private finance. While housing is inherently local, it will be important to harmonise EPC ratings, energy-efficiency criteria (through the EU Taxonomy and the EPBD) and capital markets (through bond and securitisation markets). Here, the Savings and Investment Union provides an opportunity to channel Europe's abundant savings into productive investment in residential renovation. The European Commission, the European Investment Bank and national promotional banks should:

- Expand EU guarantee facilities and risk-sharing instruments to de-risk renovation lending.
- Help national promotional banks develop standardised renovation loan products and portfolio aggregation that can be financed through capital markets.
- Recognise the mobilisation of private capital as a core performance indicator of EU-supported renovation programmes.
- Target grants primarily at vulnerable and energy-poor households while increasingly relying on guarantees and concessional finance to crowd in private capital for the wider market.
- Rapidly operationalise the Pan-European Investment Platform for Affordable and Sustainable Housing to aggregate renovation projects, strengthen project pipelines and mobilise private financing for residential energy efficiency.

4. Invest in delivery capacity

Financial support alone will not deliver Europe's renovation objectives. The national cases show that programmes' effectiveness depends not only on financial incentives and instruments, but also on implementation arrangements, including administrative simplicity, institutional coordination and stable delivery mechanisms. The European Commission should complement financial instruments for renovation with measures that reduce administrative, regulatory and transaction costs by:

- Helping member states simplify administrative procedures for renovation projects.
- Providing practical guidance to member states on addressing persistent market failures, including split incentives between landlords and tenants, fragmented condominium ownership and limited consumer awareness.
- Supporting the rollout of dedicated delivery channels with integrated technical, financial and administrative advice. While banks' branches and digital channels can reach households, it is important to strengthen these channels, such as one-stop shops, by working in combination with such outreach or independently of it.

5. Establish a European benchmarking framework for renovation programmes

One of our key findings is that it is difficult to compare national housing energy-efficiency programmes across member states. The analytical framework we developed demonstrates the value of benchmarking programmes across a common set of dimensions, but also highlights the limitations created by differences in national housing markets, programme design and, crucially, data availability.

Evidence on the effectiveness of national renovation programmes remains fragmented, while comparable data on the energy efficiency and energy performance of the building stock are often limited. This constrains both policymakers' ability to identify where support is most needed and financial institutions' capacity to assess investment opportunities and risks. It also makes it challenging to establish reliable baselines, target interventions effectively or monitor progress over time. Improving the availability and comparability of building-level and programme-level data should, therefore, be treated as an important component of the EU's renovation policy framework.

The European Commission should establish a common European benchmarking framework for residential renovation programmes, supported by more systematic collection and harmonisation of national data. The framework should combine comparable indicators covering:

- Energy savings and renovation depth.
- Emissions reductions.
- Cost-effectiveness and fiscal efficiency.
- The mobilisation of private investment.
- Housing affordability and reductions in energy poverty.
- Wider economic benefits, including productivity, health and resilience.
- Programme continuity and long-term policy certainty.
- The energy performance and characteristics of the underlying building stock.

Such a framework would help facilitate cross-country comparisons and policy learning, while also providing policymakers and financial institutions with a more reliable evidence base for targeting investment, assessing progress and identifying where further public intervention is required.

These indicators should be incorporated into the European Semester and used to benchmark member states' renovation performance. The European Commission should publish a European Residential Energy Efficiency Scoreboard to facilitate cross-country comparisons, promote policy learning and support evidence-based revisions of National Building Renovation Plans.

The Commission should also expand the technical assistance it provides and establish a structured repository of programme evaluations and best practice to strengthen continuous policy learning across the EU. Ideally, this should be based on existing initiatives such as the Odyssee and Mure databases[11] or the De-risking Energy Efficiency Platform (DEEP).[12]

Recommendations for finance and economic ministries

6. Create stable renovation frameworks tailored to national housing markets

Member states should provide stable and predictable policy environments that can attract long-term private investment while recognising that there is no single optimal policy model. Rather than pursuing one objective, renovation programmes should balance environmental, social and fiscal goals, and should reflect the characteristics of national housing markets.

