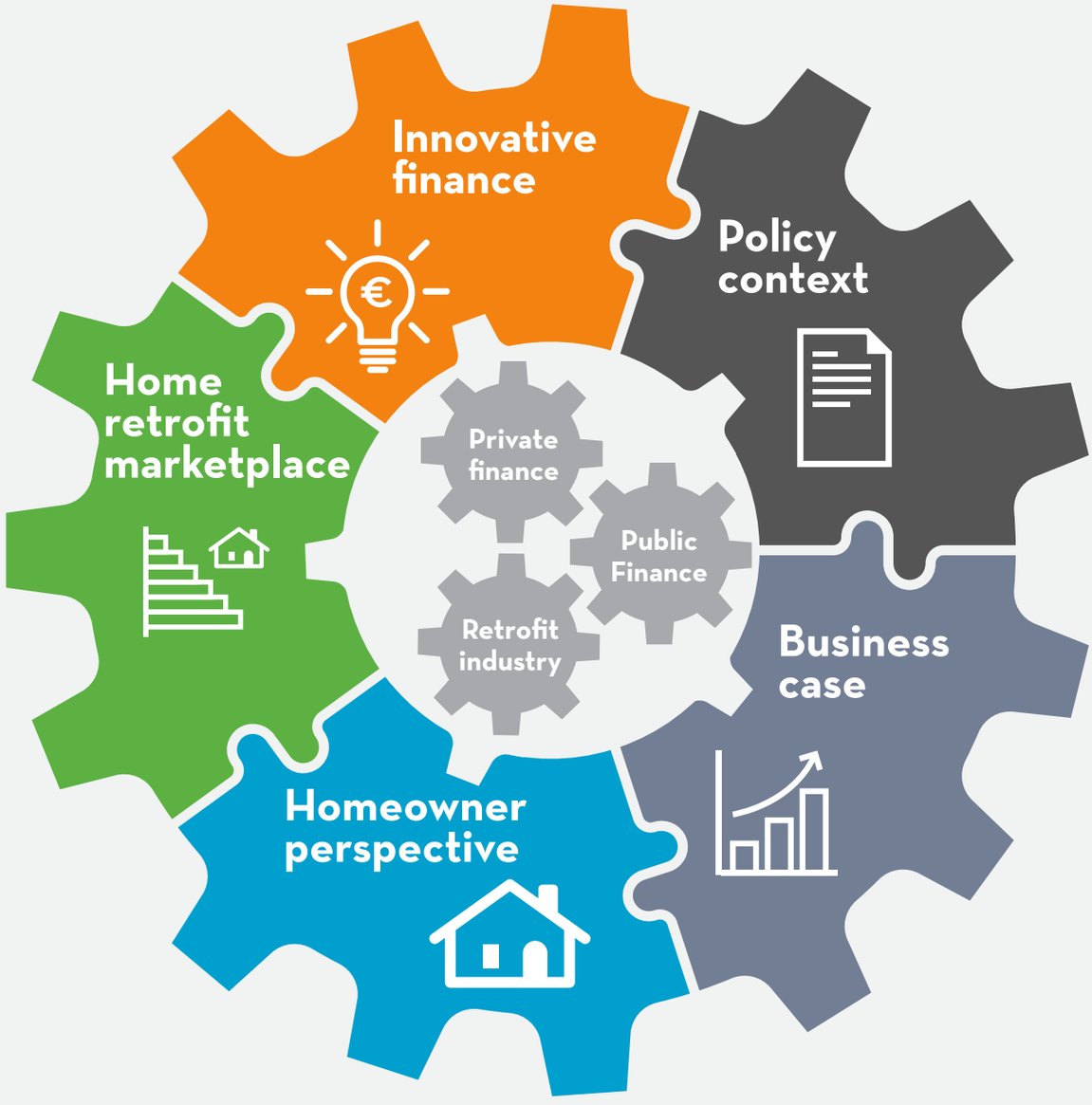
Financing Energy Efficiency in Ireland

A Handbook on the Residential Sector



SustainabilityWorks.

