

JRC SCIENCE FOR POLICY REPORT

Accelerating energy renovation investments in buildings

Financial and fiscal instruments across the EU

Economidou, Marina

Todeschi, Valeria

Bertoldi, Paolo

2019



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Contact information

Name: Marina Economidou

Address: European Commission, Joint Research Centre, Via Enrico Fermi 2749, 21027 Ispra (VA), Italy

Email: marina.economidou@ec.europa.eu

EU Science Hub

<https://ec.europa.eu/jrc>

JRC117816

EUR 29890 EN

PDF ISBN 978-92-76-12195-4 ISSN 1831-9424 doi:10.2760/086805

Luxembourg: Publications Office of the European Union, 2019

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How to cite this report: Economidou, M., Todeschi, V., Bertoldi, P., *Accelerating energy renovation investments in buildings – Financial & fiscal instruments across the EU*, EUR 29890 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-12195-4, doi:10.2760/086805, JRC117816.

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Acknowledgements

We would like to thank the following experts for sharing their valuable knowledge and expertise with us:

Andrés Paredes Salvador, Solar Department, Institute for the Diversification and Saving of Energy, Madrid (SP)

Cinzia Bruzzone, Senior Director Retail, Intesa Sanpaolo, Torino (IT)

Dominik Bach, Liaison Office to the EU, KfW Bankengruppe, Brussels (BE)

Francesco Cosenza, Head of Finance & Insurance, Enel X Srl, Roma (IT)

Harris Andreosatos, Centre for Renewable Energy Sources Energy Policy Analysis Department, Pikermi (EL)

Jessica Stromback, Joule Assets Europe, Modena (IT)

Luca Bertalot, European Mortgage Federation - European Covered Bond Council, Brussels (BE)

Lucia Alessi, Joint Research Centre, European Commission, Ispra (IT)

Marcello Paoli, Intesa Sanpaolo, Torino (IT)

Martin Schoenberg, UN Environment & UN Environment Finance Initiative, Paris (FR)

Marko Markov, Econoler S.A., Bulgaria (BG)

Paola Rusconi, DWS Group GmbH & Co. KGaA, Milano (IT)

Peter Radford, Amber Infrastructure Limited, London (UK)

Stephen Huller, BNP Paribas Personal Finance, Birmingham (UK)

Steve Fawkes, EnergyPro Ltd & Partner, Cameron Barney, London (UK)

Tovio Miller, European Bank for Reconstruction and Development, London (UK)

Tiago Serrenho, Joint Research Centre, European Commission, Ispra (IT)

Vedran Uran, GreenMax Capital Advisors, Zagreb (HR)

Zsolt Toth, European Mortgage Federation - European Covered Bond Council, Brussels (BE)

We would also to express our gratitude towards the following reviewers:

Nora Bednarski, DG Energy, European Commission, Brussels (BE)

Diana Barglazan, DG Energy, European Commission, Brussels (BE)

Martin Eibl, Executive Agency for Small and Medium-sized Enterprises, Brussels (BE)

Kamila Paquel, Executive Agency for Small and Medium-sized Enterprises, Brussels (BE)

Daniele Paci, DG Joint Research Centre, European Commission, Ispra (IT)

Faidra Filippidou, DG Joint Research Centre, European Commission, Ispra (IT)

Abstract

At today's renovation rate of around 1% of buildings per year, a timely transition of the EU building sector towards climate-neutral levels by 2050 cannot be ensured. To accelerate energy efficiency investments in this area, the European Commission has intensified its efforts in recent years, with specific calls to strengthen the existing financial framework, increase funding levels, diversify types of financial models and explore new supporting mechanisms. Various private and public financial and fiscal mechanisms for energy renovations in buildings are currently available in Europe in the form of non-repayable rewards, debt financing, equity financing, etc. This report provides a country-by-country overview of the most important public schemes identified across the EU, and investigates new private financial products in place to stimulate more energy efficiency investments in residential, commercial and public buildings. Good practices are identified based on the criteria of impact, cost effectiveness, ambition level of energy efficiency upgrades, funding sustainability/continuity, scalability and outreach to hard-to-reach groups.

Executive summary

The building sector is expected to undergo a substantial transformation over the next few decades to meet the goals set out by the European Union in relation to the transition towards a clean energy economy. It is estimated that the majority of buildings in which EU citizens currently live, work and use for recreational, educational or other purposes are in need of an energy efficiency upgrade. Energy renovations —which entail various intervention measures on the envelope of a building and its technical systems resulting into significant energy efficiency improvements— are an important pillar for achieving the EU energy efficiency target for 2030 and the transition towards climate-neutral Europe by 2050. Despite this, actual energy renovations taking place today neither meet the rate, scale nor the depth aligned with their energy efficiency potential.

Policy context

To address the issue of underinvestment in energy efficiency, revisions in 2018 to the Energy Performance of Buildings Directive 2010/31/EU and Energy Efficiency Directive 2012/27/EU, have strengthened the existing policy and financial framework. New elements include the reinforcement of existing financial instruments, establishment of new financial models or supporting mechanisms and a more active participation of financial institutions. In line with these actions, the European Commission launched the Smart Finance for Smart Buildings Initiative in 2016, with the aim to further mobilise private financing for sustainable energy in buildings. This initiative stresses the importance of more effective use of public EU funding and the need to de-risk energy efficiency investments in buildings by giving investors and private financiers a better understanding of the risks and benefits of energy efficiency. A solid financial component has also been underlined as a prerequisite for the successful implementation of the long-term building renovation strategies set up by the EU Member States in accordance with the Energy Performance of Buildings and Energy Efficiency Directives.

Key conclusions

Our research has shown that EU Member States currently deploy various public support instruments, each tailored to address specific barriers, segments and recipient groups within the sector. These are primarily in the form of grants/subsidies, followed by soft loans and tax incentives which target residential, commercial and public buildings. Our findings indicate that around EUR 15 billion are roughly spent by public resources on an annual basis across the EU. This is in line with findings from previous studies suggesting an investment gap for the Paris agreement 2°C goal (Maio, Zinetti and Janssen, 2012; Hudson, Schopp and Neuhoff, 2013; Amon and Holmes, 2016; Ogunlana and Goryunova, 2017). While private investments are not included in our findings, achieving the goals set out by the Paris agreement and the EU would require significantly higher levels of funding (IEA, 2017). A shift towards more sustainable public financing means (e.g. from grants to guarantees) which can leverage higher levels of private funds would also be needed to meet the investment scalability needs, together with limiting access to grants to vulnerable or difficult-to-access groups and exploring new, innovative mechanisms.

The use of private financial schemes on energy efficiency is generally less studied in the literature due to the vast range of business models and actors involved as well as difficulty in accessing data concerning private lending practices. Whilst many private actors choose to conduct energy efficiency upgrades using their own funds, financial institutions have become more active than ever before at offering specialised financial products geared towards energy efficiency investments. More than half of the private schemes identified in this study were enacted in the last 4 years. At the same time, new models based on non-conventional methods of raising funds are currently explored as a vehicle to drive more investments. Examples reviewed in this study include *crowdfunding for energy efficiency*, which gives access to consumers who would not normally be

eligible for traditional financing options and *energy efficiency insurance* which offers protection against possible under-achievement risks of energy efficiency projects.

Main findings

A total of 129 ongoing public financial and fiscal schemes supporting energy renovations in buildings have been identified in this study: around 61% of these are in the form of grants and subsidies, 19% soft loans, 10% tax incentives and the rest 10% combination of the above. Deployed in all Member States, grants and subsidies represent the main type of public support for energy renovations in Austria, Croatia, Ireland, Cyprus, Hungary, Latvia, Greece, Poland, Spain and Slovakia. Loans and soft loans are available in over half of the EU countries, some of which are supported by state guarantees (e.g. Bulgaria, Estonia, France, Italy and Romania) and others are designed as revolving funds (e.g. Bulgaria, Estonia, Netherlands, UK). Tax incentives are typically offered in the form of income tax deductions or credits (e.g. Belgium, France, Denmark, Finland, Sweden, Italy and the UK) or less commonly in the form of VAT reduction such as in Belgium, France and the Netherlands.

Public financial support is available for residential buildings only in Finland, Ireland, Estonia, and Romania. On the contrary, France, Belgium, Italy and Portugal have enacted all types of instruments covering all types of buildings. For all other countries, the main focus of public funding is the residential sector, with some instruments also targeting commercial buildings and/or public buildings or a different combination of building types. Many of the instruments are designed to work together with other instruments or be part of a policy package including Energy Efficiency Obligation Schemes (e.g. Denmark, France, Luxembourg, Poland and the UK).

Good practices of public schemes have been identified using the 6 criteria defined in this study, ranging from impact to cost effectiveness and scalability. The global score computed for each of the pre-selected schemes, which ranged from 1.1 to 4.7, enabled the identification and further investigation of 10 best practices. These included the French Energy Transition Tax Credit, Dutch Energy Investment Tax Deduction, Estonian Kredex Credit and Export Guarantee Fund and KfW Energy Efficient Refurbishment Programme among others. Since their inception, these programmes have collectively had a significant impact in terms of generated energy savings, supported ambitious energy upgrades and sustained relatively low pressure on public finances.

Whilst energy efficient lending is mostly integrated into mainstream products, private schemes offered as stand-alone energy efficiency loan products have also been identified. Examples include the Intesa San Paolo Condominium Loan Scheme in Italy, Zagrebank Green Housing loans in Croatia and Belifus housing retrofit programme in Belgium. Several banks have also tapped into energy efficiency mortgage sector in recent years, offering interest rate reductions based on the improved risk profile of energy efficient lending. Notable examples include Raiffeisen bank in Eastern Europe, Nordea bank in Scandinavian countries and Muenchener Hyp in Germany. The Energy Efficient Mortgages Initiative¹, which is supported by the participation of 40 EU banks, aims to standardise the way energy efficiency mortgage products are designed across the EU. Beyond traditional financing, crowdfunding has also gained some ground in recent years by offering support to sustainable energy projects through debt financing options. Even if crowdfunding platforms mainly focus on renewable energy investments, recent platforms such as CitizenEnergy, Bettervest, Econeers and Fundeen specialise on energy efficiency projects, too. This financing route however accounts only for a small share of the sector for now. Energy efficiency insurance, an innovative product which aims to shield from under-achievement and increase trust and awareness of energy efficiency projects, is currently used in Germany and the UK. Finally, specialised energy efficiency funds which third party participation have also been identified.

¹ <https://energyefficientmortgages.eu>

Quick guide

Many energy efficiency interventions are often incurred “behind the scenes” of maintenance, modernization or routine restoration works. Energy renovations in the context of our study are defined as the combination of any intervention measures on the envelope of a building and its technical systems resulting into significant energy efficiency improvements. In addition, these interventions may often be complemented with renewable energy technology installations. Financial mechanisms for energy renovations in buildings may take the form of non-repayable rewards, debt financing, equity financing or a combination of these options. They can range from well-established and traditional mechanisms such as grants, subsidies and loans to emerging and new models not yet well tested in the European market. To make a clear distinction between private and public instruments, financial products which may be partially or fully covered by private funds and are dispersed by private intermediaries are considered as private schemes in this study. Conversely, financial schemes which are partly or fully supported by public sources and have been made available to end users through public intermediaries (e.g. a public bank) are defined as public. Due to limited data on impact of private schemes, the identification of good practices was limited on public schemes for which sufficient information was obtained.

1 Introduction

Buildings play a central role in the transition towards a low carbon future in the EU (European Commission, 2016, 2018). While new buildings built today are more energy efficient than ever before, the ageing part of the stock, which was not built with optimised energy performance in mind, presents a great challenge and opportunity across Europe (Sebi *et al.*, 2019; Brown, 2001). It is estimated that at least 75% of EU buildings are in need of an energy efficiency upgrade (Economidou *et al.*, 2011). The 'Clean Planet for All' communication published by the European Commission (COM(2018)773) states that up to 97% (i.e. all buildings built before 2010) need partial or deep renovation to comply with the long-term strategy ambition. Despite this, actual energy renovations taking place today neither meet the scale nor depth aligned with their energy efficiency potential.

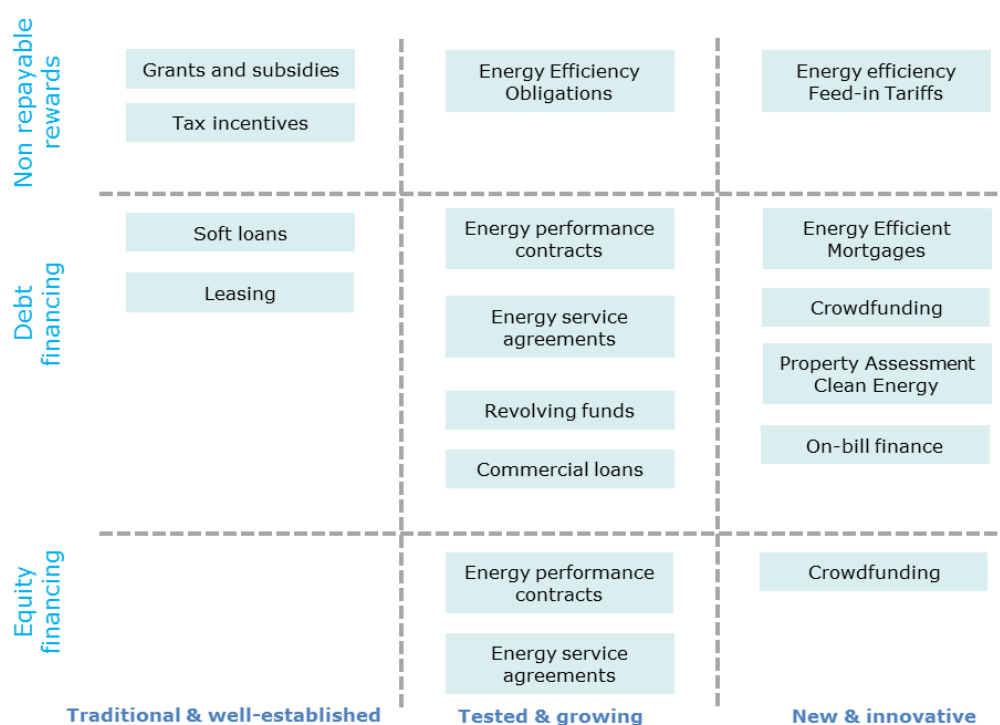


Figure 1. Current landscape of financial instruments supporting energy renovations in Europe classified according to market saturation (traditional, growing and new) and type (non-repayable reward, debt financing, equity financing)

The Energy Efficiency Directive (Directive 2012/27/EU, the EED), adopted in 2012, laid down the foundation for actions to be taken in order to accelerate energy efficiency upgrades in different sectors. It, inter-alia, required EU Member States (MS) to establish a long-term strategy for mobilising investments in their national stock of residential and commercial buildings, both public and private. Specific provisions on central government under EED Article 5 and the establishment of national funds on energy efficiency under EED Article 20 were additional requirements, which were expected to stimulate the energy renovation market. By way of amending Directive (EU) 2018/844, provisions on long-term renovation strategies have been moved from Article 4 of the EED to a new Article 2a in the EPBD and have also been strengthened. The updated EPBD calls for financial mechanisms to be actively promoted by Member States and for the mobilisation of financial institutions for energy efficiency renovations in buildings. Such measures may include the establishment of energy efficient mortgages, promotion of energy efficiency

investments in public buildings through public-private partnerships and uptake of energy performance contracts (EEFIG, 2015, Frangou *et al.*, 2018; Bjørneboe, Svendsen and Heller, 2018). In addition, concerns on the perceived risk of the investments can be addressed through, *inter-alia*, the set-up of accessible and transparent advisory tools and establishment of one-stop-shops that provide integrated energy renovation services (Boza-Kiss and Bertoldi, 2019).

Various private and public financial mechanisms for energy renovations in buildings are currently available in Europe in the form of non-repayable rewards, debt financing, equity financing or a combination of these options (Maio, Zinetti and Janssen, 2012; Economidou and Bertoldi, 2014; Brown, Sorrell and Kivimaa, 2019). They can range from well-established and traditional mechanisms such as grants, subsidies and loans to emerging and new models not yet well tested in the European market such as crowdfunding and on-bill finance models. For illustrative purposes, these have been organised according to the mechanism type (non-repayable rewards, debt financing or equity financing) and level of saturation in the European market (traditional/well established, tested & emerging, new & innovative).

A review of conventional and new financial mechanisms supporting energy renovations of buildings across the EU is presented in this report. Data have been collected with the aim to provide a country-by-country overview and identify good practices and successful financial and fiscal instruments in residential, commercial and public buildings. To do so, various sources have been used, including the National Energy Efficiency Action Plans and Long Term Building Renovation Strategies, submitted by EU Member States in compliance with Article 24 of the EED and Article 4 of the EPBD, respectively (Castellazzi, Zangheri and Paci, 2016; Economidou *et al.*, 2016, 2018; Castellazzi *et al.*, 2019). Moreover, various policy databases such as the MURE and IEA databases have been used², in conjunction with interviews with various experts from the industry, financial institutions and international organisations (see Acknowledgements section). The report covers both private and public schemes. Given that private and public funds are often blended to provide credit lines or other financial products with preferential terms, public schemes in the context of this report are defined as schemes that are partly or fully supported by public sources and are administered to end users through public intermediaries (e.g. a public bank). All other schemes, i.e. financial products which may be partially or fully covered by private funds and are dispersed by private intermediaries are defined as private schemes.

The structure of the report is as follows. Chapter 2 classifies the main types of financial/fiscal schemes for energy renovations in buildings, discussing the main advantages and challenges of each type and applicability for specific building types. The use of revolving funds, guarantee funds and risk sharing facilities used as support mechanisms are discussed, including the use of one-stop shops (OSS), aggregation of small-scale projects, technical assistance (TA) and other tools. An overview of main public schemes identified in EU Member States is presented in Chapter 3, where information on the targeted sectors, actors, types of interventions, budget, and impact is provided for each instrument. Discussion of private schemes such as dedicated credit lines offered by commercial banks to residential and tertiary consumers and financing to Energy Service Companies (ESCOs) is given in Chapter 4. Good practice schemes based on a number of pre-defined criteria are shared in Chapter 5 and practical guidance/recommendations are drawn in the concluding Chapter 6.

² MURE database: <http://www.measures-odyssey-mure.eu/>

IEA database: <https://www.iea.org/policiesandmeasures/energyefficiency/>

2 Types of schemes covered in this study

2.1 Grants and subsidies

Grant schemes can be useful at stimulating the market by subsidising energy efficiency investments for households and businesses, which otherwise cannot be fully supported by the market alone due to high upfront costs. They directly fill an immediate financial gap and thus enable a temporary shift in the market. They typically rely on limited resources and can, therefore, neither offer a sustainable solution nor support massive market uptake programs.

Grants mainly serve as direct investment subsidies which may partially or fully cover renovation costs including acquisition of material/equipment, advice, certification and installation. Across EU Member States, grants are offered for projects with investment size ranging from a few thousand to over EUR 1 million, reflecting the varying nature and scope of the eligible projects (Economidou and Bertoldi, 2014). Any remaining costs are either self-financed or covered by a loan. The grant intensity (subsidy level) may vary with the following parameters:

- energy performance: e.g. subsidy is linked to amount of energy or costs saved meaning more support is provided for more ambitious projects;
- household income: more favourable conditions may apply for low income households or customers subject to fuel poverty;
- specific target group: e.g. condominiums or rented properties may have access to higher grant intensity;
- intervention measure: e.g. some harder-to-implement interventions such as insulation may be associated with higher intensity;
- innovativeness of technology: new and emerging technologies may receive more support to help their entry to the market.

Although grants generally score low on the continuity and funding sustainability criteria (Table 1), they constitute the most commonly found mechanism that EU countries currently use to encourage energy efficiency improvements in the building stock. They are typically associated with high uptake rates, but even the most prominent instruments cannot offer a real widespread implementation. If public grant schemes rely on EU funds, e.g. ERDF, there is often a significant delay and uncertainty in setting up follow-up schemes which may have a negative impact on market players. In addition, grant schemes often attract recipients who would have carried out the investments even without the incentive, the so-called free riders. Grant schemes are often designed in a way to crowd out any other viable commercial schemes. A more careful design of grant schemes can reduce the effects of free ridership. For example, eligible interventions can be restricted to renovations leading to state-of-art energy performance or can be limited only to a specific target group, e.g. low income households, tenants, and small and medium enterprises. Compatibility of these grant schemes with energy performance certificates could also leverage in private investments.

Table 1. Overview of grant schemes as a vehicle for financing energy efficiency investments

Strengths	Challenges
<ul style="list-style-type: none"> — Can support initial stage of a new market/diffusion of new promising technologies and deep renovations which may be perceived risky by investors. — Can be used to provide financial assistance to vulnerable groups or low-income households meeting political priorities such as health or social inclusion — Can support energy efficiency projects that normally would be too small to get attention from commercial banks 	<ul style="list-style-type: none"> — Cannot offer massive uptake rates — Typically more suitable for individual interventions which may lead to energy saving "locking-in" effect — Public budget restrictions may threaten its continuation due to high costs — May attract free riders — May discourage the use of other forms of financing such as commercial loans or energy performance contracts — Can be associated with significant paperwork or bothersome application processes — May have a negative impact on the market as a result of manufacturers or contractors raising prices (e.g. equipment or services) in anticipation

2.2 Loans

Debt financing in the form of loans can be a more sustainable means of up-scaling energy efficiency investments as they can provide liquidity and direct access to capital. Loans can be more relevant for energy efficiency measures attached to high upfront costs, especially in deep renovation projects which comprise a package of multiple intervention measures. Despite this, private debt financial products designed specifically for energy renovations in buildings are currently not fully developed as financial institutions are often unfamiliar with these investments and thus perceive energy efficiency loans as high-risk investments. High transaction costs for relatively small projects and failure to offer financing for terms long enough to support deeper measures are additional factors hindering market uptake.

To address some of these issues, international financial institutions and governments can intervene to fill the debt gap where local and traditional banking sector actors are not active. This can be done through various mechanisms, e.g. preferential loans offered by public banks, dedicated credit lines, third party financing etc. An example of the latter includes the regional "Ile-de-France Energies" third party finance scheme for condominium association supported by a EUR 100 million European Investment Bank loan. Given the nature of energy efficiency, there are different repayment methods, beyond what is considered "traditional". Traditional schemes (Section 2.2.1) refer to any loan and soft loan schemes which are attached to conventional repayment methods: that is, a lump sum of money is lent which is then periodically repaid through instalments that cover interest and principal over a fixed period of time. Repayments can also take the form of energy performance contract bills (Section 2.2.2), property tax (Section 2.2.3) and utility bill (2.2.4). All these options are discussed below.

Table 2. Overview of loan schemes as a vehicle for financing energy efficiency investments

Strengths	Challenges
<ul style="list-style-type: none"> — Represents a more sustainable means of financing than grants as capital is preserved and can be re-lent as soon as loan repayments are partly or fully made — Can be combined with various support mechanisms such as a revolving fund mechanism which ensures that loan funds are cycled back into the fund for more energy efficiency projects — Can be easily implemented by banking institutions, reducing long bureaucratic processes often linked with government grant schemes 	<ul style="list-style-type: none"> — Households and other target recipients may be unwilling to take on (additional) debt — Lack of understanding of value of energy efficiency projects by financial institutions remains a key barrier — Acquiring a second loan (e.g. on top of existing mortgage) may be complicated — Not suitable for vulnerable groups as credit worthiness of certain target groups would reduce their eligibility — Small projects may not be attractive for bankers

2.2.1 Traditional loan and soft loan schemes

Various international financial institutions and EU governments have begun experimenting with loan schemes that offer attractive terms to customers for energy efficient projects. In most cases, preferential or soft loans —government supported loans offered at below market interest rates— are delivered through public-private partnerships where the government provides financial support to a bank, which in turn offers a loan scheme with preferential interest rate to its customers. Typically credit lines are extended to financial institutions as low interest rate loans by a donor or a government. The recipient institution then on-lends the funds to customers (e.g. private individuals, condominium association, commercial customers, public authorities, energy service companies, etc.) to invest in energy efficiency projects. They can be an alternative or a complementary measure to subsidies.

Low interest rates are a common feature of most of national loan schemes in the EU targeting energy efficiency investments. In certain cases, zero interest rate loans are available such as in Belgium, Croatia and France. These are typically directed towards the most vulnerable groups such as low income households. In France, the cost difference between the normal- and zero-rate loans is paid by the government through a tax credit scheme offered to participating banks. The combination of loans and grants in order to partially offset project costs are also a common practice. For example, the Bulgarian Energy Efficiency and Renewable Source Fund offers incentive payments of 20-35% with a funding cap of EUR 9,000. The Bulgarian scheme also provides Energy Service Companies (ESCOs) portfolio guarantee, and thereby undertakes some of the risk associated with disruptions in the flow of receivables of the ESCO. The Estonian Renovation loan for apartment buildings, which is designed based on the concept of revolving fund, also provides guarantees. In Germany, German public bank KfW receives a subsidy from the government to lower the interest rate at which it lends to the commercial banks, which can thus propose energy efficiency loans to homeowners under market rates.

Energy Efficiency Revolving Funds

An energy efficiency revolving fund is a type of fund that is dedicated to scaling up energy efficiency investments using a revolving mechanism. A portion of the savings generated by supported investments is used to replenish in part the fund (i.e. revolved) allowing for reinvestment in future projects of similar value. This represents a promising support mechanism as it acts as an ongoing funding vehicle that helps drive more energy efficiency investments over time, while generating cost savings and ensuring capital is available for further projects. Energy Efficiency Revolving Funds may often be used to support investments in the public sector.

To ensure that this support mechanism delivers, sufficient funds must be deposited into the revolving fund. In addition, the rate of return of supported energy efficiency interventions must balance risks associated with this type of fund, which means that projects must be closely monitored in order to accurately calculate energy savings (and thereby rates of return).

Some examples of revolving funds identified in this study include:

- Energy Efficiency and Renewable Sources Fund in Bulgaria;
- Kredex Fund in Estonia;
- National Revolving Fund for Energy Saving in the Netherlands;
- SALIX scheme in the UK.

2.2.2 Loans with performance contract bill repayment model

Under an energy performance contract (EPC), an energy services company (ESCO) undertakes a project to deliver energy efficiency improvements in the premises of the client. It then partially or fully uses the stream of income from the cost savings to repay the costs of the project. Following the end of the contract all energy savings are transferred to the client.

There are two main types of energy performance contracts with different loan arrangements:

- 1** Guaranteed savings: The ESCO guarantees a certain level of energy savings and in this way shields the client from any performance risk. The loan goes on the client's balance sheet and the ESCO assumes full project performance risk
- 2** Shared savings: The savings are split in accordance with a pre-arranged percentage between the client and the ESCO, i.e. the loan goes on the ESCO's balance sheet. The ESCO finances the project and assumes debt obligation on balance sheet. The ESCO assumes both (partial) project performance and credit risks. There is no standard split of the share of the ESCO vs. the client, as it depends on the length of the contract, payback time and underlying risks taken.

ESCO projects³ can either be financed through internal funds of customers or ESCOs, or alternatively through third-party financing. While financing is not supposed to be part of the key ESCO activities, they may often provide or arrange for the financial terms of the project in the case of the shared savings EPC model. In the customer financing model, the ESCO does not participate in the financial solution of the project, but instead its role is restrained to the technical and managerial aspects. Project financing may also come from a third party, typically a financial institution, instead of internal funds of the ESCO or of the customer.

³ A large database of good practices on ESCO projects can be found here: <https://guarantee-project.eu/bestpractice/>

Table 3. Overview of energy performance contracts as a vehicle for financing energy efficiency investments

Strengths	Challenges
<ul style="list-style-type: none"> — Reduces or eliminates performance risk of energy efficiency measures — Eliminates need for internal technical expertise and packages all services in a single contract/source of accountability — Avoids upfront capital expenditure in case of shared model — Incentivises ESCOs to provide optimised and state-of-the-art solutions to maximise energy savings 	<ul style="list-style-type: none"> — Uncertainty of baseline measurement and ex-post measurement challenges — Difficulty to access finance by ESCOs who may become very indebted — Not suitable for small projects due to high transaction costs — Difficulty to promote ESCO models in markets which are not yet mature

2.2.3 Loans with on-tax repayment model

Property Assessed Clean Energy (PACE) is a means of financing energy renovations through the use of specific bonds offered by municipal governments to investors. The governments use the funds raised by these bonds to loan money towards energy renovations in residential or commercial buildings. The loans are repaid over the assigned term – typically 15 or 20 years – via an annual assessment on their property tax bill. The long repayment term attached to PACE programmes allows for investments with long payback times to be considered in the renovation. This additional tax assessment is placed on the property rather than the property owner which means that PACE assessments are also transferable. In other words, it is possible to recoup the investment upon sale thereby reducing the concern about investment recovery during sale transactions. PACE programmes are secured by a senior lien on the owner's property, which avoids repayment security to be attached to the borrower's creditworthiness and is therefore more attractive to financiers. The loan is attached to the property, so it can be transferred and paid off by the next owner.

PACE programmes are mainly implemented in the United States with a reported \$150 million in federal grant funds initially allocated (LBNL, 2011). Currently, there are 36 US states with PACE enabling legislation, 12 with active programmes and others in the process of programme development. It should be noted that PACE programmes were suspended in 2010 due to the fact that U.S. mortgage authorities Freddie Mac and Fannie Mae refused to finance mortgages with PACE liens. This occurred because PACE loans are generally assigned first lien status; that is, in cases of default, they are paid off to the municipality before the main mortgage is paid to the lender (Bird & Hernández, 2012).

Despite this issue, in the US there is still growing interest around the PACE mechanism. PACE financing is not yet available in the EU, however, pilot project, EuroPACE⁴ is testing the concept in Olot, a municipality in Catalunya. The EuroPACE project aims to adopt best practices from the US PACE market and enhance its impact in the European market.

⁴ <https://www.europace2020.eu/>

Table 4. Overview of On-Tax repayment schemes as a vehicle for financing energy efficiency investments

Strengths	Challenges
<ul style="list-style-type: none"> — Avoided upfront capital expenditure — Can be paid off over extended periods of time — Can be transferred to next owner if property is sold — Associated with lower probability of default than in standard loans due to reduced red tape for lenders in case of default (it is the tax collector who carries the burden) — Can be combined with technical assistance 	<ul style="list-style-type: none"> — Selling the property might be challenging if buyers don't want the loan — Effective only if national tax collection is well-structured and transparent. Not all countries collect property taxes in the way that is suitable for PACE

2.2.4 Loans with on-utility bill repayment model

On-bill financing is a mechanism that reduces upfront cost barriers by linking repayment of energy efficiency investments to the utility bill and thereby allowing customers to pay back part or all costs of energy efficiency investments over time. The funds can originate from utilities, the state or third parties. Savings made by energy efficiency investments under this mechanism can be higher than the cost to make the investment, ensuring the total post-renovation utility bill does not exceed the pre-renovation bill. They can be particularly useful for small businesses with limited capital to spend as well multi-family or rented properties where split incentive deter such investments. On-bill finance programmes can be categorised into: (1) on-bill loans and (2) on-bill tariffs. The main difference between the two is that on-bill loans must be paid off in case of ownership transfer while on-bill tariffs assign the obligation to the property, thus allowing for a transfer of the repayments to the next tenant or buyer.

Utility on-bill financing programmes, typically administrated by utilities, have been used in the U.S. for many years. The US experience shows that while on-bill financing can successfully overcome important barriers such as upfront cost and split incentives, there are still issues that need to be addressed such as the need to modify billing systems, role of utilities as financial institutions, risks of no payment, handling transfer of property, diversifying sources of capital, etc. In the European context, the first on-bill financing scheme was implemented in the UK in 2013 with the introduction of the Green Deal, which enabled owners and occupants to install EE improvements at no up-front cost. The scheme initially gained momentum before it was effectively ended due a number of key barriers including uncompetitive interest rates in comparison with general home improvement loans or traditional commercial bank loans.

Loan guarantees and risk sharing arrangements

Guarantees can provide a valuable solution in cases where financial intermediaries (lenders) are reluctant to fund energy efficiency projects due to high perceived risks. There are different types of guarantee mechanisms, such as loan guarantees and risk sharing arrangements.

In broad terms, a loan guarantee is a security provided by a government or public institution (guarantor) with a reputable credit to ensure loan repayments in case of borrowers' defaults. By providing financial guarantees to enhance project creditworthiness, guaranteed loans can boost energy efficiency while at the same time reduce tax deductible interest payments, creating more taxable income for governments. Loans supported by a guarantee mechanism can often be designed to have lower than market value interest rates and more favourable terms such as lower collateral arrangements.

Guarantees can be designed to partially transfer the default risk of an individual loan or portfolio of loans to the guarantor, covering the principal amount and/or interest. This can be done for instance in a *pari-passu* arrangement where a predefined share of losses and participation in recoveries of losses is done on an equal footing basis with the lender. Alternatively, guarantees can be designed on a *first-loss* basis, where losses are first attributed to the guarantor up to a pre-determined level or *second-loss* basis where the guarantor commits to cover only a second tranche of losses.

The risk sharing facility (RSF) of the European Investment Bank (EIB) is an example of a guarantee scheme where a bilateral loss-sharing agreement has been made with financial institutions under which the EIB reimburses financial institutions for a portion of principal losses incurred on a portfolio of SME loans (typically up to a maximum of 50%). The Private Finance For Energy Efficiency (PF4EE) instrument (LIFE programme) is a joint agreement between the EIB and the European Commission which aims to address the limited access to adequate and affordable commercial financing for energy efficiency investments. The PF4EE instrument provides:

- 1.a portfolio-based credit risk protection provided by means of cash-collateral (Risk Sharing Facility), together with
- 2.long-term financing from the EIB (EIB Loan for Energy Efficiency) and
- 3.expert support services for the Financial Intermediaries (Expert Support Facility)

Other examples of energy efficiency guarantee schemes identified in this study include:

- Belfius housing retrofit programme in Belgium
- National Energy Efficiency Programme for renovation of multifamily residential buildings in Bulgaria
- Thermal rehabilitation of residential buildings financed by bank loans with government guarantees in Romania
- Kredex Fund in Estonia

Table 5. Overview of On-Utility Bill repayment schemes as a vehicle for financing energy efficiency investments

Strengths	Challenges
<ul style="list-style-type: none"> — Avoided upfront capital expenditure — Ease of repayment linked to bill neutrality concept — Access to finance for customers who are not able to qualify for traditional financing options — Can be transferred to the next owner 	<ul style="list-style-type: none"> — Challenging design elements such as modification of billing systems, role of utilities as financial institutions, risks of no payment, handling transfer of property, diversification sources of capital — Difficulties in assessing credit risk of customers through their historical payments — Customer risk of power shut-off or repayment issues when customers partially pay their bills

2.3 Fiscal instruments

Tax incentives can increase demand for energy efficiency projects by reducing the cost of the energy efficiency improvement through reduced taxes for households and businesses. They can be less costly than grant schemes and are considered a popular instrument promoting energy efficiency in certain EU countries. They may work well alongside a taxation scheme, whereby the tax loss attributed to the tax incentive scheme is offset by revenues from taxation for energy intensive industries. They are effective if the tax collection rate is sufficiently high and can be useful at promoting new technologies that lack profitability at current stage. They can take various forms, such as accelerated depreciation, tax exemptions, income tax or VAT reduction (Table 6). As in the case of grant schemes, tax incentives are susceptible to free ridership issues and therefore careful design of this policy is needed.

Table 6. Types of tax incentives (Hilke & Ryan, 2012)

Tax deduction	Eligible investment costs relating to energy efficiency measures can be deducted (fully or in part) from income or revenues liable to taxation
Tax credit	Similar to tax deductions but investment costs are deducted (fully or in part) from respective taxes due to be paid
Tax reduction	Purchase taxes or sales taxes are reduced for qualifying equipment or services, e.g. reduced value added taxes for insulation material and installation services. This is either done directly at the point of sale (tax reductions) or applications for tax refund must be filed after the purchase (tax rebates);
Accelerated depreciation	It allows purchasers to depreciate the costs of their energy efficiency investments more rapidly than standard investments, thus effectively reducing the after tax total cost of the equipment;
Tax or customs duty exemptions	They relieve purchasers from paying customs duties or import taxes on qualifying imported equipment or excise tax on consumption or purchase of specified products, e.g. highly efficient appliances.

2.3.1 Income tax credits/deductions

Income tax credits or deductions form the most common type of tax incentive scheme across the EU. Tax schemes directed towards energy renovations of buildings are currently favoured in Belgium, Denmark, Netherlands, France, Italy and Greece. The schemes are often designed with a specific technology focus, which mean that they are designed to stimulate investments in specific technologies/measures rather than set overall energy performance criteria. An exception is the Italian tax credit scheme which offers the option of a comprehensive retrofit package in addition to their list of individual measures. France, in its recently enacted law on Energy Transition for Green Growth (2015) has announced rebates for home renovations, whereby taxpayers will receive a tax credit corresponding to 30% of renovation costs incurred to make their homes more energy efficient. In the Netherlands, the Dutch Energy Allowance investment scheme offers innovators a stimulus to develop new technologies that have a better energy efficiency performance than reference technologies. By allowing for frequent updates of the eligible measure list, the schemes can facilitate the market introduction phase of new technologies. Selected schemes are described in more detail below, as they can provide examples of how to effectively design a potential tax incentive scheme in case this type of instrument is to be considered in the future by the Cypriot authorities. While tax incentives can be expensive due to reduced government income as a result of lowered collected tax, these should be considered in conjunction with new tax revenues as a

direct impact of the scheme. The latter has been possible in the case of the French and Italian schemes.

Table 7. Overview of tax incentive schemes as a vehicle for financing energy efficiency investments

Strengths	Challenges
<ul style="list-style-type: none"> — Can work well if the tax collection rate is sufficiently high — Can be useful at promoting new technologies that lack profitability at current stage — In certain cases, they can increase tax revenues to the government 	<ul style="list-style-type: none"> — Usually have a poor performance in an economy in recession or in transition — Less effective if tax evasion is easy high or tax collection rates are low — Can be subject to the problem of the “free rider” — Tax savings to households and businesses typically mean reduced tax revenue to the government

2.3.2 Property taxation

Incorporating the building energy class in the evaluation of property tax, which currently mostly depends on the real estate value of the building, can give an incentive to property owners to invest in energy saving measures in order to reduce their tax burden. For instance the property tax could be modified as to reflect the current efficiency standard of a building; the better the standard the lower the tax. The adjustment can be revenue-neutral —i.e. tax levels are increased for inefficient buildings and decreased for efficient ones— or revenue-generating where taxes are increased for inefficient buildings only (Bürger, 2013). The generated revenue of the latter could feed a public support fund which would provide incentives to groups with low creditworthiness or limited capital to invest (e.g. low income households or SMEs). A careful design modification of current property tax system to incorporate the efficiency level of the building into property tax paid by owners can incentive property owners of very inefficient buildings to invest in energy efficiency upgrades in order to reduce their tax burden rate. As in the case of other types of fiscal instruments, success highly depends on the effectiveness of tax collection mechanism.

Table 8. Overview of property taxation schemes as a vehicle for financing energy efficiency investments

Strengths	Challenges
<ul style="list-style-type: none"> — Incentives to homeowners to reduce tax burden — Can work well if the tax collection rate is sufficiently high 	<ul style="list-style-type: none"> — Less effective if tax evasion is easy high or tax collection rates are low — Can result to loss of tax revenue for government — May not be sufficient to incentive homeowners — May have an adverse effect on poor/vulnerable households

2.3.3 Value Added Tax (VAT) reduction

VAT reduction schemes on energy efficiency offer lower VAT rates for the purchase and/or installation of various energy efficiency intervention measures, ranging from thermal insulation materials to heat pumps and biomass boilers. These schemes are diffused in a few EU countries such as Belgium, France and Netherlands, with reduced VAT rate being as low as 5% in certain cases. Governments can generally use this type of scheme to lower VAT rates for either the purchase or installation costs of energy efficiency products and materials as well as renewable energy technologies. They aim to influence the choice made by consumers and have the advantage of being directly perceived by the consumer at the point of purchase. However, there often fail to promote comprehensive energy efficiency upgrades at building level and the total amount of the reduction is limited by the amount of tax applicable to the product.

Table 9. Overview of VAT reduction schemes as a vehicle for financing energy efficiency investments

Strengths	Challenges
<ul style="list-style-type: none"> — VAT reduction mechanism enables immediate reduction in investment costs — VAT reduction can be cumulated with the tax reduction and/or the subsidies for energy efficiency investments 	<ul style="list-style-type: none"> — May be less effective at promoting comprehensive energy efficiency upgrades at building level

2.4 Other instruments and supporting mechanisms

2.4.1 Energy Efficiency Obligation Schemes

Energy Efficiency Obligations (EEOs) are a market-based instrument enacted by governments in order to stimulate energy efficiency investments through obligations placed on energy companies. Under an Energy Efficiency Obligation scheme, energy distributors or retail energy sales companies are required to achieve a certain amount of energy savings in a pre-defined time. For example, the Energy Efficiency Directive requires Member States to establish energy efficiency obligations, mandating energy companies to achieve yearly energy savings of 1.5% of annual sales to final consumers. Once implemented, energy efficiency obligations have the advantage of boosting the market for energy efficiency investments by stimulating the development of new business models such as ESCOs. Whilst energy companies may choose to deliver their savings in various sectors of the economy such as industry, residential and commercial customers may also be targeted in energy efficiency obligation schemes through specific interventions in buildings. Following the introduction of the Energy Efficiency Directive in 2012 the number of EEOs in Europe has grown from 5 schemes (prior to the implementation of the EED) to 16 EEOs (Rosenow and Bayer, 2017; Tsemekidi-Tzeiranaki *et al.*, 2019).

2.4.2 Energy Efficiency Feed In Tariffs

Feed-in Tariffs can be another relevant type of market-based instrument introduced by governments to promote the use of specific technologies. Energy efficiency feed-in tariffs (EE FITs) represent an innovative instrument inspired from the concept of Feed in Tariffs for small-scale renewable and low-carbon electricity generation technologies. In the case of energy efficiency, consumers are encouraged to reduce their energy use through a reward-based system. The exact price for a kWh of energy saved is indicated and the market is allowed to determine the quantity of energy savings to be delivered. One of the limits of this instrument is the set-up of the price of energy savings and associated risk of a fixed price system favouring cheap energy efficiency interventions (Eyre, 2013). As EE FITs are a new concept, there are no practical examples from which experiences can be drawn.

2.4.3 One-Stop Shops (OSSs)

The revised Energy Performance in Buildings Directive (EU) 2018/844 introduces the concept of one-stop-shops. With the establishment of long-term renovation strategies (Article 2a of Directive (EU) 2018/844), Member States are called to consider advisory tools such as one-stop-shops to inform and assist consumers in relation to energy efficiency renovations and relevant financial instruments. Article 20(2) also requires Member States to provide information to owners and tenants through accessible and transparent advisory tools such as one-stop-shops.

One-stop-shops (OSSs) can be defined as advisory tools that facilitate access to financial mechanisms, assist consumers in relation to technical and financial issues and guide them through a number of key stages in the renovation process. OSSs are transparent and accessible advisory tools from the client perspective and new, innovative business models from the supplier perspective (Boza-Kiss and Bertoldi, 2018).

Assistance through OSSs can help address a number of barriers, such as the difficulty in accessing financial incentives, fragmentations of energy efficiency interventions, high transaction costs due to small individual investments, insufficient understanding of complex energy efficiency interventions, lack of reliable and credible information about costs and benefits.

Homeowners are often engaged in simple or routine works, such as replacement of appliances, or modernisation projects that are geared towards enhanced comfort or aesthetics levels. OSSs promote integrated energy renovation solutions (that is, full

home renovation, which address energy efficiency in a holistic way) wherever possible. They represent a building-related service that facilitates a dialogue between building users/owners and suppliers in order to identify solutions throughout all stages of the renovation process. The role of OSSs can be thus defined as an intermediary point of contact.

From a practical point of view, OSSs can help clients in selecting appropriate contractors and suppliers, taking into account their previous experiences. OSSs often guarantee the quality of the service, and have a few basic packages tailored to specific cases. These cover detailed information about what each renovation package entails, including possible interventions, solutions and benefits. At the same time, from the supplier's point of view (planners, engineers, installers, manufacturers, financial partners), OSSs help the provider to simplify interactions with single private clients, as OSSs guide clients through visits, decision-making processes and other cumbersome processes.

OSSs overcome market fragmentation on both the demand side and the supply side by offering holistic, whole-value-chain renovation solutions (Boza-Kiss and Bertoldi, 2019).

The OSS service providers usually are organisations, projects, and independent experts or advisors that deal with technical assistance, structuring and provision of financial support, helping the client to apply for public funding. OSSs target residential buildings, mostly within the private stock. In Europe, several examples of OSSs have been identified in Nordic countries, France and Benelux countries (Boza-Kiss and Bertoldi, 2018). Some notable examples of OSSs include the Rhodoshop Programme Development Unit in Bulgaria, the Småland-Blekinge pilot OSS in Sweden, the Ile-de-France Energies⁵ for residential buildings in France and the Energy Investment Unit at Cambridgeshire County Council for public buildings in the UK⁶. The EU programme Horizon 2020 supports establishment of OSSs, recognising their value to mobilise energy efficiency finance.

2.4.4 Technical assistance

The European Commission has set up a series of facilities funding Project Development Assistance (PDA) to support public authorities and bodies in developing bankable sustainable energy projects.

The European Local Energy Assistance (ELENA) facility, a joint initiative by the EIB and the European Commission under the Horizon 2020 programme, provides grants for technical assistance on the implementation of energy efficiency, distributed renewable energy and urban transport programmes. Established in 2009, the ELENA facility has awarded more than EUR 130 million of EU support triggering an estimated investment of around EUR 5 000 million on the ground. ELENA supports programmes above EUR 30 million with a three-year implementation period for energy efficiency and four-year for urban transport and mobility. It can cover up to 90% of technical assistance/project development costs. The main objective of ELENA is to help private individuals and homeowner associations prepare and implement energy renovations in private and public residential buildings. A number of recent successful projects include:

— Central Denmark Energy Planning and Investment (2014-2017). The creation of a project department (support unit) assisted by external consultants for specific assignments, which supported 11 municipalities and the Region itself in preparing the planned investment programme. This included building refurbishment (building shell improvements, upgrade of energy building equipment's) for 100 buildings. The ELENA co-financing was EUR 2.31 million (the total Project Development Services (PDS) cost is EUR 2.567 million) and the investment mobilized EUR 57.8 million.

⁵ <https://www.iledefranceenergies.fr/>

⁶ <https://www.mlei.co.uk/>

— “Picardie Pass Rénovation” (2013-2018) in France. Under the programme, individual and collective homeowners visited a newly-created public service company for energy efficiency to get advice, an energy audit, recommendations for renovation measures and help with long-term financing for the work – all in one office. The ELENA grant was used to develop the public service company that oversaw the work and assisted residents with each step of their renovation projects. In addition, the EIB provided a loan to help finance the housing renovation measures. The ELENA co-financing is EUR 1.7 million and the investment mobilized EUR 33.4 million.

—Embracing efficiency in Ljubljana (2013-2016) in Slovenia. ELENA programme stepped in to help plan the budget for upgrades and schedule renovation measures for 70 public buildings, including schools, libraries and health centres. It included new insulation, energy-efficient windows, the replacement of boilers, cooling and heating system retrofits, and the installation of small-scale renewable energy systems.

Project Development Assistance (PDA) was also included in the Intelligent Energy Europe programme (IEE) and now through Horizon 2020 Energy Efficiency for smaller-scale projects than ELENA. Launched in 2011, the aim of PDA is to support ambitious public authorities –regions, cities, municipalities or groupings of those– and public bodies in developing bankable sustainable energy projects. Under PDA, 28 projects across Europe were funded triggering EUR 600 million investments (every million Euro of H2020 support should trigger investments worth at least EUR 15 million). PDA projects focus on energy efficiency investments in existing public and private buildings, street lighting, retrofitting of existing district heating and/or cooling, urban transport, and industry and services (size of investment portfolio: EUR 7.5-50 million). Some notable examples include:

— SUNSHINE (2015) in Latvia (LV), which finances and implements deep energy renovations of 80 multi-family buildings through Energy Performance Contracting (EPC) with dedicated platform to build capacity in ESCO market Latvia (EUR 29.4 million investments);

— EnerSHIFT (2016) in Province of Genoa (IT), focusing on deep retrofits of social housing buildings of four social housing operators in the Region of Liguria based on EPC (EUR 14.6 million investments);

— LEMON (2016) in Provinces of Reggio Emilia and Parma (IT), which aims to prepare energy retrofitting investments of social housing buildings using EPCs (EUR 15.3 million investments).

The IEE programme also supports 22 Mobilising Local Energy Investment (MLEI) projects in 12 Member States with an investment volume of EUR 487 million. These projects concern:

— Bundling/EPC projects: i.e. Paride (IT), Accelerate (ES), ENSAMB (NO), BEAM-GRAZ (AT), GLEE AM (PT), MARTE (IT), 2020TOGETHER (IT);

— Investment funds, citizen financing: i.e. L-CIF (UK), OTR (UK);

— District heating: i.e. BOWEN (NL), Energy4flexibility (NL), HUKMREG2012 (HU), Efidistrict (ES);

— Public ESCO schemes: i.e. POSIT'IF (FR), ESCOLIMBURG (BE), ESCOSC (NL);

— Other: i.e. Solrod (Biogas, DK), ZagEE (municipal buildings, HR), SOLANOVA (condominiums, HU).

The report also examines how **energy efficiency mortgages, crowdfunding platforms** and **energy efficient insurance** models can support energy renovations. These instruments are discussed in Chapter 4.

3 Overview of public schemes in EU Member States

Table 10 provides an EU28 overview of the main public financial and fiscal instruments supporting energy renovations in buildings. Many countries have chosen to deploy a combination of different instruments, each tailored to address different barriers, specific segments and recipient groups within the building sector.

Financial support is predominantly offered in the form of **grants/subsidies**, followed by loans and tax incentives. Grants and subsidies is a type of instrument deployed in all Member States. This is a particularly popular instrument in Austria, Croatia, Ireland, Cyprus, Estonia, Latvia, Greece, and Poland. Grants and subsidies represent the main type of public support for energy renovations in buildings in these countries. **Loans and soft loans** are available in over half of the EU countries, namely Austria, Belgium, Bulgaria, Czech Republic, Estonia, France, Germany, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, Portugal, Romania, Slovakia, Slovenia, Spain and the UK. Some of these schemes are supported by state guarantees such as in Bulgaria, Estonia, France, Italy and Romania. In addition, several of these schemes have been designed as revolving funds. Examples include the Energy Efficiency and Renewable Sources Fund in Bulgaria, the Kredex Fund in Estonia, the National Revolving Fund for Energy Savings in the Netherlands and the SALIX scheme in the UK. **Tax incentives** have been found to be active in Belgium, Denmark, Finland, France, Italy, Malta, Sweden, the Netherlands and the UK. These are typically offered in the form of income tax incentives (e.g. Belgium, France and Italy) or VAT reduction schemes such as in Belgium, France and the Netherlands.

France, Belgium, Italy and Portugal have enacted all types of instruments for **all types of buildings** covered in our study: residential, commercial and public. For all other countries, the main focus is the residential sector, with some instruments also targeting commercial buildings and/or public buildings or a different combination of building types. In Finland, Ireland, Estonia, and Romania, public support is given for residential buildings only. Many of the instruments examined herein have been designed to work together with other instruments or be part of a policy package. Energy Efficiency Obligation Schemes (EEOs) have been used for years in Denmark, Belgium, France, Italy, and United Kingdom and more recently in compliance with Article 7 of the Energy Efficiency Directive 2012/27/EU in many other countries. In Denmark, France, Luxembourg, Poland and the UK, these schemes, inter-alia, cover energy efficiency upgrades in buildings.

Figure 2 provides a snapshot of all public financial and fiscal instruments in this study. In summary, there are 129 instruments supporting energy renovations in buildings across the EU, 61% of which are grants/subsidies, 19% loans/soft loans, 10% tax incentives and the remaining 10% a combination of the above. Our results show that around **EUR 15 billion** are roughly spent by public resources on an annual basis across the EU⁷. This analysis is based on budget-related information collected for 85% of instruments covered in our study. The findings of this study showed that the largest schemes in terms of public resources spent are the Italian Eco-bonus tax rebate scheme, the French Energy Transition Tax Credit scheme, the German KfW Energy Efficient Refurbishment Programme and the Austrian Regional subsidies for energy efficiency in residential buildings.

⁷ It is important to note that these figures do not refer to any specific period, but rather represent a generic year during the duration of the given scheme. Depending on data availability for each scheme, this was taken as the average value over a specified period (preferred option) or the value given for a specific year or a typical year on average (alternative option).