In particular, EU member states should:

- Implement ambitious National Building Renovation Plans under the revised EPBD with clear long-term investment pipelines.
- Avoid frequent changes to subsidy schemes, tax incentives and eligibility criteria that undermine investor confidence.
- Arrange effective delivery channels either by using existing structures (such as through banks) or establishing new ones (such as one-stop shops) to simplify access to finance and technical assistance for households and SMEs.
- Regularly evaluate programme performance and refine policy design based on evidence rather than repeatedly redesigning support schemes.
- Engage proactively with the European Semester by addressing Country-Specific Recommendations related to housing, energy efficiency and investment, while reporting progress relative to National Building Renovation Plans.

7. Prioritise more ambitious renovation strategies to address major structural vulnerabilities

Member states with a combination of high residential fossil fuel consumption, ageing building stocks and persistently low renovation rates should adopt more ambitious renovation strategies and accelerate investment in energy efficiency. Our analysis suggests that a group of member states (including Italy, Germany and Hungary) have several structural characteristics that increase both exposure to fossil fuel price volatility and the potential gains from accelerated renovation. These countries should, therefore, be considered priority candidates for more ambitious policy action.

They should prioritise energy-efficiency investment in their National Building Renovation Plans, make full use of the available EU financing and technical assistance, and develop investable renovation pipelines capable of mobilising private capital at scale. The European Commission should also pay particular attention to these structural vulnerabilities when preparing future Country-Specific Recommendations under the European Semester.

[11] See Odyssee-Mure (n.d.).

[12] See De-risking Energy Efficiency Platform (2026).

Recommendations for central banks and financial regulators

8. Explore how to integrate energy efficiency into monetary and prudential frameworks

Energy efficiency influences both macroeconomic conditions and financial stability. By reducing energy consumption and demand, such efficiency can increase resilience against energy price shocks and, therefore, indirectly contribute to price stability. At the same time, more energy-efficient buildings may come with lower transition and physical climate risks. This has potential implications for mortgage credit risk and collateral values.

Some European central banks have already begun integrating climate-related considerations into collateral frameworks, while others have also used targeted refinancing programmes to support energy-efficient lending (as described in our analysis of Hungary's schemes). Similarly, within the EU prudential framework, energy efficiency is increasingly relevant to environmental and social risk management requirements.

European central banks and prudential regulators should build on these existing approaches while remaining consistent with their mandates and objectives. They should examine whether energy efficiency could be more strongly reflected in monetary and prudential policies, and whether there is scope to account for its implications more systematically in light of growing energy market volatility.

Meanwhile, favourable funding conditions for commercial banks can help expand the supply of energy-efficiency lending. Beyond public or concessional funding sources, capital markets could also play a greater role in refinancing such lending. To facilitate this, building on the EU Taxonomy, common EU definitions and standards for measuring and documenting the energy performance and energy savings of financed renovations could improve the comparability and aggregation of green loans. This would support the securitisation of these loans and could attract a broader range of capital-market investors.

Taken together, these recommendations redefine energy efficiency as a strategic investment that simultaneously strengthens European competitiveness, housing affordability, energy security and macroeconomic resilience. They also demonstrate the value of systematic benchmarking and policy learning across member states, recognising that while there is no single model for successful renovation policy, comparative evidence can help policymakers identify the design principles that deliver the greatest economic, social and environmental benefits.

6. Conclusions

We have argued that effective policy requires an effort to balance environmental, social and economic/fiscal objectives within different national contexts. In other words, there is no single optimal model for financing residential energy efficiency. It is important to view energy efficiency not only as a means to achieve climate objectives but also as an investment in housing affordability, energy security and macroeconomic resilience.