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Laura Heuston Aideen O'Hora Karen Deignan

SustainabilityWorks, 18 December 2020

About SustainabilityWorks

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Foreword from Marie Donnelly

The benefit of having a warm, comfortable home with good air quality and low energy bills has been brought into sharper focus by COVID-19. As a result of the pandemic, many people are spending more time in their homes than ever, with our houses being utilised to their full capacity as workplaces for adults and for remote learning by students. This retreat into our homes brought about by the pandemic has coincided with a time when public awareness, public policy and the financial sector are increasingly focused on the challenge of making our homes more energy efficient in the context of climate action.

Residential energy efficiency upgrades (also referred to as "retrofits") have been shown to deliver more comfortable homes and health benefits for the occupants, while paying for themselves over time, thanks to reduced energy bills. They also make a material contribution to decarbonisation at a national and individual level. Yet despite all of these benefits, uptake by homeowners is slow and certainly not at the scale required to meet national climate targets for 2030. At the pace we are going, reducing emissions to net zero will take centuries, which is time we cannot afford as we seek to tackle the climate crisis.

As we recover from the pandemic, a renovation wave can support recovery for individuals and the economy alike. Retrofits enhance property values, reduce energy bills and deliver labour-intensive local jobs in SMEs. In fact, research has found that energy efficiency renovation projects are the largest generator of jobs per million euros invested.

But we must understand and deal with the many barriers to undertaking a retrofit, including the disruption factor, hassle of dealing with multiple contractors, and lack of funds for the upfront costs. The latter is cited as a significant barrier by Irish homeowners which means that solving the residential retrofit finance puzzle is key to unlocking home retrofit activity.

On a positive note, Irish finance providers are engaged. They recognise that residential retrofit finance is one of those win-win scenarios where they can both play a game-changing role in supporting the transition to a decarbonised economy, while also building market share in an emerging market opportunity. Many have already launched or are actively considering launching discounted personal loans and mortgages targeted at home retrofits and so are researching the market, identifying customer segments, exploring routes to markets and generally building out their strategy.

I believe this Handbook on the owner-occupier segment of the residential sector will be invaluable in bringing key public and private stakeholders across the sector together by giving them a shared understanding of the key issues and the financial and technical terminology involved. That lexicon includes terms such as smart finance, Pay As You Save, On-tax and On-bill schemes, green mortgages, shallow and deep retrofits, green buildings, bundled measures, One Stop Shops and Project Coordinators, amongst many others. All of these terms and more will be defined and explored in this report.

Beyond that, I hope that the insights in the Handbook will support and accelerate finance provider innovation to enable and further stimulate residential retrofit activity in Ireland. The financial sector has the potential to play a significant role in profitably supporting the transition to a decarbonised economy and helping the country achieve its national 2030 climate targets. I hope this Handbook will support finance providers to realise this potential.

Marie Donnelly,
Chairperson, Renewable Energy Ireland.
December 2020

Executive Summary

The benefits of home energy efficiency upgrades

Home energy efficiency ("retrofit") projects result in more comfortable homes, health benefits and reduced greenhouse gas emissions. They therefore enable people to make one of the biggest contributions to climate action that is possible by an individual. Retrofits have also been shown to pay for themselves over time, thanks to reduced energy bills. Yet despite these benefits, uptake by homeowners is not at the scale required to reduce greenhouse gas emissions in line with national obligations under the Paris Agreement on climate change. To address this, over the next decade policymakers will be focusing attention and resources on how best to accelerate the pace and depth of home retrofit activity.