Table 10. Overview of main public instruments identified in this study that support energy renovations of residential, tertiary and public buildings in EU Member States

Member State	Sectors covered	Measure Type			Number of measures	Notable Examples
		Grants/Subsidies	Loans/Soft Loans	Tax Exemption/Reduction		
AUSTRIA (AT)	Residential				4	1) Residential building subsidy ("Wohnbauförderung") 2) Austrian Federal Government's Renovation Drive ("Sanierungsscheck")
	Commercial				2	
	Public				2	
BELGIUM (BE)	Residential				11	1) Green loans for energy efficiency investments by households (Brussels) 2) Property Tax Reduction (Flanders) 3) Financial incentives for RUE investments in buildings (Wallonia)
	Commercial				4	
	Public				4	
BULGARIA (BG)	Residential				4	1) National Energy Efficiency Program for Multifamily Residential Buildings renovation 2) Residential Energy Efficiency Credit Line REECL
	Commercial				2	
	Public				1	
CROATIA (HR)	Residential				3	1) Programme of energy renovation of commercial non-residential buildings 2014-2020 (B.4) 2) Programme of energy renovation of multifamily housing
	Commercial				1	
	Public				1	
CYPRUS (CY)	Residential				3	1) Grant scheme "Save & Upgrade" for residential sector
	Commercial				1	
	Public					
CZECH REPUBLIC (CZ)	Residential				5	1) Operational Programme Environment (2014-2020): Sustainable Use of Energy Sources 2) New Green Savings Programme 2014-2020
	Commercial				4	
	Public				2	
DENMARK (DK)	Residential				2	1) Green BoligJobordning household employment scheme
	Commercial				1	
	Public				1	
ESTONIA (EE)	Residential				1	1) Reconstruction of private residences and apartment buildings
	Commercial					
	Public					
FINLAND (FI)	Residential				2	1) Energy Grants for Residential Buildings/Housing Finance and Development Centre of Finland
	Commercial					
	Public					
FRANCE (FR)	Residential				6	1) Energy Transition Tax Credit (CITE) 2) Social Housing eco-loan 3) Energy Saving Certificates
	Commercial				3	
	Public				4	
GERMANY (DE)	Residential				4	1) CO2-Gebäudesanierungsprogramm 2) Market Incentive Programme for Renewable Energies (MAP) 4) Energy Incentive Programme (APEE)
	Commercial				4	
	Public				4	
GREECE (EL)	Residential				1	1) "Saving at home" Programme 2) Energy savings in Local Self-Governments
	Commercial					
	Public				1	
HUNGARY (HU)	Residential				4	1) Warmth at Home Programme (WAH) (funded from carbon credits) 2) Energy Efficiency subsidies for public and local governmental buildings
	Commercial				1	
	Public				2	
IRELAND (IE)	Residential				5	1) Better Energy Homes (Residential Retrofit) 2) Warmer Homes Scheme (Low Income Housing Programme)
	Commercial					
	Public					

Table 10. Continued...

Member State	Sectors covered	Measure Type			Number of measures	Notable Examples
		Grants/ Subsidies	Loans/ Soft Loans	Tax Exemption/ Reduction		
ITALY (IT)	Residential				5	1) Ecobonus 2017 tax deduction scheme 2) Renewable Energy for Heating and Cooling and Small Interventions Increasing Energy Efficiency Support Scheme (Conto Termico 2.0)
	Commercial				3	
	Public				4	
LATVIA (LV)	Residential				2	1) Energy efficiency improvement in residential buildings 2) Energy efficiency improvement in public buildings 3) Energy efficiency in manufacturing industry
	Commercial				2	
	Public				4	
LITHUANIA (LT)	Residential				3	1) Programme for the renovation/upgrading of multi-apartment buildings 2) Programme for Improving Energy Efficiency in Public Buildings
	Commercial				2	
	Public				1	
LUXEMBOURG (LU)	Residential				4	1) Promotion of energy renovation of residential buildings 2) Klimabank loans
	Commercial				1	
	Public				1	
MALTA (MT)	Residential				1	1) Financing Schemes and instruments and fiscal incentives
	Commercial					
	Public					
NETHERLANDS (NL)	Residential				5	1) Subsidy schemes (IRE, MEI, UKR, Clean and Efficient Demonstration Projects) 2) Energy Investment Allowance (EIA)
	Commercial				3	
	Public					
POLAND (PL)	Residential				3	1) Subsidised loans for the construction of energy efficient houses 2) Operational Programme Infrastructure and Environment 2014-2020
	Commercial					
	Public				1	
PORTUGAL (PT)	Residential				6	1) Energy Efficiency National Fund 2) 1 Direito
	Commercial				3	
	Public				3	
ROMANIA (RO)	Residential				2	1) National Programme for Improvement of Energy Performance in Apartment Blocks
	Commercial					
	Public					
SLOVAKIA (SK)	Residential				7	1) State Housing Development Fund 2) SlovSEFF II and III (for renovation of multifamily buildings)
	Commercial				1	
	Public				1	
SLOVENIA (SI)	Residential				3	1) Financial incentives for energy-efficient renovation and sustainable construction of residential buildings 2) Financial incentives for the energy efficient heating systems in residential and Commercial buildings
	Commercial				2	
	Public				1	
SPAIN (ES)	Residential				3	1) PAREER programme 2) PIMA SOL programme
	Commercial				1	
	Public				2	
SWEDEN (SE)	Residential				2	1) EU financial support for energy efficiency in buildings 2) Aid for improvement and increases in energy efficiency of rental accommodation
	Commercial				1	
	Public				1	
UNITED KINGDOM (UK)	Residential				7	1) Energy Efficiency Loan Scheme (SALIX) 2) Energy Company Obligation (ECO)
	Commercial				1	
	Public				1	

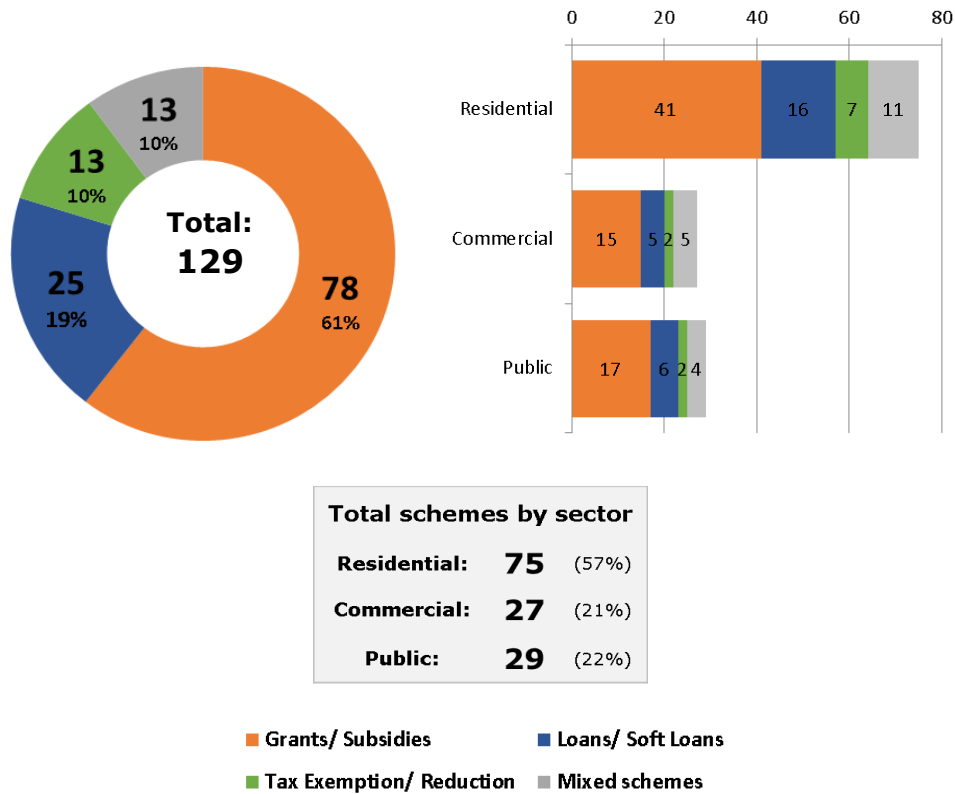


Figure 2. Snapshot of financial instruments supporting energy renovations in buildings across the EU

Our findings are in line with data stemming from other reports. Blom, Vergeer and Forster (2018) confirmed around 16 billion per year for net public costs committed in public schemes (i.e. grants/subsidies, tax rebate, debt finance) —considering all sectors (not only residential, commercial and public). Historical data showed that public funding for energy efficiency in the EU grew from 6 billion in 2012 —when the Energy Efficiency Directive (2012/27/EU) was approved— to about 7 billion in 2014 (Maio, Zinetti and Janssen, 2012).

While private investments are not included in these figures, achieving the goals set out by the EU in 2030 would require significantly higher levels of funding. The IEA estimates that 60-100 billion of annual investment is needed in buildings to achieve Europe’s 2020 energy efficiency targets alone (considering both public and private funds) (IEA, 2017). Looking out to 2040, the IEA estimates showed that an average of 178 billion needs to be invested annually to keep the EU on track to the well below 2°C goal (Amon and Holmes, 2016).

The main instruments identified in each country are summarised below. Multiple sources were used to collect the latest information about financial support for energy renovations in buildings: the latest National Energy Efficiency Action Plans submitted in 2017 by Member States in accordance with Article 24 of Directive 2012/27/EU, the long-term renovation strategies submitted in 2017 by Member States to comply with the requirements of Article 4 of the same Directive and the new draft Energy and Climate Plans submitted in 2018 by Member States in the framework of the Energy Union Governance Regulation. Databases such as the MURE database on energy efficiency policies and Energy Efficiency Database of the International Energy Agency were also consulted.

In the rest of Chapter 3, a country-by-country summary of public financial and fiscal instruments is given, presenting the following information for each instrument identified:

- name of measure;
- policy type;
- targeted sector(s) and actor(s);
- implementation period and implementation body;
- website;
- renovation depth and supported interventions;
- budget;
- brief description;
- impact.

3.1 Austria (AT)

Name of measure	Regional subsidies for energy efficiency in residential buildings ("Wohnbauförderung")
Policy type	Grants/Annuity grants/Soft loans
Targeted sector(s)	Residential
Targeted actor(s)	Housing associations, landlords, owner-occupiers
Implementation period	Since 1969
Implementation body	Provincial government ("Länder")
Website	https://www.help.gv.at/Portal.Node/hlpd/public/content/21/Seite.210301.html
Renovation depth	<i>High</i>
Supported interventions	Thermal insulation of windows, outer walls, roofs and ceilings; Connection to the district heating, installation of central heating systems, solar thermal plants, heat pumps, biomass heating systems, allowances.
Budget	EUR 2 100 million in 2018 whereof EUR 490 million for renovation
Brief description	Subsidy models differ from province to province. Subsidies are provided in the form of grants, annuity grants, soft loans and allowances. The level of subsidy is dependent on the thermal quality achieved or efficiency of the heating system. Most provinces use point systems.
Impact so far	In 2017, 14 000 cases of deep renovation have been subsidized. Total reduction of CO ₂ eq-emissions through the housing subsidy scheme of the "Länder" was about 160 000 to 500 000 tons per year in the last decade.

Name of measure	Austrian Federal Government's Renovation Grant ("Sanierungsscheck")
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Owners, leaseholders or tenants; enterprises
Implementation period	Since 2009
Implementation body	Austrian Ministry for Sustainability and Tourism (BMNT), Austrian Federal Government
Website	www.umweltfoerderung.at
Renovation depth	<i>Medium</i>
Supported interventions	Insulation of external walls and top-floor ceilings, replacement of windows, replacement of fossil fuel heating systems with renewable heating systems, etc.
Budget	EUR 36.2 million in 2018: EUR 25.8 million for private dwellings and EUR 10.4 million for enterprises
Brief description	The "Sanierungsscheck" offers subsidies to companies and private individuals in the form of one-off, non-repayable grants. For private individuals, subsidies support thermal renovations in residential buildings which are more than 20 years old. These can be accessed by (joint) owners, leaseholders or tenants of detached or semi-detached houses or owners/tenants of apartments in multi-storey residential buildings. The subsidy amounts to up to 30% of eligible costs, with a ceiling of EUR 6 000 in detached houses and up to EUR 3 000 per apartment in multi-storey residential buildings. For enterprises, measures for improving the thermal protection of buildings used for business purposes which are more than 20 years old are supported. The level of the payments is based on the renovation depth and level of decrease in heat energy demand. Similar support is provided for enterprises. The percentage of subsidized cost depends on the scale of renovation and on the decrease in heating and energy demand.
Impact so far	In 2018, the "Sanierungsscheck" of 36.2 million was granted to 5 782 private individuals and 180 enterprises, leading to a total investment volume of approx. 283 million. The projects will lead to annual energy

	savings of approx. 111 000 MWh and to annual CO ₂ -reductions of approx. 35 300 tons. (https://www.bmnt.gv.at/umwelt/klimaschutz/ufi/ufi.html)
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Name of measure	klimaaktiv Programme
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Central Government, Energy Agencies, Energy Suppliers, Prof. Associations
Implementation period	Since 2004
Implementation body	Austrian Ministry for Sustainability and Tourism (BMNT), Austrian Federal Government; Austrian Energy Agency
Website	http://www.klimaaktiv.at
Renovation depth	<i>Medium</i>
Supported interventions	Modernisation interventions in large residential buildings, energy use optimisation measures for companies, energy performance contracting in federal buildings, energy-efficient appliances
Budget	Approximately EUR 7 million per year.
Brief description	klimaaktiv is the Austrian climate protection initiative to support energy efficiency improvements and increased use of renewables in all sectors of the economy through direct grant support, information, education, training of professionals and advice. Under the four thematic headings of Building and Renovation, Saving Energy, Renewable Energy and Mobility, klimaaktiv outlines new solutions, sets quality standards and increases the knowledge and competence of the players involved. The primary objective of klimaaktiv is to introduce and promote climate friendly technologies and services.
Impact so far	n/a

Name of measure	THEWOSAN (Thermal and energy renovation)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Owners
Implementation period	(Implemented)
Implementation body	LIFE – Centre for Climate, Energy and Society
Website	https://pocacito.eu/marketplace/thewosan-%E2%80%93-funding-scheme-buildings https://www.joanneum.at/en/life/ www.wien.gv.at/stadtentwicklung/energieplanung/foerderungen/wbf.html
Renovation depth	n/a
Supported interventions	Insulation of building envelope, elimination of thermal bridges, passive-solar energy gains, installation of more energy efficient or renewable energy heating and hot water systems.
Budget	
Brief description	THEWOSAN is Vienna´s programme and funding scheme for thermal and energy renovation of existing residential buildings. Subsidies are provided in the form of a non-repayable contribution in the amount of EUR 25 to EUR 160 per m ² of floor area depending on the energy efficiency level achieved, and of an additional EUR 60 per m ² of floor area if the passive house standard is achieved. The maximum amount of the non-repayable contribution is limited to 30 % of the total building costs.
Impact so far	More than 88 300 flats have been renovated by 2011. The reduction of the heating energy demand is on average about 960 GWh per year. The linked CO ₂ emission reductions over the whole period are nearly 147 989 tonnes.

3.2 Belgium (BE)

Name of measure	Tax deduction for roof insulation (Federal level)
Policy type	Tax relief
Targeted sector(s)	Residential
Targeted actor(s)	General public, landlords, owner-occupiers
Implementation period	Since 2004
Implementation body	Federal Public Service of Finance
Website	n/a
Renovation depth	Low
Supported interventions	Roof insulation
Budget	
Brief description	This tax deduction mechanism has been transferred to the Regions since 1 st January 2015. Federal tax incentives for energy efficiency improvements in buildings were abolished in 2012, except for roof insulation measures. The tax deduction for roof insulation accounts for 30% of the real expenses. This tax deduction mechanism was transferred to the Regions in 2015. The Brussels-Capital Region has abolished the roof insulation tax reduction in 2017. The Flemish Region has also abolished this tax reduction.
Impact so far	n/a

Name of measure	Energy bonus (Brussels Region)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	n/a
Implementation period	Since 2004
Implementation body	Bruxelles Environnement (Brussels Capital Region Ministry of Environment)
Website	http://www.environnement.brussels/thematiques/energie/primes-et-incidentants
Renovation depth	n/a
Supported interventions	Renewable energy facilities, CHP, district heating, energy audit, insulation, super-insulating glazing, high-performance boilers, green rooftops or façades, ventilation, energy efficient appliances.
Budget	As of 2004, more than 150 000 subsidies have been offered, equivalent to EUR 120.21 million between 2004 and 2013 (more than EUR 23.15 million per year from 2013).
Brief description	Since 2004, Brussels-Capital Region offers to individuals and businesses a set of 'energy' subsidies for renovation projects or for energy efficient appliances. Specific aid is given for new construction to the passive standard (heating demand <15 kWh/m ² yr) and refurbishment to very low energy levels (i.e. audits and insulation, ventilation and heating works). Social criteria have been introduced to favour low-income households. The energy subsidy system is financed by a levy on gas and electricity consumers. Thanks to the integrated air-climate-energy plan, the system of 'energy' premiums is reinforced.
Impact so far	n/a

Name of measure	Brussels Green loans "Le Prêt Vert Bruxellois" (Brussels Region)
Policy type	Loans/Others
Targeted sector(s)	Residential
Targeted actor(s)	General public
Implementation period	Since 2008
Implementation body	Local government
Website	https://www.credal.be/credit/prevertbruxellois
Renovation depth	Medium

Supported interventions	Insulation, ventilation and high-performance heating systems
Budget	n/a
Brief description	The Brussels Green loan scheme is a loan at an interest rate of 0% to 2% offered to households in Brussels with limited income who have difficulty in accessing the traditional banking system to finance investments relating to the rational use of energy. The households participating in the scheme can benefit from information and advice before, during and after the completion of the works. This loan product has been developed through a partnership between the Region, the alternative credit union CREDAL and the Housing Fund. It also includes "budget management guidance" for low income and poorly educated persons.
Impact so far	n/a

Name of measure	UREBA Subsidies to Improve Energy Efficiency of Public Buildings (Wallonia Region)
Policy type	Grants/Subsidies
Targeted sector(s)	Public
Targeted actor(s)	n/a
Implementation period	Since 2000
Implementation body	Public Service of Wallonia - DGO4 - Department of Energy and Sustainable Building
Website	https://energie.wallonie.be/fr/amelioration-de-la-performance-energetique-des-batiments.html?IDC=8969&IDD=83066
Renovation depth	n/a
Supported interventions	Energy management system, investment feasibility studies, building envelope, systems.
Budget	EUR 4 million in 2016
Brief description	Subsidies for Rational Use of Energy are made available for investments in public buildings, ranging from energy audits, energy management systems, investment feasibility studies, to investments in building shell, elements or systems. The subsidy ratio varies according to the type of public building, and type of RUE action. Besides regular annual call for projects, there are some specific calls (in 2007, 2008 & 2013) with higher subsidy rates for specifically targeted public building types (e.g. schools). The subsidy covers some 70% or more, depending on the energy efficiency of the replacement. Wallonia aims to promote the rational use of energy - including building insulation and efficient heating - among renewable energy sources.
Impact so far	Achieved results (indicate in final or primary energy): 639 268 GWh final (2015) Expected results (indicate in final or primary energy): 867 583 GWh final (2020)

Name of measure	Financial incentives for RUE investments in residential buildings (Wallonia Region)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Landlords, low-income households, owner-occupiers
Implementation period	Since 2005
Implementation body	Local government
Website	https://wallex.wallonie.be/index.php?doc=29199&rev=30705-20417
Renovation depth	High
Supported interventions	Heating system (gas condensing boiler, heat pump); Domestic hot water (combination heat pump, instant gas-fuelled water heater, solar water heater); Envelope of existing buildings (wall - floor - roof insulation, glazing); Controlled mechanical ventilation with heat recovery; Electrical/lighting consumption (consumption meter, low

	lighting usage in the service and industrial sectors).
Budget	EUR 40 million per year
Brief description	The scheme provides subsidies for energy efficiency investments in the residential, service and industrial sectors. Because of budget restrictions, the scheme was replaced by a new system starting on 1 st April 2015, targeting low and medium income households only (below EUR 93 000 net revenue) in dwellings that are at least 20 years old. The lower the income, the larger the amount of the grants. Besides the subsidies, 0% interest rate 'Ecopack' loans are also granted, for investments in roof, wall and floor insulation, which are awarded through either the FWL (Fonds wallon du Logement) or the SWCS (Société wallonne du Crédit social).
Impact so far	Final energy savings (total final consumption): 10.78 PJ (2015); 11.56 PJ (2016); 13.82 PJ (2020).

Name of measure	Programme PIVERT for the renovation of social houses (Wallonia Region)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Social houses
Implementation period	Since 2014
Implementation body	La Wallonie et les sociétés de logements de service public
Website	https://www.swl.be/index.php/nos-missions/12-le-logement-durable
Renovation depth	<i>High</i>
Supported interventions	Insulation of roofs, attic, exterior walls, exterior wood furnishings, elimination of thermal bridges, replacement of a traditional boiler with condensing boiler, etc.
Budget	EUR 400 million in 4 years (EUR 100 million per year)
Brief description	The programme of green investments (PIVERT) aims to make substantial energy performance improvements to approximately 15,000 units of public housing. It focuses on innovative and sustainable renovation works. The programme target overall energy performance of 90 kWh / year per m ² , ie a consumption of 9 liters of fuel oil / year / m ² or 9 m ³ of gas / year / m ² .
Impact so far	Expected results under Article 7: 1 291 GWh (2014-2020) Achieved results: 649 GWh final (2014-2017)

Name of measure	Ecopack loan scheme (Wallonia Region)
Policy type	Loans
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Large families
Implementation period	Since 2012 (2015?)
Implementation body	Gouvernement wallon
Website	n/a
Renovation depth	n/a
Supported interventions	Building envelope or heating / hot water systems
Budget	Ecopack & Rénopac: EUR 100 million in 2016
Brief description	Ecopack is a zero interest loan granted to large size families for installation of at least one energy efficiency intervention. The loanable amount lies between EUR 1 000 and EUR 30 000, and is repayable over up to 15 years. The credit committee determines the repayment term depending on the financial situation of the applicant. In addition, the Ecopack grants the right to the energy subsidies as described in the corresponding section under "Primes Énergie". The Walloon Housing Fund for large families (FLW) and the Walloon Social Credit Corporation (SWCS) were empowered by the Walloon Government to grant the zero-per cent loans.

Impact so far	EE additional annual, GWh/y: 42 (2014); 26 (2015) EE total annual, GWhcum/y: 42 (2014); 68 (2015)
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Name of measure	Reduced VAT for renovation of old buildings (Flanders Region)
Policy type	Tax Exemption/Reduction
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	Since 2000
Implementation body	Central government
Website	https://financien.belgium.be/nl/particulieren/woning/verbouwen (Royal Decree of 18 January 2000 modifying Royal Decree of 20 July 1970 on VAT tax rates)
Renovation depth	Low
Supported interventions	Renovation works (conversion, renovation, rehabilitation, improvement, repair, maintenance).
Budget	n/a
Brief description	Since 1 st January 2000, the VAT has been reduced from 21 to 6 % for dwellings of more than 5 years. It may be cumulated with the tax reduction and the subsidies for energy saving investments. Since 12 th February 2016, the reduced rate of 6 % is only applicable to private dwellings that are at least 10 years old. Although its primary concern is to foster job creation in services with a high labour intensity, this measure also has an indirect on energy efficient building renovation, by reducing the cost of the related investments.
Impact so far	Before 2000, only dwellings over 15 years old were entitled to the reduced VAT rate.

Name of measure	Property Tax Reduction (Flanders Region)
Policy type	Tax relief; Tax Exemption/Reduction
Targeted sector(s)	Residential, Commercial
Targeted actor(s)	Landlords; General Public
Implementation period	Since 2009
Implementation body	Flemish Tax Agency; local government
Website	www.energiesparen.be
Renovation depth	Medium/High
Supported interventions	Thermal insulation (K40 standard since 1 st January 2012) , insulation of windows, walls, floors and roofs; renewable energy technologies; technical systems
Budget	n/a
Brief description	The Flemish Decree of 23 May 2008 stipulates that new residential buildings with an E-level of E60 and new commercial buildings with an E-level of E70 shall receive a 20 % property tax reduction for a period of 10 years. New residential buildings with an E-level of E40 shall receive a 40 % property tax reduction. In 2013 the regulation became stricter for residential buildings. In case of an E-level of E50 (E40 in 2014) a reduction of 50% is given for a period of 5 years and a 100% reduction for 5 years in the case of an E30 building. From 1 st October 2016, the discount property tax discount for energy efficient new construction, which has been in existence for years, was extended to major energy renovations of residential buildings for which a building permit application must be submitted: i) if the E-level is a maximum of E90, the reduction is 50% of the property tax for 5 years; ii) if the E-level is a maximum of E60, the reduction is 100% of the property tax for 5 years. The 'major energy renovation' is a renovation in which the technical installations are completely replaced and at least 75% of the existing and new envelope is (subsequently) insulated.
Impact so far	Expected impact (additional to all existing measures implemented until

2020): 47 GWh.
Total final consumption: CO₂ = 0.086 (2010); CO₂ = 0,288 (2016)

Name of measure	Lower gift tax for energy renovation (Flanders Region)
Policy type	Tax Exemption/Reduction
Targeted sector(s)	Residential
Targeted actor(s)	Landlords
Implementation period	Since 2009
Implementation body	Local government
Website	(4th NEEAP for Flanders, page 127)
Renovation depth	<i>Low</i>
Supported interventions	- Complete replacement of technical installations (heating, cooling, ventilation...); Insulation of at least 75% of the existing and new outer shell.
Budget	n/a
Brief description	Reduction in the gift taxes for property to anyone performing relevant energy saving renovation within 5 years. On 1 st July 2015, the Flemish Government reduced the gift taxes for property. Anyone who makes an energy saving renovation for a total amount of at least EUR 10 000 (excluding VAT) within five years also enjoys an additional reduced rate. Upon registration of the deed, the ordinary gift tax rate for real estate will be levied. Then, if the terms of the reduced rate are met, the difference between the previously levied normal rate and the reduced rate will be refunded.
Impact so far	Expected impact (additional to all existing measures implemented until 2020): 4 900 GWh

Name of measure	Tax deductions for those who lend money for renovations (Flanders Region)
Policy type	Tax Exemption/Reduction
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	n/a
Implementation period	(Implemented)
Implementation body	Local government
Website	n/a
Renovation depth	n/a
Supported interventions	n/a
Budget	n/a
Brief description	The tax deduction amounts to a maximum of EUR 625 per year, for the term of the loan and as long as the borrower uses the home as his principal residence. For loans up to EUR 25 000, the tax reduction is 2.5% of the borrowed amount (calculated on the average of the amounts used on 1 st January and 31 December, respectively, of the income year). The borrower receives an inexpensive loan at no additional cost. Parties who lend money to a relative or acquaintance for renovation works on a property that is registered as vacant, neglected, uninhabitable or unfit can receive a tax deduction. The condition is that the borrower (or one of the borrowers) must live in the property for at least 8 years.
Impact so far	n/a

Name of measure	Revolving fund for vulnerable households (Flanders Region)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Vulnerable households

Implementation period	Since 2015
Implementation body	Local government; FEA
Website	n/a
Renovation depth	n/a
Supported interventions	Roof insulation, wall insulation, high efficiency glazing and the installation of a condensation boiler.
Budget	Over 9 000 loans were granted since the beginning of 2015. Vulnerable families receive a 0 % interest rate and intensive supervision during the process.
Brief description	A network of Energy Houses allocates energy loans financed with public funds for energy saving investments under the coordination of the FEA. At the Flemish climate and energy summit on 1 December 2016, ING, BNP Paribas Fortis and BPost Bank committed themselves to offering cheap energy loans in 2017 at interest rates of less than 2 percent. By offering inexpensive energy loans, the banking sector is helping to create an energy efficient future.
Impact so far	Expected impact (additional to all existing measures implemented until 2020): 79 GWh

3.3 Bulgaria (BG)

Name of measure	Residential Energy Efficiency Credit Line REECL
Policy type	Loans
Targeted sector(s)	Residential
Targeted actor(s)	Housing associations, owner-occupiers
Implementation period	Since 2005
Implementation body	Central government, financial institutions, local government
Website	http://reecl.org/en/
Renovation depth	<i>High</i>
Supported interventions	Thermal insulation (thermal insulation of windows, outer walls, roofs and ceilings); Space and water heating (Gas Boilers; Biomass Fuelled Room Heaters, Stoves and Boiler Systems); RES (Solar Thermal Systems, Cooling and Heating Heat Pump Systems, Building-Integrated Photovoltaic Systems, Heat-Exchanger Stations and Building Installations, Gasification Installations, Balanced Mechanical Ventilation with Heat Recovery).
Budget	EUR 20 million.
Brief description	To help Bulgarian households reduce their energy bills and consumption the European Commission, the European Bank for Reconstruction and Development, and the Bulgarian Energy Efficiency Agency have developed the Residential Energy Efficiency Credit Line (REECL) to provide credit lines to reputable Bulgarian banks and make loans to householders for specific energy efficiency measures. The REECL facility aims to give householders or Associations of Home Owners across Bulgaria an opportunity to avail of the benefits of energy efficiency home improvements by providing them with loans and incentive grants through local participating banks. Each borrowing household will benefit from a 20 % incentive towards the cost of the energy savings projects (to a maximum of EUR 850). The total number of energy efficiency home improvement projects to be financed under the REECL facility will be in the range of 30 000.
Impact so far	Total final consumption: Year 2016: 0.209 PJ; CO ₂ = 1.3 kt. Electrical energy savings: 108,679 MWh/y (2013); 14,135 MWh/y, CO ₂ = 9,654 tCO ₂ /y (2014); 14,145 MWh/y, CO ₂ = 9,661 tCO ₂ /y (2015); 14,135 MWh/y; CO ₂ = 9,654 tCO ₂ /y (2016). Expected results: new phase REECL 3 (launched in 2016); number of projects 57; total amount EUR 891 253 (BGN 1 747 555); grants EUR 144 985 (BGN 284 285); energy savings 5,808 MWh/y; CO ₂ savings 1,319 t/y.

Name of measure	National Programme for Renovation of Residential Buildings in the Republic of Bulgaria
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Building professions, general public, housing associations, owner-occupiers
Implementation period	2007-2020
Implementation body	Associations, central government, energy agencies, financial institutions, industries, local government
Website	http://building-request.eu/content/national-program-renovation-multifamily-buildings-republic-bulgaria https://www.seea.government.bg/bg/
Renovation depth	<i>Medium</i>
Supported interventions	The scheme mandates complete renovation not allowing for partial interventions: thermal insulation (thermal insulation of windows, outer walls, roofs and ceilings); refurbishment on common parts related to EE and safe habitation; replacement of old internal plumbing systems (replacement of the vertical main water supply and waste drain pipes); renovation of surrounding public areas.
Budget	The <i>Demonstration Project for the Renovation of Multifamily Buildings</i> is a joint initiative of the Ministry of Regional Development and Public Works and the United Nations Development Programme, which started in 2007. The project financing is EUR 5.62 million (BGN 11 million). The <i>Energy Renovation of Bulgarian Homes</i> project is financed by Operational Programme "Regional Development" and is aimed to 36 Bulgarian cities. The total grant amount is EUR 25.56 million (BGN 50 million) (duration: 2012-2015 years).
Brief description	In 2005 the Government adopted the National Programme for renovation of the residential buildings in Republic of Bulgaria. The Program priority is the multi-families residential buildings. The Programme foresees within the 2006-2020 period 684 683 dwellings to be renovated, of which: 362 792 are Panel; 152 686 Ferro-concrete; and 169 205 Massive. Scheme for renovation of multifamily buildings: a) Conditional subsidies to condominiums for renovation purposes; b) Facilitated access to loans for renovation; and c) Technical assistance to the voluntarily associated homeowners of entire buildings for the organization of the renovation process.
Impact so far	Results for the period 2007-2011: 50 multifamily buildings and their surrounding public areas fully renovated; 80 975 m ² floor area of residential infrastructure were improved; 1 093 households renovated; 2 732 inhabitants, benefited from the improved infrastructure; 8 489 MWh (40-60%) annual energy savings; 6,672 tones CO ₂ savings; 219 working places created.

Name of measure	Financing of energy efficiency projects in municipal buildings by Operational Programme Regional Development
Policy type	Grants/Subsidies
Targeted sector(s)	Commercial
Targeted actor(s)	Building Profess., Energy Managers / Account., Energy Suppliers, Financial Institutions, Local Authorities, house owners (for one-family residential buildings).
Implementation period	2010-2020
Implementation body	Central Government, Local Authorities
Website	https://www.mrrb.bg/en/energy-efficiency/energy-renovation-of-bulgarian-homes/
Renovation depth	<i>High</i>
Supported	Insulation of outer enclosing elements, replacement of window frames,

Interventions	renovation of microclimate maintenance systems, technical installations, local installations and/or connections for heating, gas supply, installation of individual counters, as well as accompanying construction works related to the implementation of the energy efficiency measures, including constructive reinforcement.
Budget	To implement the energy efficiency projects, OPRD 2014-2020 provides support from ERDF in the amount of EUR 287.8 million that will enable the implementation of investments with a total project cost of more than EUR 338.6 million, including EUR 208.1 million in the housing sector and EUR 130.5 million in public buildings.
Brief description	Operational Program Regional Development (OPRD) aims at practical implementation of Priority 4 of the National Strategic Reference Framework – “Balanced Territorial Development”. Energy efficiency measures are implemented in most of the projects under Operational Program "Regional Development" 2007-2013 for reconstruction and rehabilitation of buildings of different types of infrastructure outside of the above mentioned grant schemes.
Impact so far	Total final consumption (services): 0.09 PJ (2015). Summary of the implementation of projects financed by OP "Regional Development" for 2014-2016: number of projects 46; number of buildings with EE measures 166; energy savings 53.54 GWh/y.

Name of measure	National Energy Efficiency Programme for Multifamily Residential Buildings renovation
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Building professions, general public, housing associations, owner-occupiers, tenants
Implementation period	2016-2020
Implementation body	Central government, financial institutions
Website	http://www.mrrb.government.bg/bg/energijna-efektivnost/nacionalna-programa-za-ee-na-mnogofamilni-jilistni-sgradi/ https://ec.europa.eu/energy/sites/ener/files/documents/bg_neeap_2017_bg.zip https://www.mrrb.bg/en/
Renovation depth	<i>High</i>
Supported interventions	Thermal insulation of building envelope improvements of the heating, electrical work.
Budget	In the state budget for 2016, a state guarantee has been included in the amount of EUR 0.51 million (BGN 1 million).
Brief description	The NPEEMB aims to carry out renovation of multifamily residential buildings - PPHC Prefabricated Panel House Construction, LSCT Lift Slab Construction Technology, LAF Large-Area Formwork - through the implementation of energy efficiency measures and aims to ensure better living conditions for citizens in multifamily buildings, better thermal comfort and higher quality of the living environment. The Project aims at developing a replicable scheme for renovation of multifamily buildings.
Impact so far	Results of the NPEEMB implementation in 2016: Number of HoAs registered 5 716; Number of requests for funding submitted to the Bulgarian Development Bank (BDB) 3 977; Number of contracts for targeted financing between municipality, regional governor and BDB 2 022; Buildings with approved and registered energy efficiency audits in SEDA 1 681; Number of buildings under construction 584; Number of buildings with completed renovation activities 214; Improved Housing Infrastructure 1 125 915 m ² floor area; Number of renovated dwellings 12 460; Expected energy savings from renovated residential buildings 88 152 MWh/y; Estimated annual GHG emission reductions 29.5 ktCO ₂ /y.

Name of measure	Energy Efficiency and Renewable Sources Fund
Policy type	Loans; Loan guarantees
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	ESCO
Implementation period	Since 2004
Implementation body	Energy Efficiency and Renewable Sources Fund
Website	https://www.bgeef.com/en/
Renovation depth	n/a
Supported interventions	n/a
Budget	FEEVI was originally capitalised entirely with grants, and its main donors are the UN Global Environment Fund through the International Bank for Reconstruction and Development (the World Bank) with a contribution of EUR 8.8 million, the Government of Austria with EUR 1.5 million, the Government of Bulgaria with EUR 1.5 million, and private Bulgarian sponsors.
Brief description	FEEVI is structured as a self-financing trade mechanism (revolving fund) and focuses its efforts on helping identify, develop and finance feasible energy efficiency improvement projects that reduce GHG emissions in the air, contributing to foster the development of a functioning energy efficiency market in Bulgaria. Any energy efficiency project approved and supported by FEEVI should comply with the following requirements: the project should introduce an established technology; the cost of the project should be between EUR 15.32 thousand (BGN 30 thousand) and EUR 1.53 million (BGN 3 million); the share of the borrower should not be less than 10 %; loan repayment term to be up to 7 years. The main principle in the management of the FEEVI is public-private partnership. The Fund operates in accordance with arrangements and rules developed with the technical assistance of the World Bank and approved by the Bulgarian government.
Impact so far	Achieved results (indicate in final energy): 6.3 GWh (until 2016). As of 31 st December 2016, the Fund financed 218 investment projects for a total of EUR 51.08 million (BGN 99.9 million) where the total amount of resources granted by the Fund comes to EUR 29.14 million (BGN 57 million).

3.4 Croatia (HR)

Name of measure	Programme of energy renovation of multifamily housing (B.3) IMPLEMENTED by Energy renovation programme for multi-apartment buildings (B.3; MEN-2)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Co-owners of residential buildings (citizens); companies managing multifamily housing (building managers).
Implementation period	2014-2020 (B.3) / 2021-2030 (B.3; MEN-2)
Implementation body	MGIPU; NCB; Ministry of Construction and Physical Planning; Environmental Protection and Energy Efficiency Fund
Website	n/a
Renovation depth	n/a
Supported interventions	Thermal insulation of the building envelope and other EE measures; integral renovation project, in accordance with the energy audit recommendations; co-financing of energy audits, energy certificates, project documentation and technical assistance in the preparation and implementation of the project.
Budget	<i>Period 2014-2020:</i> The overall investments required for renovating 1 % of the total surface area of multifamily housing amount to EUR 71.05 million (HRK 527.5 million) per year: EUR 1.35 million (HRK 10 million)

	<p>per year for energy audits and energy performance certificates of buildings; EUR 2.36 million (HRK 17.5 million) per year for drawing up project documentation for the renovation of buildings; EUR 67.35 million (HRK 500 million) per year for integral renovation of multifamily housing (total annual investment: EUR 20 million, EUR 10 million public; EUR 10 million private).</p> <p><i>Period 2021-2030:</i> Estimated investment costs in period 2021-30: EUR 1 050 million (HRK 7 800 million).</p>
Brief description	<p>Energy renovation programme for multi-apartment buildings continues the implementation of the programme for energy renovation of multifamily housing 2014-2020. The requirement for participation in the co-financing programme is the existence of project documentation required in accordance with the construction legislation. From 2017 one of the main instruments of European cohesion policy, namely the European Fund for Regional Development, will be used for co-financing this measure.</p> <p>For the period 2017-2020 it is planned to increase the target from 1 % to 2 %, which means that the response of citizens to energy renovation of 2 % of the total surface area of multi-apartment buildings or 1 000 000 m² every year is assumed. The funds from ESI funds should be planned for the next programming period 2021-2027 (with implementation until 2030) for this measure. Technical conditions should also be the same as in the existing Program, so it is necessary to achieve a reduction of at least 50 % of the heating demand of the building.</p>
Impact so far	<p>Expected results: 2190 TJ (2019) and 2920 TJ (2020); under Article 7: 7 695 PJ (2014-2020); cumulative savings over period 2021-30: 8.15 PJ and 194.70 ktoe (approx. 520 000 m² renovated annually).</p>

Name of measure	Programme of energy renovation of commercial non-residential buildings 2014-2020 (B.4) IMPLEMENTED by Increasing energy efficiency and use of RES in the private service sector (tourism and trade)
Policy type	Grants/Subsidies
Targeted sector(s)	Commercial, Public
Targeted actor(s)	Large Enterprises, SMEs, Economic entities registered for tourism and trade
Implementation period	2014-2020 / 2017-2023
Implementation body	MCPP (Ministry of Construction and Physical Planning); Manufacturers; MZOE; EPEEF; NCB
Website	https://narodne-novine.nn.hr/clanci/sluzbeni/dodatni/432768.pdf https://ec.europa.eu/energy/sites/ener/files/documents/2014_neeap_en_croatia.pdf https://ec.europa.eu/energy/sites/ener/files/hr_neeap_2017_en.pdf
Renovation depth	<i>High</i>
Supported interventions	Development of the infrastructure for renewable energy; implementation of measures for increasing energy efficiency; infrastructural investments such as investments in smart meters and energy renovation of buildings.
Budget	<p><i>Period 2014-2016:</i> the total amount of investment is EUR 6.7 million; the total funds paid out from the Fund us EUR 2.7 million (from 2014 to 2016).</p> <p><i>Period 2017-2023:</i> 1st part - EUR 25 million in grants; 2nd part - EUR 15 million in combination of grants and financial instruments.</p>
Brief description	The first phase of the Programme was from 2014 until the end of 2016 and envisaged provision of grants from Environmental Protection and Energy Efficiency Fund for projects related to the use of renewable energy in touristic sector as well as for energy renovation of commercial non-residential buildings. In the second phase of the Programme, available financing from European Regional Development Fund will be used as stated in the draft 4 th NEEAP under the specific

	objective of Operational programme "Increasing energy efficiency and use of RES in the commercial service sector (tourism and trade)".
Impact so far	Achieved results: 0.078 PJ (2015-2016); 0.04355 PJ and 3 364.08 tCO ₂ (2014-2016). Expected results under Article 7: 0.927 PJ (2014-2020); indicate in energy: 242 (2019); 349 TJ (2020).

Name of measure	Programme of energy renovation of family homes 2014-2020 (B.5) IMPLEMENTED by Energy renovation programme for single family houses (B.5; MEN-4)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Owners of family homes (citizens)
Implementation period	2014-2020 / 2021-2030
Implementation body	The Environmental Protection and Energy Efficiency Fund (EPEEF); NCB; Ministry of Construction and Physical Planning
Website	n/a
Renovation depth	n/a
Supported interventions	Renovation of the building envelope; replacement of heating systems; use of RES (installation of solar thermal collectors; installation of heat pumps; installation of small, biomass powered boilers); co-financing of energy audits, energy certificates, project documentation and technical assistance in the preparation and implementation of the project.
Budget	The Programme of energy renovation of family homes 2014-2020 encourages investments in the energy renovation of family homes amounting to EUR 27.94 million (HRK 207.5 million) per year (sources of financing: Resources from European Union structural funds). Approximately EUR 30 million has been earmarked for the renovation of this sector by 2020 under the OPCC. Planned funds by the end of 2020: renovation of building envelope - EUR 11.79 million; replacement of the heating system - EUR 5.39 million; fostering the use of RES - EUR 10.77 million. Estimated investment costs in period 2021-30: EUR 707.15 per year.
Brief description	<i>Period 2014-2020:</i> This measure is aimed at the renovation of existing family homes by 2020. It focuses primarily on family homes of up to 400 m ² constructed before 1998 and on their renovation in compliance with low-energy standards by encouraging the renovation of the building envelope, the replacement of the heating system and the use of RES. From 2017, this measure was co-financed with the resources from the European Fund for Regional Development approved under the Operational Programme Competitiveness and Cohesion 2014-2020. For the period between 2017 and 2020 it is planned to increase the target from 100 houses per county to 200 houses per county, which means that it is assumed that the citizens will respond to energy renovation of 4000 family homes in Croatia every year. <i>Period 2021-2030:</i> Reduction of heating demand and energy consumption, promotion of nZEB standard. Allocation for this Programme needs to be planned to provide grants amounting to 60% of eligible costs, with the maximum co-financing of energy audits, energy certificates, project documentation and technical assistance in the preparation and implementation of the project. Technical conditions should also be the same as in the existing Programme, so it is necessary to achieve a reduction of at least 50 % of the heating demand of the building. The renovation up to the nZEB standard should be further encouraged.
Impact so far	Expected results: 1209 TJ (2019); 1612 TJ (2020); under Article 7: 4640 PJ (2014-2020) Achieved results: 0.769 PJ FEC (2014-2016); Cumulative savings over period 2021-30: 10.50 PJ (approx. 350,000.00 m ² renovated annually).

Name of measure	Programme for combating energy poverty
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	NCB
Implementation period	2017-2026
Implementation body	MZOE - developer of the Programme in cooperation with MSPM EPEEF - establishment of financing and co-financing scheme
Website	n/a
Renovation depth	n/a
Supported interventions	Replacement of household appliances according to the "old for new" system; replacement of windows; improvement or replacement of heating systems; increasing the thermal protective envelope; simple EE measures.
Budget	During the period of this Action Plan 2017-2019: EUR 0.032 million (HRK 240 000); in particular for the year 2017 - EUR 0.027 million (HRK 200,000.00); for the year 2018 - EUR 0.0027 million (HRK 20,000,000.00); and for the year 2019 - EUR 0.0027 million (HRK 20,000,000.00).
Brief description	This measure provides for the development and deployment of a systematic programme for combating energy poverty through the implementation of measures of energy efficiency. A requirement for participating in the co-financing programme is gaining the status of a vulnerable customer in accordance with the regulations applicable at the moment of implementation of a measure. The specific objective of the measure is the establishment of a system that would allow vulnerable energy buyers to improve energy efficiency at household level while improving housing conditions.
Impact so far	Expected results: 20.6 TJ FEC (2020); Under Article 7: 0.041 PJ (2018-2020)

3.5 Cyprus (CY)

Name of measure	Grant scheme for encouraging the use of renewable energy sources and energy savings in homes
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Households
Implementation period	Since 2019. Valid until 20/12/2019. May be extended through 2020.
Implementation body	Central government
Website	http://www.mcit.gov.cy/mcit/EnergySe.nsf/All/CD72CA56E5F51D8EC22583B700383FE7/\$file/Σχέδιο%20Χορηγιών%20για%20ενθάρρυνση%20της%20χρήσης%20ΑΠΕ%20και%20της%20ΕΞ.Ε%20στις%20κατοικίες.pdf
Renovation depth	Low-Medium
Supported interventions	Roof insulation and/or Small PV installation in existing buildings used as dwellings
Budget	National Fund for RES and ES: EUR 24,5 million for 2019
Brief description	Encouraging the use of RES and energy savings in existing buildings used as dwellings. In particular, the Grant Scheme covers the following categories: 1. Roof insulation of existing houses 2. Roof insulation and PV installation for existing houses 3. PV installation for existing houses 4. PV installation for existing houses – energy vulnerable consumers
Impact so far	By Sep 2019, about 1300 PV systems were installed and 500 house roofs were insulated.

Name of measure	Scheme for Promoting Saving and Upgrading in the residential sector and in business
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial
Targeted actor(s)	Owner-occupiers; Small-Medium Enterprises (Legal Entities or Physical/Natural persons who exercise economic activity)
Implementation period	2014-2020
Implementation body	Central government, Ministry of Energy, Commerce, Industry and Tourism of the Republic of Cyprus
Website	http://www.mcit.gov.cy/mcit/sit/sit.nsf/32177ee11d0d6003c225816f001d4b05/ab7a6b03df68044bc225819200419072?OpenDocument http://www.mcit.gov.cy/mcit/sit/sit.nsf/All/0D4058BE3ABCC725C22582570036AE3D?OpenDocument
Renovation depth	n/a
Supported interventions	Thermal insulation of building envelope; replacement of heating/air conditioning systems, installation of renewable energy systems for heating/cooling , installation of electricity saving systems etc.
Budget	EUR 53 million has been secured by the European and Structural Funds 2014-2020 for grant schemes and projects for energy efficiency investments in private and public buildings: EUR 33 million will be allocated for SMEs and households while, the remaining amount for central government public buildings.
Brief description	<p>The Scheme includes two types of investments: i) deep Energy Renovation of Buildings for achieving at least energy class B class or energy saving at least 40 % relative to the total building energy consumption before upgrading; ii) deep Energy Renovation of Buildings for Upgrading to nearly zero energy buildings.</p> <p>The following grants are given to beneficiaries who join the Scheme: i) 50 % of the total approved budget of the proposal for the first type of investment (the percentage is increased to 75%, for applications submitted by vulnerable consumers) and; ii) 75 % of the total approved budget of the proposal for the second and third type of investment. The maximum grant amount could reach EUR 0.2 million per SME; EUR 0.025 per building or EUR 0.02 per building unit (apartment).</p>
Impact so far	n/a

Name of measure	Grant scheme for the installation or replacement of solar heating systems for domestic hot water
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Households
Implementation	Since 2015 (scheme is repeated on an annual basis)

period	
Implementation body	Central government
Website	http://www.mcit.gov.cy/mcit/EnergySe.nsf/All/462B2B82CB8C7901C2258363002C7CC1/\$file/Σχέδιο%20ΗΛΙΑΚΑ%202018.pdf
Renovation depth	Low
Supported interventions	Installation or replacement of solar heating systems for domestic hot water
Budget	Special Fund for RES and ES: EUR 0.178 million (2015-2016)
Brief description	This scheme aims to provide economic incentives in the form of a State grant for installing or replacing solar water heaters in existing dwellings. The scheme covers investments consisting in purchasing and installing new equipment/materials. The scheme relates only to the replacement of solar hot water production systems in existing private residential units. Subsidised systems should meet specified energy criteria. Also, an installation permit should be obtained from the competent town planning authority, as appropriate.
Impact so far	About 1000 solar heating systems are been installed or replaced every year.

3.6 Czech Republic (CZ)

Name of measure	Operational Programme Enterprise and Innovation for Competitiveness
Policy type	Grants/Subsidies
Targeted sector(s)	Commercial
Targeted actor(s)	Enterprises
Implementation period	2015-2020
Implementation body	https://www.oppik.cz/
Website	http://www.mpo.cz/cz/podpora-podnikani/oppik/
Renovation depth	n/a
Supported interventions	Energy and resource efficiency in SMEs and support of low carbon technologies
Budget	286 million
Brief description	The Operational Programme (OP) will substantially contribute to promoting the country's ability to achieve a competitive and sustainable economy based on knowledge and innovation. Under Specific Objective 3, support is specifically provided to increase energy efficiency in the business sector. The programme supports improvements in the energy performance of the business sector, and the broader use of energy services in all regions of the Czech Republic, excluding the City of Prague. The target audience comprises business entities (small, medium-sized and large enterprises) for interventions in the field of energy savings (thermal insulation of production and business structures), also agricultural entrepreneurs, food businesses and retail organisations.
Impact so far	n/a

Name of measure	Programme ENER
Policy type	Soft loan
Targeted sector(s)	Commercial
Targeted actor(s)	Enterprises
Implementation period	2016-2020
Implementation body	Czech-Moravian Guarantee and Development Bank
Website	https://www.cmzrb.cz/en/podnikatele/uvery/energ/?rc
Renovation depth	n/a
Supported interventions	Energy efficiency, renewable energies
Budget	CZK 130 million (EUR 5.1 million)

Brief description	ENERG is a soft loan programme with 0 % interest rate available to enterprises based in Prague. The programme combines soft loan with grant for technical assistance and a performance fee for reaching the level of energy savings. The aim of ENER Programme is to help SMEs in Prague, Czech Republic to access funding for projects aimed at reducing the energy intensity of their activities, or using renewable energies to achieve final energy savings. A continuous call for applications runs until the CZK 130 million (EUR 5.1 million) fund is depleted or the programme ends (31 December 2020). The programme is funded from the proceeds of the sale of emission allowances for 2014. The support is provided in the form of a non-interest-bearing investment loan up to 70 % of the eligible expenditure (i.e. in the CZK 1-20 million range), with a maturity of ten years. At the same time, the beneficiary can receive a financial contribution for the purchase of an energy assessment up to CZK 100 000 (~€ 4 000). In the case of energy savings, according to the project plan, within three years of the completion of the project, the entrepreneur will also receive a bonus financial contribution of 7 % of the exhausted amount of the preferential loan.
Impact so far	<i>n/a</i>

Name of measure	Regeneration of pre-fabricated concrete buildings - PANEL, NEW PANEL and PANEL 2013+ Programmes
Policy type	Loans/Others
Targeted sector(s)	Residential
Targeted actor(s)	Housing associations
Implementation period	Since 2001
Implementation body	Central government, Ministry for Regional Development, State Housing Development Fund
Website	http://www.sfrb.cz/programy-a-podpory/program-panel-2013/
Renovation depth	<i>Low</i>
Supported interventions	Building envelope, thermal insulation; regulation of the heating system; RES (modernisation of the heating system, including the use of renewable energy sources); HVAC (repair or modernisation of ventilation technology); repair of lightning rods and fire equipment and structures; control system (measurement of heat consumption for the heating system, hot water consumption, cold water consumption); acquisition of building energy performance certificate.
Budget	EUR 23.28 million (CZK 600 million) for 2016
Brief description	The Ministry of Regional Development programme, administered by the State Housing Development Fund, offers low-interest loans for repairing and modernising multi-family buildings. An emphasis is placed on comprehensive repairs so that owners spend financial resources in a purposeful manner. Programme is designed to provide financial support for reconstruction and modernisation of all types of blocks of flats.
Impact so far	Total energy consumption [PJ]: 1.192 (2010); 0.198 (2013); 0.1069 (2016); 0.1 (2020). Achieved results indicate in energy: 106.9 TJ final (2014-2016). Expected results under Article 7: 206.9 TJ final (2014-2020).