The four national cases demonstrate that different programmes reflect different policy priorities, institutional settings and housing market characteristics. These schemes pursued varying combinations of objectives related to areas such as emissions reductions, affordability, energy security, fiscal efficiency, private capital mobilisation and economic development. In line with this, traditional indicators such as energy savings or emissions reductions alone are insufficient to capture the full performance of housing energy-efficiency programmes. Our analytical framework developed demonstrates the value of simultaneously assessing programmes in multiple dimensions, including cost-effectiveness, private finance leverage, market coverage, scalability and outreach to vulnerable groups. One takeaway from this analysis is that it is important to more explicitly recognise policy trade-offs during programme design and evaluation.

Public finance remains indispensable for the necessary energy efficiency improvements, but its role should extend far beyond direct subsidies. The national cases involve a wide spectrum of approaches to financing, ranging from grants and tax incentives to concessional lending and even central bank refinancing. Importantly, our findings suggest that well-designed public interventions can play a vital catalytic role in mobilising private investment alongside public resources.

While the EU has no direct competence in housing, recent initiatives led by the European Commission have demonstrated how it can create momentum to encourage member states to consider energy efficiency in their national commitments. More broadly, sharing best practice and successful models for mobilising private capital could make national schemes more effective.

As member states prepare and then implement their National Building Renovation Plans, there will be a significant opportunity to strengthen policy learning across Europe. This can help maximise the environmental, social and economic returns of future public investment in residential energy efficiency.

The implementation of the National Building Renovation Plans could help translate this policy learning into a more systematic European approach to residential energy efficiency. The objective should not be to impose a single financing model across member states but to create the conditions in which national programmes can draw on comparative evidence, adapt to the specific characteristics of their housing markets and make more effective use of both public and private capital.

Another implication of our analysis is that energy efficiency should increasingly be understood as a form of investment in macroeconomic resilience. The energy crisis demonstrated the extent to which households remain exposed to fluctuations in fossil fuel prices, particularly in countries with a high dependence on oil and gas for residential heating. Improving the energy efficiency of buildings can reduce this exposure while simultaneously strengthening energy security and making housing more affordable, especially when combined with electrification, district heating and greater use of renewable energy (where appropriate). This broader perspective suggests that the benefits of renovation extend far beyond energy savings and emissions reductions, and should be reflected more systematically in assessments of public investment decisions.

Our comparative analysis also points to the value of systematic benchmarking across member states. While national housing markets and institutional settings mean that one country cannot simply replicate another's policy instruments, comparing national programmes using common criteria can

reveal where different approaches perform well and important trade-offs emerge. A more systematic European approach to monitoring and evaluating renovation programmes would, therefore, improve programme design and allow member states to learn from one another. This is particularly important given the scale and long-term nature of the investment required: policy effectiveness will depend not only on the volume of public resources committed, but also on how consistently and efficiently those resources are deployed.

Stronger European coordination, benchmarking and exchanges of best practice can help ensure that future investment in residential energy efficiency delivers not only deeper emissions reductions but also greater economic resilience, energy security and social benefits.

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Appendix: overview of case studies