When considering residential energy efficiency, the sector is generally split into three segments based on the ownership profile – namely owner-occupied, private-rented and public-rented homes (including social housing). The rationale for this is that, while there are some commonalities, each segment has different key decision-makers, behavioural drivers and barriers. It is important to note that this Handbook focuses solely on owner-occupied homes. These represent the largest segment of the three ownership profiles, with two-thirds of the 1.7 million residences in Ireland being owner-occupied.

Finance is a barrier to residential retrofits

There are many barriers to undertaking a residential retrofit, from basic awareness of retrofitting and what it means for a home to the disruption factor and the hassle of co-ordinating multiple contractors. Having noted those other challenges, the lack of funds for the upfront cost of a retrofit project continues to be cited as a key barrier by Irish owner-occupiers. To reach national targets, hundreds of thousands of citizens will have to make individual decisions to retrofit their homes and to decide whether to do so using savings, loans or other more innovative financial solutions. Solving the residential retrofit finance puzzle is key to unlocking and scaling home retrofit activity.

Solving the residential retrofit finance puzzle

There is a wealth of international research and applied experience on the characteristics of a finance offer that is most likely to overcome the finance barrier for homeowners considering residential retrofits. Extensive research and pilot trials by the SEAI support the importance of these features and provides additional detail in an Irish context. See summary below.

Overcoming the homeowner finance barrier

International research	**Irish research**
Lower-cost and longer-term debt than available on the market	… national research suggests that unsecured personal loans should be for a 10 year+ term at rates lower than 5% APR and discounted mortgage rates should also be available
Mortgage and personal loan options	…to ensure optionality and flexibility for homeowners in terms of both ease of application and flexibility on repayment
Integrated retrofit service and finance offer	…where finance providers partner with One Stop Shop retrofit service providers to provide an integrated solution with a view to simplifying and easing the customer journey
Underpinned by grants	…national research has shown that grants continue to be important to maximise uptake rate even if low interest loans are introduced. For the same reason, energy supplier contributions under the Energy Efficiency Obligations Scheme are important to consider (EEOS)
On-tax and On-bill mechanisms have worked in some countries	… National research also shows that On-tax and On-bill schemes are of potential interest to homeowners. However, neither type of scheme has yet been shown to be effective in a European context. Furthermore, either mechanism would require national legislation to be implemented.

The role of commercial finance providers

Given the central role of mortgages and personal loans in any solution, commercial finance providers have a key role to play in solving this puzzle and unlocking retrofit activity. They have the skills and capability to design innovative financial solutions. They have the capacity to handle the high-volume and the (relatively) low value credit involved, both from a risk assessment and a process perspective. However, from a commercial viewpoint, sustainability is about more than the climate crisis and involves balancing environmental, social and economic objectives. Doing the right thing must bring a positive return. A new product or service must be commercially viable as well as making a positive contribution to the environment. Clearly, providing finance at below market rates on an unsecured or reduced security basis incurs more risk and additional capital costs for a commercial finance provider. This is not economically sustainable and means that new approaches to credit product solutions for the sector need to be considered.

Innovative financial mechanisms

This is where innovative and blended finance solutions come into play. These could involve public/private sector structured products using public credit enhancements and also wider adaptation and use of green mortgages.

For personal unsecured loans, below-market terms could be enabled by national and/or EU public credit enhancements, using existing mechanisms such as the Smart Finance for Smart Buildings guarantee facility and the Private Finance for Energy Efficiency financial instrument. Such public finance supports could potentially be supplemented by a contribution from large energy suppliers under the national EEOS.

For mortgage products, discounted rates are already being achieved by Irish commercial finance providers without public finance support, thanks to increasing evidence of the correlation between lower risk of default and the energy efficiency of a home.

Finance providers need a strong business case

However, finance providers have to devote significant internal resources in order to launch a discounted "green mortgage" or develop any new product involving public credit enhancements. Furthermore, it is globally recognised that energy efficiency loans rarely "fly off the shelves". Finance providers need to work in partnership with key stakeholders in the energy efficiency value chain to develop innovative solutions in order to address homeowner barriers to engagement, drive market demand and build market share. Clearly, they will only do so if they believe there is a strong business case, and have a long-term strategic vision underpinned by conviction in the market opportunity.