Name of measure	Environment Operational Programme OPZP 2014-2020
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Low-income households, owner-occupiers
Implementation period	2014-2020
Implementation body	Ministry of Environment, State Environmental Fund, Central government, Local government
Website	http://en.opzp.cz/sekce/506/about-operational-programme-

	environment/ http://www.opzp.cz/about/ www.opzp.cz/clanek/768/2340/6-verze-opzp-pro-budouci-programove-obdobi-2014-2020/
Renovation depth	<i>High</i>
Supported interventions	Measures for single-family and multi-family buildings (expected number of replaced boilers: 80 340): replacement of boilers; installation of solar thermal systems.
Budget	Budget for both Priority axes is EUR 900 million (EUR 375 mil for PA 2 - Boiler replacement for households and EUR 525 mil. for PA 5 - Renovation of public buildings)
Brief description	An operational programme under the auspices of the Ministry of the Environment administered by the State Environmental Fund of the Czech Republic focused on supporting energy efficiency in two priority axes of the Operational Programme Environment. The Operational Programme Environment (Priority Axis 2) focuses on improving the quality of the environment and it is open for owners of single-family buildings. It helps to improve the state of the air, water and soil, it addresses waste and industrial pollution, and it promotes care for the landscape, the use of renewable sources of energy and the building of infrastructure for environmental awareness. It can be applied throughout the Czech Republic except for the City of Prague. The second priority - Priority axis 5 aims at the renovation of public buildings ranging from central government buildings to public buildings owned by municipalities.
Impact so far	Savings in total energy consumption (Priority Axis 2): 0.8172 PJ (2016); 2.3 PJ (2020).

Name of measure	New Green Savings Programme
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Housing associations, owner-occupiers
Implementation period	2014-2016
Implementation body	Central government, Ministry of Environment, administered by the State Environmental Fund
Website	http://www.usporysrozumem.cz/
Renovation depth	<i>Medium</i>
Supported interventions	<ul style="list-style-type: none"> - Measures to improve the energy performance of existing single-family buildings: subsidies for thermal insulation of building envelopes, replacement of windows and doors, thermal insulation of exterior walls, roofs, ceilings, floors, support for partial and comprehensive measures; - Measures supporting the construction of single-family buildings with very high energy performance: subsidies for the construction of new houses with very high energy performance; - Measures supporting the efficient use of energy: subsidies for the replacement of environmentally unfriendly sources of heat by efficient environmentally-friendly sources; - Measures for the replacement of electric heating by systems using heat pumps; - Measures for the installation of solar thermal systems; measures for the installation of forced ventilation systems with heat recovery from exhaust air).
Budget	EUR 774 million from 2014 to 2020. The total annual investment (2016) is EUR 150 million; with EUR 80 million public and EUR 80 million private.
Brief description	The main objective of the program is to improve the environment by reducing emissions of pollutants and greenhouse gases (mainly CO ₂), as well as saving energy in final consumption and stimulating the economy of the Czech Republic with other social benefits. Promotes energy saving reconstructions of houses and apartment buildings, replacement of unsuitable heating sources and usage of renewable

	<p>energy.</p> <p>Under the programme, support within the calls announced so far is directed towards the following intervention areas:</p> <ul style="list-style-type: none"> - <i>Single-Family Buildings</i>: improvement in the energy performance of existing single-family buildings; construction of single-family buildings with very high-energy performance; efficient use of energy sources - <i>Multi-Family Buildings</i>: improvement in the energy performance of existing multi-family buildings; support for the preparation of an expert opinion and provision for professional technical supervision; efficient use of energy sources.
Impact so far	<p>Expected results under Article 7: 10 565 TJ final (2014-2023/24)</p> <p>Achieved results in energy: 734.8 TJ final (2014-2016)</p>

Name of measure	JESSICA Programme (Ministry of Regional Development)
Policy type	Loans
Targeted sector(s)	Residential
Targeted actor(s)	Housing associations
Implementation period	2014-2020
Implementation body	Financial institutions
Website	https://www.iea.org/policiesandmeasures/pams/czechrepublic/name-128743-en.php
Renovation depth	<i>Low</i>
Supported interventions	Thermal insulation of building envelopes and of internal structures; removal of static disorders in load-bearing structures and of structural and functional defects; rehabilitation of foundations and substructure waterproofing; reconstruction of technical equipment of buildings; replacement or modernisation of enclosed and open balconies, including railings.
Budget	EUR 24 million from 2014 to 2015
Brief description	A programme of the Ministry for Local Development administered by the State Housing Development Fund focusing on the provision of low-interest long-term loans to revitalise deprived urban areas. This programme offers long-term low-interest loans for the reconstruction and upgrading of multi-family buildings in deprived zones (with a service life of 20 or more years). The measure covers only the deprived zones of 41 towns and cities with an Integrated Urban Development Plan.
Impact so far	<p>Expected results under Article 7: 73.9 TJ final (2014-2020)</p> <p>Achieved results indicate in energy: 73.9 TJ final (2014-2016)</p>

Name of measure	Integrated Regional Operational Programme
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	2015-2020
Implementation body	Central government, financial institutions
Website	http://www.strukturalni-fondy.cz/cs/Microsites/IROP/Uvodni-strana
Renovation depth	<i>Medium</i>
Supported interventions	Support for energy efficiency, smart energy management systems, and the use of energy from renewable sources in public infrastructure, in public buildings and in housing, among other things.
Budget	<p>EUR 680 million from 2015 to 2020.</p> <p>The total annual investment is EUR 200 million; with EUR 80 million public and EUR 120 million private.</p>
Brief description	A programme of the Ministry of Regional Development Focusing on for basic objectives of the Czech Republic's regional policy, as formulated in the Czech Republic's Regional Development Strategy for 2014-2020 to promote an increase in competitiveness and the harnessing of the

	economic potential of the regions (growth objective); to lessen the growing gaps in the negative regional differences (balancing objective); to reinforce environmental sustainability (preventive objective), to optimise the institutional framework for regional development (institutional objective).
Impact so far	Expected results under Article 7: 3100 TJ final (2017-2020)

Name of measure	Operational Program Prague Growth Pole (OPPGP)
Policy type	Grants/Subsidies
Targeted sector(s)	Commercial, Public
Targeted actor(s)	Public Estates
Implementation period	2017-2020
Implementation body	Local Authorities
Website	http://penizeproprahu.cz/
Renovation depth	Low
Supported interventions	The use of appropriate renewable energy sources, energy-efficient equipment and intelligent control systems.
Budget	EUR 39 million (CZK 1 billion) from 2017 to 2020
Brief description	The operational programme under the auspices of the City of Prague focuses on support for improving the energy performance of buildings and the technical equipment used to ensure the operation of municipal public and road transport, implementation of pilot projects to convert energy intensive municipal buildings into nearly-zero energy buildings. The aim of the Operational Programme Prague - Growth Pole (OPPGP) is to contribute to the Union strategy for smart, inclusive and sustainable growth and to the attainment of economic, social and territorial cohesion. This measure is applicable only in the City of Prague with a service life of 30 or more years
Impact so far	Expected results under Article 7: 10 TJ final (2014-2020)

3.7 Denmark (DK)

Name of measure	Grants for New Business Concepts for Heat Pumps (HO-6)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential and industrial buildings
Targeted actor(s)	Owner-occupiers
Implementation period	2016-2019
Implementation body	Government; Danish Energy Agency
Website	https://sparenergi.dk/forbruger/varme/varmepumper/varmepumper-paa-abonnement
Renovation depth	n/a
Supported interventions	Conversion from oil and natural gas to heat pumps in existing buildings
Budget	EUR 3.33 million (DKK 25 million) for residential houses and EUR 1.43 million (DKK 10.7 million) for industry buildings
Brief description	The purpose of the initiative is to facilitate a market for energy services based on heat pumps where energy companies install, finance, run and maintain heat pumps installed in houses and in industry. In return the customer pays for the heat delivered by the heat pump. Thereby a heat pump as an energy service imitates the way that district heating has been deployed and driven in urban areas. An agreement between a customer and an energy service enterprise typically involves the customer paying a one-off amount in the form of a connection contribution, a regular subscription and charges for its heat consumption. The initiative has encompassed concept development, testing and

	demonstration, and since autumn 2016 nationwide roll-out in collaboration with five enterprises. It is anticipated that the experiences gained with energy services for heat pumps will spread to other enterprises and that it will represent a widely available alternative to householders themselves being responsible for the investment, ownership and operation of the heat pump. The enterprises have the broadest possible scope to customise their solutions to ensure that they become as competitive as possible.
Impact so far	An evaluation report on the subsidy scheme for residential houses was published in Spring 2019. It shows that 670 out of the potential 1,900 heat pumps have been installed by the four energy companies currently in the scheme. The report is written in Danish and can be found on: https://ens.dk/sites/ens.dk/files/Energibesparelser/evaluering_af_varmepumpeordning.pdf

Name of measure	Green BoligJobordning household employment scheme
Policy type	Tax incentives
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Owner-occupiers
Implementation period	Since 2011
Implementation body	Government
Website	n/a
Renovation depth	n/a
Supported interventions	Insulation of roofs, cavity wall insulation, window replacement, etc.
Budget	A maximum deduction from taxable income of EUR 1 607 (DKK 12 000) per year is given for each person in the household.
Brief description	In 2016 and 2017, a scheme is in force according to which owners of residential properties may be entitled to tax deductions for salary costs to carry out a range of energy-saving measures. For example, a deduction may be granted for the retrospective insulation of roofs, cavity wall insulation, window replacement, etc. Deductions are also given for costs linked to energy advice.
Impact so far	n/a

3.8 Estonia (EE)

Name of measure	KredEx Renovation loan for apartment buildings
Policy type	Loans; Soft loans
Targeted sector(s)	Residential
Targeted actor(s)	Housing associations, owner-occupiers
Implementation period	Since 2014
Implementation body	KredEx (government owned non-profit provider of financial service) and Ministry of Economic Affairs and Communications
Website	n/a
Renovation depth	n/a
Supported interventions	Insulation of apartment buildings, reconstruction of utility systems (e.g. heating system and ventilation system), replacement of windows, etc.
Budget	The total annual investment is EUR 90 million; with EUR 30 million public and EUR 60 million private.
Brief description	The soft loan developed within the framework of the Operational Programme for the Development of the Living Environment may receive applications from apartment associations, building associations and communities of apartment owners. The long-term low interest rate renovation loan is suitable for apartment associations who wish to renovate their apartment buildings and thereby improve the energy efficiency of the buildings and improve

	the physical and social environment. The renovation loan is aimed at the reconstruction of apartment buildings constructed before 1993 and improving the energy efficiency thereof. Apartment associations, building associations and communities of apartment owners with at least 3 apartments can apply for the renovation loan. The expected impact of the measure lies in the fact that the prerequisite of being granted a renovation loan under favourable conditions is an energy audit which provides the high-priority renovation work. Only the renovation work provided in the energy audit is financed with the loan. The prerequisite of being granted the soft loan is the achievement of at least 20% energy savings in apartment buildings of up to 2,000 m ² (net covered area) and at least 30% energy savings in apartment buildings bigger than 2,000 m ² . The loan period is up to 20 years.
Impact so far	Expected results under Article 7: 372 GWh (2014-2020).

3.9 Finland (FI)

Name of measure	Energy Subsidies for Residential Buildings
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	Since 2003
Implementation body	Ministry of Environment prepares the propositions for the Government Budget; The Housing Finance and Development Centre of Finland (ARA); Municipalities
Website	https://www.iea.org/policiesandmeasures/pams/finland/name-22865-en.php
Renovation depth	n/a
Supported interventions	Independent energy audits; External repair work as defined in legislation; Improvements in ventilation and heating systems; Instalment of renewable energy technologies.
Budget	The total annual investment is EUR 70 million (with EUR 10 million public and EUR 50 million private).
Brief description	Within an approved authorization in the State Budget, repair and energy grants can be made by The Housing Finance and Development Centre of Finland for improvements in the condition and quality of individual apartments and apartment buildings. The purpose of the grants is to improve the energy economy of residential buildings. They cover up to 15-25 % of the approved costs and are awarded by the local authority. Due to the overall reductions in the Government's budget, these subsidies have now been partially ceased. The building's owners finance any necessary repairs themselves (savings, revenue, reserves, funds) or apply for bank loans or, in special circumstances, loans or interest subsidies from the Housing Finance and Development Centre of Finland. Funding from the Housing Finance and Development Centre of Finland is generally only available for non-profit organisations.
Impact so far	Energy saving: 284 GWh/y (2010); 1 172 GWh/y (2016); 1 170 GWh/y (2020).

Name of measure	KETO-5-TEM Heat pumps for detached, semi-detached and terraced houses
Policy type	Tax credit
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	2014-2020
Implementation body	Energy Authority and the Finnish Heat Pump Association
Website	n/a

Renovation depth	n/a
Supported interventions	Heat pumps in existing detached and terraced houses
Budget	
Brief description	Since 2001, householders have been able to obtain tax credit for the cost of work involved in installing a heating pump in their homes. The acquisition and introduction of heat pumps is actively promoted through information and communication measures financed by ministries, and via development projects. Depending on the type of heat pump, the tax credit is worth between EUR 200 and EUR 3 500. In Finland, heat pumps constitute a key measure in achieving both the energy 2020 efficiency objective and the renewable energy objective.
Impact so far	By the end of 2016, almost 800,000 heat pumps had been installed in detached and terraced houses. Expected results: 7 574 Gwh final (2020); under Article 7: 10 602 GWh cum (2020) Achieved results: 8 056 GWh cum final (2016)

3.10 France (FR)

Name of measure	Existing Buildings Programmes
Policy type	Grants/Subsidies; Tax relief
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Owner-occupiers
Implementation period	Since 1975
Implementation body	ADEME, the municipalities, ANAH (French Agency for Improvement of Existing Dwellings)
Website	n/a
Renovation depth	n/a
Supported interventions	Heat insulation improvements, heating regulation, the replacement of boilers or in some instances the installation of a wood stove; help low-income homeowners improve their main residence; improve privately owned rented housing units; improve the rental housing units they own or manage for social welfare purposes.
Budget	Large-scale funding system gathering private and public money to finance retrofitting operations will be implemented. The amount of this public financing for energy savings can be assessed at EUR 2 220 million (Fr 2.5 billion) in 1992. In the 2002 budget, building energy retrofits benefit from a tax reduction of 15% of expenses to a maximum of EUR 8 000 per family.
Brief description	The incentives are as follows: - <i>Tax reductions</i> : income tax reductions were available from 1 January 1990 until 31 December 1995 for heat insulation improvements, heating regulation, the replacement of boilers or in some instances the installation of a wood stove in main residences built before 1 January 1982. This measure was renewed in 1996. The tax reduction is valid for any type of work (not only energy management improvements) if it is carried out by professionals. - <i>Grants for housing improvements</i> : this government subsidy is to help low-income homeowners improve their main residence if it is over 20 years old. - <i>Grants from ANAH, the National Housing Improvement Agency</i> : this grant aims at helping improve privately owned rented housing units built more than 15 years ago. - <i>Grants for rental and social housing improvements (PALULOS)</i> : this grant assists organisations to improve the rental housing units they own or manage for social welfare purposes, rented to house low-income people, and which are more than 15 years old.
Impact so far	n/a

Name of measure	Preferential loans for energy saving measures (LDD)
Policy type	Loans
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	SEMs, individuals, co-properties and entrepreneurs
Implementation period	Since 2007
Implementation body	Directorate General for Energy and Raw Materials (Ministry of Ecology, Energy, Sustainable Development and Planning)
Website	http://www.fbf.fr/Web/internet/content_particuliers.nsf/(WebPageList)/Les+modalites+de+fonctionnement+du+Livret+de+developpement+durable+sont+precisees?Open (Décret n°2007-161 du 6 février 2007 relatif au livret de développement durable)
Renovation depth	n/a
Supported interventions	Energy efficient boilers; thermal insulation (walls, windows, shutters); thermal regulation equipment; equipment producing energy from renewable sources; space and water heating equipment using wood or other biomass; heat pumps.
Budget	On 5 th October 2006, the French Government announced the creation of a EUR 10 000 million fund for the funding of domestic energy conservation projects with low-interest loans.
Brief description	Available from 1 st January 2007, these low-interest loans (LDD) are based on a previous tax-free savings account known as the CODEVI (<i>Compte pour le Développement Industriel</i>). Preferential loans can be awarded to individuals, co-properties and entrepreneurs for the purchase and installation of energy efficient equipment. Applicants must provide the bank with documents from the equipment installer, certifying that the equipment and installation meets the required energy efficiency criteria. This financial measure is complementary to the 2005 tax credit scheme. The acquisition of domestic energy efficient equipment entitles the buyer to a price reduction (tax credit scheme) and a low-interest loan at the same time (LDD measure).
Impact so far	n/a

Name of measure	Energy Transition Tax Credit (CITE) (ex- Sustainable Development Tax Credit)
Policy type	Tax incentives; Tax Exemption/Reduction
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers, building professionals
Implementation period	Since 2005
Implementation body	Central government
Website	(Loi n°2005-781 du 13 juillet 2005 de programme fixant les orientations de la politique énergétique Lois de finances "Finance laws" 2005, 2006, 2009, 2010, 2011, 2012, 2014, 2015)
Renovation depth	<i>High</i>
Supported interventions	Thermal insulation materials; space and water heating (heating pump for heat generation); RES (energy equipment using renewable energy source)
Budget	About €1.6 billion/year
Brief description	The "Energy Transition Tax Credit" or Crédit d'Impôt Transition Énergétique (CITE) in French, replaces the "Sustainable Development Tax Credit" (CIDD) launched in 2005 (and stopped on 31 st August 2014). It supports owners, leaseholders or dwelling occupiers for free (main residence) who pay tax in France in purchasing efficient materials and equipment to limit energy consumption and greenhouse gas emissions. Amount of the global credit tax is limited over a 5-year period to: EUR 8 000 for a single person, widow or divorced; EUR 16 000 for a couple subject to joint taxation. These amount are increased

	EUR 400 per dependent child and to EUR 200 per child in alternate residence.
Impact so far	Energy saving - Total final consumption (PJ): 32.6 (2013); 38.9 (2016); 45.2 (2020).

Name of measure	Zero-rated eco-loan ("prêt à taux zéro")
Policy type	Loans/Others
Targeted sector(s)	Residential
Targeted actor(s)	General public
Implementation period	Since 2009
Implementation body	Central government, energy agencies, banks
Website	(Finance act for 2009 + article 108 of the Finance Act for 2016)
Renovation depth	<i>Medium</i>
Supported interventions	<ul style="list-style-type: none"> - Outdoor walls insulation; Roof insulation; Outdoor window and door insulation; - Installation or replacement of heating or hot water equipment; - Installation of heating or hot water equipment, relying on renewable energy sources.
Budget	This loan is granted to landlords (occupiers or lessors) without any income condition. It could be used by co-owners in the limit of EUR 0.01 million per flat (or until EUR 0.03 million if the co-owners union launches "bunches of works").
Brief description	<p>The zero-rated eco-loan scheme (<i>eco-prêt à taux zero or Eco-PTZ</i>) has been introduced by the "Finance law 2009" (<i>loi de finance 2009</i>) to allow landlords to get a loan to finance energy refurbishment works for their main residence. It is granted by banks which have concluded specific agreement with the French State under conditions fixed in the General Taxes Code (Code Général des impôts).</p> <p>The Tax free loan is aimed at individual owner-occupiers or landlords to finance major renovation work. It is also possible to combine the eco-PTZ loan with the CITE tax credit.</p>
Impact so far	Total final consumption [PJ]: 7.5 (2013); 8 (2016); 8 (2020). Expected results indicate in energy: 0.19 Mtoe in final energy (2020).

Name of measure	Social Housing Eco-Loan (Eco-PLS)
Policy type	Loans
Targeted sector(s)	Residential, Public
Targeted actor(s)	Housing associations, tenants
Implementation period	2009-2020
Implementation body	Caisse des dépôts et Consignations (CDC), associations, central government, energy agencies, financial institutions
Website	(Convention du 26 fevrier 2009 entre l'Etat et la CDC sur la mise en œuvre de l'"éco-prêt logement social" pour l'amélioration de la performance énergétique des logements sociaux)
Renovation depth	<i>High</i>
Supported interventions	Energy renovations of social dwellings and also energy savings works made in high energy-consuming dwellings located in ANRU zones (revitalizing urban zones).
Budget	Total annual investment: EUR 400 million. The amount of this scheme ranges from EUR 9 000 to EUR 16 000 (an increase of EUR 2 000 can be done for energy performance labelled dwellings).
Brief description	The social housing eco-loan scheme (éco-prêt logement social - éco-PLS) was launched in February 2009 to provide financial support for energy renovations of social dwellings in the framework of the Grenelle law. It is available to municipalities owning or managing social house associations and follows strict energy consumption criteria. This scheme has been strengthened through an agreement signed by the

	French State and the social union for housing which targets to renovate the 800 000 least energy efficient social dwellings by 2020 (100 000 between 2009 and 2010 ten 70 000 per year planned initially). The priority was given to dwellings with low energy categories E, F or G (see "FRA34 Energy Performance Diagnosis (DPE)" for details on housing energy categories).
Impact so far	Expected results indicate in energy: 1.03 Mtoe in final energy (2020). Achieved results indicate in energy: 0.65 Mtoe in final energy (2016).

Name of measure	VAT Reduction on energy efficiency investments
Policy type	Tax incentives; Tax rebates and exemptions
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Energy agencies
Implementation period	Since 2014
Implementation body	Ministère du Logement et de l'habitat Durable; General public
Website	n/a
Renovation depth	<i>High</i>
Supported interventions	Improve the energy quality of housing constructed
Budget	According to the NEEAP 2017, the cost of the measure is estimated to EUR 1 100 million in 2015, and in 2016; whereas according to the Ministry for Housing, the tax expenditure base was estimated to EUR 7 700 million in 2015 for the 5.5 % VAT.
Brief description	The reduced rate of VAT of 5.5 %, applicable from 1 January 2014, is applied only in cases of work to improve the energy quality of housing of at least 2 years old. The aid provided in the form of this reduced rate of VAT allows households to immediately reduce the cost to be paid.
Impact so far	The results of the OPEN 2015 survey indicate that the reduced rate of VAT and the CITE are the schemes most used by households.

3.11 Germany (DE)

Name of measure	CO ₂ Building Renovation Programme (<i>CO₂-Gebäudesanierungsprogramm</i>)
Policy type	Loans/Others
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Landlords, owner-occupiers, private and public companies, social organisations, municipalities
Implementation period	Since 2006
Implementation body	Central government, financial institutions
Website	https://www.kfw.de/kfw.de-2.html https://www.kfw.de/migration/Weiterleitung-zur-Startseite/Homepage/KfW-Group/Research/PDF-Files/Energy-efficient-building-and-rehabilitation.pdf
Renovation depth	<i>High</i>
Supported interventions	Building envelope; technical building equipment
Budget	EUR 2 billion p.a.
Brief description	Under the CO ₂ Building Renovation Programme, low-interest loans combined with repayment grants and investment grants are given out for energy-efficient refurbishments of existing buildings as well as the construction of highly-efficient new buildings. To be eligible for funding, buildings must clearly exceed the legal requirements on energy efficiency that are laid down in the Energy Saving Ordinance (EnEV), that is, meet the "Efficiency House" standard for energetically ambitious buildings. Funding is then deployed on the basis of what level of the "Efficiency House" standard a building achieves. The programme is

	carried out by KfW Promotional Bank.
Impact so far	More than 5.4 million housing units have been refurbished so far in the residential building branch of the programme. In the programme branch for non-residential buildings, more than 3,500 buildings have received funding. Final energy savings achieved in both the residential and non-residential component amounted to 7.4 PJ (2016), 5.5 PJ (2017), and 5.3 PJ (2018).

Name of measure	Market Incentive Programme for Renewable Energies in Heat Market (Marktanreizprogramm für erneuerbare Energien im Wärmemarkt-MAP)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Housing associations, landlords, owner-occupiers
Implementation period	Since 1999
Implementation body	Central government, financial institutions
Website	www.bafa.de www.kfw.de www.bmwi.de
Renovation depth	<i>Medium</i>
Supported interventions	Renewable energy technologies for the production of heat and cooling, as well as certain heat storage facilities and local heating networks.
Budget	The financial volume currently is EUR 320 million per annum.
Brief description	<p>The Market Incentive Programme is intended to support the attainment of the goal of the Renewable Energies Heat Act (i.e. RES to have a 14% share in final energy consumption for heating/cooling by 2020) by further expanding the deployment of technologies to use renewable energy in the heating/cooling sector. Two kinds of support are provided depending on the type and size of the installation:</p> <ul style="list-style-type: none"> For small installations, primarily in existing buildings, investment grants are given out through the Federal Office for Economic Affairs and Export Control. Applications for such funding mainly come from private investors in the single-family or two-family homes segment. For larger installations, as well as for heat networks and storage, repayment grants are offered in the form of low-interest loans under the KfW Renewable Energies Programme ('premium' variant). Investments of this kind are mostly made in solutions for commercial or local government use.
Impact so far	Total CO ₂ savings from 2000 to 2018 amount to approx. 5 million tonnes.

Name of measure	Energy Efficiency Incentive Programme (APEE)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Housing associations, landlords, owner-occupiers
Implementation period	Since 2016
Implementation body	Federal Ministry for Economic Affairs and Energy, KfW/BAFA
Website	n/a
Renovation depth	n/a
Supported interventions	Ventilation systems, building envelope, replacement of inefficient heating systems with efficient ones, measures to optimise heat distribution systems
Budget	The programme currently has a budget of EUR 165 million p.a.
Brief description	<p>The programme, launched on 1 January 2016, aims to supplement the existing funding programmes on buildings (CO₂ Building Renovation Programme and Market Incentive Programme). Funding is deployed in the form of grants in the following areas:</p> <ul style="list-style-type: none"> the installation of ventilation systems (ventilation package) in conjunction with measures to renovate the building envelope which are

	<p>designed to prevent damage to the building (e.g. mould);</p> <ul style="list-style-type: none"> the replacement of inefficient heating systems with efficient ones (heating package); this includes measures to optimise the heating system (heating and heat distribution) which address the entire efficiency potential of the heating system; <p>the launch of innovative fuel cell heating systems onto the market (funding for these systems is available since August 2016).</p>
Impact so far	Final energy savings: 1.2 PJ (2016), 1.9 PJ (2017), 1.9 PJ (2018)

Name of measure	Energy Consulting Programme
Policy type	Grants/Subsidies
Targeted sector(s)	Private households, Commercial, municipalities and non-profit organisations
Targeted actor(s)	Private households, companies, municipalities and non-profit organisations
Implementation period	Since 2008
Implementation body	central government, financial institutions
Website	www.bafa.de
Renovation depth	High
Supported interventions	Energy efficiency
Budget	EUR 45 million p.a.
Brief description	With the Energy Consulting Programmes, the German government supports private households, companies, municipalities and non-profit organisations to make more efficient use of energy. A wide range of information, advice and support services is available and used intensively.
Impact so far	Savings about 3 PJ/a

3.12 Greece (EL)

Name of measure	Saving at home Programme
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	General public, low-income households, manufacturers
Implementation period	2011-2020
Implementation body	Central government, financial institutions, local government
Website	(NEEAP)
Renovation depth	<i>High</i>
Supported interventions	Replacing window frames/glass panes and installing shading systems; installing thermal insulation in the building envelope; upgrading the heating and domestic hot water system.
Budget	The programme is financed by the European Union (European Regional Development Fund (ERDF)) and by National Resources, through the Regional Operational Programmes (ROP) and the Operational Programme 'Competitiveness and Entrepreneurship' (OPCE) and Environment and Sustainable Development' (OPESD) under the NSRF 2007-2013. The total eligible budget of EUR 325.5 million (from 2011 to 2016).
Brief description	The 'Saving at home' programme aims at providing financial incentives for energy-saving interventions in the residential building sector with a view to reducing energy needs. It was started at 2011 and ended on December 2016 (implemented with "Saving home Programme II" until 2020). The types of housing that can be subsidised by the programme are: i) Single-family houses; ii) Apartment blocks - for the part of the block which relates to all the apartments in the building; iii) Individual

	apartments. The minimum energy objective of the Programme is that it must upgrade by at least one energy class or, alternatively, provide an annual primary energy savings greater than 30% of the reference building consumption (kWh/m ²).
Impact so far	Savings in total final consumption: PJ=0.920 and CO ₂ =104.55 (2018); PJ=1.262 and CO ₂ =143.41 (2014); PJ=1.327 and CO ₂ =150.79 (2016); PJ=1.628 and CO ₂ =184.99 (2017); PJ=1.628 and CO ₂ =184.99 (2020). By December 2016, approximately 26 thousand dwellings joined the programme had been submitted. The budget breakdown by category of energy upgrading interventions of completed applications is: <ul style="list-style-type: none"> - replacing window frames/glass panes and installing shading systems: EUR 106 million; - installing thermal insulation in the building envelope: EUR 49 million; - upgrading heating and domestic hot water system: EUR 55 million.

Name of measure	Energy savings in Local Self-Governments
Policy type	Grants/Subsidies
Targeted sector(s)	Public
Targeted actor(s)	General Public, Local Authorities, Public Estates
Implementation period	2009-2020
Implementation body	Central Government, Energy Agencies, Local Authorities
Website	(NEEAP)
Renovation depth	<i>Medium</i>
Supported interventions	Energy upgrade of the building envelope (exterior insulation, replacement of glass panes and window frames, green roofs); energy upgrade of heating and cooling systems; upgrade of the natural/artificial lighting system; installing an energy management system; interventions to public areas of the urban environment; integrated energy savings and management in municipal lighting; bioclimatic interventions to improve microclimate and energy efficiency in urban areas.
Budget	Proposals of 106 municipalities have met the criteria for participations in the program and were evaluated positive for funding, with a total budget of EUR 83.4 million. From those 59 municipalities finally complete their action plans and implement energy efficiency improvements in existing municipal buildings, in public lighting and in other technical municipal infrastructure with total cost of EUR 23.3 million for 2016.
Brief description	The specific objectives of the program focused on: reduction of energy consumption and peak loads; reduction of CO ₂ emissions and limitation of climatic change; creation of favourable urban environment and restriction of urban thermal island phenomenon; upgrade the way of living in buildings and cities and improvement of daily round of citizens; support and appointment of exemplary role of local self-government for implementation of energy saving measures; raise awareness and change behaviour of citizens, for the efficient use of energy and the protection of environment; activation of market forces and further promotion of investments for sustainable growth.
Impact so far	Savings in total final consumption [PJ]: 0.094203/year (from 2016 to 2020).

3.13 Hungary (HU)

Name of measure	Home savings scheme
Policy type	Soft loan
Targeted sector(s)	Residential

Targeted actor(s)	Owner-occupiers
Implementation period	Since 1997
Implementation body	Ministry for National Economy
Website	n/a
Renovation depth	n/a
Supported interventions	The housing savings scheme can significantly contribute to interventions resulting in energy savings.
Budget	EUR 143 million (2015-16). EUR 524 million (163.69 billion HUF) of total renovation investments, whereof EUR 143 million (44.752 billion HUF) for energy purposes.
Brief description	The home savings scheme operating since 1997 is a long-term state-sponsored form of savings, based on the principle of self-reliance. For condominiums and housing co-operatives, the amount of support may range from EUR 330.49 to 991.46, depending on the number of dwellings. The period of housing savings can be a minimum of 4 and a maximum of 10 years. The person engaged in the home savings scheme and the beneficiary is entitled to state aid once a year to an extent corresponding to the annual deposit amount for their monthly regular savings.
Impact so far	Achieved results indicate energy: 1.068 PJ/y (2015-16)

Name of measure	Warmth at Home Programme (WAH)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Housing associations, landlords, owner-occupiers
Implementation period	Since 2014
Implementation body	Ministry of National Development; NFSI Nemzeti Fejlesztési és Stratégiai Intézet Nonprofit Kft.
Website	http://cityinvest.eu/content/hungary-0
Renovation depth	n/a
Supported interventions	Heating modernisation; replacement of large household appliances; facade door and window replacement sub-programme; subsidy for modernisation and renovation of condominiums resulting in energy savings; sub-programme for replacement of large household appliances; sub-programme supporting modernisation of heating systems; sub-programme for replacement of large household appliances; replacement of natural gas convectors.
Budget	EUR 93 million (2014-17). Various types of grants with different periods of applications.
Brief description	The main impact area of the current sub-programmes of the Warmth at Home Programme launched in 2014 is a complex energy efficiency renovation of private and public buildings because in Hungary, buildings are responsible for 40 % of annual energy consumption.
Impact so far	Achieved results indicate in energy: 0.6 PJ/y (2014-16). With projects implemented so far, more than 65 000 tonnes of CO ₂ emissions could be prevented per year. With the replacement of obsolete household appliances, up to EUR 61.20 (HUF 20 thousand) can be saved by families on their annual spending and with the upgrading of residential buildings; these savings amount to up to EUR 459.01 (HUF 150 thousand).

Name of measure	Energy Efficiency subsidies for residential EE purposes
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Housing associations, landlords, owner-occupiers
Implementation period	Since 2015
Implementation body	Ministry of National Development

Website	http://www.complex.hu/kzldat/t1500095.htm/t1500095.htm http://www.kormanyhivatal.hu/download/4/cf/e1000/Hasznalt_lakas_v_asarlas_tajekoztato_20150701.pdf http://mkoqy.ioqtar.hu/?page=show&docid=a1500095.TV
Renovation depth	n/a
Supported interventions	Replacement of windows and doors, insulation and the combination of refurbishment with renewable energy source are highly supported
Budget	In 2015, the financial support was EUR 2 million (654,5 million HUF) from the Building Energy Efficiency indicated target and EUR 14.95 million (4 886,3 million HUF) from the ZFR indicated target. This source increased with 25% of the state revenue of the EU Emission.
Brief description	This policy counts with three main sources: EU structural subsidies, state revenues from the EU Emission Trading System related and the state budget law. The EU support for residential sector will be available by the Environment and Energy Efficiency Operative Programme KEHOP (KÖRNYEZETI ÉS ENERGIAHATÉKONYSÁGI OPERATÍV PROGRAM), which is a Co-Financed program by EU Funds and national sources. According to the new decision of the government, the programs will be available only from KEHOP supported energy efficiency funds with repayable support.
Impact so far	n/a

Name of measure	Energy Efficiency subsidies for public and local governmental buildings
Policy type	Grants/Subsidies
Targeted sector(s)	Public
Targeted actor(s)	local government
Implementation period	Since 2015
Implementation body	Ministry of National Development
Website	http://www.palyazat.gov.hu/
Renovation depth	n/a
Supported interventions	Improved energy efficiency in existing buildings
Budget	In 2015, the KEOP-2015-5.7.0 (Building energy development of Public buildings measure) had a budget of EUR 0.46 million (HUF 150 million) and 100% support intensity. Supporting entities and projects had been decided according to the decree 1290/2015 (V.5) No. 1. Annex that the maximum support would be EUR 150 million/project.
Brief description	Unlikely the previous years, there has been a strategic change in the government policy regarding public sector and municipal buildings refurbishment. The main purposes are: (1) Eliminate or minimize the own resources by the public sector and the local government sector; (2) Avoid the non-eligible success fee type costs (which earlier could reach 5 - 10% / project); (3) Reduce the risk of the success of the proposal to avoid unnecessary costs; (4) Improve cost-efficiency by avoiding the excessive costs in the feasibility studies. Thus, already in 2015, they appeared in subsidies where the subsidy rate is 100%, but the eligible projects are defined by specific legislation.
Impact so far	n/a

Name of measure	Energy efficiency projects within the Modern Cities Programme
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	General public, landlords, owner-occupiers
Implementation period	Since 2017
Implementation body	National Energy Network
Website	n/a
Renovation depth	n/a

Supported interventions	Improvement of energy efficiency, such as theatre or hospital reconstruction, inner city rehabilitation or the renovation of historic buildings.
Budget	n/a
Brief description	Under the Modern Cities Programme, the Government is signing contracts with 23 county towns which include support for implementation of the most important development projects promoting the development of individual cities. Subsidy for individual development projects will be funded from central budget supports.
Impact so far	Expected results under Article 7: 2 PJ by 2020. Within the scope of the Modern Cities Programme, measures to improve energy efficiency with budget support (PJ): 2 (2020); 10 (2030); 24 (2050).

3.14 Ireland (IE)

Name of measure	Better Energy Homes
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Private homeowners
Implementation period	Since 2011
Implementation body	Energy agencies
Website	http://www.seai.ie/Grants/Better_energy_homes/
Renovation depth	<i>High</i>
Supported interventions	Attic insulation, wall insulation, heating systems upgrades, solar thermal panel, etc.
Budget	Approximately 210 thousand households availed of the scheme up until mid-2017 at a total cost of EUR 214.5 million.
Brief description	The Better Energy Homes scheme provides grants to private homeowners who wish to improve the energy performance of their homes. The purpose of this program is to stimulate energy-efficiency actions to reduce energy usage by homeowners and the general public. In January 2018 the level of support for heating controls and external wall insulation was increased and support was introduced for heat pumps from April 2018. Support for replacement of oil or gas boilers was withdrawn.
Impact so far	In 2016, EUR 17 million was spent on the scheme which resulted in over 15 000 homeowners undertaking 36 000 energy efficiency measures in their homes. This has delivered energy savings of 84.26 GWh (28.77 ktCO ₂). Since the start of the scheme, over EUR 202.4 million worth of grants has been paid to homeowners. These funds have supported the upgrade of 191 338 homes, with a total 475 190 individual energy efficiency measures.

Name of measure	Warmer Home Scheme (Low Income Housing Strategy)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Building professions, general public, households at risk of energy poverty, local government
Implementation period	Since 2002
Implementation body	Sustainable Energy Authority of Ireland via Regional not for profit organisations
Website	http://www.sei.ie/ http://www.seai.ie/Power_of_One/Grants_Available/
Renovation depth	<i>Medium</i>
Supported	Draught proofing, attic insulation, lagging jackets for hot water tanks,

interventions	low energy light bulbs and cavity wall insulation, etc.
Budget	EUR 20 million in 2016. Since its creation EUR 175 million have been invested
Brief description	The Better Energy Warmer Homes scheme is a housing retrofit scheme targeted at those living in, or at risk of, energy poverty. Energy efficiency upgrades are delivered free of charge to those who meet the eligibility criteria which were broadened in 2016 following the publication of the Government's Strategy to Combat Energy Poverty. Recipients of the scheme do not receive grants but have measures installed free of charge.
Impact so far	In 2016, EUR 20 million was spent under the Better Energy Warmer Homes scheme which supported the delivery of energy efficiency measures to 6,743 energy poor homes. This resulted in energy savings of 15.5 GWh, corresponding to monetary savings of EUR 0.98 million (3.6 kt CO ₂) and supporting an estimated 336 jobs. Since its creation, the scheme has upgraded 126 889 premises/dwellings with more than EUR 175 million invested.

Name of measure	Social Housing Upgrades (DHPCLG)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Social Housing residents
Implementation period	Since 2013
Implementation body	SEAI; local authorities
Website	n/a
Renovation depth	Low
Supported interventions	Work includes attic insulation, draught proofing, and wall insulation as internal, integral to cavity or external. Other measures including heating supply efficiency upgrades and inclusion of renewable energy sources is expected to be advanced in 2018/19.
Budget	For the years 2013, 2014, 2015 and 2016 the amounts are EUR 26.95 million; EUR 30.72 million; EUR 26.90 million; and EUR 22.53 million respectively.
Brief description	Energy efficiency upgrades to social housing stock undertaken by local authorities. Energy efficiency upgrades to social housing stock. Phase 1 and 2 consist of external fabric upgrade to those social housing units which are below acceptable standards.
Impact so far	The Energy savings and Carbon savings achieved in 2016 are 27 GWh and 5.4 kt/CO ₂ . It is expected that a reduction in the order of 20-30% in Carbon emissions will be achieved in the existing housing stock being upgraded (2020).

Name of measure	Warmer Homes Expansion - Pilot for tenants in receipt of HAP
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Landlords who are renting to tenants in receipt of the housing assistance payment
Implementation period	Since 2017
Implementation body	Sustainable Energy Authority of Ireland (SEAI)
Website	n/a
Renovation depth	n/a
Supported interventions	Attic insulation, cavity wall insulation, lagging jacket, energy efficient LED lightbulbs, energy advice
Budget	n/a
Brief description	The expansion of the Warmer Homes scheme to homes of private tenants who are in receipt of the Housing Assistance Payment. This should increase the energy efficiency of buildings in the private rented sector and demonstrate the value of energy efficiency to private

	landlords. It should also encourage landlords to rent their properties to beneficiaries of the HAP, and increase the availability of housing to people on lower incomes.
Impact so far	2020: Savings arising from this measure will accrue as a subset of the savings allocated to the BEWH Scheme (B2).

Name of measure	Deep Retrofit Pilot Scheme
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Homeowners
Implementation period	Since 2017
Implementation body	DCCAE; SEAI
Website	n/a
Renovation depth	Low
Supported interventions	Deep retrofit projects in the residential market
Budget	EUR 5 million in 2017
Brief description	The Deep Retrofit Pilot Programme is a multi-annual pilot programme offering grants for comprehensive energy upgrades to homeowners. The main objective of the Deep Retrofit Pilot Programme (DRP) is to bring a private dwelling from a Building Energy Rating of C3 (or lower) to a minimum of A3. Higher grant support (approximately 50 %) exists for deep retrofits to help achieve a really energy efficient A-rated home. To undergo a deep retrofit, an investment of approximately EUR 30 000 or more is required.
Impact so far	Expected energy savings in 2020 of 18 GWh in final energy.

3.15 Italy (IT)

Name of measure	Eco-bonus tax rebate scheme
Policy type	Tax credits
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Landlords, manufacturers, owner-occupiers, tenants
Implementation period	Since 2007
Implementation body	Central government
Website	http://www.efficientaenergetica.enea.it/Cittadino/impianti-termici/detrazioni-fiscali
Renovation depth	n/a
Supported interventions	Comprehensive or single retrofit energy efficiency measures, such as thermal insulation, installation of solar panels, replacement of heating and air-conditioning systems or comprehensive refurbishments.
Budget	EUR 23 billion (2007-2018)
Brief description	Tax credits have been available since 2007 for household owners. These originally covered 55 % of the energy-related cost, reimbursed over 10 years, beginning with the completion of work. The tax rebate scheme was re-confirmed for 2016 by the 2016 Stability Law, introducing three new possibilities: 1) to claim the incentive for home automation interventions, in particular relative to "multimedia devices for the remote control of heating, hot water and air conditioning"; 2) to transfer the incentive for interventions on building common parts to the supplier of the service in exchange for a discount; 3) to include social housing as new eligible area. The 65% tax deduction for energy efficiency was increased to 70 or 75% for interventions on the building envelope that improve the energy performance, while the 50% tax deduction for general renovations was increased if it contributes to reduce the seismic risk of the building. The extension of the tax rebate scheme to the condominiums of collective buildings allows a tax

	deduction ranging from the 70% to the 75% of the energy efficiency interventions carried out on the common parts of the building.
Impact so far	The total value of the resources that the Italian state has committed to disburse to the beneficiaries since 2007 (until 2018) is approximately 23 billion euro. It is estimated that since 2007 the measure has stimulated approximately 38 billion euro of private investment in the energy renovation sector of residential buildings in Italy

Name of measure	Plafond Casa ("Piano Casa")
Policy type	Loans
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Owner-occupiers
Implementation period	Since 2013
Implementation body	Central government
Website	n/a
Renovation depth	n/a
Supported interventions	Increasing energy efficiency; purchase of residential real estate; purchase and restructuring, involving an increase in the property's energy efficiency.
Budget	In order to support housing policies, Article 6(1)(a) of the Decree-Law of 31 August 2013 (converted into Law No 124 of 28 October 2013) allocates EUR 2 000 million to facilitate access to credit in the residential sector. This amount was increased to EUR 3 000 million in April 2016.
Brief description	The Fund is intended to finance home purchases through mortgage-backed loans. Priority is given to properties that are the main residence, preferably within energy categories A, B or C, and/or renovations and energy efficiency improvements, with priority given to young couples, households with at least one disabled person and large families. The practical arrangements for the scheme are defined in a specific agreement between Cassa Depositi e Prestiti and the Italian Banking Association. For the banks, access to the credit line is set to a first-come-first-served basis, provided that resources have not been exhausted.
Impact so far	n/a

Name of measure	Kyoto Fund for energy efficiency in public school and university buildings
Policy type	Soft loans
Targeted sector(s)	Public
Targeted actor(s)	Public bodies
Implementation period	Since 2014
Implementation body	Central government, Ministry of the Environment
Website	http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legge:2014-06-24;91!vig= (Legislative Decree n.91 of 24 June 2014)
Renovation depth	n/a
Supported interventions	Improved energy efficiency in existing buildings: replacement of systems and work on building envelopes, as well as drawing up energy audits for structures.
Budget	A total amount of EUR 350 million of soft financing is available to public bodies for those energy efficiency works able to ensure a (at least) two-class improvement of the energy efficiency parameter of the building, within 3 years.
Brief description	The Kyoto Fund for Schools provides funding at a preferential rate (0.25 %) for the purposes of carrying out energy efficiency measures in publicly owned school and university buildings.

	The improvement is certified by comparing the building's previous energy certification, required at the time of participation in the call for applications, and its certification after the work, required upon completion of the work. In addition to energy efficiency, it is also possible to request funding for works to make buildings safe and works necessary in order to comply with earthquake prevention rules. In such cases, a maximum of 49 % of a project's total amount may be obtained.
Impact so far	After the call for applications for the Kyoto Fund, 120 energy efficiency projects were considered eligible, for a total value of approximately EUR 66 million. Residual resources have been made available by means of a second call, which was launched in April 2016. To date, 92 energy efficiency projects have been funded, for a total value of approximately EUR 38 million.

Name of measure	National Energy Efficiency Fund
Policy type	Loans
Targeted sector(s)	Residential
Targeted actor(s)	Companies, Public administrations
Implementation period	2014-2030
Implementation body	Invitalia S.p.A., Ministry of Economic Development, the Ministry of the Environment, the Protection of Natural Resources and the Sea
Website	n/a
Renovation depth	n/a
Supported interventions	Energy efficiency: build and expansion of district heating and/or cooling networks, energy efficiency measures in public services and infrastructure, including public lighting.
Budget	EUR 490 million for the period 2014-2020 (up to approximately EUR 70 million per year). It is estimated that the fund will mobilise investments in the energy efficiency sector for more than EUR 800 million with resources already available (EUR 150 million).
Brief description	The National Energy Efficiency Fund consists of two sections: i) granting of guarantees on individual financing operations (30 % of the annual resources); ii) provision of subsidised loans (70 % of the annual resources). The Fund supports energy efficiency projects implemented by public authorities, ESCOs and business to increase energy efficiency in buildings (including social houses), industrial installations and production processes. It also supports district heating and cooling networks, improve the efficiency of public services, and infrastructure (including street lighting). In order to increase the capacity of the Fund to promote energy efficiency measures, the financial allocation available today will be increased by promoting the payment of resources for energy efficiency managed by central and local administrations (Structural Funds, European Investment Funds) and directing the mechanism to promote civil (both residential and tertiary) and transport interventions.
Impact so far	Expected impact: 2.75 Mtoe of cumulative savings over the period 2021-2030; 0.95 Mtoe of annual savings in 2030.

Name of measure	Programme for energy renovation of buildings owned by the central government (PREPAC)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Public authorities
Implementation period	Since 2016
Implementation body	Ministry of Economic Development
Website	http://www.sviluppoeconomico.gov.it/index.php/it/normativa/decreti-interministeriali/2035552-decreto-interministeriale-del-16-

	settembre-2016-programma-di-riquali (Interministerial Decree 16/9/2016; Interministerial Decree 5/12/2016; Interministerial Decree 31/05/2018)																								
Renovation depth	n/a																								
Supported interventions	Improved energy efficiency in existing buildings																								
Budget	EUR 355 million for 2014-2020.																								
Brief description	<p>The Interministerial Decree of 5th December 2016 approved the projects already submitted in 2014-2015: 69 projects for a total amount of approximately EUR 73 million of approved funding. By Interministerial Decree and the Environment Decree of 21st September 2017 approved the work programmes for 2016, aimed at improving the energy performance of central government buildings, defining the arrangements for financing, implementing and monitoring the buildings.</p> <p>By means of the Interministerial Decree of 31st May 2018, the Ministry of Economic Development and the Ministry of the Environment approved the plans for 2017 for the improvement of the energy performance of the buildings of central government, defining the arrangements for their financing, implementation and control. The ministries provided funding for 39 operations up to a maximum amount of approximately EUR 39 million.</p>																								
Impact so far	<p>The reserve lists for 2018 are in the process of being approved: 100 proposals were submitted. Table contains a summary of PREFAC programmes for the five-year period 2014-2018.</p> <table border="1"> <thead> <tr> <th>YEAR</th> <th>Projects presented (n)</th> <th>Eligible projects (n)</th> <th>Resources required by eligible projects (EUR)</th> </tr> </thead> <tbody> <tr> <td>2014</td> <td>30</td> <td>22</td> <td>10.769.620</td> </tr> <tr> <td>2015</td> <td>122</td> <td>47</td> <td>62.228.613</td> </tr> <tr> <td>2016</td> <td>89</td> <td>32</td> <td>60.207.917</td> </tr> <tr> <td>2017</td> <td>83</td> <td>39</td> <td>38.952.030</td> </tr> <tr> <td>2018</td> <td>100</td> <td>Under investigation</td> <td>Under investigation</td> </tr> </tbody> </table>	YEAR	Projects presented (n)	Eligible projects (n)	Resources required by eligible projects (EUR)	2014	30	22	10.769.620	2015	122	47	62.228.613	2016	89	32	60.207.917	2017	83	39	38.952.030	2018	100	Under investigation	Under investigation
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2017	83	39	38.952.030																						
2018	100	Under investigation	Under investigation																						

Name of measure	Conto Termico 2.0
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Building professions, landlords, owner-occupiers
Implementation period	Since 2016
Implementation body	Central government, energy agencies, financial institutions, GSE
Website	(Ministerial Decree February 16 th 2016)
Renovation depth	Low
Supported interventions	Energy efficiency improvements in existing buildings (insulation of opaque surfaces, replacement of transparent closures, installation of system shielding and replacement of generators with appliances condensation); small-scale projects concerning systems producing thermal energy from renewable and high efficiency system (heat pumps, biomass boilers, heaters and fireplaces, solar thermal systems, including those based on the solar cooling technology)
Budget	EUR 900 million from 2016 to 2017. The total annual budget is up to 900 million euro of which 200 for public administrations projects and 700 million euro for the private initiatives.
Brief description	Conto Termico 2.0, in force since May 31 st 2016, strengthens and simplifies the support mechanism already introduced by the MD December 28 th 2012, which encourages measures to increase energy efficiency and the production of thermal energy from RE. The mechanism responsible for the management and disbursement of incentives is GSE (Gestore dei Servizi Energetici). The main changes introduced by the new mechanism are the following: i) simplification of the procedures for the public administration to access to the incentives;

	<p>ii) introduction of new energy efficiency measures; iii) expansion of the range of allowed subjects; iv) the public administrations (and for the ESCO working for them), are now allowed to cumulate with other public funds up to 100% of the investment value.</p>
Impact so far	<p>Savings in total final consumption [PJ]: 0.032 (2015); 1.07 (2016). The percentage saving share of the energy efficiency intervention carried out in 2014-2016 is: wall insulation 36 %; windows: 17 %; condensing boilers 45 %; other 2 %.</p> <p>Around 2018 calls for incentives have been received since the launch of the mechanism for the whole of 169.000, corresponding to an amount of incentives committed amounting to EUR 463 million, of which 9 million were only in December 2018 as a result of the new incentive requests admitted to the mechanism.</p> <p>The incentives paid in 2018 by the Thermal Account amount to a total of EUR 177 million, of which 146 million for private actions and EUR 31 million for operations carried out by the PA of which 12 million by means of a reservation.</p>

3.16 Latvia (LV)

Name of measure	Energy efficiency improvement in residential buildings (Activity 4.2.1.1)
Policy type	Grants, guarantees and loans
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	2014-2020
Implementation body	Ministry of Economics
Website	https://www.em.gov.lv/lv/es_fondi/atbalsta_pasakumi_2014_2020/energetika_un_energoefektivitate/veicinat_energoefektivitates_paaugstina_sanu_dzivojamas_ekas/
Renovation depth	<i>Medium/High</i>
Supported interventions	Energy efficiency measures in multi-apartment residential buildings
Budget	The total funding available for Activity 4.2.1.1. is EUR 166 million (2014 – 2020), which includes ERDF funding of EUR 141 million and funding from the national budget of EUR 25 million.
Brief description	<p>In February 2010, the Ministry of Economics in cooperation with partners launched an awareness raising campaign titled "Let's Live Warmer" with the aim of informing residents about opportunities available through involvement in Activity 4.2.1.1. "Energy efficiency improvement in residential buildings" of the Operational Programme., The Ministry of Economics is responsible for Activity 4.2.1.1. during the EU funding period 2014–2020. The programme is implemented by state-owned development finance institution ALTUM. Support is available constantly till December 2023, and the owners of multi-apartment buildings are the final recipients of the energy efficiency increasing projects.</p> <p>It is planned:</p> <ol style="list-style-type: none"> 1) to renovate approximately 650 multi-apartment buildings; 2) average heating energy consumption in multi-apartment buildings after implementation of energy efficiency measures – 90 kWh/m2/per annum; 3) additional capacities using the renewable energy resources - 2.74 MW, GHG reduction - 12 582 tonnes of CO2 equivalent.
Impact so far	Starting from the beginning of Activity 4.2.1.1. till July 2019, 546 project applications have been received of total funding EUR 127,7 million and 225 projects have already got a support from ALTUM of total funding EUR 47,4 million. There are 72 ongoing projects in construction process, but for better understanding of your need it

would be great if you could contact me via phone to discuss the aim and proposal of the planned article.