Table A1. Characteristics of the schemes across the four case studies

	Italy	France	Germany	Hungary
Name of programme	Superbonus	Ma Prime Rénovation (MaPrimeRénov')	(Bundesförderung für effiziente Gebäude – BEG)	Green Home Programme
What is the primary policy objective? (e.g. energy efficiency)	Energy efficiency (improvement of buildings' energy performance) Seismic safety	Energy efficiency of the existing housing stock and decarbonisation of residential heating	Energy efficiency of the building stock and decarbonisation of heating	Development of a green housing loan market
Are secondary policy objectives mentioned?	Economic stimulus, job creation, and construction sector relaunch (post-COVID recovery) Green/climate transition alignment Housing stock upgrade	Reduce energy poverty (higher subsidies for low-income households) Stimulate the building sector and local jobs Climate alignment with the National Low-Carbon Strategy and 2050 carbon neutrality	Lower household energy bills. Switch from gas/oil to heat pumps and district heat	Financial and price stability
What targets have been set?	Initial National Recovery and Resilience Plan targets for Superbonus: renovate at least 100,000 buildings (36 million m^2 in total area) with an average 240 kWh/m^2 per year in energy savings	The 2026 Budget provides €3.6 billion to the MaPrimeRénov' programme to fund at least 120,000 major renovations and 150,000 individual renovation projects	Target is reduction in emissions Target For the funding year 2024 of 3.2 Mt CO_2 eq (gross) was set for the entire BEG	No headline target, the envelope size (Ft300 billion, or approximately €0.82 billion) is the defining number
Who is the target group? What kind of buildings are targeted?	Target group: condominiums, natural persons, social housing, cooperatives, non-	Target group: condominiums; natural persons Buildings targeted: existing residential buildings only (≥15 years old)	BEG WG: complete renovation of residential buildings BEG NWG: complete renovation of non-	Natural person borrowers An energy rating of at least BB and a primary energy demand of no

	profits/voluntary organisations Buildings targeted: existing residential buildings		residential buildings BEG EM: renovation with individual measures for residential and non-residential buildings BEG BfN: climate-friendly new buildings	more than 90 kWh/m² per year; later tightened to 80 kWh/m² per year
Are there any key performance indicators that measure 'success' or efficiency?	Monitoring indicators: number of completed works (buildings), total investments, percentage of works completed and average investment per type of renovation	Major renovations completed (distinct from total renovations); budget distributed, average amount of MaPrimeRénov'; local economic impact	These appear to be focused on emissions targets but also track factors such as cases approved, federal funds, energy and CO_2 savings, gross value added and jobs Annual independent evaluation by full team	Number of loan contracts EPC rating distribution (above minimum threshold)
What is the main financial mechanism of the programme? (such as grants or subsidised loans)	110% tax deduction on eligible expenses, usable as direct offset against IRPEF (personal income tax) or IRES (corporate income) over 5–10 years, or transferable as tax credit (cessione del credito) to the bank/contractor, or invoice	Direct state grant paid once works complete Two routes since 2024: single-measure (Parcours par geste) and accompanied whole-building (Parcours accompagné).	Delivered jointly by KfW and BAFA (Federal Office for Economic Affairs and Export Control) Mixture of grants and loan subsidies The relevant KfW programmes are 261, 263, 264, 358, 359, 422, 458, 459, 464, 522 and 523 Additional subsidies with BAFA	Energy-efficient mortgages with an interest rate capped at 2.5% (below market rates), supported by a 0% interest rate central bank refinancing facility

	discount (sconto in fattura)			
What are the observed outcomes (so far)?	The Superbonus exceeded PNRR targets, renovating 505,417 buildings (86 million m^2 versus planned 100,000 buildings/36 million m^2) as of March 2026, achieving average energy savings of 240 kWh/m^2 per year, with €131.97 billion in investments that boosted GDP by 2–3% and created 121,000 jobs, but at a fiscal cost exceeding €200 billion (raising debt to GDP by 3–4 percentage points), construction inflation of 20–40%, regressive benefits favouring wealthier owners, and significant fraud issues	By the end of 2025, MaPrimeRénov' had helped renovate nearly 2.8 million homes, including through more than 459,000 major renovations, and generated nearly €44 billion worth of works. It is estimated to have saved over 7 million metric tonnes of CO_2	2024 funding year: 358,000 projects funded; €30 billion in investment triggered; €6.9 billion in federal funding spent; 7.0 TWh in primary energy savings per year; 2.3 Mt CO_2 in greenhouse gas emissions reductions per year Effects realised over up to 4 years: €24 billion gross value added in Germany; 311,000 full-time equivalent jobs secured or created	Helped finance around 8,600 energy-efficient households utilising a total framework of roughly Ft300 billion (around €820 million at the time) The Primary Energy Demand (PED) requirement of 90, later 80 kWh/m^2 of the programme significantly exceeded the average PED value of financed single-family houses in the country. The latter varies between 149 kWh/m^2 and 384 kWh/m^2 (depending on the district), while the average values for apartment buildings are between 146 kWh/m^2 and 319 kWh/m^2