Name of measure	Energy efficiency improvement in public buildings (Activity 4.2.1.2)
Policy type	Grants/Subsidies
Targeted sector(s)	Public buildings
Targeted actor(s)	Owners of public buildings
Implementation period	2014-2020
Implementation body	Ministry of Economics
Website	https://www.em.gov.lv/lv/es_fondi/atbalsta_pasakumi_2014_2020/energetika_un_energoefektivitate/
Renovation depth	<i>Medium</i>
Supported interventions	Thermal insulation
Budget	The total funding available for Activity 4.2.1.2. is EUR 115 million (2014 – 2020), which includes ERDF funding of EUR 98 million and funding from the national budget of EUR 17 million. Support in form of grants - 30%.
Brief description	<p>The eligible beneficiaries are owners of public buildings. The eligibility criteria are the following:</p> <ol style="list-style-type: none"> 1) at least 75% of the building floor surface is used to carry out the statutory functions of the beneficiary; 2) specific investment costs capped at 300 EUR/m²; 3) final energy consumption for heating after renovation to be lower than 110 kWh/m²/per annum; 4) ex-post energy performance certification required; 5) the renovated building shall meet the national minimum energy performance requirements in line with the Latvian standard LBN 002-015; 6) thermal energy and power savings of at least 30%; 7) monitoring of savings over at least 5 years. <p>The programme aim - to increase the energy efficiency in public buildings. Funding is granted for the preparation of project documentation, project construction supervision and author supervision, reduction of the building's energy sources consumption, as well as renovation or reconstruction of the building. After completion of renovation, reconstruction, final energy consumption for heating after renovation to be lower than 110 kWh/m²/per annum must be achieved. It is planned to achieve additional capacities using the renewable energy resources – 2 MW, GHG reduction – 9 457 tonnes of CO₂ equivalent.</p>
Impact so far	Starting from the beginning of Activity 4.1.1. till July 2019, 129 project applications have been received of total funding EUR 95 million, contracts for implementation of 92 projects have been concluded, of which 14 projects have been completed.
Name of measure	Energy efficiency in manufacturing industry (Activity 4.1.1.)
Policy type	Grants/subsidies
Targeted sector(s)	NACE 2.red C section (excl. Tobacco manufacturing)
Targeted actor(s)	Manufacturing companies
Implementation period	2014-2020
Implementation body	Ministry of Economics
Website	https://www.em.gov.lv/lv/es_fondi/atbalsta_pasakumi_2014_2020/energetika_un_energoefektivitate/
Renovation depth	Medium/High
Supported interventions	Reconstruction or simplified renovation works in buildings to increase energy efficiency; increase of energy efficiency in technology.
Budget	Available funding - EUR 25,7 million (cohesion fund). Support in form of

	grants - 30%.
Brief description	<p>Support is for activities:</p> <ol style="list-style-type: none"> 1) reconstruction or simplified renovation works in buildings to increase energy efficiency; 2) increase of energy efficiency in technology; 3) use of the RES, including change of technologies, where the fossil energy resources are used etc. <p>Planned energy savings after project must be at least 15% and planned energy consumption for heating after renovation of building does not exceed 110 kWh/m² per year.</p> <p>It is planned:</p> <ol style="list-style-type: none"> 1) to give support 52 buildings; 2) total saved energy - 4 395 MWh per year; 3) additional capacities using the renewable energy resources - 5.4 MW, GHG reduction - 6 757 tonnes of CO₂ equivalent.
Impact so far	Starting from the beginning of Activity 4.1.1. until July 2019, 46 project applications have been received of total funding EUR 12,1 million.

Name of measure	Energy efficiency in municipal buildings (Activity 4.2.2.)
Policy type	Grants/subsidies
Targeted sector(s)	Municipal sector
Targeted actor(s)	Municipalities
Implementation period	2014-2020
Implementation body	Ministry of Environmental Protection and Regional Development
Website	http://www.varam.gov.lv/lat/fondi/kohez/2014_2020/?doc=18636
Renovation depth	<i>High</i>
Supported interventions	Thermal insulation of multi-apartment residential buildings and social housing
Budget	EUR 55.29 million (2014-2020); ERDF funding of EUR 47 million and state budget co-funding of EUR 15.6 million
Brief description	The objective of this programme is to reduce primary energy consumption in local government by supporting energy efficiency investments in municipal buildings in line with the priorities set out in local government development programmes. Funding is granted for 1) renovation of existing buildings, supporting only measures improving energy efficiency of buildings which are included in the energy certification of the accordant buildings, 2) the rebuilding or renewal of the heating infrastructure, 3) the purchase and installation of equipment producing thermal energy by using renewable energy sources, 4) publicity measures regarding the project implementation, 5) management of the project.
Impact so far	<p>Decrease of annual primary energy consumption of public buildings as of 25th September 2019: 13 121 027 kWh/year (the planned indicator by 2023 - 13 718 237 kWh/year); Estimated annual decrease of greenhouse gas: 3753 tons of CO₂ equivalent (3460 tons of CO₂ equivalent/year decrease planned by 2023); Additional power produced from renewable energy sources: 0,257 MW (1,2 MW of additional power planned by 2023).</p> <p>Until 25th September 2019, 113 contracts have been concluded for ERDF funding of EUR 33.67 million, of which 59 projects have been completed using ERDF funding of EUR 13.46 million. In total, 122 projects have been submitted.</p>

Name of measure	The Climate Change Financial Instrument (CCFI)
Policy type	Grants
Targeted sector(s)	Residential, Commercial, Public

Targeted actor(s)	Local governments, Tertiary education institutions
Implementation period	Since 2009
Implementation body	Ministry of Environmental Protection and Regional Development
Website	n/a
Renovation depth	n/a
Supported interventions	Energy performance Improvement measures in buildings in both public and private sectors.
Budget	In total, by the end of 2013, in the framework of sale transactions, funding of approximately EUR 200 million was obtained, of which approximately EUR 126 million were allocated to project submission tenders for implementation of energy performance measure in buildings.
Brief description	The Climate Change Financial Instrument (CCFI) contains funds obtained by selling the State owned greenhouse gas emission units in compliance with the procedure stipulated in Article 17 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, that are used to eliminate climate change correspondingly to the principles and priorities defined in the Law "On Participation of the Republic of Latvia in the Flexible Mechanisms of the Kyoto Protocol". The objective of the CCFI is to promote the prevention of global climate change, adjustment to the effects of climate change and reduction of greenhouse gas emission. Operation of the CCFI was launched in 2009 after, in the framework of the international emission trading, the first contracts were signed for the sale of assigned amount units (AAU).
Impact so far	CCFI-10 Tender Low energy consumption buildings: 9.1 GWh final (2014); 64 GWh (2020). CCFI-6 Tender Complex solutions for greenhouse gas emission reduction in production buildings: 100.7 GWh final (2015); 93 GWh (2020). CCFI-1 Tender Energy efficiency improvement in municipal buildings: 79.5 GWh final (2015); 15 GWh (2020)

Name of measure	Emissions Auctioning Financial Instrument (EAAI)
Policy type	Grants
Targeted sector(s)	Public
Targeted actor(s)	Public authorities, Local governments
Implementation period	Since 2016
Implementation body	Ministry of Environmental Protection and Regional Development
Website	n/a
Renovation depth	High
Supported interventions	Energy efficiency measures in public buildings
Budget	By the end of 2018, funding of EUR 50 million was allocated to four open project tenders for implementation of energy performance measures in buildings.
Brief description	The EAAI is national green investment scheme aimed at tackling global climate change, supporting adaptation to the consequences of climate change and reducing GHG emissions in accordance with national legislation on pollution. EAAI is funded directly from revenues of auctioning of emission allowances. Operation of the EAAI was launched in 2012, the first open tenders were organized in 2016.
Impact so far	The implementation of 13 projects within two open EAAI tenders continued. Two of these projects have already been completed. It is planned to achieve 989 t. CO ₂ emission reduction.

3.17 Lithuania (LT)

Name of measure	Lithuanian Environmental Investment Fund
Policy type	Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Energy Suppliers, Large Enterprises, SMEs
Implementation period	Since 1999
Implementation body	Central Government
Website	(Lithuanian Environmental Investment Fund (Official Gazette 2003, No 85-3890; 2010, No 112-5700; 2011, No 46-2206)
Renovation depth	n/a
Supported interventions	n/a
Budget	EUR 2.67 million during 2013-2016. Source of finances is 30% of taxes levied on environment pollution.
Brief description	The main focus of the Fund is on projects related to the reduction of atmospheric emissions of pollutants and greenhouse gases; support is also given to energy efficiency investments. The LEIF programme gives support to beneficiaries in the form of subsidies with maximum ceiling per beneficiary of no more than EUR 200 thousand for three years. The subsidy may cover up to 80 % of total eligible costs.
Impact so far	In 2012, financing was appointed to 7 projects, which were implemented by industrial enterprises with EUR 199.84 LEIF support. Energy savings achieved are 4300 MWh. Till the end of 2020, it is expected to save 34.4 GWh. Total project value more than EUR 0.6 million. Condensing economizer of 1.98 MW for 10 MW biomass boiler was installed. During 2013-2016 financing was appointed to 21 new energy efficiency projects the subsidy to which was EUR 2.67 million.

Name of measure	Upgrading of multi-apartment buildings
Policy type	Grants/Subsidies; Loans
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	2005-2020
Implementation body	Central government, financial institutions, local government
Website	http://amiestas.lt/teisine-baze/ (Decision of the Government N° 1213 of 23 rd September 2004)
Renovation depth	<i>Medium</i>
Supported interventions	- Energy efficiency measures such as reconstruction and change of heat and hot water supply systems; installation of equipment using renewable energy sources; improvement of heat isolation of pipe works; reconstruction of ventilation system; roof, walls insulation; change of outside doors, windows; modernization of elevators. Other measures: reconstruction of other engineering systems (sewage system, electricity installation, drinking water supply system, etc.).
Budget	With reference to data of Housing Energy Saving Agency of Lithuania (2017), an average cost of contracted works when modernizing multifamily houses is about 195 EUR/m ² in 2017, compared to 2016, when the price stood at about 191 EUR/m ² , the price remained rather stable.
Brief description	The programme promotes energy upgrades of multi-apartment buildings and fuel cost reductions related to thermal energy in flats built up to the technical standards of construction valid up to 1993 by at least 20% by the end of 2020. That is, by 2020 the estimated annual cost of thermal energy (fuel) in these houses must be reduced by at least by 1000 GWh per year compared to 2005. This corresponds to a reduction of carbon dioxide emissions by at least 230 kt per year compared to 2005.

Impact so far	<p>Saving in total energy [PJ]: 0.091 (2014); 0.497 (2015); 0.749 (2016). Results:</p> <ul style="list-style-type: none"> - in 2012, 37 multifamily houses were renovated, their useful area is 87036.13 thousand m²; - during 2005-2012, 479 multifamily houses were renovated, their useful area is 1276898.78 thousand m²; - in 2013, 41 multifamily houses were renovated, their useful area is 57582 thousand m²; - during 2013-2017 (20th October 2017) 1773 multifamily houses were renovated. Such an increase is due to a new model for modernization of multifamily houses.
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Name of measure	Energy efficiency improvement in the household sector (Special programme for climate change)
Policy type	Grants/Subsidies; Loans
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	Since 2012
Implementation body	Central government, financial institutions
Website	((1) THIRD ENERGY EFFICIENCY ACTION PLAN 2014 LITHUANIA; (2) Law on the Financial Instruments for Climate Change Management)
Renovation depth	<i>Low</i>
Supported interventions	General (essential) repair of cold and hot water supply systems; change and replacement of heating and ventilation systems; change of windows and outside doors; insulation of roofs, floor and walls; installation of solar collectors, wind power plants, geothermal plants; installation of biomass boilers.
Budget	Budget and financial source: EUR 2.39 million in 2016 and using financial resources as they are provided in Law on Climate Change Financial Instruments.
Brief description	<p>The measure consists of two sub-measures:</p> <ul style="list-style-type: none"> - sub-measure "Modernization of living houses to reduce at least 20 percent of energy consumption and to reach at least C energy efficiency class", which approved support for 720 projects during 2012–2016. Total sum of investment is EUR 4.1 million (174 projects are approved for the support in 2016). - sub-measure "Use of renewable energy sources in individual living houses", which approved support for 1212 projects during 2012–2016 (342 projects with an amount of EUR 1.18 million are approved for the support in 2016).
Impact so far	Saving in total energy [PJ]: 0.262 (2016).

Name of measure	Programme for Improving Energy Efficiency in Public Buildings
Policy type	Grants/Subsidies
Targeted sector(s)	Tertiary
Targeted actor(s)	General Public
Implementation period	2014-2020
Implementation body	Central Government, Local Authorities
Website	(Programme for Improving Energy Efficiency in Public Buildings)
Renovation depth	n/a
Supported interventions	Modernization of heating and hot water engineering systems; modernization and installation of cooling systems; insulation of roof; insulation of building envelopes; change of doors and windows; modernization of lighting; modernization of boiler houses in upgraded buildings.
Budget	Budget and financial source EUR 29 million: State funds, municipality budget, private funds, EU Structural Funds.
Brief description	With the view of the indicative national energy efficiency target for

	2030, Lithuania has implemented "Renovation of public buildings belonged to central government" measure using the support of the EU structural funds for the period 2014-2020. The aim is to increase EE in public buildings, which are owned by state and municipalities. It is planned that till 2020, 700 thousand m ² of public buildings will be renovated, from which 470 thousand m ² of state public buildings and 230 thousand m ² of municipality buildings.
Impact so far	Total energy savings [GWh]: 4.73 (2014); 7.94 (2015); 171.5 (2016). Saving in CO ₂ : 14 (2020).

3.18 Luxembourg (LU)

Name of measure	PRIME House financial aid programme
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	Since 2013
Implementation body	My Energy
Website	http://www.myenergy.lu (Règlement grand-ducal du 18 décembre 2012 au Memorial A-No 264; Legal basis: Journal Officiel du Grand-Duché de Luxembourg A-No 70 6 Septembre 1993)
Renovation depth	n/a
Supported interventions	Solar thermal installations; Solar PV; Heat pumps; Wood boilers
Budget	Individual homeowners can benefit from up to EUR 15 000 for buildings of low energy consumption. Less energy efficient households for renovation and installations or energy efficient and renewable energy technologies can receive up to EUR 40 000 in grants.
Brief description	The regulation of 12 th December 2012 sets up a new financial aid scheme called "PRIME House". The regulation went into force on 1 st January 2013 superseding regulation in force between 2008 and 2012. The scheme provides financial support in the form of grants for projects aiming to generate energy savings and use renewable energy sources in the building sector. The scheme focuses on renovation and improvement of existing buildings as well as new buildings.
Impact so far	n/a

Name of measure	Promotion of energy renovation of residential buildings
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	2013-2020
Implementation body	Central Government
Website	http://legilux.public.lu/eli/etat/leg/rgd/2016/12/23/n40/io
Renovation depth	n/a
Supported interventions	Thermal insulation of building envelope; use of mechanical ventilation system
Budget	A state budget of between approx. EUR 5 million and EUR 9 million has been allocated over the period.
Brief description	The support provides a financial incentive for energy renovations of existing residential buildings in accordance with the Energy Efficiency Regulation. Subsidies are granted for improving the thermal insulation of the building envelope and for the use of a mechanical ventilation system. Prior to the renovation, the provision of energy advice is mandatory, which is also subsidised. The better the standard achieved, the higher the subsidy. For extensive energy renovations, which result

	<p>in a thermal insulation class C, B or A, the grants were doubled as compared to the previous promotion programme. An additional increase of the amount of support compared to the previous promotion programme becomes available if ecological construction materials are used.</p> <p>The effect of the measure may manifest for several years after the respective closing date.</p>
Impact so far	Final energy savings: 12 GWh (2013-15); 47 GWh (2020)

Name of measure	Promotion of solar systems and heat pumps in residential buildings
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	2013-2020
Implementation body	Central Government
Website	http://legilux.public.lu/eli/etat/leg/rqd/2016/12/23/n40/jo
Renovation depth	n/a
Supported interventions	Improve energy efficiency of heating systems in existing and new residential buildings; solar thermal systems and heat pumps
Budget	A state budget of between approx. EUR 9 million and EUR 14 million per year was allocated over the period.
Brief description	The programme, which entered into force on 1 st January 2017, stipulates additional grants in the case of the combined use of a solar thermal system and a heat pump, or a biomass boiler.
Impact so far	Final energy savings: 10 GWh (2013-15); 28 GWh (2020). The total number of supported systems was 246 in 2013, 450 in 2014 and 585 in 2015. 644 applications were submitted in 2016, but this number may rise further. For the purpose of the trends of the number of supported cases, an annual increase of 10 % is assumed up to 2020, which takes into account the budget estimation of the responsible administration.

Name of measure	Klimabank loans
Policy type	Loans
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Owner-occupiers, private individuals, legal entities
Implementation period	Since 2017
Implementation body	Climate Bank
Website	www.legilux.public.lu/eli/etat/leg/loi/2016/12/23/n23/jo www.legilux.public.lu/eli/etat/leg/rqd/2016/12/23/n43/jo www.myenergy.lu/fr/particuliers/lois-et-reglements/soutien-financier#prets-climatiques
Renovation depth	n/a
Supported interventions	Renovation projects, replacement of technical installations, and in the case of interest-free loans, initial energy advice in relation to residential buildings
Budget	The interest-free loans for low-income households, which are fully secured by the state, cover the initial energy consulting costs and subsequent renovation works and may not exceed EUR 50 000 over a maximum term of 15 years. They can be combined with a one-off capital grant amounting to 10 % of the borrowed capital to reduce the total amount to be repaid (maximum EUR 5 000). The reduced interest loans can be used by any natural persons and legal entities and is limited to an amount of EUR 100 000 per residential building over a term of 15 years with a 1.5 % subsidy on the interests of the bank. They support energy efficiency improvements in residential buildings which are at least 10 years.
Brief description	Klimabank, which entered into effect in January 2017, aims to offer

	financial support in the form of reduced interest loans to private individuals and legal entities, as well as support of low-income households through an interest-free loan. Although not technically a bank but a system of financial aid, it is complementary to the PRIME House programme and gives the possibility for applicants to benefit from both types of financial aids using the same support criteria.
Impact so far	n/a

3.19 Malta (MT)

Name of measure	Financing Schemes and instruments and fiscal incentives
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	General Public, Owner-occupiers
Implementation period	2014-2020
Implementation body	Central Government
Website	n/a
Renovation depth	n/a
Supported interventions	<ul style="list-style-type: none"> - Incentive Scheme for Building Envelope Improvement (Double Glazing); - Incentive Scheme for Building Envelope Improvement (Roof Insulation); - Energy Efficiency in Low Income Houses in MED Grant Scheme; - Scheme for the Installation of Heat Pumps (Domestic); - Energy Efficiency for vulnerable groups; - Energy Efficiency Support Scheme.
Budget	n/a
Brief description	Financing schemes/instruments and fiscal incentives to incentive target sectors to adopt more energy efficient technologies. Measures aim to target the residential, industrial, commercial and transport sectors.
Impact so far	Cumulative End Use Energy Savings in kWh: 235 652 079 (2017); 691 748 336 (2020). A total annual end-use savings of 86 682 MWh were achieved in 2017 through measures falling in the category 'Financing Schemes and Instruments and Fiscal Incentives'.

3.20 Netherlands (NL)

Name of measure	Subsidy schemes (IRE, MEI, UKR, Clean and Efficient Demonstration Projects)
Policy type	Grants/Subsidies
Targeted sector(s)	Commercial
Targeted actor(s)	SMEs
Implementation period	Since 2007
Implementation body	Central Government, Energy Agencies
Website	n/a
Renovation depth	<i>High</i>
Supported interventions	Energy efficiency measures and efficient energy systems.
Budget	n/a
Brief description	<p>Various schemes exist to support the development of and investment in energy efficiency measures and efficient energy systems.</p> <p>The subsidy programme '<i>Investments in Energy Saving</i>' (IRE) offers companies in the greenhouse cultivation a subsidy of 25% for measures to increase energy efficiency. The maximum amount of subsidy for each investment can vary.</p> <p>The programme '<i>Market Introduction of Energy Innovations</i>' (MEI)</p>

	<p>started in 2007. Investments in semi-closed greenhouses should result in a local reduction in CO₂ emissions of at least 25%.</p> <p>The '<i>Unique Opportunities Scheme</i>' (UKR) supported projects in which market parties and other stakeholders cooperate towards the transition to a sustainable energy system. The scheme subsidizes up to 40 % of the part of the investment that is not cost-effective.</p> <p>The '<i>Clean and Economical demonstration projects scheme</i>' supports since 2011 demonstration projects, which must involve the application of renewable technologies that produce energy savings, the use of renewable energy and a reduction in the emission of greenhouse gases. The subsidy can be granted for up to 50% of eligible costs and 70% if the project is carried out by a partnership of agricultural companies.</p>
Impact so far	n/a

Name of measure	Reduced VAT rate on labour costs for insulation and glass and for maintenance and renovation of residential buildings ("Verlaagd BTW tarief")
Policy type	Tax benefit
Targeted sector(s)	Residential
Targeted actor(s)	Housing associations, landlords, owner-occupiers, housing associations, landlords, owner-occupiers
Implementation period	Since 2009
Implementation body	Central government, central government
Website	https://www.belastingdienst.nl/wps/wcm/connect/bldcontentnl/belastingdienst/zakelijk/btw/tarieven_en_vrijstellingen/diensten_6_btw/werkzaamheden_aan_woningen/isoleren_van_woningen http://www.eib.nl/pdf/evaluatie_stimuleringspakket_woningbouw.pdf
Renovation depth	<i>Medium</i>
Supported interventions	<p>Encouraging energy-saving investments: installing insulation material and (insulating) windows.</p> <p>The floor, roof and facade insulation should have an Rc value $\geq 2.5 \text{ m}^2 \text{ K/W}$; in case of insulation of the floor, the insulation should have an Rc value $\geq 1.1 \text{ m}^2 \text{ K/W}$.</p>
Budget	n/a
Brief description	<p>All consumers in the Netherlands pay VAT when acquiring energy saving measures, which is why the reduced VAT rate is applied very frequently for energy saving measures.</p> <p>This measure is for reduced VAT rate related to on energy-saving measures on residential buildings. It started on 1st July 2009 and changed in details over the years. The lower VAT results in lower the cost for energy savings measures for home owners. Additional to energy saving the measure should also result in additional work for the construction companies.</p> <p>The first (planned temporary) reduction of the VAT rate from 19 to 6 % started by 1st July 2009. This reduction of the VAT rate was applicable for energy-saving measures on homes and for all labour costs for renovation and restoration work performed in and on the home. Also on the materials used during this work for energy-saving measures the construction companies were allowed to apply the lower VAT rate.</p> <p>From 1st January 2010 the reduction of the VAT on insulation materials was restricted to those situations that the costs of the materials were smaller than the labour costs. It continued to be reduced for labour costs.</p> <p>Since 1st January 2014 the VAT rate for insulation materials is back on the normal level of 21%. The reduced VAT rate is only on labour costs for insulation and glass and for of maintenance and renovation of residential buildings continued to be a temporary measure. It was continued by January and October 2010, July 2011, March 2013, January 2014 and it was foreseen to last until 1st July 2015. But the measure continues still in 2016. The reduced VAT is only applicable for houses that are at least two years old. The programme was included in</p>

	the 2 nd and in the 3 rd Dutch NEEAP.
Impact so far	n/a

Name of measure	Nationaal Energiebespaarfonds (National Revolving Fund for Energy Saving)
Policy type	Loans
Targeted sector(s)	Residential
Targeted actor(s)	Homeowners; Housing associations; Owners' associations
Implementation period	Since 2014
Implementation body	Central Government; Financial institutions
Website	https://www.energiebespaarlening.nl/
Renovation depth	<i>Low</i>
Supported interventions	Encouraging investments in energy-saving in existing buildings; National Revolving Fund for Energy Saving
Budget	EUR 170 million of Central Government funds are available for the three funds together (owner-occupiers, landlords and owners' associations). The fund for owner-occupiers was launched in early 2014 with EUR 225 million of co-financing from Rabobank and ASN Bank. The Nationaal EnergiebespaarFonds (National Revolving Fund for Energy Saving) further lowered the interest on energy saving loans in the first half of 2016, thanks to a government grant of EUR 10 million. By November 2016 almost EUR 57 million in loans for energy saving measures had already been issued.
Brief description	The National revolving Fund for Energy Saving for owner-occupants has been operational since 21 st January 2014. Since June 2015 it also provides loans to owners' associations consisting of 10 or more apartments. The fund for landlords has been operational since 2014. De Stichting Fonds Duurzaam Funderingsherstel (Fund for the Sustainable Repairing of Foundations) was established on 28 th March 2017. The Central Government uses revolving funds for loans for energy-saving measures in the built environment (existing buildings). This measure encourages energy-saving and employment and ensures that housing remains affordable for Dutch households if energy prices rise.
Impact so far	n/a

Name of measure	Energy-saving at Home subsidy scheme (Subsidieregeling Energiebesparing Eigen Huis)
Policy type	Subsidy
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers and owners' associations
Implementation period	Since 2016
Implementation body	Netherlands Enterprise Agency; Central government
Website	https://www.rvo.nl/subsidies-regelingen/subsidie-energiebesparing-eigen-huis
Renovation depth	<i>Low</i>
Supported interventions	Energy saving in private housing stock: wall insulation, cavity wall insulation, roof insulation, floor or ground insulation and replacing windows with low-emissivity glass.
Budget	A total of over EUR 56 million has been made available as a subsidy for energy saving measures. The funds have been spread across the years 2016, 2017 and 2018 in the budget.
Brief description	Owner-occupants and homeowners' associations have been able to apply for a subsidy from the Netherlands Enterprise Agency since 15 th September 2016 as a stimulus to extend energy saving measures. The subsidy, which comprises approximately 20 % of the investment, will only be issued when at least two of the energy saving measures (see supported interventions) is performed. When at least two energy saving measures are implemented under this

	<p>requirement, the owner-occupier or owners' association can also receive an additional subsidy for further energy saving measures, such as insulating doors or customised recommendations.</p> <p>Owner-occupants and owners' associations that implement an extremely energy efficient package of measures receive a bonus over and above the subsidy of EUR 4 000 per home. As a rule, such a package is considered to be renovating a home, for example, so that it becomes zero-energy.</p> <p>Aside from this subsidy, EUR 4.5 million is available in subsidies specifically for owners' associations for energy recommendations, a long-term maintenance plan involving energy saving measures (green LTMP) and process guidance. The intention of this subsidy is to provide guidance to owners' associations in the transition to energy saving measures.</p>
Impact so far	n/a

Name of measure	The STEP subsidy (Incentive scheme for energy performance in the rental sector)
Policy type	Subsidy
Targeted sector(s)	Residential
Targeted actor(s)	Social rental sector, housing associations, landlords
Implementation period	Since 2014
Implementation body	Central government
Website	http://www.rvo.nl/subsidies-regelingen/offici%C3%ABle-bekendmakingen-stimuleringsregeling-energieprestatie-huursector-step
Renovation depth	Low
Supported interventions	n/a
Budget	EUR 400 million subsidies available for landlords in the social rental sector for investments during the 2014-2018 period.
Brief description	<p>The STEP-subsidy encourages a substantial wave of short-term investments to make residential rental properties energy-efficient. Since 2016, the subsidy sums have been raised. This increase applies to new applications and with retroactive force for subsidies already awarded.</p> <p>The extremely energy efficient renovations such as nearly zero energy homes or energy-neutral homes receive a greater subsidy than previously.</p> <p>The minimum improvement under the Energy Index is, for a number of specific cases, lowered from class 3 to class 2. This means that more houses will be eligible for a subsidy.</p>
Impact so far	<p>By 1st October 2016,175 applications were submitted for STEP grant; this is about EUR 103.5 million requested from the budget available for STEP. 907 applications were granted subsidies to a total amount of EUR 90.3 million.</p> <p>In the National Energy Outlook 2016 it is expected that the STEP scheme could result in an additional energy saving of about 0.7 PJ.</p>

Name of measure	Energy Investment Allowance (EIA)
Policy type	Tax reduction
Targeted sector(s)	Tertiary (Commercial offices, Distribution and warehousing, Hotel and catering, Other sectors, Retail, Sport and leisure)
Targeted actor(s)	Entrepreneurs from all sectors that pay income or corporation tax (excluding households, public bodies and the non-profit-making sector); Employers; Energy Managers; Account; Large Enterprises; SMEs
Implementation period	Since 1997
Implementation body	Central Government

Website	https://www.rvo.nl/subsidies-regelingen/energie-investeringsaftrek-eia https://zoek.officielebekendmakingen.nl/blg-251649.pdf https://www.jaarverslagenrvo.nl/eia/2017/01/index
Renovation depth	<i>High</i>
Supported interventions	EIA applications can be made for the purchase or manufacturing costs of energy-efficient equipment. The energy-efficient equipment must save more energy than the prevailing equipment available on the market.
Budget	As of 1 st January 2017 the allowance percentage has been reduced from 58 % to 55 %. Changes to the EIA scheme between 2014 and 2018: - Available budget (in millions of EUR): 111 (2014); 101 (2015); 161 (2016); 166 (2017); 149 (2018); - Rate deducted from taxable profit: 41.5 % (2014); 41.5 % (2015); 58 % (2016); 55 % (2017); 55 % (2018).
Brief description	The Energy Investment Allowance (EIA) is a fiscal measure that offers the possibility of an additional allowance on taxable profit. EIA applications can be made for the purchase of designated energy-efficient equipment. From 2013 to 2015 the EIA deduction rate was 41.5 %, meaning that the tax advantage – based on a corporate tax rate of 25 % – was roughly 10 %. As of 1 January 2016 the rate of deduction was increased to 58%, raising the tax advantage to approximately 14.5%. The result is an additional stimulus for energy saving. An investment may relate to (a part of) equipment that is eligible both for the EIA and for other fiscal measures (Small-Scale Investment Allowance (Kleinschaligheidsinvesteringsaftrek (KIA)), VAMIL and/or MIA). You cannot use both the EIA and MIA for the same investment element, although it is possible to combine the EIA or MIA with VAMIL.
Impact so far	Energy savings and investments with the EIA 2006-2011: - Saving in Nm ³ natural gas equivalent: 4 349; - Na correction for free riders: 2 801; - Investment amount for which EIA was ultimately awarded: EUR 5 509 million.

Name of measure	Energy saving and renewable energy subsidy scheme in sports facilities "Subsidieregeling Energiebesparing en duurzame energie sportaccommodaties")
Policy type	Grants/subsidies
Targeted sector(s)	Commercial (sport facilities)
Targeted actor(s)	Sports foundations/associations
Implementation period	n/a
Implementation body	Netherlands Enterprise Agency
Website	https://www.rvo.nl/subsidies-regelingen/subsidieregeling-energiebesparing-en-duurzame-energie-sportaccommodaties
Renovation depth	<i>n/a</i>
Supported interventions	Energy efficiency measures; Renewable energy technologies
Budget	EUR 6 million (2017)
Brief description	From 1 January 2019, this scheme is incorporated into the new subsidy scheme for the promotion of construction and maintenance of sports facilities. The Subsidies Implementation Service to Institutions (DUS-I) implements this subsidy scheme.
Impact so far	n/a

Name of measure	Sustainable Energy Investment Grant ("Investeringssubsidie duurzame energie, ISDE")
Policy type	Grants/subsidies

Targeted sector(s)	Residential; Commercial
Targeted actor(s)	Households, housing associations, businesses
Implementation period	Since 2019
Implementation body	Netherlands Enterprise Agency
Website	https://www.rvo.nl/subsidies-regelingen/investeringsubsidie-duurzame-energie-isde
Renovation depth	n/a
Supported interventions	Solar water heaters, heat pumps, biomass boilers and pellet stoves
Budget	EUR 160 million (2019)
Brief description	The Sustainable Energy Investment Grant (ISDE) supports the purchase of solar boilers, heat pumps, biomass boilers and pellet stoves. The scheme is for both private individuals and business users.
Impact so far	n/a

3.21 Poland (PL)

Name of measure	Subsidised loans for the construction of energy efficient houses
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	2013-2018
Implementation body	National Fund for Environmental Protection and Water Management (NFOŚiGW)
Website	http://www.nfosigw.gov.pl/oferta-finansowania/srodki-krajowe/programy-priorytetowe/lemur-energooszczedne-budynki-uzytecznosc-publicznej/
Renovation depth	n/a
Supported interventions	n/a
Budget	The energy-efficient housing programme offers grants of PLN 50,000 (EUR 12 500) to people who build new or renovate their old homes and whose retrofitted houses use no more than 15 kWh/m ² annually from external sources of heating and electricity. Homes which use no more than 40 kWh/m ² annually will receive PLN 30 000 (EUR 7 500). A budget of Polish Zloty (PLN) 300 million (around EUR 75 million) is expected to support at least 12 000 energy homes and flats over a period of five years.
Brief description	The program targets individuals building a single-family house or buying house/apartment from the developer (including as a housing association). The support takes the form of a partial repayment of the bank loan capital. One of the conditions for obtaining support is achieving the required demand for usable energy by meeting the conditions included in the guideline document, which are as follows: minimum technical requirements, requirements for the construction design, requirements for completed project, and ensuring the quality of construction works. Standards NF40 and NF15 for residential buildings lay down a set of requirements developed specifically for the needs of this financing programme, and are in many respects stricter and broader than those arising under applicable laws and the definition of a low-energy building.
Impact so far	Under the agreements concluded to date, co-funding of approximately PLN 12.4 million (EUR 2.92 million) has been granted for the construction of 349 single-dwelling buildings. The average area of a newly constructed low-energy house is 132.5 m ² , while the indicator of the average demand for usable energy for heating and ventilation

purposes (EUco) averages 26.4 kWh/(m²·year).

Name of measure	Operational Programme Infrastructure and Environment 2014-2020
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Public
Targeted actor(s)	General Public, Owner-occupiers
Implementation period	2014-2020
Implementation body	Central Government
Website	n/a
Renovation depth	n/a
Supported interventions	Support is available for deep, all-comprising energy-related refurbishment of public and residential buildings: insulation of the building, replacement of windows, external doors, and replacement of lighting with energy-efficient lighting; retrofit of heating systems, ventilation and air-conditioning systems, and installation of weather-sensitive building automation and building management systems; construction or refurbishment of internal receiving installations, and removal of existing heat sources; installation of micro-generation or micro-trigeneration for own needs; installation of RES in buildings undergoing thermomodernisation, installation of cooling systems, including those based on RES.
Budget	EUR 431.10 million (including public buildings – EUR 205.52 million and the housing sector – EUR 225.58 million), from EU funds (the Cohesion Fund).
Brief description	Improving energy efficiency in multi-dwelling residential buildings (measure 1.3.2) and in public buildings (measure 1.3.1). Under the investment priority, support is granted to public authorities, including state budgetary entities and central government administration, as well as their subordinate bodies and organisational entities, housing cooperatives and housing associations, state legal persons, and energy service providers within the meaning of Directive 2012/27/EU.
Impact so far	n/a

Name of measure	Clean Air Programme
Policy type	Grants/Subsidies; Loans
Targeted sector(s)	Residential
Targeted actor(s)	Homeowners
Implementation period	Since 2018
Implementation body	National Fund for Environmental Protection and Water Management; Voivodeship Funds for Environmental Protection and Water Management;
Website	https://www.gov.pl/web/environment/minister-kowalczyk-on-the-clean-air-programme
Renovation depth	n/a
Supported interventions	Energy saving in private homes: insulation and efficient heating systems
Budget	EUR 25 000 million. The Clean Air Programme launched by the Polish government
Brief description	The aim of the Clean Air Programme is to guarantee the thermal modernisation of 4 million homes (in 10 years) in order to contribute to the improvement of air quality and citizens' health. The amount of financing granted as part of the Clean Air priority programme varies from 30 to 90% subsidy of the eligible investment costs, depending on the income per capita in the household. In particular, homeowners with the lowest income may apply for a subsidy of up to 90% of eligible costs of thermal modernisation, and the amount of subsidy support may not exceed EUR 12 087 (PLN 53 000).
Impact so far	The scheme needs nearly half a million applications every year to hit its

	target. Only 7 500 contracts have been completed so far. The programme is in danger of losing EU support due to a dispute on how it is managed).The programme is currently undergoing modifications. As of the 28 th of June 2019, the number of submitted applications amounted to nearly 64,000, for a total amount of EUR 342 million (PLN 1.5 billion). The highest number of applications was submitted in Katowice, Krakow and Warsaw. To date, nearly 26 000 positive decisions granting the subsidies have been made. The total value of the contracts signed to date amounts to EUR 68 million (PLN 300 million) in total.
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3.22 Portugal (PT)

Name of measure	Energy Efficiency National Fund
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	General public, landlords, owner-occupiers
Implementation period	Since 2010
Implementation body	Ministry of Environment, Spatial Planning and Energy
Website	https://www.iea.org/policiesandmeasures/pams/portugal/name-24739-en.php http://www.buildup.eu/en/explore/links/energy-efficiency-fund-portugal (Decree-Law n° 50/2010, 20 May)
Renovation depth	n/a
Supported interventions	Predominantly technology-oriented projects in transport, residential and services, industry and public sector; action-oriented cross-inducing energy efficiency in the areas of behaviour, taxation and incentives and financing; projects not covered by the National Energy Efficiency Action Plan but which demonstrably contribute to energy efficiency.
Budget	Initial allocation of EUR 1.5 million
Brief description	The Energy Efficiency Fund is an autonomous asset with no legal personality, established by Decree-Law No 50/2010 of 20 th May to finance programmes that demonstrably contribute to energy efficiency. In addition to the Energy Efficiency Fund, financial support is provided for energy efficiency programmes such as: (1) The Innovation Support Fund (FAI), established by Order N° 32276-A/2008 of 17 th December 2008, which also approved its Management Regulations, subsequently amended by Order N° 13415/2010 of 19 th August 2010, and by Order of the Secretary of State for Energy of 5 th July 2012, which broadened the scope of application of the FAI to projects investing in energy efficiency; (2) Plan for promoting efficient energy consumption (PPEC), promoted by the Regulatory Body for Energy Services (ERSE); (3) Partnership agreement between Portugal and the European Commission, bringing together the 5 European Structural and Investment Funds - ERDF, Cohesion Fund, ESF, EAFRD and EMFF - which define the programming principles under which economic, social and regional development policy to be promoted in Portugal between 2014 and 2020 is delivered.
Impact so far	Achieved results indicate in energy: 12 120 toe final

Name of measure	Financial Instrument for Urban Rehabilitation and Revitalization
Policy type	Soft Loans
Targeted sector(s)	Residential, Commercial, Public (and Urban area)
Targeted actor(s)	Enterprises, public entities, social sector entities, general public, landlords, low-income households
Implementation period	2017-2023

Implementation body	Central public administration, financial institutions
Website	https://ifrru.ihru.pt/
Renovation depth	n/a
Supported interventions	Renovation of entire buildings and promotion of its energy efficiency. To assure that the financing is focused in the real needs, the buildings must be aged 30 years or more, or present a very bad state of conservation, and be located in urban rehabilitation areas locally defined by each Municipality.
Budget	IFRRU 2020 has a financing capacity of EUR 1 400 million, generating an investment of around EUR 2 000 million. RCM n° 84-O/2016 launches the procedure to authorize the expenditure and the selection of financial instruments and their respective managing entities, up to an amount of EUR 70 323 million.
Brief description	IFRRU 2020 is a financial instrument aimed to support investments in urban renewal that covers the entire Portuguese territory. It aims to promote the improvement of cities sustainability and improving people's life quality, creating new opportunities for economic and social development in urban centres. In order to boost investment, IFRRU 2020 brings together various sources of financing, whether European funds of PORTUGAL 2020, whether funds from other entities such as the European Investment Bank and the Development Bank of the Council of Europe, combining them with funds from commercial banking.
Impact so far	<i>Impact expected:</i> increase of the resident's satisfaction level in the intervened areas (2023); urban rehabilitation is expected to account for 23 % of the turnover in the construction sector (2030); 30% of energy consumption reduction in household sector (2030). <i>Impact in so far</i> (based on contracts and not on finalized projects): more than 1.4 thousand jobs created; more than 600 new residents; 10 788 tep is the predicted annual reduction of the consumption of primary energy in the renewed buildings.

Name of measure	Casa Eficiente 2020
Policy type	Soft loans
Targeted sector(s)	Residential (buildings or its fractions owners, condominiums)
Targeted actor(s)	General public - building owners, tenants, condominium associations, other actors that have the legal right to execute the interventions.
Implementation period	2018-2021
Implementation body	Promoted by the Portuguese State - Executed by CPCI - Portuguese Confederation for Construction and Real Estate. Technical support from the Portuguese Environmental Agency (APA), Portuguese Company of Water (EPAL) and ADENE (Agency for the Energy)
Website	https://casaeficiente2020.pt
Renovation depth	n/a
Supported interventions	Interventions on Energy Efficiency, RES, Hydric efficiency, Urban Waste management projects. Intervention can be on Envelope (walls, roofs, windows) and Energy Systems (lighting systems, ventilation, solar water, sanitary and water systems). The financed expenses: civil construction works and other engineering works; acquisition of equipment, management and monitoring systems, technologies, materials and software; replacement of appliances for more efficient models (if the amount is no greater than 15% of the eligible value for the intervention).
Budget	EUR 200-100 million from the EIB and EUR 100 million from commercial banks.
Brief description	The "Casa Eficiente" programme aims to give loans at competitive interests for interventions that promote the environmental performance of residential buildings. Main focus on energy efficiency and hydric efficiency, but also Waste management. The interventions may include in

	<p>envelope or energy systems.</p> <p>Besides the BEI, there are three national banks financing the interventions (Caixa Geral de Depósitos - State bank; Banco Millennium BCP and Novo Banco).</p> <p>The programme rolls out with 1) the participant preparing the application in the "Casa Eficiente 2020" portal, 2) gets a budget estimate from one of the construction companies listed in a list and 3) submits its application within one of the participating banks.</p>
Impact so far	<p>Expected impacts (only qualitative): improve energy efficiency in the residential sector, promote RES use, improve hydric efficiency in the residential sector, optimize urban waste management, remove hazardous materials for the environment, increase the quality of the buildings and improve quality of life of its occupants, stimulate environmentally responsible behaviours, Strengthen the civil construction sectors, create jobs.</p>

Name of measure	Fundo Nacional de Reabilitação do Edificado (FNRE)
Policy type	Fund; Tax exemptions
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	State, municipal and other public entities and 3 rd sector entities owning devolute buildings (1 st stage), Privates (2 nd stage)
Implementation period	Since 2016
Implementation body	Fundiestamo - "Real Estate Investment and Funds Management Society" - Formed by Decree: DL 209/2000 (2 nd September). It is a company managed by the "Grupo Parpública" a state organization responsible for managing the state's assets.
Website	http://www.fundiestamo.com/index.php/fundos/area-fnre
Renovation depth	Deep and light renovations
Supported interventions	The sub-funds decide what type of intervention is needed in the building.
Budget	n/a
Brief description	<p>The creation of the Fundo Nacional de Reabilitação do Edificado (FNRE) was decided by the Ministers Council Resolution n° 48/2016. It is a special investment fund, closed, of private subscription and undetermined duration. It is a fund of sub-funds.</p> <p>The objective of FNRE is to develop renovation projects, with the objective to increase renting, especially housing, with the intention to increase urban regeneration. In the scope of FNRE it is foreseen the constitution of sub-funds, each of these with autonomy of 10 years. Each of the sub-funds can be the owner of one or more building units, and from the same or different municipalities.</p> <p>Municipalities, Private Social Security institutions, Government controlled or supported administration institutions, public institutes all can participate in a first stage. Privates can enter in a second stage.</p> <p>The owners of the buildings, give out their participation in the fund, in exchange of "UP's" - Participation Units. The Fund manages the interventions and maintenance of the building units.</p> <p>Advantages: Tax exemptions, access to other financial instruments for building renovation (IFRRU, Casa Eficiente, etc). The buildings do not need to be all residential, but the sub-funds need at least to have 51 % of the constructed area as residential units. The remainder 49 % can be for other uses: commerce, services, logistics, etc. The funds cannot serve for social housing. Since one of the objectives is to foment the renting for young people and in city centres, the rents will follow the market trends (at a lower price nevertheless).</p>
Impact so far	n/a

Name of measure	1 Direito
Policy type	Soft Loans; Tax exemptions

Targeted sector(s)	Residential (in precarious conditions)
Targeted actor(s)	Families, Municipalities, Buildings owners
Implementation period	2019 - 2024
Implementation body	IHRU - Institute for housing and urban renovation
Website	n/a
Renovation depth	n/a
Supported interventions	<p>Full renovation works, supporting works, safety and construction management services during the works, legal expenses. Materials, designs can also be offered by the municipality and the IHRU (10% of all the construction works).</p> <p>Technical support: the support is given through not refundable financial support and tax exemption - up to 90 %.</p> <p>For renovation works are only eligible for soft loans the energy efficiency measures that allow an increase of two levels in the energy certificate in comparison with the baseline.</p>
Budget	EUR 700 million total: EUR 40 million in 2019, EUR 126 million in 2020, EUR 154 million in 2021, EUR 154 million in 2020, EUR 133 million in 2023, EUR 93 million in 2024.
Brief description	<p>Born from the legislation Decreto-Lei nº 37/2018 (https://dre.pt/application/conteudo/115440317) 1 Direito is a programme of access to housing that should secure the access of an adequate housing for people living in undignified conditions and that don't have the financial condition to access, without a support to a dignified housing solution. Social and territorial inclusions are among the main focus of the programme, with also the aim to promote cooperation between local administration with central administration and private sector.</p> <p>The support is first of all for families to access dignified housing, followed by entities that promote housing solutions like public authorities, owners associations, owners of buildings located in degraded zones.</p> <p>The municipality evaluates the family applications, sends it to the IHRU - Institute for housing and urban renovation that evaluates and suggests changes. The beneficiaries of approved applications then draft a financing agreement.</p>
Impact so far	Expected (April 2019): 6 166 building units supported until 2020.

Name of measure	Reabilitar para Arrendar - Habitação Acessível (Renovate to Rent - Accessible Housing)
Policy type	Soft Loans
Targeted sector(s)	Residential
Targeted actor(s)	Individual or collective agents that own a building to be renovated
Implementation period	Since 2015
Implementation body	IHRU - Institue for housing and urban renovation
Website	https://www.portaldahabitacao.pt/web/quest/o-que-e-rpa-ha
Renovation depth	n/a
Supported interventions	<p>Designs and other connected works including project management, technical assistance; energy efficiency solutions including certification and studies; preparatory studies; works in the common buildings areas, namely regarding envelope and water, electricity, gas stairs and elevators works; works on the inside of the building units.</p>
Budget	EUR 50 million total (EUR 25 million from BEI).
Brief description	<p>With the objective to finance renovation works in buildings older than 30 years and with the objective of renting after the renovation works, the building owners can apply for support at the IHRU which evaluates the interventions to be performed. In case of positive feedback IHRU decides the amount to be loaned and loan conditions. The conditions of the loan are up to 90 % of the works to be performed. The works need to be executed in 36 months maximum after the loan has been</p>

	conceded. The timeline to pay the loan is 180 months with a fixed rate, defined in the moment of approval.
Impact so far	10 projects financed in three years (2015-2018).

3.23 Romania (RO)

Name of measure	National Programme for Improvement of Energy Performance in Apartment Blocks
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	Since 2009
Implementation body	Central government, associations
Website	http://www.mdrap.ro/dezvoltare-regionala/-4970/-7166
Renovation depth	<i>Low</i>
Supported interventions	n/a
Budget	Total annual investment: EUR 60 million (EUR 50 million public; EUR 10 million private). Since 2016: the minimum budget of a project to increase energy efficiency at a residential building is EUR 0.1 million and the maximum EUR 5 million. A project may include more than 10 apartment buildings with at least 2 levels.
Brief description	Under the National Programme for Improvement of Energy Performance in Apartment Blocks, funded in accordance with GEO N° 18/2009, as approved and amended and supplemented by Law N° 158/2011, as subsequently amended and supplemented, energy efficiency works were carried out in the period 2009-2016 in 1 657 apartment blocks in various climatic zones, representing approximately 62 559 apartments.
Impact so far	By 31 December 2015: a number of 138 contracts were concluded, referring to works for increasing the energy performance of 728 blocks of flats, consisting of 30 617 flats; a number of 57 contracts were completed, referring to 248 blocks of flats, namely 12 633 flats. The energy saving thus resulting in the residential buildings included in this programme (approximately 40 % of the final energy consumed prior to restoration of the buildings) was 0.164 PJ in 2015.

Name of measure	Thermal rehabilitation of residential buildings financed by bank loans with government guarantee
Policy type	Loans
Targeted sector(s)	Residential
Targeted actor(s)	General public, housing associations, owner-occupiers
Implementation period	Since 2010
Implementation body	Associations, financial institutions
Website	http://www.buildup.eu/en/explore/links/thermal-rehabilitation-residential-buildings-financed-bank-loans-government-guarantee
Renovation depth	<i>Medium</i>
Supported interventions	Thermal insulation of the building envelope; replacement of exterior woodwork; thermal insulation and waterproofing of flat roof or roof structure; basement floor insulation; repair/replacement of the heating and hot water systems; repair, replacement/purchase of the boiler and the related facilities; introduction of alternative systems for providing partial/total energy for hot water, lighting and/or heating.
Budget	Available budget for 2011: EUR 143.1 million. Works are financed: from beneficiary's own sources, representing

	<p>minimum 10 % from the value of the works; from bank loans, in lei, with government guarantee and subsidized interest, contracted by the beneficiary and 100 % guaranteed by the National Guarantee Fund for Small and Medium Enterprises SA - IFN in the name and for the state, representing maximum 90 % of the value of the works.</p> <p>The reimbursement of the bank loans with government guarantee and subsidized interest is maximum 5 years.</p>
Brief description	<p>The Program runs according to requirements of Government Emergency Ordinance (OUG) N° 69/2010, approved by Law 76/2012 and has as an aim to facilitate the access of owners associations and owners of houses to bank loans with government guarantee and subsidized interest, in order to accomplish thermal rehabilitation works for residential buildings.</p> <p>Thermal rehabilitation of residential buildings and houses, hereinafter called residential buildings, is a public interest action in order to reduce energy consumption at final consumers, with direct impact on decrease of costs for hot water and indirect impact on decrease of conventional fuel and greenhouse gas emissions.</p> <p>The scope of OUG 69/2010 is to facilitate access of owners' associations – non-profit legal persons – and houses owners – natural persons, hereinafter called beneficiary, to bank loans granted by finance institutions, hereinafter called financers, with government guarantee and subsidized interest for works on thermal rehabilitation of residential buildings.</p> <p>The measure is to be applied to residential buildings built and received until the end of 2000.</p>
Impact so far	Final energy savings in final consumption [PJ]: 1.45 (2014); 1.927 (2015); 3.92 (2016).

3.24 Slovakia (SK)

Name of measure	Improvement of thermal technical properties of buildings - Single-family buildings (SFB)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Single family building owners
Implementation period	2014-2020
Implementation body	Associations, energy agencies, financial institutions
Website	(Order No V-1/2006 of the Ministry of Construction and Regional Development)
Renovation depth	<i>Medium</i>
Supported interventions	Improvements in the thermal performance of buildings and building technical systems
Budget	n/a
Brief description	<p>Grant from the Single-family Building Insulation Support Programme via the Ministry of Transport, Construction and Regional Development. A grant is awarded for up to 30 % of the eligible costs of thermal insulation, up to a maximum of EUR 6 000 per single-family building. An allowance of up to EUR 500 is also granted for the production of design documentation and an energy performance certificate. The programme budget is EUR 30 million.</p>
Impact so far	

Name of measure	State Housing Development Fund
Policy type	Soft loans
Targeted sector(s)	Residential (apartment buildings)
Targeted actor(s)	Building professions, general public, housing associations, landlords, owner-occupier
Implementation	2014-2020

period	
Implementation body	Ministry of Transport and Construction, central government, energy agencies, financial institutions
Website	(Act N° 607/2003 amended by the Act N° 349/2007 Coll.)
Renovation depth	<i>High</i>
Supported interventions	Improvements in thermal performance of residential buildings: building envelope, roof, windows, doors, inner walls between heated and non-heated space, etc.
Budget	EUR 533.6 million (2014-2016)
Brief description	The State Housing Development Fund was established in 1996 under Act No 124/1996 on the State Housing Development Fund. It provides support for the expansion and modernisation of housing stock, particularly in the form of long-term loans with lower interest rates than commercial banks. The Fund provides support for improvements in the thermal performance of multi-family buildings with resources from the State Housing Development Fund. Soft loans with reduced interest are granted by the State Housing Development Fund for the renovation of buildings resulting in a 35% reduction in the heat required for space heating compared to the original condition.
Impact so far	

Name of measure	SlovSEFF II and III (for renovation of multifamily buildings)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Building professions, general public, housing associations, landlords
Implementation period	2010-2030
Implementation body	Enviros (consultant), FactorCO ₂ (consultant), Allplan (verification consultant), Slovenská sporiteľna, a.s. (bank), VÚB Bank, a.s., OTP Banka Slovensko, a.s., UniCredit Bank Czech Republic and Slovakia, a.s
Website	n/a
Renovation depth	n/a
Supported interventions	Purchase and installation of equipment, systems and processes for the use of renewable energy sources for the production of electricity and/or heat and/or cooling and/or any other form of energy replacing fossil fuel resources; equipment, systems and processes to reduce the consumption of primary energy, the final consumption of electricity, fuels or other forms of energy for the production of goods and/or the provision of energy services related to the production of goods or the provision of services related to the industrial sector; in residential buildings which are complex, major projects to reconstruct the thermal circumstances of apartment blocks, consisting of thermal insulation of the peripheral envelope (walls, roofs, cellars), together with other measures. The minimum level of energy savings to be achieved is 30% of the total delivered energy assessed as the difference before and after the rehabilitation.
Budget	The EBRD provided EUR 40 million for loan financing. The Spanish government provided EUR 5 693 800 for grants and another EUR 2 million for technical assistance (consulting, energy auditing arrangements, etc.). Of this, about 20 % is intended for apartment buildings.
Brief description	Through the Slovseff III programme, a bonus is provided under the Green Investment Scheme, which is financed by proceeds from greenhouse gas emission allowances. SlovSEFF and SlovSEFF II and III have been developed by the European Bank for Reconstruction and Development (EBRD) as a means for financing sustainable energy projects. SlovSEFF was launched with a value of EUR 60 million and extended in 2010 with additional funding sources of EUR 90 million from the EBRD, intended for local banks. The funding source for grants and technical assistance was the Bohunice International Decommissioning Support Fund (BIDSF). The loan is granted by

	contracted commercial banks and the applicant is entitled to a grant upon reaching the required level of energy savings. Grants under SlovSEFF III are funded from the profits of innovative emission credit transactions between the Slovak and Spanish governments. Under the terms of the contract, Slovakia allocated profits from the sale of permits to projects aimed at reducing additional greenhouse gas emissions in Slovakia. Only private sector entities, including housing companies and cooperatives, are eligible applicants.
Impact so far	n/a

Name of measure	Munseff (for renovation of multifamily buildings)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Building professions, general public, housing associations, landlords
Implementation period	2014-2030
Implementation body	Central government, European Bank
Website	n/a
Renovation depth	n/a
Supported interventions	Improvement of thermal properties of buildings: renovation of the space heating system, replacement of boilers, installation of heat exchanger stations, modernisation of mechanical equipment; replacement of windows and doors with more energy-efficient versions; thermal insulation of buildings; renovation of lighting; installation of solar thermal panels.
Budget	EUR 15.6 million from the European Bank for Reconstruction and Development and 0.3 million from local authorities (2014-2015). The minimum loan per project is EUR 0.02 million; the maximum loan is EUR 0.85 million. Upon the successful completion of project implementation, a multi-apartment building may obtain a grant covering between 10 % and 15 % of the overall loan (one of the requirements is the attainment of energy savings of more than 30 % compared to the situation prior to project implementation).
Brief description	MUNSEFF is a credit line to support the development of energy efficiency and renewable energy sources among towns and municipalities in Slovakia. This support is provided by the European Bank for Renovation and Development. The programme is implemented in Slovakia by Slovenská sporiteľňa, a.s. and Všeobecná úverová banka, a.s. The MUNSEFF programme enables applicants to receive a grant covering part of the loan principal; the amount of the grant depends in part on the scope of the project or the amount of energy saved. Under the MUNSEFF programme, multi-apartment buildings with renovation projects aimed at increasing energy efficiency may apply for soft loans, grants or the free assistance of a design consultant.
Impact so far	n/a

Name of measure	JESSICA schemes for the renovation of multifamily buildings
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Building professions, housing associations, landlords
Implementation period	2014-2020
Implementation body	Central government
Website	n/a
Renovation depth	n/a
Supported interventions	Improvement of thermal properties of multi-family buildings.
Budget	EUR 38.222 million (2014-2016)
Brief description	Support for preparation of the projects through the State Housing

	Development Fund (JESSICA). The energy efficiency of buildings has been boosted in particular by the greater funding available to improve the thermal performance of multi-family buildings via the JESSICA financial mechanism.
Impact so far	

Name of measure	IROP (Integrated Regional Operational Programme)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Building professions, general public, housing associations, landlords
Implementation period	2014-2020
Implementation body	Central government
Website	n/a
Renovation depth	High
Supported interventions	Renovation of multifamily buildings
Budget	EUR 111.4 million (sourced from the EU), of which EUR 101.4 million is earmarked for less-developed regions and EUR 10 million for a more developed region; EUR 139.25 million for 2017-2020
Brief description	Multi-family buildings will undergo major renovation with resources from the IROP (2014-2020) and the <i>Slovseff III</i> programme. Projects under the IROP (2014-2020) are expected to be implemented from 2018 (also for public buildings, including schools, are taken up as quickly as possible).
Impact so far	

Name of measure	Single-family Building Insulation Support Programme (grants for energy renovation)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Housing associations, landlords
Implementation period	2016-2020
Implementation body	Central government
Website	n/a
Renovation depth	n/a
Supported interventions	Building insulation
Budget	In 2016, the single-family building insulation allowance was granted, after insulation had been installed, for 14 single-family buildings in the amount of EUR 56 205; allowances aggregating to EUR 526 500 were reserved for 81 single-family buildings ahead of such insulation. EUR 0.281 million (2014-2016), EUR 40.375 million planned for 2017-2020
Brief description	In 2016, the Single-family Building Insulation Support Programme was announced. A further EUR 30 million from the central government budget was allocated to this programme.
Impact so far	n/a

3.25 Slovenia (SI)

Name of measure	Financial incentives for energy-efficient renovation and sustainable construction of residential buildings
Policy type	Grants/Subsidies; Loans
Targeted sector(s)	Residential
Targeted actor(s)	General public, housing associations, landlords, owner-occupiers
Implementation period	2008-2020

Implementation body	Central government, financial institutions
Website	n/a
Renovation depth	<i>High</i>
Supported interventions	Energy renovation (thermal insulation of shells and lofts, replacement of windows and other building elements); construction of new low energy and passive buildings.
Budget	The necessary public fund for implementing the measures from 2011 to 2016 is estimated at EUR 161 million.
Brief description	Instruments for stimulation of energy renovation of old buildings and for sustainable construction of new low energy and passive residential buildings (houses) are presented. The energy renovation of old buildings includes thermal insulation of buildings and replacement of old and drafty windows. The financial stimulation is designed to support the investment in new energy efficient buildings exceeding minimum standard level.
Impact so far	Savings in total final consumption [PJ]: 0.29 (2008); 0.5 (2010); 1.58 (2016); 2.31 (2020). In the period from 2010 up to and including 2016, financial incentives are used to completely rehabilitate 3.7 million m ² of residential space in single-dwelling and 1.2 million m ² in multi-dwelling buildings, and to construct 0.2 million m ² of low-energy or passive residential buildings. Renovated buildings represent 8 % of the surface area of the entire buildings fund of 2010, and newly constructed buildings a 3 % growth of the floor area from 2011 to 2016. Comprehensive rehabilitation works will be given progressive incentives.

Name of measure	Financial incentives for the energy efficient heating systems in residential and tertiary buildings
Policy type	Grants/Subsidies; Loans
Targeted sector(s)	Residential, Commercial
Targeted actor(s)	Building professionals, housing associations, owner-occupiers, energy managers
Implementation period	2008-2020
Implementation body	Central government, financial institutions
Website	http://www.mzi.gov.si/si/delovna_podrocja/energetika/ucinkovita_raba_energije/
Renovation depth	<i>High</i>
Supported interventions	Replacement of inefficient boilers with high energy efficient devices such as condensing and modular boilers; installation of special biomass boilers with very high efficiency; optimization of heating system operation through investments in thermostatic valves, regulation and hydraulic balance of heating system; ventilation systems with high-efficiency heat recovery from waste air; thermal solar systems; heat pumps.
Budget	The necessary of public fund for implementing the measures in the period 2011-2016 is estimated at EUR 164 million.
Brief description	The goal of these instruments is to progress implementation of energy efficiency measures to decrease the energy consumption for space heating in residential buildings.
Impact so far	n/a

Name of measure	Financial incentives for comprehensive energy renovation and sustainable construction of buildings in the public sector
Policy type	Grants/Subsidies
Targeted sector(s)	Public
Targeted actor(s)	Public sector buildings, Ministries not eligible for cohesion funds (e.g. MORS), municipalities
Implementation period	2017-2020

Implementation body	Ministry responsible for energy, Eco Fund
Website	n/a
Renovation depth	n/a
Supported interventions	Energy renovation of buildings and construction of almost zero energy buildings in the public sector.
Budget	EUR 180 million is foreseen under the Sustainable Energy investment priority, of which EUR 115 million is non-refundable, EUR 50 million is provided for financial instruments, and EUR 15 million will be contributed by the Republic of Slovenia from the integral budget.
Brief description	Financial incentives to finance investments are provided within the Cohesion Fund and Eco Fund funds (non-refundable and returnable funds). It is envisaged that part of the investments will be financed by private sources. To increase the impact of public funds, the accelerated start-up of the energy contracting mechanism is planned. The emphasis is on designing financial instruments that must effectively eliminate obstacles in financing the renovation of buildings according to the model of energy contracting.
Impact so far	Achieved results indicate in energy [GWh/y]: 80.5 (2013); 24.7 (2015).

Name of measure	Financial incentives for efficient use of energy/electricity
Policy type	Grants/Subsidies; Soft Loans
Targeted sector(s)	Commercial
Targeted actor(s)	Energy Managers/Account., Local Authorities
Implementation period	2008-2020
Implementation body	Central Government, Financial Institution
Website	http://www.mzip.gov.si/en/areas_of_work/energy/
Renovation depth	<i>Medium</i>
Supported interventions	Energy-efficient electric motors, frequency regulation of motor revolutions, energy-efficient pumps and ventilators, energy-efficient systems for preparing compressed air, energy-saving lighting.
Budget	The necessary amount of public fund for implementing the measures in the period 2011-2016 is estimated at EUR 12 million (EUR 9 million as incentives for industry and EUR 3 million for service companies).
Brief description	The energy efficiency measures to stimulate improvement of the efficient use of electricity in service sectors and industry. Electricity consumption excluding heating and preparation of hot water sectors presents about 57 % of all final energy consumption in service. The share of electricity consumption for lighting is about 44 %.
Impact so far	Savings in total electric consumption (starting impact year 1990): 0.112/0.187 PJ.

Name of measure	Aid for the efficient use of household energy for vulnerable population groups (G.3)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Households with income in the first quintile
Implementation period	2017-2020
Implementation body	Ministry responsible for energy, Ministry responsible for social affairs, Eco Fund, ENSVET
Website	n/a
Renovation depth	n/a
Supported interventions	Establish a system for providing information on counselling and implementation of EE measures and help implement measures tailored to vulnerable groups of the population.
Budget	Renovation of existing housing stock for increased energy efficiency, demonstration projects and support measures (G.1; G.2; G.3): EUR 25.29 million. Contribution of EE (G.1; G.2; G.3) Eco Fund: EUR 25 million (2017).

Brief description	<p>Under measure G.3, socially weak citizens can apply for an Eco Fund call for grants for energy renovation of multi-apartment buildings and apply for incentives in the amount of 100 % of the recognised investment costs. In the autumn of 2016, the Eco Fund, within the ENSVET network, also set up the AERO project (reducing energy poverty, assisting energy-poor citizens). Measures are being implemented for energy rehabilitation in households with problems of energy poverty. The measures are intended for both investments and advising and changing behavioural habits.</p> <p>An additional model of differentiation of owners is introduced in relation to the social and financial condition of their households, and the appropriate partial adjustment of the amount of co-financing is introduced. This measure eliminates the hurdle of difficult financing for renovation in households, where they live very close to the poverty threshold but do not have the status of socially weak people.</p>
Impact so far	n/a

3.26 Spain (ES)

Name of measure	BIOMCASA-SOLCASA-GEOTCASA programmes
Policy type	Loans/Others
Targeted sector(s)	Residential
Targeted actor(s)	General public
Implementation period	Since 2009
Implementation body	Central government, financial institutions, utilities
Website	https://www.idae.es/ahorra-energia/renovables-de-uso-domestico/programa-solcasa
Renovation depth	<i>Low</i>
Supported interventions	Biomass, solar thermal energy or geothermal energy for thermal use and/or air conditioning.
Budget	EUR 25.7 million from 2009 to 2015.
Brief description	The BIOMCASA-SOLCASA-GEOTCASA programmes, managed by the IDAE, aim to promote energy service companies and encourage (via project financing) efficient hot water, heating and cooling systems powered by biomass, solar or geothermal energy.
Impact so far	Expected results: the implementation of the programmes could suppose a substitution of primary energy of 3.5 ktoe.

Name of measure	PAREER +PAREER-CRECE+PAREER II Programme (Aid Programme for Energy Rehabilitation in Existing Buildings)
Policy type	Subsidies and/or Loans
Targeted sector(s)	Residential; Public;
Targeted actor(s)	Building professionals, general public, housing associations, landlords, manufacturers
Implementation period	2013 - 2019
Implementation body	MINETUR, IDEA, central government
Website	https://www.idae.es/ayudas-y-financiacion/programa-de-ayudas-para-la-rehabilitacion-energetica-de-edificios-existent
Renovation depth	<i>Medium</i>
Supported interventions	Insulation of building envelope, thermal and lighting installations, replacement of conventional energy for biomass or with geothermal energy in thermal installations.
Budget	EUR 404 million (2014-2020)
Brief description	The Ministry of Industry, Energy and Tourism through the Institute for Energy Diversification and Saving (IDAE) has launched a specific aid and financing programme to encourage and promote the implementation of measures on energy conservation, energy efficiency,

	<p>the use of renewable energy and reduction of carbon dioxide emissions in existing buildings, regardless of their use and the legal nature of the owners. This programme promotes comprehensive actions and integrated measures encouraging the improvement of energy efficiency and the use of renewable energies in the stock of existing buildings in the residential sector by awarding grants and repayable loans to projects involving the renovation of building envelopes and heating installations and to those which use biomass and geothermal energy rather than conventional energy sources.</p> <p>The aided actions should improve the total energy rating of the building by at least 1 letter measured on the carbon dioxide emission scale (kg CO₂/m² year) compared to the initial energy rating of the building. In addition, additional support will be granted for actions that reach energy class A or B, or that increase the initial energy rating of the existing building by more than two letters.</p> <p>The additional aid up to a maximum aid amount, depending on the following criteria:</p> <ul style="list-style-type: none"> a- Social criterion: actions carried out in housing buildings that have been definitively qualified under a public protection regime. b- Energy efficiency: actions that raise the energy rating of the building to obtain an energy class A or B on the CO₂ scale, or increase the initial energy rating by two letters. <p>Integrated action: actions that simultaneously combine two or more types of action.</p>
Impact so far	Saving in total final consumption [ktep]: 85

Name of measure	DUS Programme (Aid to local authorities for singular projects of local authorities improving the transition to a low-carbon economy under the FEDER operational programme for sustainable growth 2014-2020)
Policy type	Grants/Subsidies
Targeted sector(s)	Public existing buildings
Targeted actor(s)	Public
Implementation period	2017-2020
Implementation body	MINETUR, IDAE, Central Government
Website	https://www.idae.es/ayudas-y-financiacion/para-proyectos-de-inversion-que-favorezcan-el-paso-una-economia-baja-en
Renovation depth	Medium
Supported interventions	Improving energy efficiency in building and public infrastructure and services. Sustainable urban mobility. Use of renewable energy from thermal uses, as well as for electrical self-consumption. Insulation of building envelope, thermal and lighting installations, replacement of conventional energy for solar, biomass or geothermal energy in thermal installations, photovoltaics
Budget	EUR 987 million from 2017 to 2020 for all interventions (the whole programme objectives) not only for buildings
Brief description	The DUS Programme provides direct grants to local authorities for investment projects in the low-carbon economy. Projects should achieve a reduction in carbon dioxide emissions through the following types of actions: energy efficiency in buildings, public infrastructure and services. Sustainable urban mobility. Renewable energy technologies (thermal uses, electricity) are also supported by the programme. The FEDER co-financing rate to be received shall be allocated to the region in which the project is located, and can be either 50%, 80% or 85% depending on the region's ranking. The aided actions should improve the total energy rating of the building by at

	least 1 letter measured on the carbon dioxide emission scale (kg CO ₂ /m ² year) compared to the initial energy rating of the building.
Impact so far	Saving in total final consumption in buildings: 85 ktep

Name of measure	PIMA SOL (Plan for promoting environmentally friendly behaviour in the tourism sector)
Policy type	Grants/Subsidies
Targeted sector(s)	Non-residential (hotel facilities)
Targeted actor(s)	Hotel facility owners
Implementation period	Since 2013
Implementation body	Ministry of Agriculture, Food and Environment (MAGRAMA), Climate Change Spanish Office (OECC), Central Government
Website	https://www.mapama.gob.es/es/cambio-climatico/planes-y-estrategias/pima-sol.aspx
Renovation depth	<i>Low</i>
Supported interventions	Building envelope (facade and roof) and windows, improved insulation, lighting and air-conditioning control systems, solar panel water-heating systems, passive air-conditioning systems based on better architectural design, more efficient heating and cooling equipment, use of geothermal energy and biomass for air-conditioning and efficient water-management systems.
Budget	The Ministry of Agriculture, Food and the Environment supports energy renovation projects in hotels, with a financial aid package allocation of EUR 5.21 million (period 2013-2014). The Plan also counts on the financing of the European Investment Bank (EIB), which approved on 29 th July 2013 a line worth EUR 200 million through Spanish banks. The latter would in turn, contribute another EUR 200 million with very advantageous interest rates and repayment periods.
Brief description	The Plan to Promote the Environment in the hotel sector, PIMA SOL, approved in Cabinet Meeting on 2 nd August 2013, is an initiative devoted to reducing greenhouse gas emissions (GHG) in the Spanish tourism sector through energy renovations of hotel installations. Renovation projects are to reach a minimum energy improvement rate that will translate in, at least, two letters higher on the energy rating or else, reach letter B. The provisions stated in Royal Decree 235/2013, of 5 th April, approving the basic procedure to certify energy efficiency in buildings, are taken into account in order to determine eligible projects to achieve a reduction in gas emissions with the Fund's purchase of carbon credits.
Impact so far	The energy efficiency projects carried out by hotels, after meeting specific criteria, will generate carbon credits equal to the reduction of 1 tonne of CO ₂ . The government is obligated to buy them at the fixed price of EUR 7 per credit. In 2014, the estimated final energy savings as a result of these plans amounted to 0.8 ktoe.

Name of measure	Programa de fomento de la mejora de la Eficiencia Energética y Sostenibilidad en Viviendas (Programme of promotion of the improvement of the energy efficiency and sustainability of houses)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Homeowners, public administrations, homeowners associations, housing associations, building companies, energy services companies.
Implementation period	2018-2021
Implementation body	Ministry of Development, central government
Website	https://www.fomento.gob.es/arquitectura-vivienda-y-

	suelo/programas-de-ayudas-a-la-vivienda/programa-de-fomento-de-eficiencia-energetica-y-sostenibilidad-en-viviendas
Renovation depth	<i>High</i>
Supported interventions	<ul style="list-style-type: none"> -Improvement of building envelope (insulation, replacement of window frames and panes, new bioclimatic and shading devices) -Heating and air-conditioning systems, hot water production and ventilation -Solar, biomass or geothermal energy systems -Improvement of elevators and lighting installations (LED lighting, switch on control) -Saving water systems, grey and black sanitary waste water reuse systems -Improvement of waste separation and collection -Improvement of noises -Reconditioning of solar (better ground permeability, plants of low water consumption, better watering systems) -Improvement of Radon concentration -Sustainable mobility in buildings (electric car recharge points, bicycle parking) -Green building envelopes -Home automation or sensor systems
Budget	EUR 101.32 million (2018-2021)
Brief description	<p>The Ministry of Development has approved the State Housing Plan 2018-2021.</p> <p>The State Housing Plan 2018-2021 is divided into several lines of aid. One of them is the Programme of promotion of the improvement of the energy efficiency and sustainability of houses. This financing programme is orientated to encourage and promote the energy efficiency and sustainability in residential buildings and houses, either in cities or rural areas. In particular, subsidies are given to improve building envelope in residential buildings. The Programme finances rehabilitation of buildings and houses, urbanization of public spaces and construction of new blocks or houses previously demolished. Shanties and shacks are also included.</p> <p>Although some actions are related to energy efficiency reduction this programme is generally targeted to improve conservation.</p>
Impact so far	<p>Reduction of energy demand:</p> <ul style="list-style-type: none"> -Climatic Area D-E 35% -Climatic Area C 25% -Climatic Area α, A-B 20% or reduction of the non-renewable primary energy consume (regarding energetic certification) at least 30% <p>Aids 2018: EUR 15.74 million</p>

3.27 Sweden (SE)

Name of measure	Deduction for repair, conversion and extension work
Policy type	Tax reduction
Targeted sector(s)	Residential, Commercial, Public
Targeted actor(s)	Building professions, general public, housing associations, landlords, manufacturers
Implementation period	Since 2008
Implementation body	General Public
Website	n/a
Renovation depth	n/a
Supported interventions	<p>General repairs, maintenance or conversion and extension of residential accommodation including energy efficiency measures.</p> <p>In particular, house owners are granted a right to a tax reduction for work such as drilling and installation of geothermal heating as well as</p>

	replacement of windows, doors and taps, additional insulation and assembly and replacement of ventilation. For a single holder of a tenant owner apartment, only repair, conversion and extension work carried out in the apartment confers a right to a tax reduction, for example replacement of taps but not replacement of windows.
Budget	The tax reduction was lowered from 50 to 30 % of labour costs on 1 st July 2016. The maximum amount of aid is still SEK 50 000 (EUR 4 748) per year. The possibility is offered to owners of houses, apartments and second homes as well as holders of tenant owner apartments.
Brief description	The deduction for repair, conversion and extension work is a tax reduction on the cost of labour for repairs, maintenance or conversion and extension of residential accommodation. The deduction was introduced in 2008 in order to stimulate the supply of labour and reduce illegal labour. A natural effect of the deduction for repair, conversion and extension work is that it provides an incentive for property owners to carry out more renovations.
Impact so far	n/a

Name of measure	Aid for improvement and increases in energy efficiency of rental accommodation
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	Since 2016
Implementation body	Central government
Website	n/a
Renovation depth	n/a
Supported interventions	Renovation and energy efficiency measures.
Budget	In 2016, the Government allocated SEK 800 million (EUR 75.96 million) for the aid. In the budget proposals for 2017, the Government has proposed SEK 1 000 million (EUR 94.96 million) annually for the period 2017-2020.
Brief description	Aid was introduced on 1 st October 2016 with a view to stimulating renovation and greater energy efficiency for rental accommodation and improvements to outdoor environments in areas with socio-economic challenges. The aid is intended for buildings containing residential apartments that are let with a right of tenancy and that are located in residential areas where more than 50 % of households have low purchasing power. Renovation aid amounts to 20 % of the cost of renovation and that part of the aid goes directly to the tenants through a rent reduction over a seven-year period. Support for improvements in energy efficiency is calculated on the basis of the energy saving achieved after the renovation. That part of the aid goes to the property owner. To obtain that part of the aid, the renovation must lead to an improvement in the energy performance of at least 20 %.
Impact so far	n/a

3.28 United Kingdom (UK)

Name of measure	Energy Company Obligation (ECO)
Policy type	Grants/subsidies (Energy Efficiency Obligation Scheme)
Targeted sector(s)	Residential
Targeted actor(s)	n/a
Implementation period	2013-2022 (Scheme reformed since 2013; current scheme began in 2018)
Implementation body	Office of Gas and Electricity Markets (OFGEM)
Website	https://www.gov.uk/government/policies/helping-households-to-cut-

	<p>their-energy-bills/supporting-pages/energy-companies-obligation-eco</p> <p>https://www.gov.uk/government/consultations/energy-company-obligation-eco3-2018-to-2022</p>
Renovation depth	<i>High</i>
Supported interventions	Solid wall insulation, cavity wall insulation, loft insulation, other insulation, boiler replacement and repair, electric storage heater replacement and repair, other heat measures (e.g. controls), district heating connections upgrades, they include a variety of insulation, heating and microgeneration. Incentives to encourage innovative, better performing and more cost effective products and delivery methods were introduced under the scheme in 2018.
Budget	n/a
Brief description	<p>The Energy Company Obligation (ECO) is an energy efficiency obligation scheme, through which the central government imposes an energy savings target on large energy suppliers (gas and electricity) that has to be achieved at the customer end (domestic sector only). Previous schemes focussed on both carbon and bill savings targets. The current target is based only on bill savings and supports fuel poverty and households vulnerable to the effects of cold.</p> <p>The energy suppliers choose different ways of delivering their obligation, including subcontracting work to installers, managing agents, working with municipalities or carrying out the work themselves. The obligation on suppliers, known as Home Heating Cost Reduction Obligation (HHCRO), affordable warmth group, requires a defined reduction in energy costs in low-income households.</p>
Impact so far	Saving in total final consumption: 21TWh (estimated total from 2013 – 2020) Energy suppliers have legal obligations under the Energy Company Obligation (ECO) scheme if they reach a certain threshold. The thresholds were reduced in 2018, resulting in a greater number of smaller suppliers becoming obligated. Initially, obligated suppliers needed to have more than 250 000 domestic customers and provide more than 400 gigawatt hours of electricity or more than 2 000 gigawatt hours of gas. This was reduced to 200 000 accounts in 2019 and it will be reduced again to 150 000 customer accounts by 2020. By the end of June 2019, around 2.54 million measures were installed in around 2 million households.

Name of measure	Energy Efficiency Loans Scheme (SALIX)
Policy type	Soft Loans
Targeted sector(s)	Public
Targeted actor(s)	Public Estates (schools, higher and further educational institutions, emergency services, hospitals, leisure centres, local authorities, the NHS)
Implementation period	Since 2006
Implementation body	Central Government, Financial Institution
Website	http://www.salixfinance.co.uk
Renovation depth	<i>Medium</i>
Supported interventions	Over 120 technology types, including building energy management systems, cavity wall insulation, combined heat and power systems, evaporative cooling, heat recovery systems, LED lighting, lighting controls, loft insulation, pipework insulation, server virtualisation, T5 lighting and Variable speed drives.
Budget	Salix is receiving BIES funding. The capital pot for England stands at £262m as of the end of 2018/19 and is planned to increase each year to a total of £385 million by 2020/21.
Brief description	Salix Finance Ltd is a private company funded by government to establish energy efficiency revolving loan schemes in the public sector. The company, set up by the Carbon Trust, has developed an innovative spend-to-save programme to overcome barriers in the public sector. Salix provides interest-free loans to organisations, which are required

	to provide matched funding and establish an on-going ring-fenced energy saving fund within the organisation. The energy or estates team (typically) then uses this fund to support projects across the estate that pay back into the loan fund using the energy savings they generate. The loans, once established, continue to deliver energy savings over time, with recycled savings used to repay the individual project loan and then released for front-line services.
Impact so far	Savings in total final consumption: 0.7 PJ and 56 CO ₂ (2016); 3.2 PJ and 252 CO ₂ (2020). From 2004 up to 31 st March 2017, Salix has helped over 1 800 clients to commit over 15 500 projects valued at EUR 635.85 million (£563.5 million). These projects are forecast to deliver over EUR 153.46 million (£136 million) of annual financial savings on energy bills and EUR 2 256.8 million (£2billion) over the projects' lifetime. The projects are forecast to save over 690 000 tonnes of CO ₂ annually. Salix currently manage a 20 million revolving, interest free loan fund on behalf of the Scottish Government for public sector energy efficiency implementation projects. These projects have produced an estimated £102 million and 491,416 tCO ₂ lifetime savings since 2008. This funding has delivered over 17,000 projects, significantly improving energy performance in the public sector. This has generated estimated bill savings in the wider public sector of around £55m in 2017/18, with projected bill savings of £72m in 2018/19.

Name of measure	Northern Ireland Sustainable Energy Programme (NISEP)
Policy type	Grants/Subsidies
Targeted sector(s)	Residential, Commercial
Targeted actor(s)	Building professionals, housing associations, domestic dwellings, commercial premises.
Implementation period	Since 2014
Implementation body	Central government, energy agencies, utilities
Website	https://www.uregni.gov.uk/publications/northern-ireland-sustainable-energy-programme-nisep-list-schemes-2019-2020
Renovation depth	Low
Supported interventions	n/a
Budget	Around EUR 8.91 million (£7.9m) per annum in grant funding for energy efficiency and renewable energy schemes for both domestic and non-domestic buildings
Brief description	<p>NISEP is a voluntary energy efficiency programme set up and overseen by the NI Authority for Utility Regulation (UR). The Energy Saving Trust (EST) acts as Programme Administrator to manage the programme on behalf of UR.</p> <p>The NISEP works by way of a small sum of money being collected from electricity customers through a Public Service Obligation (PSO) element of use of system charges and is used to provide funding for energy efficiency schemes. The charge is a flat rate (around 0.113 pence) per kilowatt hour which means that customers who use higher volumes pay more than those who use less.</p> <p>Applicants to become a Primary Bidder have to meet certain qualifying criteria (which is met by licensed suppliers by virtue of being licensed). Some, but not all, of the licensed energy suppliers in NI participate in the NISEP along with a number of other organisations.</p> <p>A total of 80% of funding is targeted at priority (vulnerable) customers and is based primarily on low income (usually between £20,000 and £40,000, dependent on familial situation) but supplementary criteria can also be considered including age, disability, rural location and a SAP rating of 54 or below on property. The remaining 20% of funding is targeted at non-priority domestic and commercial consumers. Non-</p>

	priority schemes provide part funding towards energy efficiency measures.
Impact so far	Savings in total final consumption: 0.72 PJ and 60 CO ₂ (2016); 1.08 PJ and 90 CO ₂ (2020).

Name of measure	Warmer Homes Scotland Scheme
Policy type	Grants/subsidies
Targeted sector(s)	Residential – Owner Occupier and Private Rented Sector
Targeted actor(s)	Eligible Owner Occupiers and Tenants of Private Sector Rental Landlords
Implementation period	Since September 2015 – August 2022
Implementation body	Scottish Government
Website	http://www.greenerscotland.org/home-energy/advice-and-grants/warmer-homes-scotland
Renovation depth	Low
Supported interventions	Fabric measures, such as insulation, to improve the energy efficiency of the Scottish housing stock. central heating systems including gas boilers and newer technologies like air source heat pumps, biomass and solar PV water heaters.
Budget	The Scottish Government has made £23.75 million pounds available for 2019/20.
Brief description	<p>The Warmer Homes Scotland Scheme is the Scottish Government’s national fuel poverty scheme designed to tackle fuel poverty by providing home energy efficiency measures, including renewable and micro generation measures to eligible households who are living in, or at risk of fuel poverty. Eligibility for the scheme is based on both the occupant and the property meeting the eligibility criteria of the scheme.</p> <p>The contract was extended in January 2019 to allow the scheme to continue to be delivered for a further 2 year period from 1 September 2020 -31 August 2022. This extension includes a contractual commitment on the Scottish Government to provide a minimum of £32 million plus VAT (£38 million in total) in funding over the 2 year extension period.</p>
Impact so far	Since September 2015, the scheme has assisted over 16,000 fuel poor households across Scotland become warmer and have more affordable energy bills, saving on average of over £300 per year on their energy bills. Warmworks Scotland LLP, the managing agent for Warmer Homes Scotland has procured a supply chain of 21 installers to deliver the scheme, the majority of which are SMEs. Since its launch, the scheme has helped to create almost 500 jobs and more than 100 apprenticeships.

Name of measure	HEEPS Loans
Policy type	Loans
Targeted sector(s)	Residential
Targeted actor(s)	Landlords, owner-occupiers, Registered Social Landlords
Implementation period	Since 2015
Implementation body	Scottish Government, Energy Savings Trust, Local Authorities, companies
Website	https://www.energysavingtrust.org.uk/scotland/grants-loans/home-energy-scotland-loan
Renovation depth	n/a
Supported interventions	Fabric measures such as insulation and glazing, heating systems and home renewables
Budget	In the period up to March 2019, over £100 million was made available

	for energy efficiency loans.
Brief description	The scheme offers interest-free loans of up to £17,500 for home renewables and up to £15,000 for energy efficiency measures per household. Equity Loans of up to £40,000 are also available. RSLs can borrow up to £1,000,000. HEEPS: Loans can be combined with ECO and HEEPS ABS/HEEPS WHS schemes. Cashback is also available on some energy efficiency measures
Impact so far	In the period 2015-2018, in excess of 11,000 energy efficiency measures were delivered through HEEPS Loans schemes

Name of measure	Home Energy Efficient Programmes (Scotland) Area Based Scheme
Policy type	Grant
Targeted sector(s)	Residential
Targeted actor(s)	Landlords, owner-occupiers
Implementation period	Since 2013
Implementation body	Scottish Government, Energy Savings Trust, Local Authorities, companies
Website	https://www.energysavingtrust.org.uk/scotland/grants-loans/heels/area-based-schemes
Renovation depth	n/a
Supported interventions	Fabric measures, such as insulation, to improve the energy efficiency of the Scottish housing stock.
Budget	The Scottish Government has made £49 million pounds available for 2019/20.
Brief description	HEEPS: Area Based Schemes (ABS) are designed and delivered by Local Authorities, in conjunction with utility companies and local delivery partners, targeting fuel poor areas to provide energy efficiency measures to a large number of Scottish households and help reduce fuel poverty. The ABS funding model and guidance to councils prioritises 'harder to treat properties' requiring solid wall or complex cavity wall insulation. Both the measures provided and households benefitting must also be eligible for Energy Company Obligation funding (i.e. fuel poor households).
Impact so far	Since 2013, the Scottish Government has invested almost £373 million through our HEEPS: ABS programme, supported over 85,000 households and helped hundreds of local communities to tackle fuel poverty. This includes over 50,000 properties that have benefitted from solid wall insulation.

Name of measure	Wales Home Energy Efficiency Scheme - Nest
Policy type	Grants/Subsidies
Targeted sector(s)	Residential
Targeted actor(s)	Householder
Implementation period	Since 2011
Implementation body	Welsh Assembly Government
Website	http://nestwales.org.uk/
Renovation depth	n/a
Supported interventions	New fuel boiler; central heating system; loft and cavity wall insulation; some newer technologies like air source heat pumps, biomass and external wall insulation.
Budget	Total annual public investment: EUR 20 million.
Brief description	Nest is a Welsh Government scheme that can provide eligible householders with a "whole house" package of energy efficiency improvements free of charge. Nest measures are designed for individual properties so there is no standard package. Not all possible

	<p>measures will be funded. This will be decided on a case-by-case basis, looking at the cost against the value of the energy saving over time. This ensures that measures can be installed to as many households as possible within budget.</p> <p>There are three qualifying criteria for Nest measures: a householder or someone they live with must receive a means-tested benefit; the property must be privately owned or privately rented (where privately rented the landlord must give permission for the measures work to be undertaken); and the property is very energy inefficient and has an Energy Performance Certificate rating of E, F or G.</p> <p>A Nest health pilot strand was introduced in 2017. The current criteria introduced in 2019 to qualify for measures are: must have respiratory, circulatory or mental health conditions as identified by the National Institute for Health and Care Excellence (NICE) in 2016; referral to this stream of Nest is by either self referral, evidenced by medical prescriptions or referral by a health professional; the property must be privately owned or rented; the property is energy inefficient with an EPC rating of D, E, F or G; and the householder must be on a low income linked to 80% of National Average (Median) income.</p> <p>Householders who do not meet the nEST criteria can still receive free energy support and signposting to help them reduce their energy bills. Nest is managed by British Gas who sub-contracts to installers. The Energy Saving Trust works with British Gas to manage the Nest call centre and to market the scheme.</p>
Impact so far	<p>Investment of £165m since 2011 including £15m of Energy Company Obligation (ECO) funding. Free energy advice has been provided to 129,506 households with 37,733 households receiving free installations to enhance the energy efficiency of their homes.</p>

4 Overview of private schemes in EU Member States

The landscape of private financing on energy efficiency is complex, involving various mechanisms, business models and actors. Many private households, companies, project developers and ESCOs decide to invest their own resources to improve the energy efficiency of their own or their clients' premises. In addition, energy renovations often happen "behind the scenes" of many maintenance, modernization and routine restoration works. All these factors mean that it is extremely difficult to get a complete picture of private financing practices in the area of energy efficiency investments.

In recent years, financial institutions have been more active in offering specialised financial products geared towards energy efficiency investments. At the same time, new models based on non-conventional methods of raising funds are being explored as a vehicle to drive more investments.

As discussed earlier, private and public funds are often blended to establish financial products with more attractive terms. To make a clear distinction between private and public, it was decided to explore financial products which may be partially or fully covered by private funds and are dispersed by private intermediaries in this chapter⁸.

Table 11. List of private schemes in EU Member States.

MSs	Type	Name of scheme	Timing
IT	Commercial loans on energy efficiency	Condominium Financing ("Finanziamento Condominio")	Since 2019
HR		Green Housing Loans by Zagrebacka Bank	n/a
BE		Belifus housing retrofit programme	Since 2018
*Mult		EBRD Sustainable Energy Financing Facilities schemes	Since 2006
PL		Financing energy efficiency by BOŚ commercial bank	Since 2012
UK	Energy Efficiency Mortgages	Eon-BNP Paribas green mortgage product	Since 2018
*Mult		Green home ("Casa Ta Verde"), Raiffeisen bank	Since 2018
SE		Nordea Green Mortgages	Since 2018
DE		MünchenerHyp sustainability loans	Since 2015
DE	Crowdfunding and energy cooperatives	Bettervest	Since 2013
*Mult		CitizenEnergy	Since 2014
DE		Econeers	Since 2013
ES		Fundeen	Since 2017
UK	Specialised funds	Mayor's London Energy Efficiency Fund	Since 2018
LV		Latvian Baltic Energy Efficiency Facility	Since 2016
*Mult		SUSI Energy Efficiency Fund	Since 2009
UK	Energy efficiency insurance	HSB Engineering Insurance	Since 2014
DE		Energie Einspar Protect (EEP) KlimaProtect	n/a
*Mult		Energy Savings Insurance	Since 2015

*Mult: Multiple countries

⁸ Instead, financial schemes which are partly or fully supported by public sources and have been made available to end users through public intermediaries (e.g. a public bank) have been covered in Chapter 3.

The collected information on private schemes was obtained from desk research, and complemented by interviews carried out with national experts. Based on our research, we were able to identify 19 private schemes which have been divided into the following subgroups:

- Commercial loans on energy efficiency
- Energy Efficiency Mortgages
- Crowdfunding and energy cooperatives
- Specialised funds
- Energy efficiency insurance

In the remaining Chapter 4, a summary of private instruments is given, presenting the following information for each instrument identified:

- Name of measure;
- Timing;
- Overview;
- Implementation details;
- Impact;
- Link;
- Success factors.

4.1 Commercial loans on energy efficiency

To scale up energy efficiency investments, commercial banks must take a prominent role in tapping into the energy efficiency market. Credit lines established by banks can help mitigate the perceived high financial risk of energy efficiency projects and lower transaction costs through the establishment of standardised project appraisal and loan processing processes. These are often combined with technical assistance to improve understanding of the fundamentals of energy efficiency projects and eliminate the perceived risks of energy efficiency investments. For project developers and/or energy service companies, credit lines can expand the pool of commercial debt financing for their projects.

Energy efficiency credit lines make funds available to participating financial institutions including local banks. Typically credit lines are extended to financial institutions as a low interest rate loan by a donor (such as a multilateral development bank or other international financial institutions) or by government. The recipient institution then on-lends the funds to borrowers (private or legal persons) to invest in energy efficiency projects.

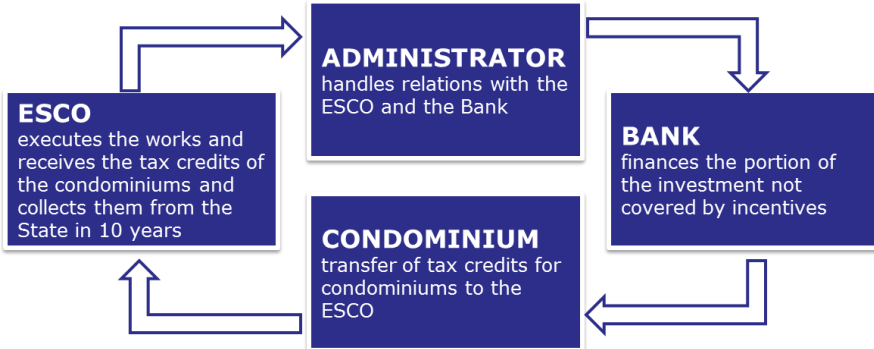
Table 12. Main strengths and weaknesses of commercial loans on energy efficiency

STRENGTHS	WEAKNESS
<ul style="list-style-type: none"> — More sustainable means of financing than public funds; — Support to deeper/more ambitious renovations 	<ul style="list-style-type: none"> — Down-payment may be high; — Unwillingness to take on additional debt; — High transaction costs for small projects

4.1.1 Intensa San Paolo Condominium Scheme (IT)

Name	Condominium Financing (Finanziamento Condominio)
Timing	Since 2019
Overview	The Intesa Sanpaolo bank renews and enhances the catalogue offer dedicated to the Condominiums segment with particular attention to the new Condominium Financing. This scheme is a medium-long term loan

	intended to finance renovation works or other interventions on the building of single condominiums or condominium complexes (e.g. replacement or installation of boilers, photovoltaic systems, electrical systems, etc.). The funding cannot exceed 80% of the costs incurred.
Implementation details	<p>The loan contract is a single contract, characterized by the possibility of choosing between monthly, quarterly or six-monthly instalments, the repayment of the loan takes place with the payment of deferred instalments which expire at the beginning of each month/quarter/semester. The amount that can be financed is between EUR 0.01 million and EUR 1million1 million (up to 80% of the total investment), the duration of the finance ranges from 24 to 124 months. The loan provides that the customer can choose between <i>fixed</i> and <i>variable rates</i>.</p> <p>Until 2021 the <i>fiscal incentives</i> in favour of Condominiums were confirmed:</p> <ul style="list-style-type: none"> - tax reliefs up to 85% are foreseen for both energy-related redevelopment and adaptation to seismic regulations; - deductions modulated according to the level of energy efficiency achieved. <p>The main market stakeholders (especially the ESCO) stimulate the demand for Condominium Financing, some <i>collaboration opportunities</i> are:</p> <ul style="list-style-type: none"> - the main stakeholders in the market such as the condominium administrator associations and utility companies (through the establishment of ESCO) want to seize the opportunities provided by the institutions and contribute to the redevelopment of the Italian real estate assets; - opportunities for collaboration between organizations/private stakeholders and ISPs. <p><i>Credit granting rules:</i></p> <ul style="list-style-type: none"> - professional administrator registered in the Economic Administrative Directory or at least in a trade association; - condominium preferably already a customer for more than 24 months positively experienced; - maximum non-payment of the condominium amounting to a maximum of 5% of the total annual service charges; - % maximum incidence of the extraordinary instalment on the ordinary one equal to 50-60%. <p><i>ESCO projects:</i></p> <ul style="list-style-type: none"> - A2A Group has acquired the first independent Italian ESCO - Consul System - by a Utility to create operating synergies and develop new products and services for the customer base of both companies. Consul System is the main independent ESCO in terms of the number of EECs (Energy Efficiency Certificates) generated (2016). - Snam has acquired of an 82% controlling stake in TEP Energy Solution (TEP), one of Italy's leading enterprises in the energy efficiency sector. This is the first time that Snam has invested in the energy efficiency sector acquiring the ESCO (2018). <p>Enel X is an ESCO that has been founded two years ago, and it is an Enel associate. In particular, Enel, acting through its subsidiary Enel X Italia, acquires Yousave, an Italian company active in the energy efficiency field, specialised in providing services to industrial and service companies as well as government, with a special focus on energy digitisation (2017). The main EE interventions carried out by Enel X in the residential sector concern the boiler and the building's envelope. Most of the costs are due to manpower (scaffolding, etc.) and to the envelope, whereas the cost of the boiler is more on less the 5 % of the total. On average, the cost of EE for condominium with 5 floors varies between EUR 0.5 million and EUR 1 million (the boiler costs around EUR 0.02-0.03 million). The contracting</p>

	<p>times are very long, and the time to start the project is around 9 months.</p> <p><i>Description of financial mechanism:</i></p> <ul style="list-style-type: none"> - ESCO coordinates a complex and complete network of professionals dedicated to energy efficiency with the aim of providing the Condominium with concrete solutions, including all the necessary services, with a 'turnkey' approach. - The strength of the process is ESCO's role in fiscal management: the condominiums giving the tax credit to the ESCO (up to 85% of the investment), will only have to pay the part not covered by the incentives. - The bank, in this way, will have to finance the Condominium only for a marginal share of the total investment. <p>For example, in an energy renovation project of EUR 100 000, the ESCO finances the 80% of the cost and the condominium the 20%. The ESCO recovers the 80% (EUR 80 000) in 10 years due to the tax relief (<i>Ecobonus</i>). The condominium finances the 20% (EUR 20 000) or requests a mortgage to the bank. This means that the condominium spends the 20% of the cost and the ESCO recovers 80% without interests. This is possible thanks to the <i>Ecobonus</i> tax deduction.</p>  <p>Figure 3. Flowchart of "Condominium Financing" mechanism</p> <p><i>Limits:</i> The main risk associated with financing depends on the type of interest rate chosen by the customer:</p> <ul style="list-style-type: none"> - with a <i>variable rate</i> there is the possibility of an increase in the interest rate with respect to the initial rate; - with the <i>fixed rate</i> is impossible to benefit from any reductions in market rates over time. <p>The condominiums composed exclusively of legal persons (e.g., associated firms, companies) are excluded from the possibility of applying for financing.</p>
<p>Impact</p>	<p>Using the <i>Ecobonus</i> scheme, in general the 85 % tax relief is for condominiums, while for the single apartments the tax relief is of 55-60%. In 2019 Enel X and Intesa Sanpaolo have signed an agreement for the financing of energy requalification and seismic safety measures for condominium buildings.</p>
<p>Link</p>	<ul style="list-style-type: none"> - https://www.intesasanpaolo.com/it/business/prodotti/finanziamenti-per-impres-investimenti-aziendali/finanziamento-condominio.html - https://corporate.enel.it/it/media/press/d/2019/06/enel-x-e-intesa-sanpaolo-siglano-un-accordo-sulla-riqualificazione-energetica-dei-condomini - https://www.enel.com/media/press/d/2018/07/enel-x-acquires-energy-

	<p>service-company-yousave</p> <ul style="list-style-type: none"> - https://www.a2a.eu/en/a2a-acquires-consul-system-first-independent-italian-esco-leader-energy-efficiency - http://www.snam.it/en/Media/Press-releases/2018/Snam_to_invest_energy_efficiency_sector.html
Success factors	<ul style="list-style-type: none"> - Possibility to access the Ecobonus incentives. - The duration of the financing can be chosen (from 24 to 124 months) on a monthly, quarterly or half-yearly instalment. - The Consumer has the right to withdraw from the contract, without penalty and without having to indicate the reason.

4.1.2 Green Housing Loans by Zagrebacka Bank (HR)

Name	Green Home Loan
Timing	n/a
Overview	<p>Green Home Loan is intended for investments in green building and increasing energy efficiency of residential properties. The loan is approved for: purchase or construction of a low-energy residential property of energy classes A+, A or B; increasing energy efficiency of a residential property. The interest is calculated and charged on the amount of a granted loan from the date when the loan is granted until the start of loan repayment (intercalary interest). It is usually calculated according to the rate and method used for regular interest.</p>
Implementation details	<p><i>Conditions:</i></p> <ul style="list-style-type: none"> - Any natural person who meets the requirements of creditworthiness of Zagrebačka banka can be a borrower; - Loan amount: up to EUR 0.25 million or HRK 2 million; - Loan repayment period: from 5 to 30 years. <p><i>Prices:</i></p> <ul style="list-style-type: none"> - Interest rate: from 3.05%; - The interest rate depends on the chosen type and period of repayment. <p><i>Benefits:</i></p> <ul style="list-style-type: none"> - The cost of appraisal of the property by ZANE agency is borne by Zagrebačka banka; - The loan amount corresponds to the estimated value of a property; - The possibility of increasing the loan by up to 5% of the purchase price (cash payment); - Arrangement of loan repayment insurance so the loan may be repaid in the event of contingencies; - The possibility of arranging a grace period (moratorium) during parental leave; - Use m-zaba to monitor the repayment and number of remaining loan instalments. <p><i>Typical example:</i></p> <p>For a loan with a currency clause in HRK, a fixed interest rate of 3.05% in the first five years of loan repayment and a variable interest rate of 3.96% (6M NRR for HRK (0.52 %) + +3.44 %) for the remainder of the loan repayment period, a repayment period of 20 years (240 monthly instalments), repayment in annuities with the cost of appraisal of the property included, property fire insurance and the loan user's personal accident insurance, the effective interest rate for a housing loan in the amount of HRK 0.5 million is 3.85 %. A monthly annuity during the first repayment period is HRK 2 786 and HRK 2 965 during the second. The total</p>

	amount to be repaid by the client is HRK 716 544.
Impact	n/a
Link	https://www.zaba.hr/home/en/green-home-loan
Success factors	<ul style="list-style-type: none"> - A thermal façade, insulated roof truss, three-layer windows and high-quality entrance door on a family house can significantly reduce heating energy consumption, depending on the initial state of the property and its location. - Arranging a Green Home Loan it is possible to have lowest interest rates for cash loans for a period of 6 months.

4.1.3 Belfius Energy Efficiency Package (BE)

Name	Belfius Energy Efficiency Package (BEEP)
Timing	Since 2018
Overview	<p>The European Investment Bank (EIB) and Belfius have signed a key agreement to encourage corporate investment aiming to improve energy efficiency in Belgium and help local authorities, inter-municipal utilities and non-profit organisations in education and healthcare to implement their smart and sustainable projects. The agreement is under the EIB and European Commission's new Private Finance For Energy Efficiency (PF4EE) instrument (LIFE programme) to address the shortage of tailored and affordable commercial financing for energy efficiency investment.</p>
Implementation details	<p>The PF4EE instrument combines three elements. The first consists of an EIB loan for financing eligible energy efficiency projects, to be managed by local banks. The second component covers the losses potentially incurred by partner banks in relation to energy efficiency loans. The third component will bolster the implementation of the PF4EE instrument by transferring the technical and financial experience acquired in the course of other similar projects.</p> <p>This agreement will enable Belfius to provide businesses with EUR 75 million in loans on favourable terms for investments aimed at improving energy efficiency in Belgium, thereby addressing key climate-change issues. These loans are available to both businesses and Energy Service Companies (ESCOs). Belfius will have access to the technical and financial expertise of specialised consultants and will benefit from a transfer of experience as part of PF4EE. These loans will also be secured by the PF4EE guarantee up to 80% of their value.</p> <p>Projects financed by PF4EE will aim, in particular, to improve the energy efficiency of existing buildings (insulation, heating, ventilation, cooling, lighting, decentralised renewable energy production, etc.), reduce the energy consumption and strengthen the energy efficiency of industrial sites and processes, refit or extend urban heating or cooling networks, and improve the energy performance of public lighting systems. The projects will be implemented on behalf of either the borrowing companies themselves or their public or private sector customers.</p> <p><i>Belfius financing for energy efficiency project:</i></p> <p>In exclusive collaboration with the European Investment Bank (EIB), Belfius has developed a unique pack for companies wishing to invest in energy efficiency and renewable energy. Belfius also wants to associate energy service companies (ESCO's) as privileged partners and offer them a package that perfectly meets their specific needs.</p> <p><i>Projects:</i></p> <ul style="list-style-type: none"> - Investments to improve energy efficiency in existing buildings

	<p>(insulation, lighting, heating, ventilation, air conditioning);</p> <ul style="list-style-type: none"> - Cogeneration, heat networks, energy-saving machines, street lighting; - Production of decentralized renewable energies (ex: solar panels) integrated on the site and intended for your own consumption. <p><i>Characteristics:</i></p> <ul style="list-style-type: none"> - EUR 75 million - 08/2019; - Contracts till 20 years; - Scope clients: companies, Public entities via ESCO, private entities with public shareholders; <p>Projects max. EUR 10 million – loan amount max EUR 5 million.</p> <p><i>For companies wanting to invest in energy efficiency:</i></p> <ol style="list-style-type: none"> 1. Financing on favourable terms; 2. Flexible credit granting thanks to the EIB's portfolio guarantee; 3. A partial reimbursement of expenses, if you finance yourself at Belfius and have an energy audit carried out. <p><i>For Energy Service Companies (ESCO's):</i></p> <ol style="list-style-type: none"> 1. A line of credit on favourable terms; 2. Flexible credit granting thanks to the EIB's portfolio guarantee; <p>Thanks to the guarantee of the EIB, a recovery of the credit risk on the end customer.</p>
Impact	n/a
Link	<ul style="list-style-type: none"> - https://www.belfius.be/about-us/en/belfius-community/sustainable-activities/buildings/energy - https://www.belfius.be/corporate/FR/Themes/Beep/index.aspx?firstWA=no - http://cityinvest.eu/content/belgium-new-eib-belfius-agreement-foster-energy-efficiency-investment
Success factors	<ul style="list-style-type: none"> - Thanks to a pertinent strategy aligned to the long term, its Belgian foothold and its financial solidity, Belfius is now among the best capitalised bank-insurers in Europe. - BEEP is an excellent financing package and makes flexible and interesting financing possible for energy efficiency investments. - Attractive financing; portfolio guarantees EIB; partial reimbursement of energy audit cost.