Table A2. Detailed scoring of the Italian programme

Criterion	Assessment
Significant impact	Score: 5. By April 2026, the Italian National Agency for New Technologies, Energy and Sustainable Economic Development had recorded interventions in more than 500,000 residential buildings. Official estimates indicate that annual energy savings attributable to public expenditure reached 214.5 kilotonnes of oil equivalent (ktoe), exceeding a target of 191 ktoe, while annual emissions reductions reached 744.9 $ktCO_2$, exceeding a target of 667 $ktCO_2$.
High cost-effectiveness	Score: 2. Despite its exceptional scale, the programme involved high public expenditure (approximately €27,000 of public investment per renovated building) and significant fiscal costs. Fraud also became a major issue, with the Guardia di Finanza reporting around €9.3 billion in fraudulent tax credits.
Ambitious energy-efficiency improvements	Score: 5. The scheme required, in most cases, an improvement of at least two Energy Performance Certificate classes and financed integrated renovation packages including: insulation; heating, ventilation, and air conditioning replacement; and renewable-energy installations, encouraging deep rather than incremental renovation.
Funding sustainability and continuity	Score: 1. Although supported by national resources and around €13.95 billion from the EU's Recovery and Resilience Facility, rapidly increasing uptake generated substantial fiscal liabilities. Repeated revisions to subsidy rates and tax-credit rules reduced policy stability and ultimately limited the programme's long-term sustainability.
Scalability/ replicability	Score: 4. The Superbonus was implemented nationwide across multiple housing types, demonstrating strong domestic scalability. However, its exceptionally high fiscal cost and administrative complexity make direct replication elsewhere difficult without significant redesign.
Outreach to hard-to-reach groups	Score: 2. The programme was broadly available to residential property owners but was not explicitly targeted at low-income households. While invoice discounting reduced upfront financial barriers, participation remained concentrated among households with greater financial and organisational capacity.
Private finance leverage	Score: 1. Transferable tax credits mobilised banks and financial intermediaries and generated private investment, but public subsidies remained the dominant source of finance. There is little evidence that participation led to additional unsubsidised retrofit investments by households.
Housing market coverage	Score: 4. The scheme covered condominiums, single-family houses and functionally independent residential units, resulting in broad housing market coverage. Nevertheless, uptake was concentrated among owner-occupied housing and condominium buildings, with weaker representation of rental housing.