4.1.4 EBRD Sustainable Energy Financing Facilities schemes (EU wide)

Name	EBRD Sustainable Energy Financing Facilities (SEFFs)
Timing	Since 2006
Overview	<p>Through SEFFs (Sustainable Energy Financing Facilities), the EBRD extends credit lines to local financial institutions that seek to develop sustainable energy financing as a permanent area of business. Finance for sustainable energy projects is provided for two key areas: energy efficiency and small-scale renewable energy. Local financial institutions on-lend the funds which they have received from the EBRD to their clients, which include small and medium-sized businesses, corporate and residential borrowers, and renewable energy project developers.</p> <p>Residential loans cover a few thousand to a few hundred thousand euros, most often to support improvements on the building envelope. Various groups have benefited from SEFF loans including individual owners, groups of home owners and multi-apartment associations.</p>
Implemen	- Loans under the SEFFs provide financing for sustainable energy projects

tation details

in two key areas:

- Energy efficiency;
 - Small-scale renewable energy.
- Recognising that sustainable energy represents a new area of investment, SEFFs provide expert guidance to build capacity in appraising the financial and technical potential of such investments:
- Financial institutions learn how to assess the feasibility of energy efficiency and renewable energy projects and how to develop suitable financial products;
 - Clients receive access to a new line of financial products and learn how sustainable energy investments can improve productivity and increase profits.

Each SEFF establishes a Project Implementation Team, comprising local and international experts carefully selected by the EBRD, to provide direct support in building capacity at financial institutions and with their clients. The Team works with both parties to identify solutions and assess feasibility, thereby increasing the acceptance rate of loan applications. Once a loan is disbursed, the Team also steers implementation and provides project monitoring services to maximise energy savings.

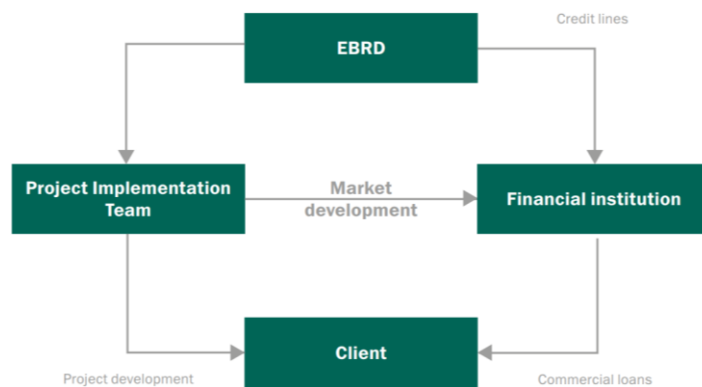


Figure 4. Flowchart of "Sustainable Energy Financing Facilities" mechanism [Source: SEFF - Innovative products for businesses and home-owners]

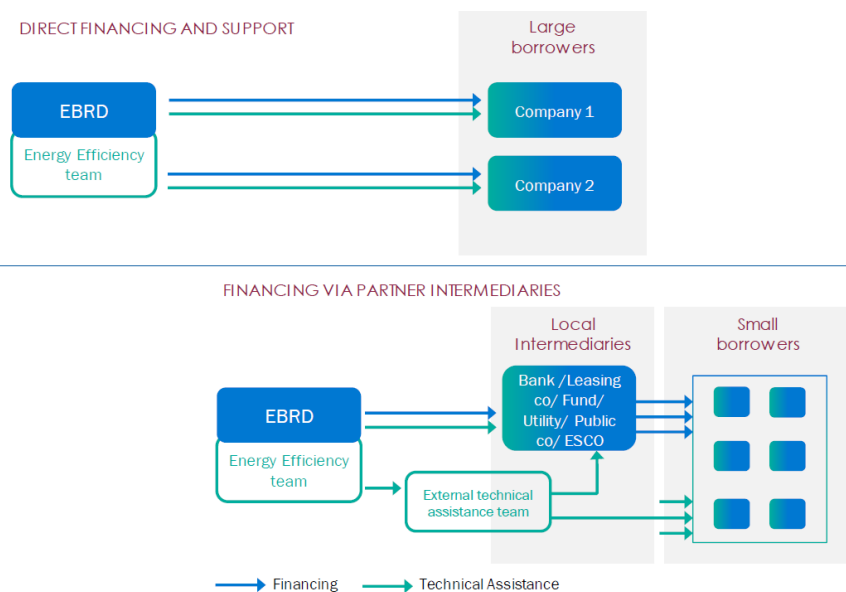


	Figure 5. EBRD's financing channels [Source: EBRD financing for energy efficiency in buildings - Bratislava Workshop 2017]
Impact	<p>Since 2006, the EBRD has provided over EUR 2 800 million in sustainable energy financing to more than 104 financial institutions, reaching 75 000 clients in 22 countries. These projects have led to annual CO₂ emissions reductions of over four million tonnes.</p> <p>SEFFs - one component of the Bank's Sustainable Energy Initiative - are being successfully implemented through approximately 60 local banks in 15 countries. At the end of 2011 in total, the EBRD made available EUR 1 900 million in funding for SEFFs.</p> <p>Green financing in buildings:</p> <p>Financed - more than 220 projects and credit lines. For projects with over 25 million sqm of GBA</p> <p>Signed - EUR 1 930 million of green financing. For projects with a total value of EUR 19 000 million, EUR 440 million in Residential Buildings (For projects with a total value of EUR 2 300 million;</p> <p>Reduced - EUR 1.5 million tonnes of CO₂/year 400 000 tCO₂e per year in Residential Buildings.</p>
Link	<ul style="list-style-type: none"> - https://www.ebrd.com/what-we-do/sectors-and-topics/sustainable-resources/seffs.html - https://www.ebrd.com/downloads/research/factsheets/seff.pdf
Success factors	<ul style="list-style-type: none"> - For home owners energy efficiency offers the chance to increase comfort while reducing utility bills. - SEFFs provide financial institutions and clients with expert guidance in designing lending products and assessing opportunities to turn sustainable energy projects into sound investments.

4.1.4.1 Polish Residential Energy Efficiency Financing Facility (PL)

Name	PolREFF – Polish Residential Energy Efficiency Financing Facility (EBRD)
Policy type	Loans
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers
Implementation period	Since 2016
Implementation body	EBRD, Euro Bank, BZ WBK bank
Website	http://bpie.eu/
Renovation depth	n/a

Supported interventions	Doors and windows replacing; Wall, roof and floor insulation; Heating source modernisation; Solar energy application.
Budget	The European Bank for Reconstruction and Development provides a credit line of EUR 200 million for the PoIREFF programme.
Brief description	<p>The Program started on the 25th October 2016 and the objective is to support apartment and house owners in modernisation and renovation projects that improve living standards and increase the energy efficiency of the buildings. It was initiated and is being developed by the European Bank for Reconstruction and Development (EBRD). It is supported by the Taiwan Business EBRD Technical Cooperation Fund and the EBRD Shareholders Special Fund that finance the Technical Support of the programme.</p> <p>The funds will be distributed by the banks participating in the programme as loans targeted at apartment and home owners enabling them to implement their modernisation plans to increase the energy efficiency of the buildings. Loans provided by the PoIREFF programme are also available for cooperatives, housing communities, developers and suppliers, whose products have been registered on the list of eligible materials and equipment.</p>
Impact so far	Previously implemented similar EBRD programs (PoSeFF I II) directed to the small and medium-sized enterprises have produced good results (period 2011-2014): more than 2100 funded projects; the value of the financing more than 200 million; 38 projects of thermal insulation.

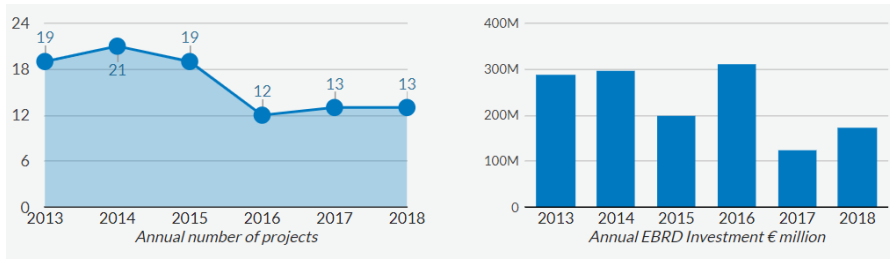
4.1.4.2 Green Economy Financing Facility (RO)

Name	Green Economy Financing Facility (GEFF) - EBRD
Policy type	Loans
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers, financial institutions
Implementation period	Since 2017
Implementation body	UniCredit Bank Romania SA, UniCredit Consumer Financing IFN SA, TaiwanICDF - International Cooperation and Development Fund
Website	http://ebrdgeff.com/ https://www.ebrd.com/news/2017/ebrd-launches-energy-efficiency-framework-for-romanian-homes-.html
Renovation depth	n/a
Supported	The funds are lent to households seeking to invest in energy efficiency

interventions	improvements (such as heating, water and electricity, as well as additional building enclosures such as walls, windows and roofs) for their homes, and expanding the availability of green solutions for the residential sector.
Budget	<p>The EBRD is extending its support for energy efficiency investments in Romania's residential sector through a loan of up to RON 206 million (EUR 45 million) to UniCredit Bank Romania SA and UniCredit Consumer Financing IFN SA.</p> <p>TaiwanICDF - International Cooperation and Development Fund will contribute up to RON 29 million (EUR 6.3 million equivalent) as concessional financing.</p> <p>The EBRD has channelled some EUR 4 000 million in green financing through similar programmes in 24 countries to date.</p>
Brief description	<p>The framework is designed to help Romanian households invest in energy efficiency, renewable energy and water-saving solutions. It is the first time that the EBRD is financing energy efficiency in Romania's residential sector. Loans will be provided via local partner banks.</p> <p>With the EBRD's support Romanian banks are expected to develop green-economy products that will best suit their customers' needs. Borrowers may be individuals, groups of individuals, housing associations or companies providing green energy products and services. They will be able to choose off-the-shelf green solutions and receive free technical advice on tailor-made low-energy solutions for complex investments. Technical assistance is grant-funded by the Global Environment Facility and the EBRD Shareholder Special Fund.</p>
Impact so far	In 2017, the EBRD has invested over EUR 525 million in 26 projects in Romania and has reached almost EUR 8 billion in cumulative investments in the country the end of the year.

4.1.4.3 Residential Sustainable Energy Financing Facility (HR)

Name	Residential Sustainable Energy Financing Facility (EBRD)
Policy type	Loans
Targeted sector(s)	Residential
Targeted actor(s)	Owner-occupiers, financial institutions
Implementation period	Since 2016
Implementation body	European Bank, Partner Banks and their clients
Website	https://www.ebrd.com/croatia.html
Renovation depth	n/a
Supported interventions	Energy efficiency and renewable energy sources: installation of energy efficient windows, insulation of walls, roofs and floors and introduction of efficient boilers, solar water systems, heat pumps or home appliances.
Budget	- Cumulative EBRD investment: EUR 3 797 million;

	- Current portfolio of projects: EUR 869 million.
Brief description	The European Bank for Reconstruction and Development (EBRD) launched a EUR 60 million facility for financing energy efficiency improvements in Croatian homes and households. Sub-loans under the new REENOVA+ Financing Facility were be extended by partner financial institutions. Erste&Steiermärkische Bank d.d. is the first financial institution that has already joined REENOVA+.
Impact so far	<p><i>EBRD activity in Croatia to date</i></p> <p>Number of projects: 2018; Number of active portfolio projects: 87.</p>  <p>Figure 6. Annual Bank Investment and number of projects [Source: EBRD, https://www.ebrd.com/where-we-are/croatia-data.html]</p>

4.1.5 Financing energy efficiency by BOŚ commercial bank (PL)

Name	Financing energy efficiency by BOŚ commercial bank
Timing	Since 2012
Overview	BOŚ S.A., the Polish Bank of Environmental Protection, is a commercial bank established for an unlimited period of time as a joint stock company. The majority of financial products offered in the area of energy efficiency and RES include some measures to make an offer more attractive for the investors and to increase the bankability of the project proposals, such as <i>preferential loans</i> and incentives regarding investment expenditures.
Implementation details	<p>The bank's mission for 25 years (since 1997) is strongly related to supporting activities that contribute to the development of products and services in environmental protection.</p> <p>The main partners of BOŚ S.A. in preferential financing environmentally-friendly investments are the National and Voivodeship Funds for Environmental Protection and Water Management. Thanks to this cooperation, BOŚ Bank can offer subsidized loans for the purchase and installation of solar collectors and, since May 2013, also loans supporting low-energy buildings and passive houses.</p> <p>The list of eco-friendly commercial loans includes such products as <i>Good Energy Loan</i> - for investments in renewable energy sources; <i>EcoInstallation</i> - a credit for the purchase and installation of equipment and products for the protection of the environment; <i>EcoSaving Loan</i> - for investments aimed at saving energy, heat, water, raw materials used in production; it allows to repay the debt with the savings coming from the investment execution; <i>Environmentally Friendly Mortgage</i> - with reduced margins for buildings and apartments equipped with renewable sources of energy, heat recovery installations or the status of a low-energy building.</p> <p>These loans are addressed to all segments of clients. They are used by local authorities, municipal companies, entrepreneurs, cooperatives and housing communities, and private investors.</p>

Impact	<p>In 2012, BOŚ S.A. granted 4 803 loans for environmentally-friendly projects in the total amount of EUR 177.6 million (PLN 757.3 million). The estimated value of investments in environmental protection, which were completed and put into operation, co-financed by BOŚ S.A. in 2012, was more than PLN 1.6 billion. The share of loans granted by BOŚ Bank in costs of the projects finalized was 34.9%.</p> <p><i>Impact in terms of air protection:</i></p> <ul style="list-style-type: none"> - reduction of CO₂ emissions 412 680 tons/year - reduction of heat consumption and heat loss 105 884 GJ/year - production of energy from RES 232 503 MWh/year
Link	- https://www.bosbank.pl/
Success factors	<p>In 2012 the Bank cooperated with the European Investment Bank (EIB), the Council of Europe Development Bank (CEB), the KfW Bankengruppe in Germany and the Nordic Investment Bank (NIB). The participation of foreign funds allowed for a preferred structure of financing including reduced margins and commission with respect to the standard product offer of the Bank. It also relieved requirements concerning investors' own contribution as well as prolonged grace period (up to 2 years) for the repayment of capital.</p>

4.2 Energy Efficiency Mortgages

Energy efficient (or green) mortgages are an attractive way of tapping into the mainstream mortgages market. An energy efficient mortgage (EEM) is a loan product that allows borrowers to reduce their utility bill costs by allowing them to finance the cost of energy-efficient upgrades into a new housing purchase or the refinancing of existing housing. Preferential mortgage terms may be offered to efficient properties, or existing mortgages can be extended in order to finance efficiency improvements. Energy efficient mortgages give the opportunity to obtain better borrowing terms, finance upgrades as part of a single mortgage, increase debt-to-income qualifying ratios and allow consumers to qualify for a larger loan amount. Energy efficient mortgages can credit a home's energy efficiency in the mortgage itself and thereby increase the home buying power of consumers and capitalize the energy savings in the appraisal. Alternatively, they are used to purchase or re-finance existing homes that will undergo energy efficiency upgrades. In other words, they allow borrowers to include the cost of energy-efficiency improvements to an existing home in the mortgage without increasing the down-payment by using the money saved in utility bills.

In the EU, the pilot projects EeMAP and EeDaPP were recently launched with the aim to create a standardised framework and data collection architecture for energy efficient mortgages. These are funded by the European Commission's Horizon 2020 Programme and supported by 40 major European banks. The pilot scheme EeMAP⁹ is aimed at creating new European standardised criteria for energy efficiency mortgages under the EU funded Energy Efficient Mortgages Initiative. Some of Europe's largest banks are participating in the pilot, including BNP Paribas, ING Bank, Nordea Bank and Société Générale. Given the rapidly growing investor demand for green mortgage-backed bonds, the business case for lenders to provide more attractive mortgages to those opting for greener homes has received more attention in recent years. Lower utility costs and their ability to hold their value better over time mean green homes are increasingly recognised as less risky investments for both borrowers and lenders.

Table 13. Main strengths and weaknesses of energy efficiency mortgages

STRENGTHS	WEAKNESS
<ul style="list-style-type: none"> — Access to low cost capital; — Enhanced borrower ability to pay monthly instalments; — Long repayment period 	<ul style="list-style-type: none"> — High transaction costs for small projects; — High collateral requirements

4.2.1 Eon-BNP Paribas green mortgage product (UK)

Name	Eon-BNP Paribas green mortgage
Timing	Since 2018
Overview	E.ON and BNP Paribas Personal Finance UK in 2018 started a new collaboration to bring innovative Green Mortgages one step closer to the UK property market, providing a new and affordable source of finance to make energy efficiency makeovers more accessible to millions of people around the country. Under the model, first-time buyers, home movers and remortgagors would be able to borrow further via a linked 'energy efficiency home improvement loan' to improve the energy efficiency of their homes.

⁹ <https://eedapp.energyefficientmortgages.eu/>.

Implementation details	<p>Around 19 million UK households – equal to around 71% of the UK’s 27 million homes – currently fall below an Energy Performance Certificate Band C rating, which means they are missing out on energy savings of up to EUR 428 (£380) a year by not having basic measures in place.</p> <p>Under the umbrella of the <i>Energy Efficient Mortgage Action Plan</i> (EeMAP) initiative, E.ON is working with BNP Paribas Personal Finance to develop and pilot an innovative Green Mortgage product, which will allow movers, first time buyers, and re-mortgagers to use their mortgage to borrow further via a linked ‘energy efficiency home improvement loan’ to improve the energy efficiency of their homes. Under this model BNP Paribas Personal Finance would provide the improvement loan financing and E.ON would provide a managed service to install appropriate energy efficiency solutions. This service would help the customer to identify what measures would deliver the greatest savings potential, E.ON would then install the measures and offer a range of in-life energy services.</p> <p>The improvements funded through the scheme loan could also result in a discounted mortgage rate once the energy efficiency measures have been verified via an updated energy performance certificate.</p> <p>The Government's Clean Growth Strategy aims to bring as many homes as possible up to Energy Performance Certificate Band C level by 2035.</p>
Impact	n/a
Link	<ul style="list-style-type: none"> - http://www.bnpparibas.co.uk/en/2018/10/18/e-joins-forces-bnp-paribas-personal-finance-help-uk-home-owners-unlock-energy-efficiency-potential-green-mortgages/ - https://liquidexpatmortgages.com/get-a-quote/?gclid=EAIaIQobChMI8dzM64rm4gIVh4jVCh1cFQExEAAYASAAEgLJaPD_BwE
Success factors	<ul style="list-style-type: none"> - Green mortgages have the potential to be a game changer in the delivery of affordable finance. - Easier access to affordable financing via an energy efficient mortgage should provide an added incentive for customers to better insulate buildings, replace old heating systems or increase their energy independence through solar panels, batteries or virtual storage. - It can also ease the purchase of existing energy-efficient houses or commercial buildings through preferential financing in conjunction with a mortgage.

4.2.2 Green home ("Casa Ta Verde"), Raiffeisen bank (EU wide)

Name	Raiffeisen Bank "Casa Ta Verde"
Timing	Since 2018
Overview	<p>Raiffeisen bank is active in green mortgages in Eastern European countries. In 2018, the bank launched the "Casa Ta Verde" green mortgage in order to encourage individuals in Romania to purchase Energy Efficient Homes granted by the Romania Green Building Council (RoGBC). Together with Alpha Bank's Alpha Green product, these are the first mortgage products dedicated to Green Homes certified by RoGBC projects available in Romania.</p>
Implementation details	<p>The "Casa Ta Verde" real estate credit has a fixed interest rate of 6.15% in the first seven years, and, from the eighth year, a variable interest. The value of the loan is between EUR 0.005 million and EUR 0.3 million. Also, the period of this type of credit varies between three and 30 years, and its guarantee is achieved through a mortgage of rank 1, established on the purchased real estate or on immovable property owned by the applicant or by third parties. Additionally, the advance is 15% -35% of the value of the real estate, the 15% is applied for the acquisition of real estate in the</p>

	<p>localities with a positive evolution of the real estate market, and the mandatory insurance for the immovable property is transferred to the bank.</p> <p><i>Product characteristics</i></p> <p>Destination: Acquisition of immovable property certified by RoGBC;</p> <p>Value: Between EUR 5 000 and 300 000;</p> <p>Period: Between 3 and 30 years;</p> <ul style="list-style-type: none"> - Advance: 15% - 35% of the building value; the 15% advance applies to the acquisition of real estate in locations with a positive evolution of the real estate market (the attached list). <table border="1" data-bbox="432 616 1353 931"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">STANDARD OFFER</th> <th colspan="2">GREEN MORTGAGE OFFER</th> </tr> <tr> <th>First 7 years</th> <th>Variable (> 7 y)</th> <th>First 7 years</th> <th>Variable (> 7 y)</th> </tr> </thead> <tbody> <tr> <td>Interest rate formula</td> <td></td> <td>ROBOR 3M+ 3.25%</td> <td></td> <td>ROBOR3M+ 2.5%</td> </tr> <tr> <td>Index Rate</td> <td></td> <td>2.10%</td> <td></td> <td>2.10%</td> </tr> <tr> <td>Analysis Fee</td> <td colspan="4">1,600 Ron</td> </tr> <tr> <td>Interest rate</td> <td>5.50%</td> <td>5.35%</td> <td>4.75%</td> <td>4.60%</td> </tr> </tbody> </table> <p>Figure 7. Interest rates offered by Green Mortgage product "Casa da Verde" by Raiffeisen bank in Romania</p>		STANDARD OFFER		GREEN MORTGAGE OFFER		First 7 years	Variable (> 7 y)	First 7 years	Variable (> 7 y)	Interest rate formula		ROBOR 3M+ 3.25%		ROBOR3M+ 2.5%	Index Rate		2.10%		2.10%	Analysis Fee	1,600 Ron				Interest rate	5.50%	5.35%	4.75%	4.60%
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Success factors	<ul style="list-style-type: none"> - Lower interest rates on standard real estate credit and lower energy and repair costs bring direct month-to-month benefits, which translate into a low cost of ownership. The annual savings made by a client requesting such credit can cover up to two installments a year. - In Raiffeisen Bank's agencies, clients can quickly obtain financial pre-approval for this type of credit with their identity card without income documents. Financial pre-approval is valid for 90 days, during which time they can look for the "green" house they want. 																													

4.2.3 Nordea Green Mortgages (SE)

Name	Green Housing Loan Programme
Timing	Since 2018
Overview	<p>In Sweden, Nordea launched a green mortgage programme in autumn 2018, offering a discounted mortgage rate. there has been widespread interest in them. The discount amounts to 0.10 percentage points in addition to any previous discount and is offered to all customers who live in a home that has energy class A or B, or homes with the Nordic Ecolabel. Homes which are certified as gold or silver according to Sweden Green Building Council are also eligible. All customers who meet the requirements can apply for a green mortgage loan regardless of whether they have already signed a mortgage loan or are new as a customer.</p> <p>In 2019, Nordea launched a green mortgage programme in Finland, the</p>

	first bank to bring such a product to the Finnish market. The prerequisite for Nordea's green loan is either an energy class A, Nordic Ecolabel or two stars awarded by the Building Information Foundation RTS for its emission and cleanliness classifications. A green loan can be granted for an existing home or a home to be purchased – including an investment flat.
Implementation details	<p>A green loan can be granted for an existing home or a home to be purchased - including an investment flat.</p> <p>As a bonus, Nordea bank offers interest rate hedging to loan at a discount price and do not charge an arrangement fee - which means finances will also benefit from the environmentally friendly choice.</p> <p>To obtain a green housing loan the home or the property need to satisfy one of the following requirements:</p> <p>Energy class A (class A in accordance with the 2018 act on energy performance on buildings or Class A or B in accordance with the 2013 act on energy performance certificates on buildings);</p> <p>Nordic Swan ecolabel;</p> <ul style="list-style-type: none"> - At least two stars in RTS's classification. <p>When a client applies for a loan, an internal evaluation is made by the bank to determine whether the loan can be classified as green. This is followed by an external evaluation relying on well-established environmental certifications approved by Oekom Research, Nordea's independent auditor.</p> <p>Nordea also participates in the Energy-efficient Mortgages Action Plan (EeMAP), which aims to encourage home owners to pay attention to the environmental impact of housing. The initiative aims to use green housing loans to direct capital towards more responsible projects and to have a nationwide effect on the environmental effects of the building stock.</p>
Impact	<p><i>Targets:</i></p> <p>The EU has calculated that an annual investment of EUR 180 000 million should be made in various environmentally sustainable initiatives combating climate change in order to meet the targets of the Paris Convention on Climate Change.</p>
Link	<ul style="list-style-type: none"> - https://www.nordea.com/fi/media/uutiset-ja-lehdistotiedotteet/press-releases/2019/04-23-15h26-nordea-to-launch-the-first-green-housing-loan-in-finland.html
Success factors	<ul style="list-style-type: none"> - Green mortgages have the potential to unlock an energy efficiency revolution by enabling homeowners to access affordable finance through which to improve their homes.

4.2.4 MünchenerHyp sustainability loans (DE)

Name	MünchenerHyp sustainability loans
Timing	Since 2015
Overview	In Germany, the MünchenerHyp bank has been offering the Sustainability Loan "Nachhaltigkeitsdarlehen" since 2015. The loan can be used to finance properties that have been built or renovated in accordance with ecological principles - and thus contribute towards preserving the environment. It is aimed at anyone who wants to build, buy, modernize, refurbish or finance a sustainable property.
Implementation details	<p>Münchener Hypothekenbank has implemented a Sustainable Mortgage Loan Programme (MünchenerHyp-Nachhaltigkeitsdarlehen) for energy efficient residential buildings with preferential conditions. The mortgage loans can be granted for new builds as well as purchasing, modernisation and follow-up financing of existing buildings if the following criteria are met:</p> <ul style="list-style-type: none"> - The annual energy consumption for space heating and domestic water

	<p>of the residential building to be financed does not exceed 70 kWh/m²a.</p> <ul style="list-style-type: none"> - The energetic quality of the building envelope (H´TW/m²K) needs to be quoted. - The energy class is to be verified either by an energy consultant or through confirmation that the conditions from the respectively applicable KfW (German development bank) programmes are fulfilled. <p><i>Limits:</i> Possible debt repayment problems of retail clients and adverse impacts on the environment through insufficient energy/resource efficiency.</p>
Impact	<p><i>Business Loan Performance:</i></p> <ul style="list-style-type: none"> - net interest income (EUR million): 280.1 (2018); 256.6 (2017); - growth new property loans: 9.3 (2018); 5.1 (2017); - mortgage portfolio (EUR million): 32 000 (2018); 29 200 (2017). <p><i>Volume by type of underlying property:</i></p> <ul style="list-style-type: none"> - 82.9 % residential (avg loan size: EUR 0.133 million residential properties) - 17.1 % commercial (avg loan size: EUR 4.4 million commercial properties).
Link	<ul style="list-style-type: none"> - https://www.muenchenerhyp.de/en/company/sustainable/sustainability-loans
Success factors	<ul style="list-style-type: none"> - The MünchenerHyp Family Loan addresses the social dimension of a holistic understanding of sustainability. This Loan is aimed at parents with at least one child, whether they are married, lone parents, or a blended family.

4.2.5 Other green mortgage products

In the Netherlands, **Triodos**, a sustainable bank concerned with social and environmental impacts, has introduced sustainability aspects in its home mortgage underwriting process, and partly bases its mortgage interest rates on these criteria. The mortgage interest rate falls 0.1 percent for every increase in the energy efficiency label¹⁰, while homes with an A++ label are allowed to have €8,000 more financing as compared to regular homes. In Germany, Bayerische Landesbank has incorporated the sustainability of (commercial) properties into its mortgage acceptance terms by offering more favourable financing terms if the bank’s sustainability criteria are met. It offers support in the certification process of buildings through its subsidiary Bayern Facility Management. Bayerische has also created a service called LImmoWert that helps to establish the value and risk effects of the sustainability (or lack thereof) of their clients’ properties, and provides advice concerning building improvements that improve value and reduce risk in this regard.

4.3 Crowdfunding and energy cooperatives

Crowdfunding is a term used to describe the collective effort made by a large number of individuals (investors) with the aim to pool funds together and support a project, cause, business idea or loan initiated by other people or organizations through an online web-based platform (Ordanini et al., 2011). With annual growth rates exceeding 100%, crowdfunding has expanded exponentially over the last years, attracting the interest of professional financial institutions, institutional investors, venture capitalists and angel investors.

¹⁰ That means if the G-rated building is renovated to class A, a reduction by 0.6% will apply to the mortgage rate

Investments in energy efficiency and renewable energy projects through crowdfunding have also gained some popularity, even though they currently account only for a considerably small share of the sector. While the two largest crowdfunding platforms Kickstarter and Indiegogo focus on innovations in consumer products such as energy management or small scale renewable energy generation systems, new platforms are designed to give funders the opportunity to provide capital in exchange for equity or future return on investments in energy efficiency and/or renewable projects. The fastest growth of crowdfunding platforms in this area is linked to renewable energy projects. Few other crowdfunding platforms have started supporting energy efficiency projects, such as Bettervest, ECONEERS and CitizenEnergy but most platforms cover both energy efficiency and renewable energy projects.

Crowdfunding uses a wide range of models. There are 4 different types of models supported by crowdfunding: donation crowdfunding, reward crowdfunding, debt (peer-to-peer lending) and equity crowd-funding. For energy efficient projects, debt (peer-to-peer lending) is the most common type which involves requesting support and resources from other investors to meet a certain crowd-investment target in exchange for interest. The size of the crowd-investment target can range from very small (e.g. a few hundreds) to several hundred thousands or more. Examples of supported projects can be found in the links of the crowdfunding platforms described in Sections 4.3.1-4.3.4. Crowdfunding for energy efficiency can be used when there is a lack of affordable financing or high upfront costs for implementing or scaling up cost-effective energy efficiency measures, e.g. in commercial buildings. Crowdfunding removes the involvement of financial institutions and helps projects get off the ground with the help of crowd investors, who then expect return on their investment through interest payments or equity. In addition, crowdfunding can lead to better awareness and support for energy efficiency projects, and offer market outreach and validation for new energy efficiency technologies. With the help of the internet, crowdfunding can draw support from people across entire countries and increasingly internationally.

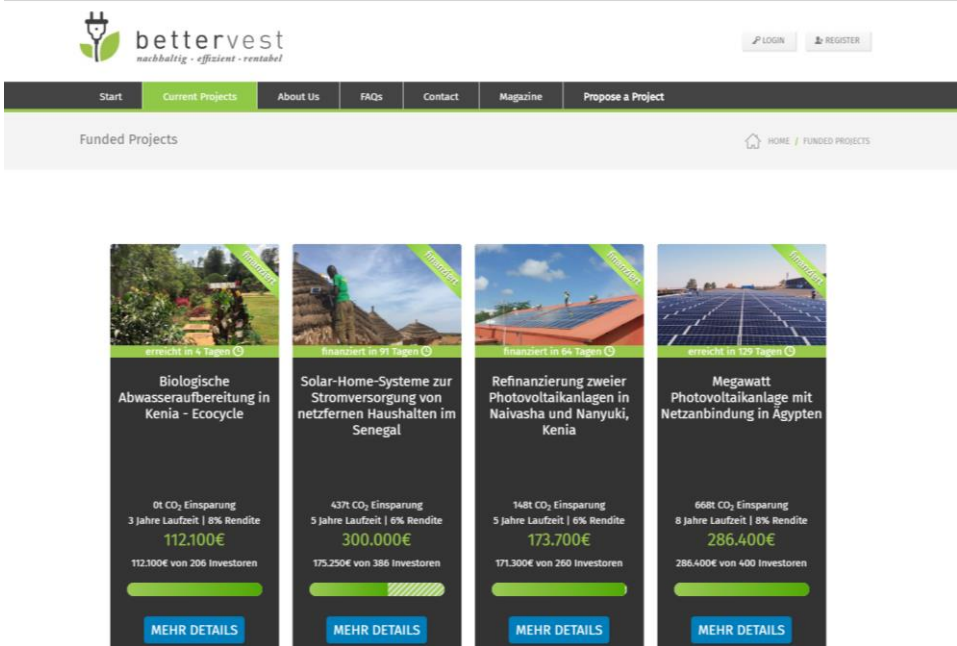
Energy cooperatives, on the other hand, rely on members in local communities to group together and support projects that would be difficult to get started otherwise. Energy cooperatives can cover small districts, entire cities, regions or even operate a variety of projects on a national level. Several energy cooperatives focusing on renewable energy exist in Europe, many of which are hosted on the website of REScoop.eu, the European federation of renewable energy cooperatives. The main difference between energy cooperatives and crowdfunding lies in the fact that crowdfunding platforms may have multiple different projects in different countries and offer various types of participation as discussed above, while energy cooperatives are single organisations typically raising money to fund their own projects. Increasingly though, the lines are becoming blurred: cooperatives can make their own investment offers or can even make use of crowdfunding platforms to fund part of their goals. Ultimately, both cooperatives and crowdfunding take advantage of support from individual members of the public to get projects up and running.

Table 14. Main strengths and weaknesses of crowdfunding platforms

STRENGTHS	WEAKNESS
<ul style="list-style-type: none"> — Access to finance for consumers not eligible for traditional financing options; — Awareness raising and wide market outreach through the help of the internet 	<ul style="list-style-type: none"> — May be difficult to reach funding target; — Investments may be risk given weak regulatory framework protecting participants

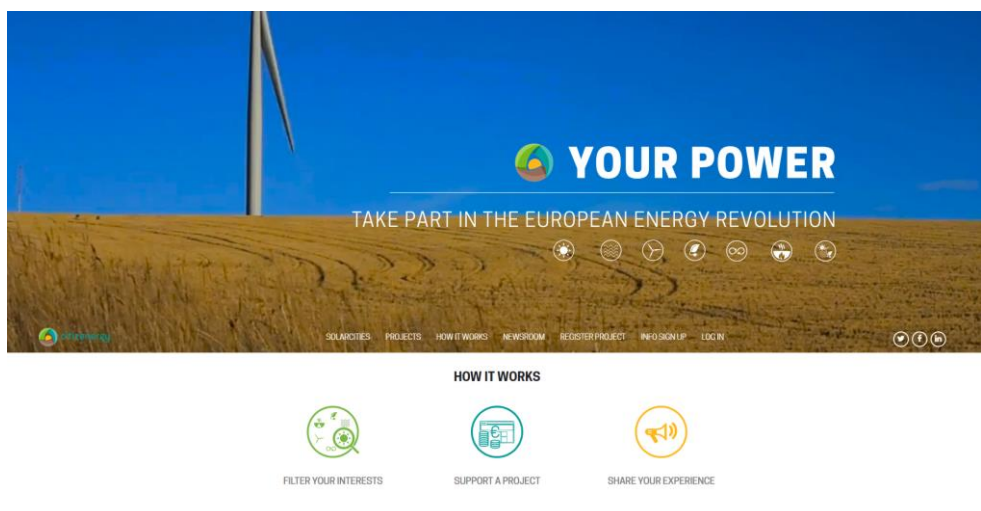
4.3.1 Bettervest (DE)

Name	Bettervest
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Timing	Since 2013
Overview	Crowdfunding for energy efficiency has been pioneered by a German crowdfunding platform Bettervest (https://www.bettervest.com/). Since 2013, Bettervest has hosted various projects on its website geared towards energy efficiency and renewable energy projects. These projects have been located in Germany, with increasing focus now being shifted towards sustainable energy projects in Africa.
Implementation details	<p>Bettervest is the world's first crowd-investing platform that enables people to jointly invest individual sums of money in energy and energy efficiency projects initiated by established enterprises, NGOs and local municipalities. In return, they benefit financially from the resulting cost and energy savings. To this end, bettervest only finances projects that are ecologically sound and able to achieve high savings in both costs and energy. The project owners receive the necessary capital with the help of private investors i.e. the crowd. Following the implementation of the energy saving measures the project owners immediately start reducing their energy consumption, carbon emissions and costs. The investors receive a part of their investment plus a fixed interest rate annually throughout the contract period.</p>
	 <p>The screenshot shows the Bettervest website interface. At the top, there is a navigation bar with links for 'Start', 'Current Projects', 'About Us', 'FAQs', 'Contact', 'Magazine', and 'Propose a Project'. Below this, there is a section titled 'Funded Projects' with a 'HOME / FUNDED PROJECTS' breadcrumb. The main content area displays four project cards, each with a title, a progress bar, and a 'MEHR DETAILS' button. The projects are: 1. 'Biologische Abwasserbereitung in Kenia - Ecocycle' (112,100€ raised), 2. 'Solar-Home-Systeme zur Stromversorgung von netzfernen Haushalten im Senegal' (300,000€ raised), 3. 'Refinanzierung zweier Photovoltaikanlagen in Naivasha und Nanyuki, Kenia' (173,700€ raised), and 4. 'Megawatt Photovoltaikanlage mit Netzanbindung in Ägypten' (286,400€ raised).</p>
	<p>Figure 8. Bettervest platform: Funded Projects</p>
Limits:	<p>In the event that a project owner becomes insolvent, the investor will only receive your money after all other higher-rank creditors. This means, an insolvency could potentially lead to a total loss of the investment. One solution is to spread the investment across several projects, so as to reduce your risk exposure.</p>
Impact	Since 2013, Bettervest has hosted 80 projects, with project sizes range from around EUR 0.005 million to nearly EUR 0.3 million that cover both energy efficiency and renewable energy projects
Link	- https://www.bettervest.com
Success factors	- To offset this risk that the investments are not guaranteed, Bettervest offers lucrative interest rates of 5% and above, as well as the opportunity to partake in the "Energiewende", which experts confirm

	<p>cannot be achieved without private investments in renewables and energy efficiency.</p> <ul style="list-style-type: none"> - Bettervest offers clean technology manufacturers, energy consultants and contractors the opportunity to be involved in the planning and implementation of these projects. - With targeted investments (on energy efficiency market) ecologically and economically viable energy efficiency measures are able to be implemented, leading to cost, energy and CO₂ reductions.
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4.3.2 CitizenEnergy (EU wide)

Name	CitizenEnergy
Timing	Since 2014
Overview	<p>The Citizenenergy Project (citizenenergy.eu) was funded by the Intelligent Energy Europe Programme of the European Union and began in 2014. The consortium is composed of 14 partner organisations from 11 European countries, and it includes different kinds of organizations of different EU countries such as crowdfunding platforms, energy cooperatives, one university and one non-profit association, among others. It is the first portal designed to encourage cross-border investments in sustainable energy across the EU through both crowdfunding platforms and energy cooperatives. It reinforces the work of crowdfunding platforms and cooperatives in financing renewable and energy efficiency projects, increasing their reach while promoting transparency.</p>
Implementation details	<p>A sort of "Tripadvisor" of our sustainable energy landscape, Citizenenergy is a valuable resource for individuals looking to get involved in the energy transition. It allows funders to acquire equity, participate as a loan, or purchase a bond (as well as some projects with traditional crowdfunding 'rewards' for more charitable endeavors) specifically for sustainable energy projects across Europe. It is the first platform of its kind to bring the worlds of renewables cooperatives and crowdfunding together in one. It brings together energy-focused crowdfunding investment opportunities across various smaller platforms into one place. Citizenenergy's value comes both in vetting and aggregating these sustainable energy investment opportunities.</p>  <p style="text-align: center;">Figure 9. CitizenEnergy platform</p>
Impact	n/a
Link	- https://www.citizenenergy.eu/

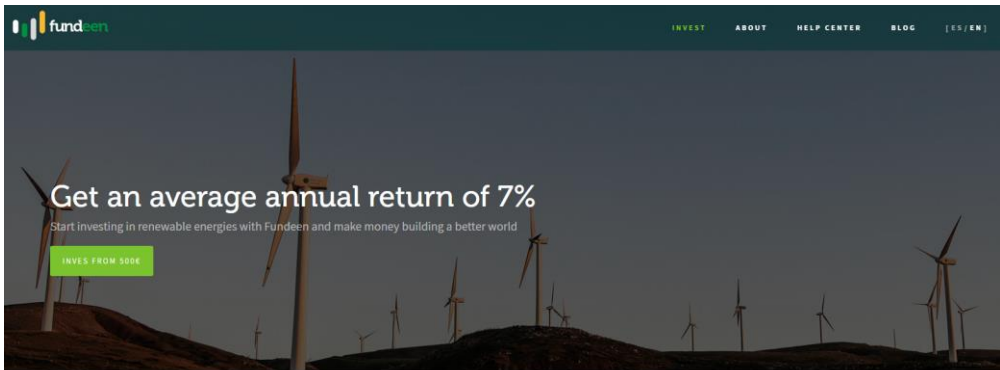
	- https://www.citizenenergyuk.co.uk/
Success factors	- The Citizenenergy platform provides information on renewable energy opportunities from crowdfunding platforms and cooperatives across Europe.

4.3.3 Econeers (DE)

Name	Econeers
Timing	Since 2013
Overview	Econeers is a German crowdfunding platform for green investments in the areas of energy efficiency and sustainable energy production, i.e. renewable energies such as solar energy, wind energy and hydropower. In 2013, Econeers (www.econeers.de) started as a sister platform of Seedmatch. It offers the opportunity to invest in pre-selected projects starting at EUR 250 and participate in the economic success of sustainable projects and the energy transition with crowdfunding investment.
Implementation details	<p>Econeers' mission is to enable everyone to invest in renewable energy and energy efficiency, and to have attractive return opportunities. The vision is a society in which the energy transition is lived by the citizens. Econeers believe that many people want to spend their money responsibly while doing something for the environment and future generations.</p>  <p style="text-align: center;">Figure 10. Econeers platform</p> <p>Limits: The acquisition of these assets entails considerable risks and may result in the complete loss of the invested assets. The prospective return is not guaranteed and may be lower.</p>
Impact	To date: <ul style="list-style-type: none"> - Savings: 52 998 tCO₂ - Registered Econeers: 9 480 - Collected capital: EUR 11.113 million
Link	- https://www.econeers.de/
Success factors	- Econeers wants to strengthen investments in energy transition projects in Germany.

	<ul style="list-style-type: none"> - Future-oriented, green crowdfunding projects provide Econeers with a financing platform. - In a kind of public participation, investors can participate transparently and fairly in the added value of the energy transition. Project operators promise a fixed-income, meaningful investment with economic and social returns.
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4.3.4 Fundeen (ES)

Name	Fundeen
Timing	Since 2017
Overview	Fundeen is a FinTech platform, launched in 2017, that allows citizens of Spain to invest in environmentally sustainable projects and receive benefits from their investments.
Implementation details	<p>Fundeen is a crowdfunding platform that is monitored by CNMV, which allows it to act as a financial intermediary between investors and promoters. It receives two fees from projects for performing this task:</p> <ul style="list-style-type: none"> - A success fee: 4.2 % of the volume of financing, charged once the project has been successfully financed. - A management fee: 1.2 % of the volume of financing, charged annually. <p>This means that thanks to the cost of sales of 1 % of the volume of financing for use of an independent payment platform, the gross margin is around 80 %.</p>  <p>The screenshot shows the Fundeen website interface. At the top, there is a navigation bar with the Fundeen logo and links for 'INVEST', 'ABOUT', 'HELP CENTER', 'BLOG', and '[ES/EN]'. The main banner features a background image of wind turbines on a hill. The text on the banner reads: 'Get an average annual return of 7%' followed by 'Start investing in renewable energies with Fundeen and make money building a better world'. A green button below the text says 'INVEST FROM 500€'.</p> <p>Figure 11. Fundeen platform</p> <p><i>Limits:</i> Investing involves risks, including loss of capital, illiquidity, lack of dividends and dilution, and should be done only as part of a diversified portfolio. Investments should only be made by investors who understand these risks. Tax treatment depends on individual circumstances and is subject to change in future.</p>
Impact	<p>To date:</p> <ul style="list-style-type: none"> - Collected capital: EUR 14 million - Followers: more than 950
Link	- https://www.fundeen.com/en
Success factors	<ul style="list-style-type: none"> - First Spanish crowdfunding platform to give individuals the chance to invest in renewable energy projects: - which had up until now been the prerogative of big electrical companies and investment funds. - from as little as EUR 500 and the chance to earn annual returns of over 7 %.

4.4 Specialised funds with third party providers

4.4.1 Mayor's London Energy Efficiency Fund (UK)

Name	Mayor of London's Energy Efficiency Fund (MEEF)
Timing	Since 2018
Overview	<p>The Mayor's Energy Efficiency Fund (MEEF) provides flexible and competitive finance and offers a range of funding options, through its consortium of funders, to deliver new low carbon technology or upgrade existing low carbon infrastructure, with an investment period of up to 20 years. It's a key part of the Mayor's strategy to improve the capital's existing building stock and improve the energy performance of new buildings (helping homes, businesses and public buildings to use less energy and save money on energy bills).</p>
Implementation details	<p>The Mayor of London's Energy Efficiency Fund (MEEF) is a new EUR 558 million (£500m) investment fund established by the GLA with funding from the European Commission, which will help achieve London's ambition of being a zero carbon city by 2050.</p> <p>MEEF builds on the success of the GLA's London Green Fund including Amber's existing fund, the London Energy Efficiency Fund (LEEF). For case studies on LEEF projects please see here. The scope and scale of MEEF is much greater than those of LEEF from both an investment and low carbon perspective.</p> <p>MEEF can invest across the capital structure, from rates as low as 1.50% for up to 20 years. It has available to it up to EUR 2.23 million (£2m) of technical support funding that can be made available to support a project's business case, accelerating the due diligence process.</p> <p>MEEF can invest in projects in the following sectors:</p> <ul style="list-style-type: none"> - A minimum of 70% of investments must be to the public sector (Local Authorities Education, Registered Providers, Health, Not for Profits); - Up to 30% of investments can be in the private sector (SMEs, ESCOs). <p>MEEF can fund up to 100% of the capital cost of a EUR 1.12 million (£1m) project but could also part fund large scale regeneration projects which will have low carbon credentials: Energy Efficiency, Decentralised Energy, Small Scale Renewables, Energy Storage, Electric Vehicle Charging Infrastructure, Regeneration Projects.</p> <div data-bbox="395 1503 1374 1944" style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <pre> graph LR S1[Stage 1: Project Screening] --> S2[Stage 2: Application] S2 --> S3[Stage 3: Decision to Invest] S3 --> S4[Stage 4: Post Investment] </pre> <p style="text-align: center;">[6 weeks – 3 months]</p> </div>

Figure 12. Overview of the process [Source:

	<p>https://www.amberinfrastructure.com/our-funds/the-mayor-of-londons-energy-efficiency-fund/application-process/]</p> <p><i>Investment Products:</i></p> <ul style="list-style-type: none"> - The fund provides repayable construction finance, predominantly in the form of senior loans, but also with the potential for mezzanine and equity. - The fund can lend to public sector, private sector or joint venture entities, including Energy Service Companies (ESCOs). - MEEF will finance a broad range of Energy Conservation Measures (ECMs) to provide energy or carbon saving benefits. This includes, for example, boiler replacement, Combined Heat and Power (CHP), insulation and ground source heat pumps. - The fund targets investments of between EUR 3.35-22.32 million (£3m-£20m) but can consider larger or small investments.
Impact	MEEF will invest, by way of loans and equity investments, projects that will help to achieve London's own carbon strategic ambition of 60% reduction in CO ₂ emissions by 2025.
Link	<ul style="list-style-type: none"> - https://www.amberinfrastructure.com/our-funds/the-mayor-of-londons-energy-efficiency-fund/ - https://www.amberinfrastructure.com/media/2072/meef-fact-sheet.pdf
Success factors	<ul style="list-style-type: none"> - MEEF seeks to address market failure by providing competitive and flexible state aid compliant finance to projects, including funding for up to 19 years. - There is no set payback period required with maximum loan terms of up to 20 years. - MEEF seeks to address market failure and hence can provide flexible terms.

4.4.2 Latvian Baltic Energy Efficiency Facility (LV)

Name	Latvian Baltic Energy Efficiency Facility (LABEEF)
Timing	Since 2016
Overview	The Latvian Baltic Energy Efficiency Facility (LABEEF) is a fund created by investment control enterprise Funding for Future, with aim to facilitate long-term investments necessary for multifamily building and public building renovation projects. LABEEF aims to support energy service companies (ESCOs) that implement renovation measures in multifamily buildings based on energy performance contracting (EPC). LABEEF forfeits the EPC contract and continues to collect the EPC receivables from the building owners until the renovation investment has refinanced itself.
Implementation details	<p>LABEEF aim is to create an innovative investment platform and to provide a long-term opportunity for the full renovation of residential buildings in Latvia, based on the best foreign practices and procedures developed by the Fund and key stakeholders such as the maintenance companies, the Building Sector and the Banking Services. One of the objectives of LABEEF is the development of a new concept for managing renovation projects, thus securing a greater transparency and financial efficiency for the residents of a building.</p> <p>The development of investment platform is financially supported by the project <i>SUNShINE</i> of the European Commission programme Horizon 2020. This project financially supports the drafting of necessary documents, e.g., standard agreement form, procedures, as well as project preparation and involvement of new energy services companies in the market. The task of this project is to develop alternative financial and know-how concepts for</p>

renovating residential blockhouses that in future will be applied not only in Latvia, but also in other states in the Eastern Europe. To increase the trust of investors in the fund and to secure transparency of its operations, it has been decided to establish the "Funding for Future" organisation to monitor the fund and its operations.

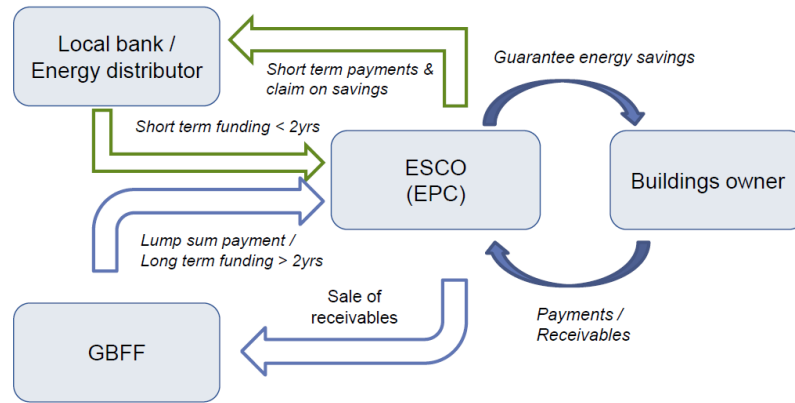


Figure 13. Funding Structure [Source: Funding for Future]

Mechanism description:

- EPC describes a financing mechanism in which the receivables consist of the cost savings achieved through greater energy efficiency of buildings.
- The ESCO finances renovation measures through a commercial bank and makes an EPC contract with the building owners.
- Once renovation measures are completed and their effectiveness has been monitored and verified, LABEEF forfeits the EPC contract and continues to collect the EPC receivables from the building owners until the renovation investment has refinanced itself.

Through this mechanism, the execution risk stays with the ESCO while the financing risk is transferred to LABEEF. To be able to forfeit the EPC contracts, LABEEF has collected loans from the European Bank for Reconstruction and Development (EBRD).