Table A3. Detailed scoring of the German programme

Criterion	Assessment
Significant impact	Score: 4. BEG supported a large number of renovations and economic activity, most of which was linked to residential renovations. It receives a score of 4 because its emissions reductions, while substantial, still fell short of the programme's full target. BEG EM funded nearly 345,000 projects covering around 668,000 homes; BEG WG supported 13,000 projects and 43,400 homes. Together, the two full programmes generated about €22.2 billion in gross value added and supported 289,000 jobs. For BEG EM, approximately 86% of these effects arose from residential renovation. Annual emissions reductions reached approximately 2.5 million tonnes of CO2 equivalent ($MtCO_2e$).
High Cost-Effectiveness	Score: 4. BEG EM provided good value for money. The cost of BEG WG is considerably higher. BEG EM cost about €107 per tonne CO_2e saved and covered around 160 residential units per €1 million of federal funding. BEG WG cost around €808 per tonne and €41,400 per dwelling, covering around 24 residential units per €1 million of federal funding. This is reflective of the nature of the renovations it funds. Final energy savings cost approximately €36/MWh under BEG EM, compared with €200/MWh under BEG WG.
Ambitious energy-efficiency improvements	Score: 4. The programme achieved significant energy and emissions reductions and supported demanding efficiency standards. BEG WG follows Efficiency House standards, while BEG EM frequently funded buildings using over 250 kWh/m² annually. EH55 and EH70 were the dominant standards under BEG WG (mid-to-high efficiency), accounting for approximately 38% and 34% of funded cases, respectively. BEG EM provided around 6,500 gigawatt-hours (GWh) of annual final-energy savings and 2.4 $MtCO_2e$ in emissions reductions. BEG WG provided 447 GWh and around 111,000 tonnes of CO_2e in emissions reductions.
Funding sustainability and continuity	Score: 5. BEG is a nationwide federal programme financed through grants and KfW interest subsidies. Demand and investment increased slightly between 2023 and 2024. Evaluations found that programme costs were economically justifiable and reported improved cost-effectiveness, but continuity remains dependent on annual federal budget availability.
Scalability/ replicability	Score: 5. BEG already operates nationwide, with uptake in every German Länder. It is integrated into KfW financing, certified energy advice, individual renovation roadmaps and complementary incentives. Residential BEG EM and BEG WG activity accounted for approximately 18.5% of Germany's residential renovation market in 2024.

Outreach to hard-to-reach groups	Score: 3. Support was focused on private and owner-occupied properties. Owner-occupied homes were overrepresented, while only about 4% of WG-funded rental properties were in disadvantaged locations. Income bonuses targeted owner-occupiers earning no more than €40,000, but represented only 18% of eligible private heating cases. Overall, the recipients were disproportionately higher-income and highly educated, and were owner-occupiers. Around 89–90% of recipients rated the administration of each scheme positively.
Private finance leverage	Score: 4. Substantial resources were mobilised through the KfW bond issuances used to cover the credit made available under BEG and the investment made by the grant recipients. Regarding the federal support itself, each euro spent generated approximately €3.90 of recipient investment under BEG EM and €8.60 under BEG WG. Stimulated investment totalled about €13.5 billion and €7 billion, respectively. Funding also increased renovation ambition: 35% of BEG WG projects would not otherwise have proceeded.
Housing market coverage	Score: 5. BEG covers owner-occupied, rented, commercial, cooperative and municipal housing through individual-measure and whole-building routes. BEG EM reached around 668,000 homes; BEG WG reached approximately 43,400 homes.

Source: (Heinrich et al., 2026a; 2026b; 2026c).