The main elements of a typical Latvian EPC project include the following:

- Turnkey service: The ESCO takes up responsibilities throughout the entire project lifetime, from the initial energy audit and project design to implementation of measures to the operation and maintenance of the renovations as well as the measurement and verification of energy savings;
- the arrangement of long-term project financing through third party Financing;
- announcing a project energy savings guarantee which assures that the projected reductions in energy use will come into effect.

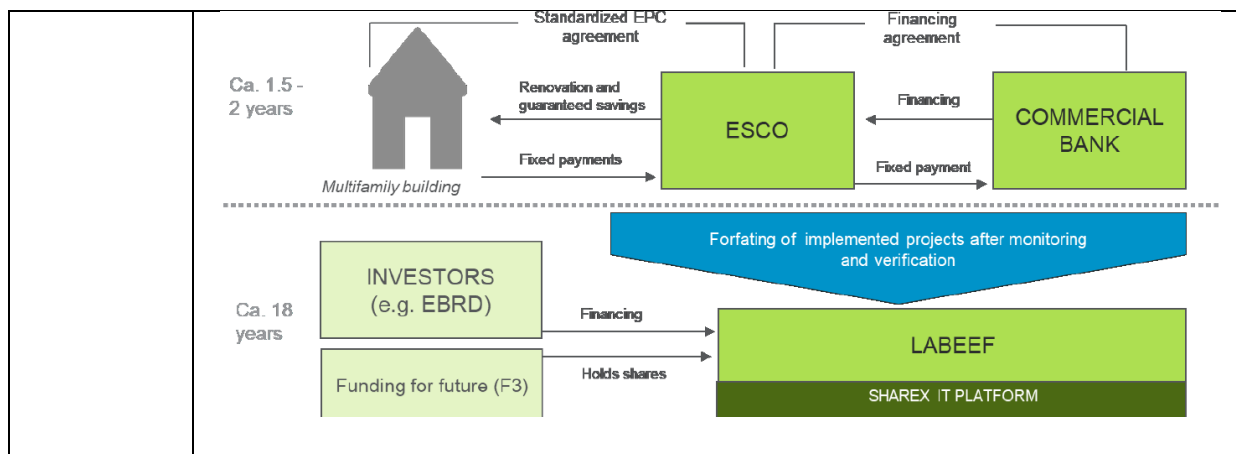


Figure 14. Functioning of LABEEF [Source: Factsheet (2018) Latvian Energy Efficiency Facility LABEEF]

The ESCO then enters into a financing agreement with a commercial bank to cover the upfront investment costs for the renovation measures. The agreement with the bank is supported by LABEEF, which guarantees to assume the financing risks after the measures are completed, monitored and verified. The monitoring and verification process is initiated once the measures are completed and lasts through a winter season. If the guaranteed energy savings can be verified during the cold season, LABEEF forfeits the EPC. LABEEF takes over 80% of the risk and rewards, leaving 20% with the ESCO.

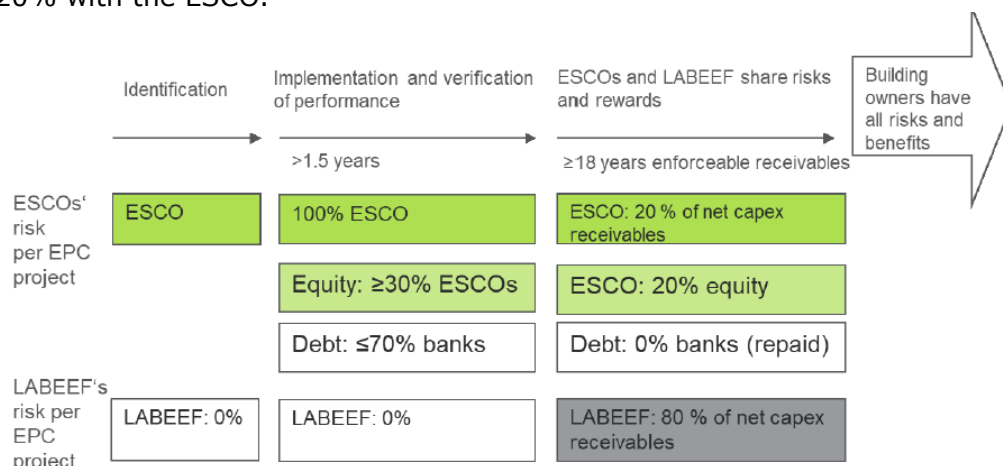


Figure 15. Distribution of risks and receivables throughout the project cycle [Source: Factsheet (2018) Latvian Energy Efficiency Facility LABEEF]

Limits:

- There are several challenges to EPC including the investment risks for the ESCO:
- the long refinancing timeframes;
- information deficits of the customer and the complex legal setup of contracting models;
- accompanied by regulations on energy and electricity taxes.

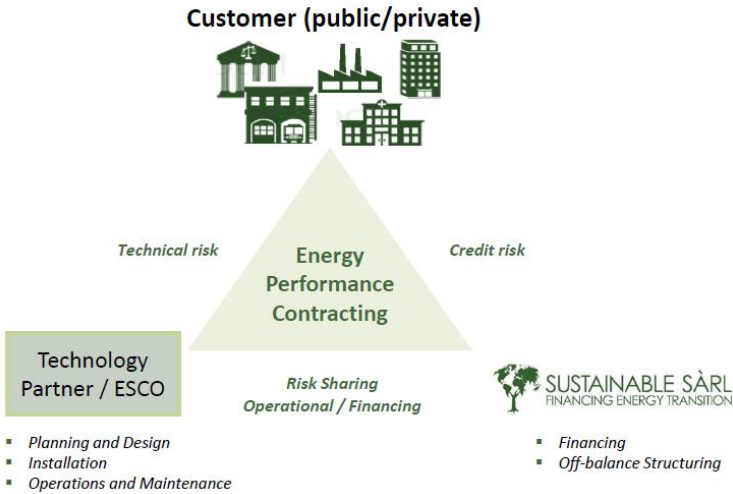
Impact

European Bank for Reconstruction and Development (EBRD), one of the potential investors, has already affirmed its support to the idea and operation of the fund, by providing a significant funding. There are currently on-going negotiations with several other investors of private capital, as well as with the relevant State institutions. It is expected that in the initial phase an investment of EUR 20 million will be allocated, which

	would secure the renovation of 60 buildings in the following three years.
Link	https://sharex.lv/en/labeef-2/
Success factors	<ul style="list-style-type: none"> - Creation of the fund is an alternative financial instrument for securing the entire renovation of Soviet era buildings, and it will be a unique example of a private and public partnership. - Opportunity to improve the quality and EE of residential assets, to alleviate the burden of financial requirements on real estate managers, maintenance companies and inhabitants, and to reduce the impact on the climate change by reducing heat losses and CO₂ emissions. - Residents do not have to take on a loan, and the cost to residents is limited to an increase in energy bills of about 15%, meaning that the affordability risk for them is mitigated.

4.4.3 SUSI Energy Efficiency Fund (EU wide)

Name	SUSI Energy Efficiency Fund (SEEF)
Timing	Since 2009
Overview	<p>SUSI Partners is a Swiss infrastructure fund manager specializing in sustainable investments supporting the energy transition. The firm currently manages approximately EUR 1 000 million investor commitments across five funds focused on opportunities for energy generation, energy efficiency enhancements, and energy storage and integrated solutions. SEEF is active in all major EURO markets (Italy, Germany, Ireland, Slovenia and Spain) and it is Europe's largest fund dedicated to Energy Efficiency.</p>
Implementation details	<p>The SUSI-advised funds for energy efficiency focus on projects in industrial processes, building infrastructure and public infrastructure by using the energy performance contracting model. Typical investments are between EUR 2-20 million and cover public infrastructure, commercial and industrial sites and retrofits of buildings. The SEEF provides financing for energy efficiency projects. It will invest approx. EUR 200 million in the next two years, across the Eurozone countries making it the largest independent energy efficiency fund in Europe.</p> <p><i>Mechanism description:</i></p> <ul style="list-style-type: none"> - Technology Partner (TO) identifies projects with customers e.g. commercial property, industrial complexes or public infrastructure; - TP plans, implements and services the project. TP enters a project contract with the customer and takes over the operational risk of the project; - SEEF finances 100% of the measures through a customised financing structure and takes over the credit risk of the customer; <p>Over the project lifetime the realised savings of the project are shared between the customer, TP and SEEF.</p>

	 <p>Figure 16. Methodology of strategy[Source: SUSI Energy Efficiency Fund (SEEF), Customized financing solutions for EE projects, link: http://www.energia.provincia.tn.it/binary/pat_agenzia_energia/ultimora/08_caporali.1489399170.pdf]</p> <p>SEEF’s transaction process can be as short as three months:</p> <ul style="list-style-type: none"> - Project and counterparty analysis (2 weeks); - Indicative offer and term sheet negotiation (4 weeks); - Due Diligence and signing (6 weeks); - Payment and monitoring (5-11 years). <p><i>Limits:</i></p> <ul style="list-style-type: none"> - SEEF does not take the risk of technology/performance/construction risk.
Impact	<p><i>Progress:</i> Primary energy consumption 1.6% above 2020 target; New buildings consume half the energy they did in the 1980; Sale of home appliances with highest energy efficiency labelling classes increased dramatically.</p> <p><i>Targets:</i> Governments need to improve energy efficiency in buildings owned of at least 3% per year; Annual reduction of 1.5% in national energy sales; Rollout of close to 200 million smart meters for electricity and 45 million for gas by 2020.</p>
Link	https://susi-partners.com/
Success factors	<p>Development of financing solutions and structures those allow to finance the energy transition. Financing solutions: Long financing tenor, up to 10 years; Innovative off-balance sheet financing structures; No upfront and commitment fees.</p>

4.5 Energy efficiency insurance

Energy efficiency (or energy savings) insurance is an innovative product in which policies protect the installer or owner of an energy efficiency project from under-achievement of predicted energy savings. One of the main barriers of the energy efficiency investments in buildings is the uncertainty associated with risks in terms of the assets installed, the revenues resulting from the project, and the energy savings generated. Specialised insurance solutions are useful to scaling up energy efficiency investments and to remove these uncertainties. Insurance companies also facilitate the flow of financing for these technology solutions and address the untapped market potential.

Leading insurance companies have been developing a number of specialised solutions in order to transfer risks from client to the insurance company. The main specialised energy efficiency insurance products and services are shown below:

- 1** Energy Performance Guarantee (EPG): EPGs cover the financial risk when energy efficiency improvements do not lead to projected levels of energy savings. EPGs can cover performance risks and/or technology risks.
- 2** Energy Efficiency (EE) services: Insurance companies offer EE services to existing and new clients such as technical assistance, advisory services, and business development, in order to exploit their existing relationships.
- 3** Add-on coverage: Insurance companies offer their clients add-ons that extend the coverage of existing insurance policies to take into account value increases resulting from EE investments.

Services and products are offered to energy efficiency stakeholders, from manufacturers of technology solutions to ESCOs, project hosts and project sponsors.

Table 15. Main strengths and weaknesses of energy efficiency insurance

STRENGTHS	WEAKNESS
<ul style="list-style-type: none"> — Overcoming technical uncertainty and improvement of credit risk; — Confidence on the customer side; — Improved credit worthiness, availability and cost of loans 	<ul style="list-style-type: none"> — Sometimes, investments are limited to small projects due to very short payback periods


4.5.1 HSB Engineering Insurance (UK)

Name	HSB Engineering Insurance
Timing	Since 2014
Overview	At the beginning of 2014 Hartford Steam Boiler (HSB) introduced insurance coverage for the efficiency of energy saving measures for buildings. HSB Engineering Insurance, as part of Munich Re, is a leading specialist provider of engineering and technology insurance and inspection services. Energy Efficiency Insurance is aimed mainly at energy services companies (ESCOs) and it is available for periods of up to five years.
Implementation details	HSB is working with an EU-backed consortium called SEAF (Sustainable Energy Asset Evaluation and Optimisation Framework), a EUR 1.7 million project funded by the European Commission to enable SMEs providing energy efficiency and other energy-related services to gain access to project finance. The overall objective of SEAF is to support millions in energy efficiency investments for European SMEs, job growth and increased energy and CO ₂ saving. Energy Efficiency Insurance is focused on providing of protection for all aspects of the project, ranging from material damage of the installed systems to business interruption. The final element is the asset

	<p>performance insurance covering a shortfall in energy savings. In particular, Energy Efficiency Insurance provides cover for the following:</p> <ul style="list-style-type: none"> - <i>Material damage</i>: covers physical damage, including breakdown, to equipment and materials installed as part of an energy-saving project with the aim of saving or generating energy. Replacement of equipment is on a new- for-old basis. - <i>Material damage</i>: covers physical damage, including breakdown, to equipment and materials installed as part of an energy-saving project with the aim of saving or generating energy. Replacement of equipment is on a new- for-old basis. - <i>Asset performance</i>: covers the annual shortfall in energy savings compared to the amount of savings insured by the policy. It covers shortfall caused by deficiencies in the design or implementation of energy-saving measures and does not require damage to have occurred to the equipment. The cover is subject to a project audit.
Impact	n/a
Link	<ul style="list-style-type: none"> - https://www.munichre.com/site/hsb-eil-mobile/get/documents_E607965295/hsb/assets.hsb.eil/Documents/Products/Energy-Efficiency-Insurance/HSBEI-1225-0418-4.pdf - https://www.munichre.com/topics-online/en/energy/energy-efficiency-insurance.html
Success factors	The product combines asset performance and technical risk insurance and is based on a unique model which gives a realistic projection of energy savings considering the interplay of all conservation measures in a building. The benefit for the client is an improvement of the project credit rating and the removal of the technical risk for the lender.

4.5.2 Energie Einspar Protect (EEP) KlimaProtect (DE)

Name	Energie Einspar Protect (EEP)
Timing	n/a
Overview	Energy Efficiency Protect (EEP) is an insurance product for energy efficiency measures that insures the guarantee regarding a pre-defined energy saving which is provided by an ESCO to a customer or investor. EPP was developed by the Hannover Re SE and KlimaProtect (a brand of b2b Protect GmbH).
Implementation details	<p>The insurance product EEP is characterized by its high flexibility. It can be used for very different technologies such as building insulation, LED installation, energy management, building control, compressed air generation and CHP plants.</p> <p>The basis of each EEP insurance is an initial analysis of the energy savings potential. This is an intensive examination of the measure to be implemented and the provider.</p> <p>KlimaProtect acts as the certifying body assessing a project proposal or a framework contract with a supplier, once a project is certified the calculated energy savings are insured.</p> <p>The ESCO is the insured entity and can use EEP as a sales argument In particular, EEP insures the guarantee with respect of a certain volume of energy savings which has been provided by an ESCO to its customers (the ESCO is the holder of the insurance policy).</p> <p><i>Different kinds of protection by EEP:</i></p> <ul style="list-style-type: none"> - Project related coverage: an individual coverage solution is suitable for larger projects with a variety of different efficiency projects and a corresponding volume of savings.

	<p>- General agreement: a general agreement is always the best solution, if a provider offers a number of similar projects. If a similarity of the different projects is observed during the analysis, the insurer and provider can make a general agreement on insuring future projects without a re-examination.</p>  <p style="text-align: center;">Figure 17. Energy Efficiency Protect (EEP)</p>
Impact	Until 2016, b2b Protect GmbH has provided insurance coverage to over 10 000 individual measures in cooperation with Hannover Re.
Link	- https://www.klimaprotect.de/en/energy-efficiency-protect/
Success factors	There is always a guarantee contract, signed between the provider and customer, which form the basis of an EEP insurance. In fact with EEP, the customer of an ESCO or investor can be sure that the promised energy saving will be achieved and a planned payback period is attained. If this not the case, the insurance company will pay for the gap.

4.5.3 Energy Savings Insurance (EU wide)

Name	Energy Savings Insurance (ESI)
Timing	Since 2015
Overview	<p>The energy savings insurance (ESI) model aims to scale up investments in energy efficiency.</p> <p>With the support of the Inter-American Development Bank and the Danish Government, BASE and other partners (Italian Federation for Energy Efficiency, the Business Council for Sustainable Development in Portugal and EnergyLab in Spain) developed the energy savings insurance (ESI) model that comprises financial and non-financial mechanisms designed to work together to overcome barriers, create trust and reduce the perceived risks for stakeholders.</p>
Implementation details	<p>The ESI model consists of risk mitigation instruments including insurance, standardized contracts, and a simplified validation process, which together help to mobilize financing. This model targets small and medium-sized enterprises (SMEs) and creates the conditions for them to invest in energy efficient technologies.</p> <p>The main components of the instrument are an insurance and package of complementary measures (Figure x). A package of complementary measures will address other barriers to investment such as technical capacity and access to capital.</p> <p>Measures include:</p> <ul style="list-style-type: none"> - Standardized contracts to reduce transaction costs, including a clause transferring part of the risk of underperformance to the technology solution provider. - Third party verification to ensure the quality of energy service providers

and their projects.

- Credit lines from development banks, which could provide long term capital, reducing the cost of financing projects.
- Grant support to sustain market demand.

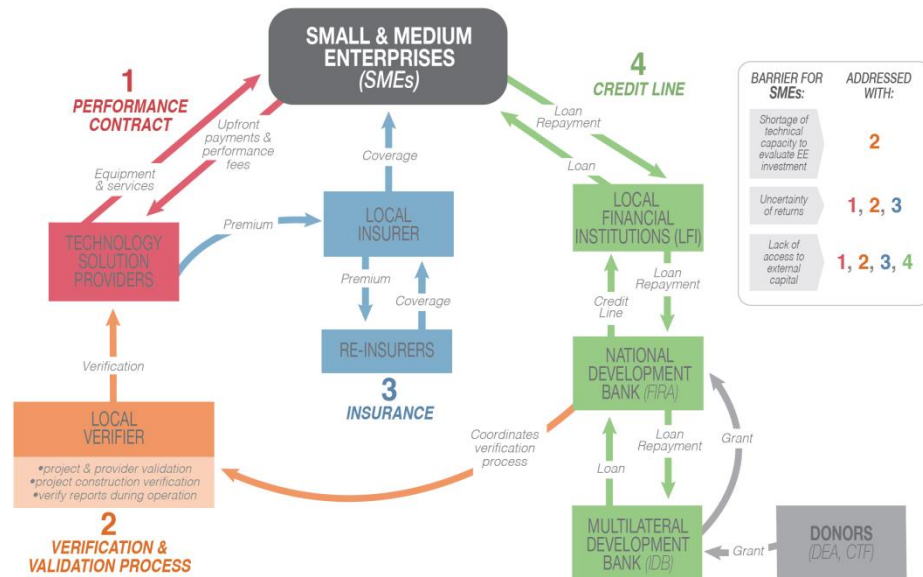


Figure 18. Energy Savings Insurance (ESI) model

BASE has also developed an ESI Toolkit that offers step-by-step instructions on how national development banks can establish a program that is able to catalyze the EE market.

Impact	ESI now has projects in seven countries that will target thousands of businesses. Replicated on a global scale, Energy Savings Insurance can drive EUR 8.92-89.16 billion (USD 10-100 billion) in investment and provide annual emission reductions of 27-234 MtCO ₂ by 2030.
Link	- http://energy-base.org/ - https://www.esi-europe.org/
Success factors	The ESI strategy facilitates access to a risk coverage product provided by a third party to insure against the provider failing to fulfil its contractual obligations regarding the energy savings. ESI and its complementary measures could absorb up to 80% of the impact of potential underperformance of energy savings during the pay-back period, significantly reducing risk for the end user/equity provider and the debt holder.

5 Identification of good practices

There is no universally accepted approach among researchers on how to define good practices on energy efficiency, even though several studies highlighting best practices exist in the literature (Levine *et al.*, 2012; European Commission, 2015; United Nations Economic Commission for Europe, 2015). Often these highlighted practices stem from the authors' own experience, while others are based on the definition of some general attributes or qualitative/quantitative criteria. For example, the MURE project developed a two-step methodological approach¹¹ which uses a total of 12 criteria (6 high- and 6 low-priority ones) to characterize successful policy measures on energy efficiency including financial and fiscal instruments.

To identify good practices on financing energy efficiency across the EU in this study, a total of 6 criteria have been used. Based on these criteria, best practice instruments are considered to have the following attributes:

- 1. Significant impact** → Instruments with significant quantifiable results, such as a large number of successful applications, volume of investments triggered and energy savings generated over their duration. They reach a wide recipient group, contribute to large energy savings and deliver significant multiple benefits (e.g. job creation etc.).
- 2. High cost effectiveness** → High cost effective instruments. These represent instruments associated with low set-up and running costs compared to volume of investments and energy savings achieved.
- 3. Ambitious energy upgrades** → Instruments that support comprehensive energy upgrades at building level. Instruments that score highly under this criterion are successful at promoting deep renovations, generate energy savings in line with each building's potential or encourage state of art renovations (beyond minimum requirements prescribed in building codes).
- 4. Funding sustainability and continuity** → Instruments that offer continuity, sustain low pressure on public finances and provide motivation among market actors to engage in long-term investments. These instruments may use innovative funding mechanisms (e.g. revolving funds) or diversified funding sources (e.g. by blending national sources with EU Funds and other international sources) including earmarked funds from taxation of fossil fuel use.
- 5. Scalability/Replicability** → Instruments that offer scalability by addressing multiple buildings through aggregation techniques, smart tools such as technical assistance and third party services (e.g. ESCOs). These may also be designed to be combined with other instruments or tools and are replicable to other sectors, regions or countries.
- 6. Outreach to hard-to-reach groups** → Instruments designed to support vulnerable groups of the society (e.g. low income households), alleviate fuel poverty or tackle segments of the building stock facing severe barriers (e.g. condominiums, multi-tenure or rented properties). These instruments are successful at addressing various energy efficiency barriers through innovative approaches.

To start with our analysis, a pre-selection was made using the MURE successful measure list. Schemes that scored an average score of at least 3 out of 5 based on the MURE methodology using the following criteria were pre-selected: 1. High impact/high number of applicants, 2. Cost efficiency for the implementer/necessary administrative support, 3. Potential for market transformation and promotion of energy services, 4. Suitability to overcome barriers for energy efficiency, 5. Ease and stability of re-financing financial measures, 7. Transferability, 8. Link to other policies, 9. Level of experience, 10.

¹¹ http://www.measures-odyssee-mure.eu/successful_info.asp

Avoidance of negative side-effects, 11. Positive side effects and 12. Ease of acceptance by stakeholders.

The instruments identified as a result of this pre-selection step are shown in Table 16 **Error! Reference source not found..**

Table 16. Pre-selected instruments based on the MURE successful measure list

Selected instruments	
AT1	Regional subsidies for energy efficiency in residential buildings ("Wohnbauförderung")
BE2	UREBA Subsidies to Improve Energy Efficiency of Public Buildings (Wallonia Region)
BE3	Financial incentives for RUE investments in residential buildings (Wallonia Region)
BG4	Residential Energy Efficiency Credit Line REECL
BG5	National Programme for Renovation of Residential Buildings in the Republic of Bulgaria
BG6	Financing of energy efficiency projects in municipal buildings by Operational Program Regional Development
BG7	National Energy Efficiency Programme for Multifamily Residential Buildings renovation
HR8	Programme of energy renovation of commercial non-residential buildings 2014-2020 (B.4) in the private service sector (tourism and trade)
CZ9	New Green Savings Programme
EE10	KredEx Renovation loan for apartment buildings
FR11	Energy Transition Tax Credit (CITE) (ex- Sustainable Development Tax Credit)
FR12	Zero-rated eco-loan ("prêt à taux zéro")
DE13	CO2 Building Renovation Programme (CO2-Gebäudesanierungs-programm)
DE14	Market Incentive Programme for Renewable Energies in Heat Market (Marktanreizprogramm für erneuerbare Energien im Wärmemarkt-MAP)
DE15	Energy Consulting Programme
EL16	Saving at home Programme
EL17	Energy savings in Local Self-Governments
IE18	Better Energy Homes
IT19	Eco-bonus tax rebate scheme
IT20	Conto Termico 2.0
LT21	Upgrading of multi-apartment buildings
LT22	Energy efficiency improvement in the household sector (Special programme for climate change)
MT23	Financing Schemes and instruments and fiscal incentives
NL24	Subsidy schemes (IRE, MEI, UKR, Clean and Efficient Demonstration Projects)
NL25	Energy Investment Allowance (EIA)
SK26	Improvement of thermal technical properties of buildings - Single-family buildings (SFB)
SK27	IROP (Integrated Regional Operational Programme)
SI28	Financial incentives for energy-efficient renovation and sustainable construction of residential buildings
SI29	Financial incentives for the energy efficient heating systems in residential and tertiary buildings
SI30	Financial incentives for comprehensive energy renovation and sustainable construction of buildings in the public sector
SI31	Financial incentives for efficient use of energy/electricity
ES32	BIOMCASA-SOLCASA-GEOTCASA programmes
ES33	PAREER +PAREER-CRECE+PAREER II Programme (Aid Programme for Energy Rehabilitation in Existing Buildings)

The pre-selected instruments were then analysed using the six criteria defined in this study and described above. For each instrument, a score ranging from 0 (very poor) to 1 (excellent) under each evaluation criterion was assigned using the following methodology:

Criterion 1 score (z_1)

The **impact** (x_1) was defined as the *average* number of units benefitting from a given scheme per year which were expressed either as the total successful applications/projects, households, dwellings, apartments, etc. If data were available over a period of time, an average annual value was calculated (preferred option);

alternatively, data for a specific reference year were used. To normalize the scores and compare the different instruments, the "max-min method" was used to determine the criterion 1 score (z_1) using equation [1]:

$$z_1 = \frac{x_1 - \min(x_1)}{\max(x_1) - \min(x_1)} \quad [1]$$

where:

z_1 is the normalized criterion 1 score that varies between 0 and 1

x_1 is the initial (real) impact

$\max(x_1)$ and $\min(x_1)$ are the minimum and maximum values of the whole data

Criterion 2 score (z_2)

Cost-effectiveness (x_2) was considered as the ratio between budget [EUR million] and savings [TJ]. If the value of the ratio is close to 0 it means that with low costs there are significant energy savings; conversely if the value is close 1 it means that it the costs are higher to obtain significant savings. According to the "max-min method" the criterion 2 score (z_2) using the equation [2]:

$$z_2 = 1 - \frac{x_2 - \min(x_2)}{\max(x_2) - \min(x_2)} \quad [2]$$

where:

z_2 is the normalized criterion 2 score that varies between 0 and 1

x_2 is the ratio between budget and savings

$\max(x_2)$ and $\min(x_2)$ are the minimum and maximum values of the whole data

Criterion 3 score (z_3)

Ambitious energy upgrades were identified when there was a reduction of at least minimum 30 % in heat energy demand and/or when there was an upgrade of at least 1 energy class. In this case, when one of the two conditions was verified, the score of 1 was assigned to the instrument.

Criterion 4 score (z_4)

Three parameters were used to evaluate the **funding sustainability and continuity**:

- x_{4a} defined as the number of years of operation;
- x_{4b} the type of funding mechanism such as revolving or guarantee (1 if the scheme was deemed as an innovative scheme);
- x_{4c} number of funding sources (c).

Each of these parameters were normalised using the max-min method to obtain the sub-criteria scores z_{4a} , z_{4b} and z_{4c} , respectively. These were then added together and re-normalised to obtain the total criterion 4 score (z_4) using equation [3]:

$$z_4 = \frac{z_{4a} + z_{4b} + z_{4c} - \min(z_{4a} + z_{4b} + z_{4c})}{\max(z_{4a} + z_{4b} + z_{4c}) - \min(z_{4a} + z_{4b} + z_{4c})} \quad [3]$$

Criterion 5 and criterion 6 scores (z_5 and z_6)

Scalability/Replicability were identified when there was the aggregation of different techniques and/or the presence of smart tools (TA, ESCO) and/or the possibility to combine different measures and/or the replicability to other sectors, regions or countries. In this case, when one of these conditions was verified, the score of 1 was assigned to BPs, otherwise the value is 0. **Outreach to hard-to-reach groups** were identified in schemes for which there was a specific support for vulnerable groups (low income households) and/or an improvement of the building stock facing severe barriers. In this case, when one of these conditions was verified, the score of 1 was assigned to BPs, otherwise the value is 0.

Global score (Z)

To obtain the global evaluation score (Z) of each instrument, the sum of above individual scores z1 to z6 was computed. It should be noted that equal weights have been applied for all criteria considered in this analysis. Future considerations may include the application of criteria weighting factors that differ according to the importance of each criterion.

From the above analysis, the top 10 instruments that obtained the highest global scores (Figure 19) are the following ones:

1. Energy Transition Tax Credit (FR) with a score of 1.00;
2. Residential building subsidies, energy subsidies and environmental subsidies from the provinces (AT) with a score of 0.86;
3. Saving at home programme (EL) with a score of 0.80;
4. Energy Investment Allowance (NL) with a score of 0.79;
5. KfW Energy Efficient Refurbishment Programme (DE) with a score of 0.74;
6. Financial incentives for RUE investments in residential buildings (BE-W) with a score of 0.74;
7. Zero-rated eco-loan (FR) with a score of 0.72;
8. Kredex Credit and Export Guarantee Fund (EE) with a score of 0.66;
9. Residential Energy Efficiency Credit Line (BG) with a score of 0.63;
10. Eco-bonus Tax deduction scheme (IT) with a score of 0.60.

The individual scores for each criterion are shown in Table 17.

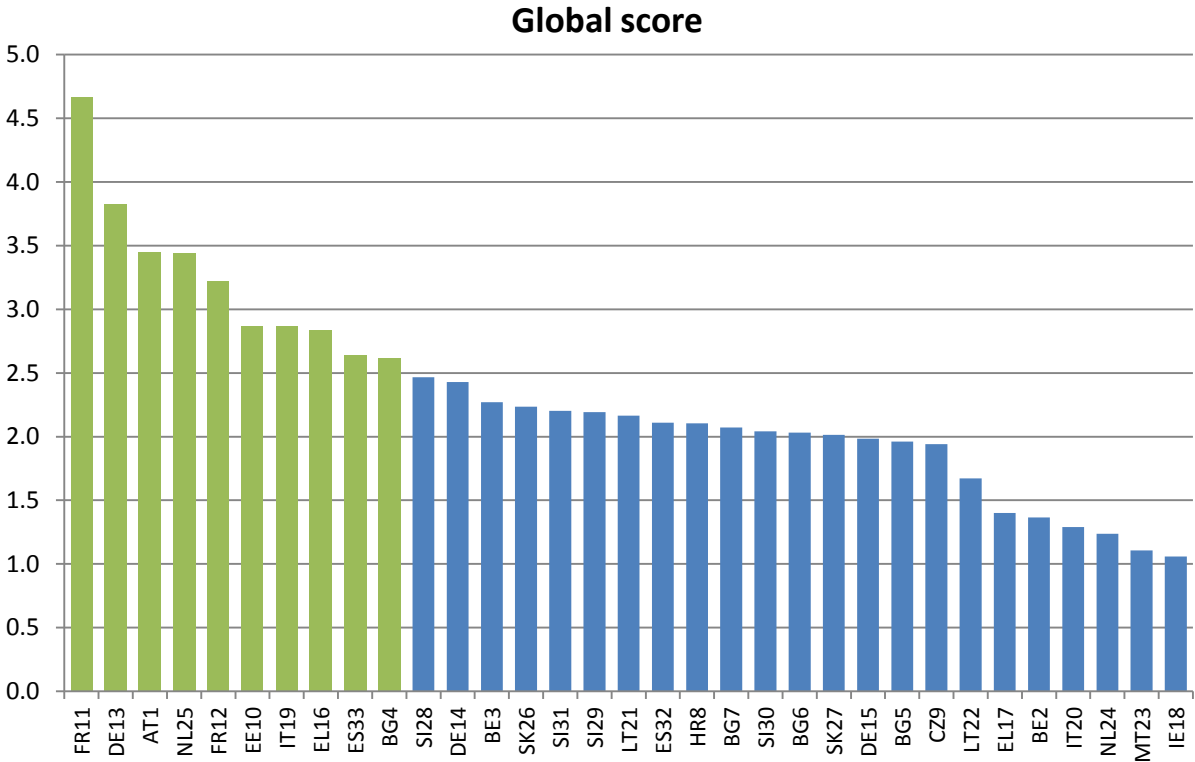


Figure 19. Identification of good practices based on the global score evaluated with the methodology proposed in this study

Table 17. Scores obtained from our analysis for each instrument

Best Practices		C1	C2	C3	C4	C5	C6	Global
AT1	Regional subsidies for energy efficiency in residential buildings ("Wohnbauförderung")	0.02	0.73	1.00	0.70	1.00	0.00	3.45
BE2	UREBA Subsidies to Improve Energy Efficiency of Public Buildings (Wallonia Region)	0.00	1.00	0.00	0.37	0.00	0.00	1.37
BE3	Financial incentives for RUE investments in residential buildings (Wallonia Region)	0.00	1.00	0.00	0.27	0.00	1.00	2.27
BG4	Residential Energy Efficiency Credit Line REECL	0.00	0.90	0.00	0.71	1.00	0.00	2.62
BG5	National Programme for Renovation of Residential Buildings in the Republic of Bulgaria	0.00	0.73	1.00	0.24	0.00	0.00	1.96
BG6	Financing of energy efficiency projects in municipal buildings by Operational Program Regional Development	0.00	0.85	0.00	0.18	1.00	0.00	2.03
BG7	National Energy Efficiency Program for Multifamily Residential Buildings renovation	0.00	1.00	0.00	0.07	1.00	0.00	2.07
HR8	Programme of energy renovation of commercial non-residential buildings 2014-2020 (B.4) in the private service sector (tourism and trade)	0.00	1.00	1.00	0.11	0.00	0.00	2.10
CZ9	New Green Savings Programme	0.04	0.79	0.00	0.11	1.00	0.00	1.94
EE10	KredEx Renovation loan for apartment buildings	0.00	0.87	1.00	1.00	0.00	0.00	2.87
FR11	Energy Transition Tax Credit (CITE) (ex-Sustainable Development Tax Credit)	1.00	0.96	0.00	0.71	1.00	1.00	4.66
FR12	Zero-rated eco-loan ("prêt à taux zéro")	0.03	0.99	0.00	0.20	1.00	1.00	3.22
DE13	CO2 Building Renovation Programme (CO2-Gebäudesanierungs-programm)	0.50	0.56	1.00	0.77	1.00	0.00	3.83
DE14	Market Incentive Programme for Renewable Energies in Heat Market (Marktanreizprogramm für erneuerbare Energien im Wärmemarkt-MAP)	0.00	0.99	0.00	0.43	1.00	0.00	2.43
DE15	Energy Consulting Programme	0.00	0.99	0.00	0.00	1.00	0.00	1.99
EL16	Saving at home Programme	0.01	0.95	0.50	0.38	0.00	1.00	2.83
EL17	Energy savings in Local Self-Governments	0.00	0.20	0.00	0.20	1.00	0.00	1.40
IE18	Better Energy Homes	0.03	0.87	0.00	0.16	0.00	0.00	1.06
IT19	Eco-bonus tax rebate scheme	0.55	0.58	0.50	0.24	1.00	0.00	2.87
IT20	Conto Termico 2.0	0.06	0.16	0.00	0.07	1.00	0.00	1.29
LT21	Upgrading of multi-apartment buildings	0.00	0.67	0.00	0.49	0.00	1.00	2.17
LT22	Energy efficiency improvement in the household sector (Special programme for climate change)	0.00	0.99	0.50	0.18	0.00	0.00	1.67
MT23	Financing Schemes and instruments and fiscal incentives	0.00	0.00	0.00	0.11	1.00	0.00	1.11
NL24	Subsidy schemes (IRE, MEI, UKR, Clean and Efficient Demonstration Projects)	0.00	0.00	0.00	0.24	1.00	0.00	1.24
NL25	Energy Investment Allowance (EIA)	0.02	1.00	1.00	0.42	1.00	0.00	3.44
SK26	Improvement of thermal technical properties of buildings - Single-family buildings (SFB)	0.00	0.00	1.00	0.24	1.00	0.00	2.24
SK27	IROP (Integrated Regional Operational Programme)	0.00	0.91	0.00	0.11	1.00	0.00	2.01
SI28	Financial incentives for energy-efficient renovation and sustainable construction of residential buildings	0.78	0.97	0.50	0.22	0.00	0.00	2.47
SI29	Financial incentives for the energy efficient heating systems in residential and tertiary buildings	0.00	0.98	0.00	0.22	1.00	0.00	2.19
SI30	Financial incentives for comprehensive energy renovation and sustainable construction of buildings in the public sector	0.00	0.99	0.00	0.05	1.00	0.00	2.04
SI31	Financial incentives for efficient use of energy/electricity	0.00	0.98	0.00	0.22	1.00	0.00	2.20
ES32	BIOMCASA-SOLCASA-GEOTCASA programmes	0.00	0.91	0.00	0.20	1.00	0.00	2.11
ES33	PAREER +PAREER-CRECE+PAREER II Programme (Aid Programme for Energy Rehabilitation in Existing Buildings)	0.00	0.52	1.00	0.12	1.00	0.00	2.64

5.1 Grants and subsidies

5.1.1 Residential Building Subsidy (AT)

Name	Residential building subsidies, energy subsidies and environmental subsidies from the provinces
Timing	Since 1982
Overview	<p>The regional subsidies earmark funds for the thermal quality improvements and expansion of efficient heating systems in residential buildings. The level of subsidy is dependent on the thermal quality achieved or the efficiency of the heating system. In addition to requirements relating to usable energy and final energy, new construction subsidies are subject to increased requirements as regards primary energy demand and CO₂ emissions. In 2015, the financing was EUR 2 530 million, including around EUR 710 million for renovation (EUR 590 million from 2009 to 2015).</p>
Implementation details	<p>Private households get subsidies for the insulation of outer walls, ceilings, replacement of windows and doors. If there is a so-called exemplary refurbishment the change of a conventional heating system to renewable systems is also subsidized. The building has to be older than 20 years and has to meet the requirements of the <i>klimaaktiv</i> standard or a high standard, and in case of partial refurbishments, the reduction of the heat energy demand has to be at minimum 50 % (requirement in 2016). Additional subsidies are foreseen for insulation material based on regenerative natural resources and for the creation of energy performance certificates. Businesses also receive subsidies for the optimization of the thermal insulation. Additional subsidies are foreseen for the combination of the measure with the optimization of the technical systems.</p> <p>The nature of the support differs from province to province and is provided in the form of loans, grants and/or subsidies.</p> <p>In general the supported interventions are: thermal insulation (thermal insulation of windows, outer walls, roofs and ceilings); space and water heating (connection to the district heating, installation of central heating systems, solar thermal plants, heat pumps, biomass heating systems).</p> <p><i>Examples:</i></p> <p>Burgenland</p> <ul style="list-style-type: none"> - The Burgenland Residential Building Subsidies Act 2005 in the currently applicable version provide subsidies for the construction and renovation of residential properties, the creation of living space, the purchase of nonsubsidised houses and apartments, the installation of alternative energy systems, and measures for improving the thermal quality of the building envelope of a subsidised property, and additionally provides for the granting of homebuilding loans and housing benefits. - The amount of the subsidies is dependent to a large degree on energy efficiency. For instance, in the case of loans for new-build properties, the amount of the subsidy increases in each case by a maximum of EUR 25 000. <p>Carinthia</p> <ul style="list-style-type: none"> - The residential building subsidies of the province of Carinthia provide support for new-build properties and renovations of residential properties. The amount of the subsidy depends to a large extent on the energy efficiency achieved. This includes both the quality of the building envelope and the nature of the energy supply. For instance, for new-build properties, the subsidy increases by EUR 275 per m² in the case of a passive house in comparison with the minimum standard. <p>Lower Austria</p> <ul style="list-style-type: none"> - In 2002, a residential building subsidy system was established in Lower

	<p>Austria which takes account of minimum standards in terms of heat energy demand and the use of heating and hot-water systems with renewable energy sources and ecological building materials.</p> <ul style="list-style-type: none"> - In the five year period from 2012 to 2016, the renovation of approximately 30 000 houses and apartments and the building of around 29 000 houses and apartments was subsidised. <p>Upper Austria</p> <ul style="list-style-type: none"> - The province of Upper Austria offers, inter alia, the following subsidies in support of the implementation of Directive 2010/31/EU: <ul style="list-style-type: none"> - Subsidies for the construction of energy-efficient buildings; - Subsidies for the energy-efficient renovation of existing buildings; - Requirements in terms of energy for new-build properties and renovation of schools, kindergartens, nurseries and official buildings of the municipalities in the context of need-based allocations, - Subsidies for energy-efficient building-technology systems; - Comprehensive and product-independent energy advice in relation to the construction and renovation of buildings for private individuals, companies and public bodies. <p>Salzburg</p> <ul style="list-style-type: none"> - Residential building subsidies: as part of the province of Salzburg's support for residential building, an incentive system for energy-ecological and ecological measures which go beyond the respective minimum requirements was established as long ago as 1993. The amount of the subsidy depends inter alia on the energy efficiency achieved. This includes both the quality of the building envelope and the nature of the energy supply. <p>Styria</p> <ul style="list-style-type: none"> - In Styria the subsidy variant of "Deep energy renovation" has been newly introduced. New insulation standards were stipulated for the years 2010/2012 in respect of multi-storey buildings. The subsidy awarded is either a non-repayable 30% annuity subsidy for a bank loan with a term of 14 years or a one-off, non-repayable subsidy contribution of 15% of the recognised subsidised overall construction costs up to a maximum of 30,000 per residence. <p>Tyrol</p> <ul style="list-style-type: none"> - As financial instruments, both loans and grants are provided in the context of the residential building subsidies. In principle, subsidies are awarded both for the construction of new buildings and for the renovation of existing buildings. In the case of subsidies in the context of renovations of existing buildings, inter alia compliance with corresponding HTC values for the relevant building parts (walls, roof, windows, etc.) is demanded as a subsidy criterion. <p>Vorarlberg</p> <ul style="list-style-type: none"> - The residential building subsidies of the province of Vorarlberg provide support for new-build properties and renovations of residential properties. The amount of the subsidy depends to a large extent on the energy efficiency achieved. This includes both the quality of the building envelope and the nature of the energy supply. <p>Vienna</p> <p>The resources of the residential building subsidies are intended to facilitate affordable housing when new-build projects are constructed. The subsidies are awarded on a sliding scale depending on income and family situation.</p>
Impact	<p>The calculation is based on data in the annual reports by the provinces in the context of energy efficiency monitoring. Final energy savings amounted to 1.9 PJ in 2014 and to 1.76 PJ in 2015. The cumulative contribution shall amount to 24 PJ between 2014 and 2020.</p> <p>In 2016, 10 100 private renovation projects and 310 projects in the</p>

	business sector were submitted. The Austrian Government offered EUR 43.5 million for the thermal refurbishment of buildings. According to the responsible ministries from 2009 to 2015 investments of EUR 4 200 million could be triggered with subsidies of approx. EUR 590 million.
Link	<ul style="list-style-type: none"> - https://www.bmlfw.gv.at/ - http://www.bmwfw.gv.at/Seiten/default.aspx - https://www.help.gv.at/Portal.Node/hlpd/public/content/21/Seite.210301.html
Success factors	<p>1) Significant impact: residential building subsidies are the most important factor behind a significant volume of building renovation in the provinces (high impact level). In 2016, 10 100 private renovation projects and 310 projects in the business sector were submitted.</p> <p>2) Cost effectiveness: the ratio between budget and savings is 0.02 (very cost-effective), the data used for the analysis are indicated below.</p> <ul style="list-style-type: none"> - Annual energy savings [TJ]: 1 900 (2014); 1 760 (2015). - Annual budget [EUR million]: 43.5 (average value from 2015 to 2019). - Annual investment [EUR million]: 840. <p>3) Ambitious energy upgrades: reduction of at least minimum 50% in heat energy demand.</p> <p>4) Funding sustainability and continuity: this scheme offers continuity based on lasting commitment, in particular it is present since 1982 (number of years 37).</p> <p>5) Scalability/Replicability: the measure was replicated to different provinces and the support was provided in the form of loans, grants and/or subsidies from each province.</p>

5.1.2 PAREER +PAREER-CRECE+PAREER II Programme (ES)

Name	PAREER +PAREER-CRECE+PAREER II Programme (Aid Programme for Energy Rehabilitation in Existing Buildings)
Timing	2013 - 2019
Overview	The Ministry of Industry, Energy and Tourism through the Institute for Energy Diversification and Saving (IDAE) has launched a specific aid and financing programme to encourage and promote the implementation of measures on energy conservation, energy efficiency, the use of renewable energy and reduction of carbon dioxide emissions in existing buildings, regardless of their use and the legal nature of the owners.
Implementation details	<p>This programme promotes comprehensive actions and integrated measures encouraging the improvement of energy efficiency and the use of renewable energies in the stock of existing buildings in the residential sector by awarding grants and repayable loans to projects involving the renovation of building envelopes and heating installations and to those which use biomass and geothermal energy rather than conventional energy sources.</p> <p>The aided actions should improve the total energy rating of the building by at least 1 class measured on the carbon dioxide emission scale (kg CO₂/m² year) compared to the initial energy rating of the building. In addition, additional support will be granted for actions that reach energy class A or B, or that increase the initial energy rating of the existing building by more than two letters.</p> <p>The additional aid up to a maximum aid amount, depending on:</p> <ul style="list-style-type: none"> - the social criterion (actions carried out in housing buildings that have been definitively qualified under a public protection regime) - the energy efficiency (actions that raise the energy rating of the building to obtain an energy class A or B on the CO₂ scale, or increase the initial energy rating by two letters) - the integrated action (actions that simultaneously combine two or more

types of action).

TYPE OF ACTION	BUILDING USE	MONEY ALLOWANCE WITHOUT CONSIDERATION					
		BASE AID	% ADDITIONAL AID				
			Social Criteria	Compreh. Action	Energy Efficiency		
"A" Final Rating	"B" Final Rating	Two-letter Upgrade or Higher					
Upgrade of the energy efficiency in the thermal envelope.	Household	30% (limit 6 000 €/household)	15%	20%	15%	10%	5%
	All other uses		0%	20%	15%	10%	5%
Upgrade of energy efficiency in thermal & lighting installations.	Household	20%	0%	0%	10%	5%	0%
	All other uses		0%	0%	10%	5%	0%
Replacement of conventional energy by thermal biomass in building thermal installations	Household	25%	5%	10%	0%	0%	0%
	All other uses		0%	10%	10%	5%	0%
Replacement of conventional energy by geothermal energy in building thermal installations	Household	30%	10%	15%	0%	0%	0%
	All other uses		0%	15%	10%	5%	0%

Figure 20. PAREER +PAREER-CRECE+PAREER II Programme: different money allowance considering the type of action and the building use [Source: MURE database]

Impact

The programme should have a favourable impact, in terms of saving and energy efficiency improvement, and in the exploitation of renewable energies in the buildings.

According to the National Energy Efficiency Action Plan in 2014 110 projects for improvements in energy efficiency to buildings were approved and 223 in 2015. The final energy savings (ktoe/year) was 20.02 in 2014 and 4.34 in 2015. The cumulative savings in 2020 is 40.23. In fact it is expected that actions implemented since the approval of requests submitted after 2015 will lead to greater savings. Expected savings are equivalent to avoided emissions of 116.77 kt CO₂/year over the 2014-2020 period.

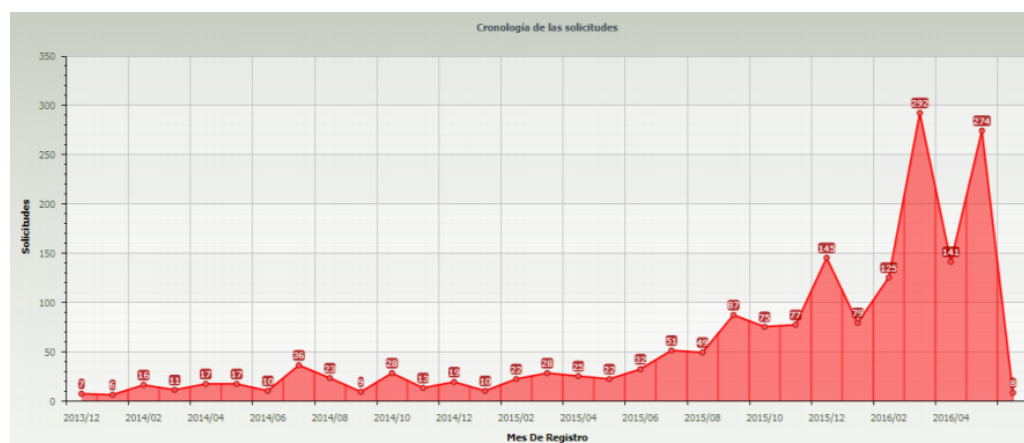


Figure 21. PAREER +PAREER-CRECE+PAREER II Programme: evolution of requests made to the PAREER-CRECE Program [Source: IDAE]

Link

- <https://www.idae.es/ayudas-y-financiacion/programa-de-ayudas-para-la-rehabilitacion-energetica-de-edificios-existentes>

Success factors

1) *Medium impact*: between 2014 and 2016 a number of 1 244 applications were made under this program.
 2) *Cost effectiveness*: the ratio between budget and savings is 0.48 (sufficiently cost-effective), the data used for the analysis are indicated below.

- Annual energy savings [TJ]: 207 (average value: 2014, 2015 and 2020).

	<p>- Annual budget [EUR million]: 100 (average value from 2014 to 2016). - Annual investment [EUR million]: 333.</p> <p>3) Ambitious energy upgrades: upgrade by at least one energy class or, alternatively, measured on the carbon dioxide emission scale compared to the initial energy rating of the building. Additional support will be granted for actions that reach energy class A or B, or that increase the initial energy rating of the existing building by more than two letters.</p> <p>4) Funding sustainability and continuity: this scheme offers continuity based on sufficiently lasting commitment, in particular it is present since 2009 (number of years 6).</p> <p>5) Scalability/Replicability: the support was provided in the form of grants and loans.</p>
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5.1.3 Saving at home programme (EL)

Name	Saving at home I & II Programme
Timing	2011-2020
Overview	The 'Saving at home' programme aims at providing financial incentives for energy-saving interventions in the residential building sector with a view to reducing energy needs. The types of housing that can be subsidised by the programme are: single-family houses; apartment blocks (for the part of the block which relates to all the apartments in the building); and individual apartments.
Implementation details	<p>The "Saving at home" was started at 2011 and ended on December 2016; the "Saving at home II" Program was designed as a follow-up to the "Saving at home" (until 2020).</p> <p>The Program provides incentives for buildings that have a building permit or other legitimisation document, are used as the main residence and whose owners meet certain income criteria. In particular, there are seven categories of incentives (Figure 22) in which the Beneficiaries are classified according to their personal or family yearly income.</p> <p>The Program is funded by European Regional Development Fund (ERDF) and national resources, and provides incentives in the form of a grant (direct support) and a loan (the "Saving II" Fund) with an interest rate subsidy. Only natural persons are eligible to participate in the Program: ownership or usufruct in an eligible home.</p> <p>The proposal (combination of interventions) for energy upgrade which is submitted with the application should cover the following requirement which is the minimum energy objective of the Programme: it must upgrade by at least one energy class or, alternatively, provide an annual primary energy savings greater than 30% of the reference building consumption (kWh/m²).</p> <p>To make sure that this requirement is met, the materials and systems to be used for the interventions must be energy certified. Moreover, building materials and electromechanical systems which are subject to a relevant requirement under applicable law, should bear the CE mark.</p> <p>The eligible categories of interventions for improving energy efficiency are:</p> <ul style="list-style-type: none"> - replacing window frames / glass panes and installing shading systems; - installing thermal insulation in the building envelope, including the roof and pilotis (open parking space in place of the ground floor); - upgrading the heating and domestic hot water system.

Category	Personal Income	Family income	Subsidy	Increase of subsidy per dependent child	Maximum subsidy
1	Up to 10,000	Up to 20,000	60%	5%	70%
2	>10,000 to 15,000	>20,000 to 25,000	50%	5%	70%
3	>15,000 to 20,000	>25,000 to 30,000	40%	5%	70%
4	>20,000 to 25,000	>30,000 to 35,000	35%	5%	70%
5	>25,000 to 30,000	>35,000 to 40,000	30%	5%	50%
6	>30,000 to 35,000	>40,000 to 45,000	25%	5%	50%
7	>35,000 to 40,000	>45,000 to 50,000	0	0%	0%

Figure 22. Saving at home program: income criteria of the categories [Source: MURE database]

Impact

By December 2016, approximately 26 thousand dwellings joined the programme had been submitted. The total eligible budget of EUR 325.5 million.

The budget breakdown by category of energy upgrading interventions of completed applications is:

- - replacing window frames / glass panes and installing shading systems: EUR 106 million;
- - installing thermal insulation in the building envelope, including the roof and pilotis: EUR 49 million;
- - upgrading the heating and domestic hot water system: EUR 55 million.

The implementation of these interventions resulted in annual final energy savings which are presented in Figure 23 and Figure 24.