Table A4. Detailed scoring of the French programme

Criterion	Assessment
Significant impact	Score: 4. In 2025, MaPrimeRénov' supported 307,731 energy renovations, comprising 120,306 major renovations and 187,425 individual-measure renovations. Targets of 100,000 major renovations (down from a target of 200,000 in 2024) and 250,000 minor renovations were set for 2025. Agence Nationale de l'Habitat (ANAH) has reported around 2.8 million energy renovations, including just under 460,00 major renovations, since 2020. This has resulted in an estimated annual saving of 7 Mt CO_2e emissions and 20.7 terawatt-hours of annual energy savings. Across all ANAH programmes (beyond MaPrimeRénov' alone), around €4.4 billion in aid generated just over €8 billion of works and supported/preserved around 85,000 jobs in 2025. MaPrimeRénov' supported a substantial number of renovations and energy savings/emissions reductions. The score is 4 rather than 5 because not all targets were met and less ambitious targets were set for 2025 compared to previous years.
High Cost-Effectiveness	Score: 3. Cost-effectiveness differs sharply by renovation route. Individual measures distributed €600.3 million across 187,425 homes. This covered approximately 312 homes per €1 million, an average grant of €3,203 per home. Major renovations (excluding condominiums) distributed approximately €2.5 billion across over 62,000 homes. This is just under 25 homes per €1 million, or an average of €40,429 per dwelling. Over 58,000 dwellings were also covered under condominiums with an average cost per dwelling of €12,001. Fraud has been flagged as an issue in these renovations. The figures show a broad reach through individual measures but a high public cost for deeper renovations. These limitations reduce the score to 3.
Ambitious energy-efficiency improvements	Score: 4. Major renovations achieved an average calculated energy saving of 69% in 2025, up from 65% in 2024, while 59,708 homes improved by at least three energy-performance classes. Moreover, 93% of major-renovation applications concerned E-, F- or G-rated homes, demonstrating a focus on less-efficient housing stock. MaPrimeRénov' has been linked to the emissions reductions of 7 million metric tonnes of CO_2 per year since 2020. However, 187,425 of the 307,731 energy renovations involved individual measures, for which no common percentage saving or EPC-class improvement is reported. Éco-PTZ was also dominated by single measures, which accounted for 68,137 of 112,632 loans, compared with only 9,448 overall-performance loans.
Funding sustainability and continuity	Score: 2. MaPrimeRénov' is financed through ANAH's publicly funded grant budget. In 2025, ANAH distributed €4.39 billion in total aid, including €3.8125 billion for energy renovation under MaPrimeRénov'. This provides substantial nationwide funding but leaves the programme dependent on annual public-budget decisions. However, repeated rule changes, budget pressures and pauses have reduced the predictability of the scheme for households and firms. Éco-PTZ added another credit channel. Éco-PTZ issuances increased at an annual rate of 7% to 112,632 for €1.67 billion in loans in 2024. Nevertheless, compensation to lenders increased by 12% as interest rates and lending

	volumes rose, demonstrating that Éco-PTZ's fiscal cost is sensitive to market rates. These factors result in a score of 2.
Scalability/ replicability	Score: 5. The French framework already operates nationwide (some differences apply overseas) and combines grants, subsidised bank finance, technical assistance and territorial delivery. MaPrimeRénov' is integrated with other policies such as Éco-PTZ and comes with mandatory *Mon Accompagnateur Rénov'* assistance for major renovations. By the end of 2025, 614 territorial advice centres and 2,823 advisers operated across France within the framework.
Outreach to hard-to-reach groups	Score: 5. MaPrimeRénov' is strongly income-targeted. Among the major-renovation beneficiaries, 46% were very-low-income and 25% low-income households, meaning that 71% were households of modest or very modest means; only 2% were higher-income households. Across all ANAH programmes, 86% of grant funding went to such households. Technical support is extensive, and recipient satisfaction with MPR was 89%, while 94% said they would recommend it. While access remains skewed towards owner-occupiers, the nature of the income requirements and the generous support and guidance available mean the scheme is reaching households that have traditionally proven hard to reach.
Private finance leverage	Score: 3. Substantial MaPrimeRénov' projects cost an average of €59,474, compared to an average public grant of €40,429. This equates to €1.47 of renovation expenditure per €1 of grant. Across all ANAH activity, around €4.4 billion of aid generated works worth just over €8 billion. Éco-PTZ mobilised €1.67 billion of bank lending through 112,632 loan offers in 2024; on average, a loan of €14,856 supported works costing €19,883. The cost to the taxpayer is equivalent to the compensation banks received for the interest they would have charged. The principal is supplied by lenders, with the state financing the interest through a tax credit. While Éco-PTZ mobilises substantial household and bank resources, it had a far smaller uptake than other forms of support and a relatively low loan maximum of €50,000. While the MaPrimeRénov' programme generates additional investment and economic activity, it is funded directly by the state. For these reasons, the overall score is 3.
Housing market coverage	Score: 4. The policy package formally covers owner-occupiers, private landlords, individual homes, apartments and co-ownership using the individual-measure and whole-building renovation routes. In 2025, MaPrimeRénov' reached 187,425 individual-measure homes, 62,205 individual Parcours accompagné homes and 58,101 co-ownership dwellings. Nevertheless, individual uptake was highly concentrated among owner-occupiers (who account for more than 4 out of 5 recipients). The programme has broad formal coverage despite its relatively small involvement in the private rental housing market.