Number of interventions	New savings (ktoe)							Cumulative savings (ktoe) (Article 7 of EED calculation)
	2014	2015	2016	2017	2018	2019	2020	2014-2020
26,964 dwellings	29.98	8.17	1.55	7.19	-	-	-	239.4
	Total savings (ktoe)							
	29.98	8.17	1.55	38.89	38.89	38.89	38.89	

Figure 23. "Saving at home I" program: energy savings from policy measures implemented in 2014-2020 (ktoe) [Source: MURE database]

Approximately 50,000 dwellings	New savings (ktoe)			Cumulative savings (ktoe) (Article 7 of EED calculation)
	2018	2019	2020	2014-2020
Approximately 50,000 dwellings	25.04	18.78	18.78	131.46
	Total savings (ktoe)			
	25.04	43.82	62.6	

Figure 24. "Saving at home II" program: Expected Energy savings from policy measures implemented in 2018-2020 (ktoe) [Source: MURE database]

Link

(NEEAP)

Success factors

1) Significant impact: The applications completed by June 2016 as part of the 'Saving at home' programme amounted to 51 659 of a total budget of EUR 529 million. 83 % of the completed applications involved the replacement of window frames, 53.9 % thermal insulation and 71.6 % upgrade of the heating system and domestic hot water supply. The total area of renovated residences amounts to 5.2 million m² resulting in total

	<p>annual primary energy savings of 853.6 GWh (high impact level).</p> <p>2) Cost effectiveness: the ratio between budget and savings is 0.03 (very cost-effective), the data used for the analysis are indicated below.</p> <ul style="list-style-type: none"> - Annual energy savings [TJ]: 2 587 (average value from 2014 to 2020). - Annual budget [EUR million]: 65.1 (average value from 2011 to 2016). - Annual investment [EUR million]: 119.92. <p>3) Ambitious energy upgrades: upgrade by at least one energy class or, alternatively, provide an annual primary energy savings greater than 30% of the reference building consumption.</p> <p>4) Funding sustainability and continuity: this scheme is financed by two funding sources: the European Union (ERDF) and the National Resources, through the Regional Operational Programmes (ROP) and the Operational Programme 'Competitiveness and Entrepreneurship' (OPCE) and Environment and Sustainable Development' (OPESD) under the NSRF 2007-2013.</p> <p>6) Outreach to hard-to-reach groups: there are seven categories of incentives in which the beneficiaries are classified according to their personal or family yearly income; this allows families with lower incomes to have access to higher percentage of subsidies.</p>
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5.2 Credit lines

5.2.1 Residential Energy Efficiency Credit Line (BG)

Name	Residential Energy Efficiency Credit Line (REECL)
Timing	Since 2005
Overview	To help Bulgarian households reduce their energy bills and consumption the European Commission, the European Bank for Reconstruction and Development, and the Bulgarian Energy Efficiency Agency have developed a EUR 50 million Residential Energy Efficiency Credit Line (REECL) to provide credit lines to reputable Bulgarian banks to make loans to householders for specific energy efficiency measures including double-glazing; wall, floor, and roof insulation; efficient biomass stoves and boilers; solar water heaters; efficient gas boilers; and heat pump systems.
Implementation details	<p>To help stimulate the uptake of residential energy efficiency projects, an additional EUR 10 million in grant financing is earmarked in support of project development and incentive grants paid to REECL borrowers after verification by independent consultant that each eligible residential energy efficiency project has been completed. Each borrowing household will benefit from a 20% incentive towards the cost of the energy savings projects (to a maximum of EUR 850).</p> <p>The grant financing comes from the Kozloduy International Decommissioning Support Fund (KIDSF), set up in 2000 with contributions from the European Commission, EU member countries, and Switzerland. KIDSF financially supports the early decommissioning of units 1-4 of Kozloduy Nuclear Power Plant. KIDSF also supports energy sector initiatives associated with the decommissioning effort, such as improving energy efficiency in Bulgaria.</p> <p>The REECL facility aims to give householders or Associations of Home Owners across Bulgaria an opportunity to avail of the benefits of energy efficiency home improvements by providing them with loans and incentive grants through local participating banks.</p> <p>Any householder or Association of Home Owners who takes a REECL loan is entitled to receive an incentive of 20%, 30% or 35% respectively toward the cost of the energy saving project once it has been completed at their residence, subject to terms and conditions.</p>

	<p>On 1st September 2016, the European Bank for Reconstruction and Development opened the third programming period of the Residential energy efficiency credit line (REECL III) which started on the Bulgarian market in 2005. The objective is for the positive effect of the Programme achieved so far to continue and the necessity of further energy efficiency improvement measures in the housing sector in Bulgaria to be met. The program contributes to the development of the economy by: 1) demonstrating the best energy efficiency technologies and complete renovation in the housing sector; expanding the market and increasing competition in the supply of such products and services; 2) developing financial intermediation with owners' associations as well as with service providers; 3) developing the capacity of the financial institutions involved to finance companies providing energy efficiency projects in the housing sector, as well as the capacity of companies providing such services in the structuring of energy efficiency projects; and 4) supporting Bulgaria in its efforts to reduce carbon emissions.</p> <p>Loans and grants are given to the following energy efficiency installations:</p> <ul style="list-style-type: none"> - Thermal insulation (thermal insulation of windows, outer walls, roofs and ceilings); - Space and water heating (Gas Boilers; Biomass Fuelled Room Heaters, Stoves and Boiler Systems); - RES (Solar Thermal Systems; Cooling and Heating Heat Pump Systems; Building-Integrated Photovoltaic Systems; Heat-Exchanger Stations and Building Installations; Gasification Installations; Balanced Mechanical Ventilation with Heat Recovery). <p>The REECL loans and incentive grants are available to REECL borrowers until 30th June 2015. It is anticipated that the total number of energy efficiency home improvement projects to be financed under the REECL facility will be in the range of 30 000.</p>								
Impact	<p>In 2014 in the frames of REECL were financed and implemented 2892 projects for implementation of energy saving measures in the households totalling EUR 4.983 million as the estimated equivalent of saving electricity is 14 135 MWh/yr., and savings in greenhouse gas emissions amounted to 9 654 tCO₂eq./yr.</p> <p>In 2015, 3052 projects were implemented for the implementation of energy saving measures in households for a total amount of EUR 4.987 million, with the projected equivalent of saved energy being 14 145 MWh/yr, and savings of greenhouse gas emissions amounting to 9661 t CO₂ eq./g.</p> <p>A new phase of the REECL 3 program has been launched in 2016. Under it, loans and grants will be offered to potential borrowers by December 31, 2018.</p> <p>The incentive payment scheme targeted affordability and market penetration barriers for advanced technologies. It was structured on a gradually decreasing basis, with caps of up to 20 % of loans. Expected results: number of projects 57; total amount EUR 891 253 (BGN 1 747 555); grants EUR 144 985 (BGN 284 285); energy savings 5.808 MWh/y; CO₂ savings 1 319 tCO₂/y.</p> <p>Table 18. Distribution of the energy savings by the type of the energy saving measures, up to 2013</p> <table border="1" data-bbox="451 1879 1326 2031"> <thead> <tr> <th>Measure</th> <th>Electrical energy savings (MWh/year)</th> </tr> </thead> <tbody> <tr> <td>Windows</td> <td>39 063</td> </tr> <tr> <td>Insulation - walls</td> <td>16 849</td> </tr> <tr> <td>Insulation - roof</td> <td>820</td> </tr> </tbody> </table>	Measure	Electrical energy savings (MWh/year)	Windows	39 063	Insulation - walls	16 849	Insulation - roof	820
Measure	Electrical energy savings (MWh/year)								
Windows	39 063								
Insulation - walls	16 849								
Insulation - roof	820								

		Insulation - floor	355
		Gas boilers/Gasification	51 585
		Regulation of the ventilation	7
		Total	108 679
Link	- http://reecf.org/en/		
Success factors	<p>1) Significant impact: under this program, 3 052 projects for implementation of energy savings measures in the households were made (medium impact level).</p> <p>2) Cost effectiveness: the ratio between budget and savings is 0.10 (moderately cost-effective), the data used for the analysis are indicated below.</p> <ul style="list-style-type: none"> - Annual energy savings [TJ]: 50.89 (2014); 50.92 (2015). - Annual budget [EUR million]: 4.98 (2014); 4.99 (2015). - Annual investment [EUR million]: 24.90 (2014); 24.95 (2015). <p>4) Funding sustainability and continuity: this scheme offers continuity based on lasting commitment, in particular it is present since 2005 (number of years 14); this scheme also is financed by three funding sources: the European Bank for Reconstruction and Development, the Bulgarian Energy Efficiency Agency, and the Kozloduy International Decommissioning Support Fund.</p>		

5.2.2 KfW Energy-efficient refurbishment Programme (DE)

Name	KfW Energy Efficient Refurbishment Programme EER (former CO ₂ Building Rehabilitation Programme)
Timing	Since 2009
Overview	The German state-owned Bank for Reconstruction (Germ.: Kreditanstalt für Wiederaufbau, KfW) manages two programmes to improve the energy efficiency of German residential buildings through the "energy efficiency programme – energy-efficient construction and refurbishment". The two programmes are (i) energy efficient construction (EEC) and (ii) energy efficient renovation (EER).
Implementation details	<p>The preceding KfW CO₂ Building Rehabilitation programme has been closed by March 2009 to be superseded by the programme "Energy-efficient Refurbishment" EER (German: "Energieeffizient Sanieren").</p> <p>Through the German Federal Ministry of Transport, Building and Urban Development (BMVBS), the German government is boosting existing promotional grants through 2020 with additional federal budget funds amounting to EUR 300 million annually.</p> <p>The KfW promotional bank offers either a loan or an investment grant programme to promote energy efficient refurbishment in both equity and debt financing areas. There are gradual promotions based on the reached level of efficiency, compared to new building standard KfW Efficiency House 55-115, which is laid out in the Energy Saving Ordinance (EnEV). If the costs and effort of a complete refurbishment would be too high, it is also possible to implement only individual measures. The support is dependent on the chosen refurbishment standard, where the best standard receives the highest support. Low-interest loans with repayment grants amounting to 12.5% or grants totalling 15% of the investment costs (a maximum of EUR 15 000 per residential unit) are available for the modernisation of buildings subject to heritage conservation (listed buildings) and of buildings particularly worthy of preservation. The budget for the period from 2013 to 2019 is EUR 2 100 million.</p> <p>The Energy-efficient Refurbishment programme is becoming even more attractive: people wishing to modernise the energy system of their home or apartment will in future benefit from an increase in investment grants. In particular private homeowners benefit from higher grant amounts.</p>

Supported interventions:

- Envelope including insulation, windows and glazing, exterior wall, doors, ceiling, etc.
- Equipment including efficient heating, efficient lighting systems, ventilation, cooling, control system.

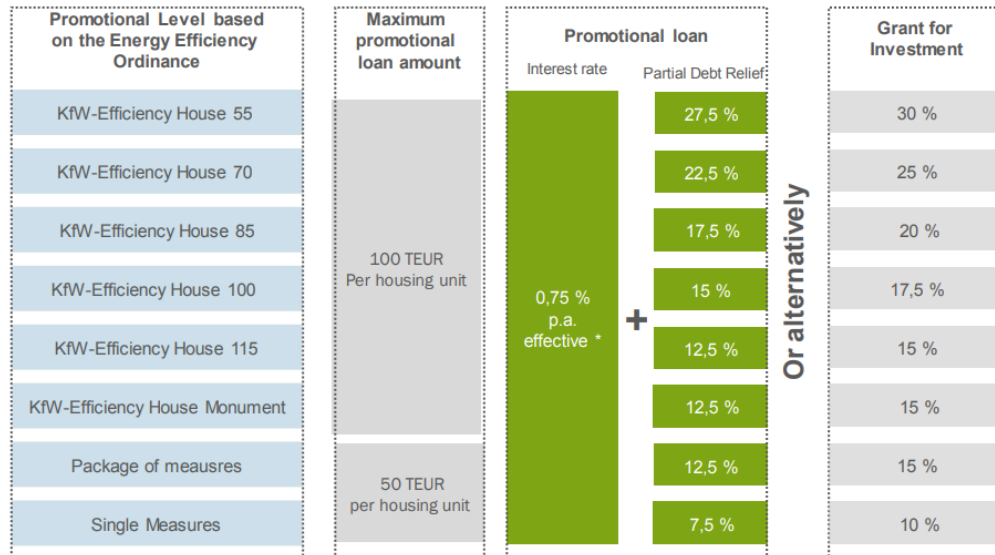


Figure 25. Methodology of KfW mechanism [Source: KfW Promotional programs for energy efficiency Paris, April 26th 2017, Petra Bühner, Kommunal- und Privatkundenbank / Kreditinstitute]

<p>Impact</p>	<p>The programme started in April 2009. In 2009 loans comprising a volume of EUR 4 237 million and grants of a volume of 74.79 million Euro were approved. In 2009, 27.6 million m² living space in existing buildings was energetically improved (Bremer Energie Institut 2010). The predeceasing KfW programme for CO₂ Building Rehabilitation (130/430) supported extensive energy rehabilitation measures in residential buildings completed in 1983 or earlier. That programme had been closed by March 2009.</p> <p>Savings in total final consumption for the year:</p> <ul style="list-style-type: none"> • 2009: 5 785 TJ; • 2010 cumulated: 30 000-45 000 TJ (of which electricity: 1 000-3 000); • 2016 cumulated: 120000-160000 TJ (of which electricity: 20 000-40 000).
<p>Link</p>	<p>- https://www.kfw.de/inlandsfoerderung/Privatpersonen/Bestandsimmobilien/Finanzierungsangebote/Energieeffizient-Sanieren-Kredit-(151-152)/</p>
<p>Success factors</p>	<p>1) Significant impact: In 2011, 181 000 apartments were covered. In 2009 loans comprising a volume of EUR 4 237 million and grants of a volume of EUR 74.79 million were approved. In 2009, 27.6 million m² living space in existing buildings was energetically improved (high impact level).</p> <p>2) Cost effectiveness: the ratio between budget and savings is 0.06 (moderately cost-effective), the data used for the analysis are indicated below.</p> <ul style="list-style-type: none"> - Annual energy savings [TJ]: 5 785 (2009). - Annual budget [EUR million]: 350 (average value from 2013 to 2019). - Annual investment [EUR million]: 2 333. <p>4) Funding sustainability and continuity: this scheme offers continuity based on lasting commitment, in particular it is present since 2009</p>

	(number of years 10); 5) Scalability/Replicability: this scheme (EER) is part of a program that consists of two schemes: energy efficient construction (EEC) and energy efficient renovation (EER)
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5.2.3 Zero-rated eco-loan (FR)

Name	Zero-rated eco-loan ("prêt à taux zéro")
Timing	Since 2009
Overview	The zero-rated eco-loan scheme (eco-prêt à taux zero or Eco-PTZ in French) has been introduced by the "Finance law 2009" (loi de finance 2009) to allow landlords to get a loan to finance energy refurbishment works (insulation, heating or water heating using renewable energies) for their main residence. The maximum amount of this loan is EUR 0.03 million refundable for 10 years (up to 15 years in cases of heavy works or "3-action bunches"). It is granted by banks which have concluded specific agreement with the French State under conditions fixed in the General Taxes Code (Code Général des impôts). The Tax free loan is aimed at individual owner-occupiers or landlords to finance major renovation work.
Implementation details	<p>This measure launched in 2009 through the "Finance law 2009" (loi de finance) has been adjusted in December 2014 (see decree n° 2014-1437 from December 2nd, 2014) in order to, from January, 1st 2015:</p> <ul style="list-style-type: none"> • to transfer the responsibility of works certification to companies which perform works; • to ensure that documentary invoices given by the borrower include induced works; • to modify the administrative penalties for companies those do not respect their duties. <p>Another legislative text has been put into force at the end of 2014 (arrêté du 2 décembre 2014 modifying the arrêté du 30 mars 2009) to converge technical eligibility criterion of the eco-loan on those of the tax credit scheme for building energy performances.</p> <p>In addition, the arrêté from December 2014 modifying the arrêté from May 2011 has updated conditions to apply for zero-rate eco-loan in French overseas territories and departments.</p> <p>This scheme has been subject to different evolutions in 2015 related to changes in the tax credit scheme for energy transition (CITE):</p> <ul style="list-style-type: none"> • it may be used for housing acquisition; • from July 2016, this loan can complete another eco-loan in the 3 years following the issue of the first one (up to EUR 0.03 per housing); • from March 2016, it can be cumulated with the CITE without any revenues condition. <p>This scheme has been extended until the end of 2018 by the last finance law (loi de finance 2018).</p> <p><i>Supported interventions:</i></p> <ul style="list-style-type: none"> - Outdoor walls insulation; Roof insulation; Outdoor window and door insulation; - Installation or replacement of heating or hot water equipment; <p>Installation of heating or hot water equipment, relying on renewable energy sources.</p> <p>The total annual public investment is EUR 70 million (EUR 76 million for 2016). This loan is granted to landlords (occupiers or lessors) without any income condition. It could be also used by co-owners in the limit of EUR 0.01 million per flat (or until EUR 0.03 million if the co-owners union launches "bunches of works"). It could be combined to CIDD since 2012. Since March 2012, it could be used for property owner association (syndic).</p>

	<p>Refurbished housing located in mainland France must be a main residence and built before the 1st January 1990. To be eligible to Eco-PTZ, housing located in French overseas territories and departments (Guadeloupe, Martinique, Guyane, La Réunion and Mayotte) must be a main residence and have requested for building permit before May, 1st 2010. Since June 2011, eligible bunches of works, and global energy performances requirements are adapted to "ultramarine" zones such as Guadeloupe, Martinique, La Réunion, Guyane and Saint-Martin.</p> <p>To benefit from the zero-rated eco-loan, households must either:</p> <ul style="list-style-type: none"> • implement a "bunch of work" (is the combination of at least two actions improving together the energy performance of a dwelling. These actions must belong to 2 different categories among the following items: outdoor walls insulation; roof insulation; outdoor window and door insulation; installation or replacement of heating or hot water equipment; installation of heating or hot water equipment, relying on renewable energy sources); • achieve a minimum "global energy performance" assessed by a thermal studies company; • rehabilitate an individual sewerage system by a solution that doesn't consume energy • or have benefited from the programme Habiter Mieux from Anah for refurbishment works. <p>The nature and the technical characteristics of the works are specified by decree of March 30th 2009, modified by decree of March 22nd, 2017.</p>																											
<p>Impact</p>	<p>According to the French NEEAP 2017 23,567 éco PTZ have been distributed in 2015 for an average lent amount of EUR 0.017, and a total generation cost of EUR 40 million (30% more than in 2010, and 3 times less than in 2014).</p> <p>The total fiscal expense was EUR 30 million in 2010, EUR 70 million in 2011, EUR 100 million in 2012, EUR 110 million in 2013, EUR 120 million in 2014 then, EUR 110 million in 2015. This increase is partly due to time delay for tax credit payment to credit institution but stayed much lower than expected.</p> <p>According to the department of observation and statistics of the Ministry for energy, the final energy consumption of the residential sector was around 45 Mtoe in 2015 so by assuming that 0.19 Mtoe (0.4%) was saved in the residential sector thanks to this scheme, this measure can be assumed to have a medium impact on the final energy consumption of the residential sector.</p> <p>Implementation of the eco-PTZ will allow a reduction in the annual final energy consumption of 0.18 Mtoe in 2013 and 0.19 Mtoe in 2016 and 2020.</p> <div data-bbox="453 1554 1326 1975"> <table border="1"> <caption>Data for the bar chart: Cumulative number of loans in operation and Number of emitted loans</caption> <thead> <tr> <th>Year</th> <th>Cumulated number of loans in operation</th> <th>Number of emitted loans</th> </tr> </thead> <tbody> <tr> <td>2009</td> <td>50,000</td> <td>70,000</td> </tr> <tr> <td>2010</td> <td>130,000</td> <td>75,000</td> </tr> <tr> <td>2011</td> <td>180,000</td> <td>40,000</td> </tr> <tr> <td>2012</td> <td>215,000</td> <td>30,000</td> </tr> <tr> <td>2013</td> <td>245,000</td> <td>30,000</td> </tr> <tr> <td>2014</td> <td>280,000</td> <td>30,000</td> </tr> <tr> <td>2015</td> <td>300,000</td> <td>25,000</td> </tr> <tr> <td>2016</td> <td>325,000</td> <td>25,000</td> </tr> </tbody> </table> </div>	Year	Cumulated number of loans in operation	Number of emitted loans	2009	50,000	70,000	2010	130,000	75,000	2011	180,000	40,000	2012	215,000	30,000	2013	245,000	30,000	2014	280,000	30,000	2015	300,000	25,000	2016	325,000	25,000
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	Figure 26. Monitoring of zero-rate eco-loans distribution between 2009 and 2016 (source: SGFGAS) – average amount of loans: EUR 0.017 million[Source: MURE database]
Link	- www.economie.gouv.fr/cedef/eco-pret-a-taux-zero
Success factors	<p>1) Significant impact: from 2009 to 2015 the number of loans is 311 260. For 2016, 22 725 eco-loans were declared as at 31st January 2017. According to the French NEEAP 2017, 23 567 éco PTZ have been distributed in 2015 (high impact level).</p> <p>2) Cost effectiveness: the ratio between budget and savings is 0.01 (very cost-effective), the data used for the analysis are indicated below.</p> <ul style="list-style-type: none"> - Annual energy savings [TJ]: 7 500 (2013); 8 000 (2016). - Annual budget [EUR million]: 30 (2010); 70 (2011); 100 (2012); 110 (2013); 120 (2014); 110 (2015). - Annual investment [EUR million]: n/a. <p>4) Funding sustainability and continuity: this scheme offers continuity based on lasting commitment, in particular it is present since 2009 (number of years 10).</p> <p>5) Scalability/Replicability: with this scheme it is possible to combine the eco-PTZ loan with the CITE tax credit.</p> <p>6) Outreach to hard-to-reach groups: this loan is granted to landlords (occupiers or lessors) without any income condition.</p>

5.2.4 Kredex Credit and Export Guarantee Fund (EE)

Name	Estonian Credit and Export Guarantee Fund (Kredex)
Timing	Since 2001
Overview	Kredex is a financing institution helping Estonian enterprises develop quicker and expand more safely to foreign markets, offering loans, credit insurance and guarantees with state guarantee. It was established in order to consolidate a number of existing but fragmented activities with three main objectives: to develop SME's; to encourage export growth; to support housing for young families. It was set up in 2001, and is under the jurisdiction of the Ministry of Economic.
Implementation details	<p>Kredex's client base comprises new starts and SME's, to which it provides loan and leasing guarantees as well as export credit guarantees. The range of financial services available from Kredex include: services to finance a business; to mitigate company payment risks; for housing; services to improve living conditions; services to improve energy efficiency.</p> <p>The services to improve energy efficiency comprises:</p> <ul style="list-style-type: none"> • <i>Housing loan guarantee</i> - The housing loan guarantee is meant for people who desire to take a loan for buying or renovating housing and seek to reduce their down payment obligation. The housing loan guarantee makes it possible to buy an apartment, house, plot of land or summer cottage. • <i>Loan guarantee for apartment associations</i> - A loan guarantee is suitable for apartment associations who want to take a bank loan for financing work performed to raise the quality of life for their residents but whose risk is deemed by banks to be higher than normal (e.g. a high share of people are in debt, the apartment is a building located in an area with low property values or in a monofunctional settlement, the investment per square metre is significantly higher than normal). • <i>Renovation grant 2019</i> - Comprehensive renovation of an apartment building helps improve the energy performance of the building, prolongs its lifetime, increases its value on the real estate market and ensures

	<p>better indoor climate. The grant is intended for apartment associations and local authorities who want to renovate their apartment building as comprehensively as possible.</p> <ul style="list-style-type: none"> • <i>Renovation support</i> - A comprehensive renovation of an apartment building increases energy performance, extends the building's useful life, raises property values and improves the indoor climate. The support is meant for associations and local governments who wish to renovate their apartment building as fully as possible. The support can be combined with loans issued by credit institutions and the apartment association's own funds. • <i>Private home renovation support</i> - Our private home renovation support product helps owners of private homes to perform renovation work. The objective is to increase energy performance of detached homes, improve the living environment and increase the housing stock. • <i>Home support for families with many children</i> - The goal of the support is to improve living conditions for families of modest means who have three or more children. Families can use the support to purchase, renovate or expand their home and modernize the systems within their home. • <i>Housing development investment support for local governments</i> - The housing development investment support is meant to allow local governments to erect new buildings with rental units or renovating existing buildings for that purpose. The goal of granting the support is to ensure that mobile workers enjoy better access to the residential rental market and to promote investments into establishing residential space for the population. • <i>Solar panel investment support</i> - The purpose of this support is to increase the share of electricity produced from renewable sources and to reduce emissions from energy-generating systems. <p>The terms of the guarantee vary by the type of loan, but Kredex charges an arrangement fee and an annual guarantee fee: the latter varies from 1.3-3.5%. These charges have enabled Kredex to become self-financing and indeed profitable in a very short period of time.</p> <p><i>Conditions for end-beneficiaries:</i></p> <ul style="list-style-type: none"> • Multi-apartment buildings: at least 3 apartments; <p>Main purpose - energy efficiency (at least 20% energy saving for the buildings up to 2000 m² or 30% for bigger buildings);</p> <ul style="list-style-type: none"> • Self-financing 15% (grant or own funds or loan); • Energy audit is obligatory, renovation according to energy audit; • Supervisory is obligatory; • Loan maturity: up to 20 years; • Interest: from 2014 ~ 3,5%, before up to 4,5% fixed for 10 years, average 4%; • No collateral is needed, credit against cash flow; • Decision by buildings: at least 50% +1 one owner at general assemble, decision with simple majority. <p><i>The success of the approach:</i> Credit guarantee agencies and funds are common across most EU member states, and in this regard there is nothing unique about Kredex. It does however display a number of features that have contributed to success:</p> <ul style="list-style-type: none"> • Kredex has a very systematic approach to the appraisal of applications. This has helped ensure a limited degree of call-in of guarantees. It has also guarded against the "deadweight" of guarantees being provided where they are not absolutely necessary. Provision is therefore very
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	<p>focused on the genuine areas of market need and failure.</p> <ul style="list-style-type: none"> • Kredex has also built strong relationships and credibility with relevant partners: the commercial banks, Chamber of Commerce and government departments. It has built partnerships with international guarantee agencies, for example in Scandinavia and Russia. It also has a co-guarantee contract with the European Investment Fund. • Kredex operates in a very sophisticated and commercial manner. For example, where guarantees are called in, Kredex does not normally pay the banks until 24 months after the end of the loan agreement. This ensures that the banks do everything possible to recover the loan without drawing on the Kredex guarantee. <p><i>Limits:</i></p> <ul style="list-style-type: none"> - Apartment Associations need more technical help. - More emphasis needed on technical side (better building design docs).
Impact	<p>Since 2001:</p> <ul style="list-style-type: none"> • Guaranteed more than 4 000 company liabilities in total of EUR 890 million; • Allowed companies to get additional funding over EUR 1 600 million, thanks to this over 17 000 new jobs have been created; • Helped almost 103 000 families to build or renovate their home; • Improved living conditions of more than 12 000 children living in families of modest means.
Link	<ul style="list-style-type: none"> - http://www.financeestonia.eu/member/kredex-sa/ - http://www.kredex.ee
Success factors	<ul style="list-style-type: none"> - 1) Significant impact: in 2009, the Kredex ambition was to renovate at least 1 000 buildings by the end of 2013 and to target energy savings of at least 20 % for buildings with a net area of less than 2 000 m² and at least 30 % for buildings with a net area of more than 2 000 m². At November 2014, 619 apartment buildings with 22 676 apartments have been renovated to modern standards with substantial energy savings and improved living environments (medium impact level). - 2) Cost effectiveness: the ratio between budget and savings is 0.044 (moderately cost-effective), the data used for the analysis are indicated below. <ul style="list-style-type: none"> - Annual energy savings [TJ]: 270. - Annual budget [EUR million]: 12 (average value from 2009 to 2015). - Annual investment [EUR million]: 17.12. - 3) Ambitious energy upgrades: reduction of at least 20% energy saving for the buildings up to 2000 m² or 30% for bigger buildings. - 4) Funding sustainability and continuity: this scheme offers continuity based on lasting commitment, in particular it is present since 2001 (number of years 18). Kredex also is based on the concept of revolving funds, using guarantee funds and offers different type of services.

5.3 Fiscal incentives

5.3.1 Energy Transition Tax Credit (FR)

Name	Energy Transition Tax Credit (CITE) (ex- Sustainable Development Tax Credit)
Timing	Since 2005
Overview	The "Energy Transition Tax Credit" or Crédit d'Impôt Transition Énergétique (CITE) in French, replaces the "Sustainable Development Tax Credit" (CIDD) launched in 2005 (and stopped on 3 rd August 2014). It supports

	owners, leaseholders or dwelling occupiers for free (main residence) who pay tax in France in purchasing efficient materials and equipment to limit energy consumption and greenhouse gas emissions.
Implementation details	<p>From 1st January 2015 (and from 31st December 2015 for the French overseas departments) and for certain equipment and materials, owners have to require to certified enterprises Reconnue Garant de l'Environnement (RGE) to benefit from taxes credit. Refurbishment works are still eligible to this tax credit in existing buildings older than 2 years that are the main residence of beneficiaries.</p> <p>The "Finance law" (loi de finances) for 2015 extended this mechanism for expenses paid between 1st September 2014 and 31st December 2015, and simplified its procedures by applying a tax credit of 30 %, without income conditions and without the obligation to set up a bunch of works (in the limit of EUR 8 000 for a single, EUR 16 000 for a couple and EUR 400 in addition per dependent for a 5-year period encompassed between January 2005 and December 2019) but the "Finance law for 2018" has significantly changed the rules by:</p> <ul style="list-style-type: none"> - Excluding oil boiler the from January 2018 excepted those complying with high performance criterion which benefited from a tax credit of 15% until June 2018; - Replacing the simple glazing by the double one that benefit from a credit tax of 15% until June 2018; - Excluding insulating shutter and doors from January, 1st 2018. <p>These eligible conditions were extended to the end of 2018 when a quotation and a deposit were made before June 2018.</p> <p>The scheme was expected to be replaced by a bonus system in 2019 to allow dwelling to benefit from the financial advantages as soon as the works are done and to take into account the energy efficiency of actions but this change is postponed to 2020. In 2020, the scheme should be extended to leaseholders.</p> <p>Since January 2019, the replacement of simple glazing by the double one is eligible again to the credit-tax (15% rate in the limit of EUR 670 per window). Oil tank removal and installation of renewable heating equipment are eligible since 2019 for low income households. The tax credit rate may represent 50% of the fossil fuel tank removal costs.</p> <p><i>Supported interventions:</i></p> <ul style="list-style-type: none"> - Thermal insulation materials; - Space and water heating (heating pump for heat generation); - RES (energy equipment using renewable energy source). <p>The ministerial order published on March 2019 set different technical requirements and costs limits for equipment/actions:</p> <ul style="list-style-type: none"> • EUR 3 350 (all taxes included) for condensing heating having a min. energy efficiency of 92% or micro combined heat and power gas heating system; • EUR 4 000 for the purchase of an heat-pump water-heating system for low income households and up to EUR 3 000 for other households; • For solar individual water-heater, combined or hybrid PV & thermal system, the cost limits are between EUR 1 300 and EUR 260; • EUR 150/m² for external wall insulation and EUR 100/m² for wall insulation from the interior (equipment and installation included); • EUR 670 for insulation of glazed surface in replacement of a simple glazing (frame + window included) from January 2019. <p>However, amount of the global credit tax is limited over a 5-year period to: EUR 8 000 for a single person, widow or divorced; EUR 16 000 for a couple subject to joint taxation. These amount are increased EUR 400 per dependent child and to EUR 200 per child in alternate residence.</p>

<p>Impact</p>	<p>According to the French NEEAP 2017, 150 000 condensing boilers eligible for the tax credit have been installed in 2015, as well as more than 21 000 air-water and geothermal heat pumps and 18 000 thermodynamic water heaters.</p> <p>In 2015, the number of thermal insulation of opaque walls that benefited from the tax credit was estimated at 160,000 for roofs and 65,000 for walls. EUR 1.12 million households benefited from a tax credit in 2015 amounting to EUR 800 on average for an average reported amount of EUR 4,100 on works completed in 2014.</p> <p>The tax expenditure related to CITE amounted to EUR 620 million in 2014 (based on 2013 income) and EUR 900 million in 2015 (based on 2014 revenues). The public cost of the scheme (on the expenses incurred in 2015) was estimated at EUR 1.6 billion euros for the year 2016 and triggered EUR 5.8 billion of work.</p> <p>According to the report from the French Court for Auditor on the fiscal expenses to support the housing sector (see references), the public expenses for dwelling was estimated to EUR 18 000 billion in 2018 of which EUR 1 682 million for the tax credit scheme for the energy transition.</p> <div data-bbox="466 801 1311 1245" data-label="Figure"> <table border="1"> <caption>Estimated data for Figure 27: Distribution of the actions per type</caption> <thead> <tr> <th>Type of action</th> <th>2012</th> <th>2013</th> <th>2014</th> </tr> </thead> <tbody> <tr> <td>windows</td> <td>180,000</td> <td>220,000</td> <td>320,000</td> </tr> <tr> <td>walls</td> <td>50,000</td> <td>60,000</td> <td>70,000</td> </tr> <tr> <td>roofs / lofts</td> <td>110,000</td> <td>150,000</td> <td>160,000</td> </tr> <tr> <td>condensing boilers</td> <td>80,000</td> <td>110,000</td> <td>120,000</td> </tr> <tr> <td>heating control and/or lagging</td> <td>30,000</td> <td>40,000</td> <td>40,000</td> </tr> <tr> <td>biomass heating systems</td> <td>160,000</td> <td>210,000</td> <td>150,000</td> </tr> <tr> <td>heat pumps</td> <td>60,000</td> <td>50,000</td> <td>40,000</td> </tr> <tr> <td>solar heat</td> <td>10,000</td> <td>10,000</td> <td>10,000</td> </tr> </tbody> </table> </div> <p>Figure 27. Distribution of the actions per type[Source: the French general direction for public finance]</p>	Type of action	2012	2013	2014	windows	180,000	220,000	320,000	walls	50,000	60,000	70,000	roofs / lofts	110,000	150,000	160,000	condensing boilers	80,000	110,000	120,000	heating control and/or lagging	30,000	40,000	40,000	biomass heating systems	160,000	210,000	150,000	heat pumps	60,000	50,000	40,000	solar heat	10,000	10,000	10,000
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<p>Success factors</p>	<ul style="list-style-type: none"> - 1) Significant impact: According to the latest available figures on the equipment funded, it is estimated in particular that 150 000 condensing boilers eligible for the tax credit were installed in 2015, as well as more than 21 000 air source and geothermal heat pumps and 18 000 heat pump water heaters. The number of opaque thermal insulation installations carried out in 2015 under the tax credit is estimated at 160 000 for roofs and 65 000 for walls. Between 800 000 and 1 000 000 households have benefited each year since the scheme started (high impact level). - 2) Cost effectiveness: the ratio between budget and savings is 0.043 (very cost-effective), the data used for the analysis are indicated below. <ul style="list-style-type: none"> - Annual energy savings [TJ]: 32 600 (2013); 38 900 (2016); 45 200 (2020). - Annual budget [EUR million]: 1 682 (2018). - Annual investment [EUR million]: 4 200 (2018). - 4) Funding sustainability and continuity: this scheme offers continuity 																																				

	<p>based on lasting commitment, in particular it is present since 2005 (number of years 14).</p> <p>5) Scalability/Replicability: with this scheme it is possible to combine the CITE tax credit with the eco-PTZ loan.</p> <p>6) Outreach to hard-to-reach groups: this fiscal incentive is granted without any income condition. There are also different costs limits for equipment: EUR 4 000 for the purchase of an heat-pump water-heating system for low income households and up to EUR 3 000 for other households.</p>
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5.3.2 Eco-bonus Tax deduction scheme (IT)

Name	Eco-bonus tax rebate scheme
Timing	Since 2007
Overview	The so-called "Eco-bonus" law, concerning the provision of fiscal incentives for energy efficiency interventions in the Italian existing buildings, has been notably enhanced by the "stability" law 232/2016 issued in December 2016 and valid for the year 2017. These tax rebate scheme originally covered 55 % of the energy-related cost, it was incremented to 70 % or 75 %.
Implementation details	<p>The law has substantially reconfirmed the tax rebate scheme of the former laws and has introduced the following important measures:</p> <ul style="list-style-type: none"> • The increase from 55 % to 65 % of the tax-deductible amounts corresponding to the energy efficiency measures in existing dwellings. As in the previous Eco-bonus laws, the energy efficiency interventions include thermal insulation, installation of solar panels, replacement of heating and air-conditioning systems or comprehensive refurbishments. The 2016 law allows also claiming the incentive for home automation interventions, in particular relative to "multimedia devices for the remote control of heating, hot water and air conditioning". The deductible costs can't exceed the threshold of EUR 96 000 per dwelling. • The extension of the tax rebate scheme to the condominiums or collective buildings allowing a tax deduction (for each member of the condominium) ranging from the 70 % to the 75 % of the energy efficiency interventions carried out on the common parts of the building. The rebate of the 70 % concerns the insulation works corresponding to at least the 25 % of the building shell and that of the 75 % to interventions aimed at improving the overall winter and summer energy performances of the building. These incentives will be valid for the expenses sustained since January 1st 2017 to December 31 2021. In this case the deductible costs can't exceed the threshold of EUR 40 000 multiplied by the number of dwelling that compose the building. • The possibility to transfer the fiscal incentive for interventions on building common parts on the supplier of the service in exchange for a discount (credit transfer). <p>As in the previous Eco-bonus law it is also possible to deduce the costs for the purchase of furniture and appliances. In this case the tax bonus is of the 50 % with a limit of EUR 10 000. The list of appliances eligible for deduction includes: refrigerators, freezers, washers, dryers, dishwashers, cooking appliances, electric stoves, electric hot plates, microwave ovens, electric heating, electric radiators, electric fans, air conditioning machines. Finally, in the previous similar laws tax credits are reimbursed over 10 years, beginning with the completion of work.</p> <p>The tax rebate scheme was re-confirmed for 2016 by Stability Law, introducing three new possibilities:</p> <p>1) to claim the incentive for home automation interventions, in particular relative to "multimedia devices for the remote control of heating, hot</p>

	<p>water and air conditioning”;</p> <p>2) to transfer the incentive for interventions on building common parts to the supplier of the service in exchange for a discount;</p> <p>3) to include social housing as new eligible area.</p>
Impact	<p>This is the last edition of the Eco-bonus law. This type of law started in 2007, and, being part of the raft of measure yearly issued in the framework of the “stability” law that is the reference yearly state balance law, has been issued each year from that date. The Eco-bonus law has been notably improved from its first issuing, each time trying to widen its impact. Actually, the law had a very good success only for what concerns the interventions, having relatively low energy effectiveness (saved kWh/year) and economic efficiency (€/kWh).</p> <p>The most profitable interventions from the energy point of view like those on the opaque walls or the attics have in fact concerned only the 0.7% of the total ones. The Eco-bonus 2017, with the extension to the condominiums and the credit transfer try then to overcome this failure. ENEA estimates that during the period 2007-2016 have been saved 1.08 MTEP/year, corresponding to an environmental benefit in terms of CO₂ not emitted in the atmosphere of more than 2 Mt per year. Of this quantity about the 50 % is attributable to the windows replacement, the 18% to the insulation of the opaque vertical walls and the 13 % to the replacement of old boilers with the condensation ones.</p>
Link	- http://www.efficienzaenergetica.enea.it/Cittadino/impianti-termici/detrazioni-fiscali
Success factors	<p>1) Significant impact: number of property units subject to intervention with Ecobonus: 353 732 (2014); 415 528 (2015); 465 751 (2016); 625 646 (2017) (high impact level).</p> <p>2) Cost effectiveness: the ratio between budget and savings is 0.004 (very cost-effective), the data used for the analysis are indicated below.</p> <ul style="list-style-type: none"> - Annual energy savings [TJ]: 4 977 (average value from 2007 to 2016). - Annual budget [EUR million]: 20.39 (average value from 2007 to 2016). - Annual investment [EUR million]: 29.13. <p>- 4) Funding sustainability and continuity: this scheme offers continuity based on lasting commitment, in particular it is present since 2007 (number of years 12).</p> <p>5) Scalability/Replicability: with this scheme it is possible to combine the Ecobonus with private schemes such as Condominium scheme (see section 4.1.1). Furthermore the Eco-bonus can be combined with Sisma-bonus (deduction for earthquake safety) reaching a rebate of the 70-85 %.</p>

5.3.3 Energy Investment Tax Deduction (NL)

Name	Energy Investment Tax Deduction (EIA: Energieinvesteringsaftrek)
Timing	Since 1997
Overview	<p>The Energy Investment Allowance (EIA) is a fiscal measure that offers the possibility of an additional allowance on taxable profit. EIA applications can be made for the purchase of designated energy-efficient equipment. The Minister of Economic Affairs annually compiles an ‘energy list’ for that purpose in the EIA Implementing Regulation, which details the equipment that is eligible for an allowance.</p>
Implementation details	<p>The EIA is a measure introduced by the Ministries of Finance and Economic Affairs. It is administered by the Netherlands Enterprise Agency and the Tax Administration.</p> <p>The EIA enables companies to deduct a certain percentage of the investment sum from the taxable profits. From 2013 to 2015 the EIA deduction rate was 41.5 %, meaning that the tax advantage – based on a</p>

corporate tax rate of 25 % – was roughly 10 %. As of 1st January 2016 the rate of deduction was increased to 58%, raising the tax advantage to approximately 14.5%. As of 1st January 2017 the allowance percentage has been reduced from 58 % to 55 %. Changes to the EIA scheme between 2014 and 2018:

- Available budget (in millions of EUR): 111 (2014); 101 (2015); 161 (2016); 166 (2017); 149 (2018);
- Rate deducted from taxable profit: 41.5 % (2014); 41.5 % (2015); 58 % (2016); 55 % (2017); 55 % (2018).

EIA applications can be made for the purchase or manufacturing costs of energy-efficient equipment.
The energy-efficient equipment must save more energy than the prevailing equipment available on the market (only the latest types of equipment are eligible for the EIA).
An investment may relate to (a part of) equipment that is eligible both for the EIA and for other fiscal measures (Small-Scale Investment Allowance (Kleinschaligheidsinvesteringsaftrek (KIA)), VAMIL and/or MIA). It is not possible to use both the EIA and MIA for the same investment element, although it is possible to combine the EIA or MIA with VAMIL.

Impact

The EIA gives an effective stimulus to invest in energy savings, although the much of the investments would have occurred anyway (more than 30% of the users). Figure 28 and Figure 29 show the impact of the scheme.

Jaar	Besparing in Nm3 aardgas-equivalent	Na correctie voor free riders	Investeringsbedrag waarover uiteindelijk EIA is toegekend (€ miljoen)
2006	1.340	864	1.680
2007	1.170	744	1.380
2008	952	607	1.020
2009	410	266	635
2010	477	320	794
2011	346	222	595
Totaal (2006-2010)	4.349	2.801	5.509

Figure 28. Energy Investment Tax Deduction: energy savings and investments with the EIA 2006-2011 [Source: MURE database]

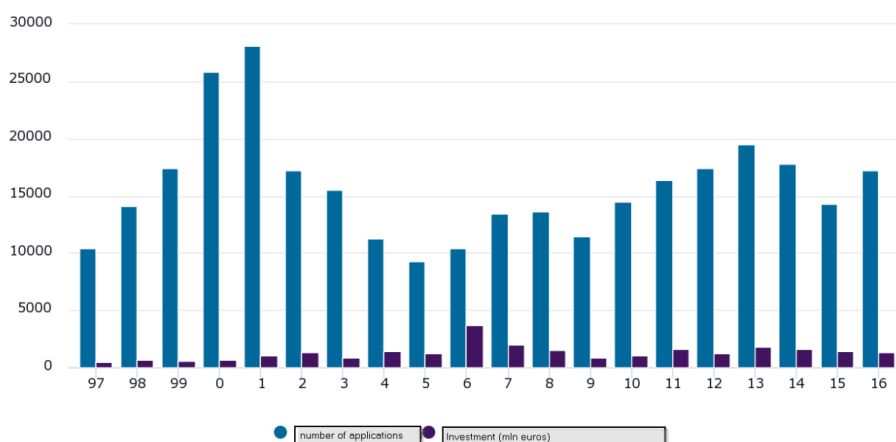


Figure 29. Energy Investment Tax Deduction: Historical data [Source: RVO, 2016]

Link

- <https://www.rvo.nl/subsidies-regelingen/energie-investeringsaftrek-eia>
- <https://zoek.officielebekendmakingen.nl/blg-251649.pdf>
- <https://www.jaarverslagenrvo.nl/eia/2017/01/index>

Success

1) Significant impact: on average, there were almost 15 000 applications

factors	<p>each year (high impact level).</p> <p>2) Cost effectiveness: the ratio between budget and savings is 0.002 (very cost-effective), the data used for the analysis are indicated below.</p> <ul style="list-style-type: none"> - Annual energy savings [TJ]: 74 705 (2017). - Annual budget [EUR million]: 137.6 (average value from 2014 to 2018). - Annual investment [EUR million]: 294.86. <p>- 4) Funding sustainability and continuity: this scheme offers continuity based on lasting commitment, in particular it is present since 1997 (number of years 22).</p> <p>- 5) Scalability/Replicability: with this scheme it is possible to combine the EIA with the VAMIL scheme.</p>
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6 Conclusions

Our analysis has shown that financial and fiscal instruments offering incentives to support energy renovations in buildings have been adopted in all EU Member States. A total of 120 public instruments have been identified in this study, where support is predominantly offered in the form of grants/subsidies, followed by loans and tax incentives. Deployed in all Member States, grants and subsidies represent the main type of public support for energy renovations in Austria, Croatia, Ireland, Cyprus, Estonia, Latvia, Greece and Poland. Public funds have also been used to buy down interest rates or offer more favourable loan terms in over half of the EU countries. Some of these loan schemes are supported by state guarantees (e.g. in Bulgaria, Estonia, France, Italy and Romania) and others are designed as revolving funds (e.g. in Bulgaria, Estonia, Netherlands and UK). Tax relief for the acquisition and/or installation of energy efficient measures is also available in the form of income tax deductions and credits (e.g. in Belgium, France, Denmark, Finland, Sweden, Italy and the UK) or less commonly in the form of VAT reduction schemes (e.g. in Belgium, France and the Netherlands).

In terms of building type coverage, our findings have shown that public financial support is available for all types of buildings covered in this study (residential, commercial, public) in over two thirds of the EU Member States. In Finland, Ireland, Estonia, and Romania, public support focuses on residential buildings only, while all other countries target a combination of different schemes for different building types. Only France, Belgium and Italy have enacted all types of instruments covering all types of buildings. Many of the instruments have been designed to work together with other instruments or be part of a policy package including Energy Efficiency Obligation Schemes (e.g. Denmark, France, Luxembourg, Poland and the UK). Typical interventions supported by the scheme included thermal insulation of building envelope, upgrades of heating or domestic hot water systems, thermal management systems, replacement of windows, etc. A few schemes provide incremental financial support (e.g. Germany, Ireland, Cyprus, etc.) with level of energy renovation ambition.

This study has shown that public resources of the order of EUR 10 billion are roughly spent on average for energy renovations in buildings across the EU every year. Nearly half of this (45%) is spent in Western and Nordic countries, while 27% is spent in Southern European Countries (Italy, Spain, Portugal, Greece, Cyprus) and the rest 28% in Central Eastern countries. The largest expenditures are associated with the tax incentive schemes of France, the regional subsidies in Austria and the KfW programme in Germany. While private investments are not included in these figures, achieving the goals set out by the EU in 2030 would require significantly higher levels of funding (IEA, 2017).

The study has shown that a shift towards more sustainable public financing means is necessary in order to leverage higher levels of private funds to meet investment scalability needs. This includes a transition from subsidy-focused to a more diverse portfolio of instruments. For example, our analysis has shown that the establishment of guarantee schemes can successfully address issues related to risk profile of energy efficiency investments by financiers, while offer a more cost-effective use of public funds. The combination of subsidies with loans can also offer an alternative route for public support schemes that are exclusively based on the provision of grants. The use of grants should be instead restricted to vulnerable households, SMEs or difficult-to-access building segments (e.g. rental properties). Moving forwards, new or emerging financial models can be considered to negate long-standing barriers such as upfront costs or split incentives as well as address the current lack of scalability associated with conventional solutions. Some of these models that have been successful in other regions in the world but have not been tested in the EU include Property Assessed Clean Energy programmes, which have had success in the US so far. Through the use of specific bonds offered by local governments, lending for energy renovations in residential or commercial buildings can be secured and attached to property tax bill. Feed-in tariffs, which have been a popular scheme to drive renewable energy investments, can also be used to support

energy efficiency by providing incentives based on the operational performance of the EE investment rather than the investment itself.

Good practices of public schemes have been identified using the following criteria: 1. impact, 2. cost effectiveness, 3. ambition level of energy efficiency upgrades, 4. funding sustainability/continuity, 5. scalability and 6. outreach to hard-to-reach groups. A global score was calculated for each instrument by summarising and normalising the scores obtained under each individual criterion. In terms of impact, the most notable schemes include the French Energy Transition Tax Credit (CITE), the Italian Eco-bonus tax rebate scheme and the KfW Energy Efficient Refurbishment Programme. Cost-effectiveness has also been identified as a success factor in several schemes such as National Programme for Renovation of Residential Buildings in Bulgaria, the Dutch Energy Investment Allowance (EIA) and Italian Eco-bonus tax rebate scheme. In terms of funding sustainability and continuity, the Estonian KredEx Renovation loan for apartment buildings, Bulgarian Residential Energy Efficiency Credit Line REECL and German Market Incentive Programme for Renewable Energies in Heat Market. The top 10 instruments that obtained the highest global scores have been discussed in more detail.

Private investments in the building sector are critical for tapping into the considerable energy efficiency potential linked to the building sector. Data access concerning private lending practices is difficult to obtain. Moreover, energy efficient lending is mostly integrated into mainstream products rather as stand-alone energy efficiency loan products and many private actors choose to conduct energy efficiency upgrades using their own funds. The use of private financial schemes on energy efficiency is therefore less studied in the literature.

Financial institutions have become more active at offering specialised financial products geared towards energy efficiency investments in recent years, with more than half of the private schemes identified in this study being enacted in the last 4 years. Several private schemes have also been examined in this study. Examples include the Intesa San Paolo Condominium Loan Scheme in Italy, Zagrebank Green Housing loans in Croatia and Belifus housing retrofit programme in Belgium. Several banks have also tapped into energy efficiency mortgage sector in recent years, offering interest rate reductions based on the improved risk profile of energy efficient lending. Notable examples include Raiffeisen bank in Eastern Europe, Nordea bank in Scandinavian countries and Muenchener Hyp in Germany. The Energy Efficient Mortgages Initiative¹², which is supported by the participation of 40 EU banks, aims to standardise the way energy efficiency mortgage products are designed across the EU.

Beyond traditional financing, crowdfunding has also gained some ground in recent years by offering support to sustainable energy projects through debt financing options. Even if crowdfunding platforms mainly focus on renewable energy investments, recent platforms such as CitizenEnergy, Bettervest, Econeers and Fundeen specialise on energy efficiency projects. This financing route, however, accounts only for a small share of the sector for now. Energy efficiency insurance, an innovative product which aims to shield from under-achievement and increase trust and awareness of energy efficiency projects, is currently used in Germany and the UK. Finally, specialised energy efficiency funds which third party participation have also been identified. New models based on non-conventional methods of raising funds are currently explored as a vehicle to drive more investments. Examples reviewed in this study include *crowdfunding for energy efficiency*, which gives access to consumers who would not normally be eligible for traditional financing options and *energy efficiency insurance* which offers protection against possible under-achievement of energy efficiency projects and thereby reduce uncertainty often associated with these investments.

While the ultimate goal is to streamline private financing into energy efficiency, the energy efficiency market still faces various obstacles which require further government

¹² <https://energyefficientmortgages.eu>

intervention. Together with an appropriate policy framework, successful EE financial instruments can incentivise the stakeholders involved, and balance the risks of implementing EE improvements with the resulting energy savings returns and benefits. Future research, however, must also look beyond innovative financial models. For example, the concept of one stop shops (OSSs) has gained popularity in recent years as they offer a single entry to customers which can guide them through all aspects of the complex renovation value chain. Aggregation of small projects through the establishment of OSSs or other means is also an issue that cannot be resolved through financing alone. The same applies to identification of ways to overcome uncertainties with regards to future energy savings, which must be investigated in more detail in order to shield customers and ESCOs from performance risks. Finally, additional research is also needed to quantify the financial impact of non-energy benefits, including increased property value (Zancanella et. al, 2018). All these are prerequisites for turning innovative models such as energy efficient mortgages, PACE, feed-in tariffs and the other instruments into mainstream financial products that will have a pivotal role as the energy transition accelerates in the coming decades.

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doi:10.2760/086805

ISBN 978-92-76-12195-4