Sources: ANAH, 2026b; 2026c; SGFGAS, 2025.

Table A5. Detailed scoring of the Hungarian programme

Criterion	Assessment
Significant impact	Score: 5. The programme achieved very strong market uptake, with the full HUF 300 billion (approximately €820 million in the period of the programme) funding envelope committed within less than one year and taken up by around 8,600 households. Therefore, the programme successfully established a dedicated green mortgage market in Hungary and demonstrated strong consumer demand for energy-efficient residential properties. Although the number of supported dwellings was lower than in some larger national programmes, the scheme appears to have achieved its policy objective of accelerating the development of green mortgage lending. The score reflects the programme's strong delivery against its stated objectives and rapid market uptake rather than an assessment of its economy-wide impact on the energy performance of the Hungarian housing stock. The structural limitation to newly constructed buildings is reflected separately in the assessment of ambitious energy-efficiency improvements and housing market coverage.
High cost-effectiveness	Score: 4. In contrast to grant-based programmes, the Green Home Programme relied on concessional central bank refinancing rather than direct fiscal subsidies. This allowed substantial private investment to be mobilised with relatively limited public (fiscal) intervention, even if 0% refinancing implied an opportunity cost for the central bank. While there are no comprehensive data available allowing a direct calculation of energy savings or emission reductions per unit of public support, the financing structure suggests relatively high public cost-effectiveness compared with grant-based support.
Ambitious energy-efficiency improvements	Score: 2. The programme financed only newly constructed residential buildings with energy performance requirements higher than the national average (a minimum EPC rating of BB and a ceiling of 90 kwh/m^2, then 80 kwh/m^2 ceiling). Importantly, this ensured that supported buildings significantly exceeded the national regulatory minimum. Yet the programme did not finance deep renovations of the existing building stock, where the largest energy savings and emission reductions can be achieved. Most supported properties met the minimum BB threshold, but a significant share also had even higher energy performance levels.
Funding sustainability and continuity	Score: 4. The programme was funded through central bank refinancing rather than annual budget expenses, which provided a predictable source of financing during its operation and avoided placing a burden on the national budget. However, the programme was temporary and closed after the available funding envelope had been exhausted. Therefore, the relatively high score primarily reflects the predictability and fiscal characteristics of the funding mechanism rather than the longevity of the programme itself.

Scalability/ replicability	Score: 4. The programme operated through the existing commercial banking system, making implementation relatively straightforward and allowing nationwide coverage. Although it has not been replicated in other jurisdictions, the underlying refinancing model could be adapted by other central banks or promotional institutions. The programme also complemented the broader package of sustainable finance measures introduced by the central bank. Therefore, the score reflects the strong technical scalability of the delivery model, while recognising that evidence of actual replication remains limited.
Outreach to hard-to-reach groups	Score: 2. Eligibility was limited to newly built energy-efficient homes, which tend to require relatively high upfront investment and, therefore, primarily benefit households with stronger borrowing capacity (and especially those with a high income). At the same time, the capped maximum mortgage rate of 2.5% improved affordability for eligible borrowers. However, overall, the programme was less accessible to lower-income households and did not specifically target vulnerable groups or the least energy-efficient buildings.
Private finance leverage	Score: 5. Mobilising private mortgage lending was one of the programme's core design features. Rather than replacing private finance, the scheme used 0% central bank refinancing to incentivise commercial banks to originate green mortgages at preferential interest rates. Arguably, the programme demonstrates a highly effective use of public intervention to catalyse private investment in energy-efficient housing.
Housing market coverage	Score: 3. The programme covered both apartments and single-family houses across Hungary but was restricted to newly constructed residential properties. Existing buildings and renovation projects were excluded, limiting the programme's coverage of the overall housing stock despite its broad eligibility criteria for new residential developments.