Levelling the playing field

Over the last 18 months, there has been extensive and encouraging engagement by Irish finance providers, with a number of green loans and green mortgage products launched. This Handbook is designed to further accelerate knowledge gathering and capacity building by finance providers so that, together with industry stakeholders and policymakers, a shared understanding of the opportunities and challenges presented by this emerging market is developed. In doing so, the Handbook aims to challenge thinking on the financial solutions currently thought to be possible, stimulating further design innovation and the creation of competitive new products. There is no definitive one-size-fits-all solution and different finance providers will have different perspectives and strategic approaches, leading ultimately to a variety of competitive products addressing this burgeoning market opportunity.

What finance providers need to know

There is a wealth of policy and market research on each of the key issues that finance providers need to understand in order to design successful products and win market share. However, this research is often fragmented, issue-specific and not connected to the business case for finance providers. Noting that the key stakeholders that lie at the heart of the solution of this puzzle are private and public finance providers and retrofit industry stakeholders, the key topics on which a shared understanding should be developed include:

- the residential retrofit policy context and direction of travel
- the business case for finance providers
- the homeowner perspective on finance
- the Irish residential retrofit marketplace
- innovative finance mechanisms that have been successful, and less successful, elsewhere

The pieces of the puzzle

With a view to arming the financial sector with core facts, analysis and insights to fast-track their considerations, the topics explored in this Handbook cover:

The policy context

National policy is a key driver of residential retrofit demand in Ireland. However, energy efficiency policy at both an EU and national level can be a confusing web of ever-escalating targets, initiatives and action plans, all embedded within a complex legislative framework.

Chapter 2 provides an overview of Ireland's current residential retrofit policy and targets, within the context of both EU policy and global ambitions on climate action.

The business case

Chapter 3 summarises the key factors supporting the business case for finance providers to engage in retrofit finance, across commercial, regulatory and reputational drivers.

Commercial factors include the scale of the market opportunity, the lower risk of mortgage default associated with more energy efficient homes, the opportunity to issue green bonds and the potential to access EU and national credit enhancement mechanisms and other financial supports to deliver blended finance solutions for retrofits.

Regulatory factors include the focus of financial regulators and supervisors on climate stress testing, climate-related risk management and disclosures. The introduction of a supporting risk weighting factor for green lending is a potential incentive that may be relevant over the longer term.

Reputational benefits include the potential to attract and retain new customers and talent as a result of being seen as an active, authentic player in tackling climate change. An additional benefit for regulated banks may be the opportunity to fulfil their obligations under the Principles of Responsible Banking.

The homeowner perspective on finance

Chapter 4 gives an overview of the barriers that homeowners face when considering retrofits. The chapter then focusses on the finance barrier, summarising national research on residential retrofit finance and reviewing the retrofit loan offers that are currently available in the Irish market.

The retrofit marketplace

The residential retrofit marketplace is complex and dynamic. Chapter 5 shines a light on some of the key issues and developments including: the evolution of business models towards One Stop Shops (OSS); the role of project aggregators; the national housing stock profile; homeowner behavioural insights; the range of grant programmes; the structure of the EEOS; and building regulations.

It is hoped that the above information will support finance providers as they seek to identify: potential routes to market; appropriate industry partners for collaboration; risk reduction measures;, and suitable intervention points in the customer retrofit journey for making finance offers.

Innovative finance

Chapter 6 provides an overview of the innovative finance mechanisms that have been used internationally. These fall into four main categories – publicly supported lower cost loans, green mortgages, On-bill schemes, and On-tax schemes. The chapter defines and explores each of these categories, highlights advantages and disadvantages, and provides practical case studies.

Given the importance of public supports for potential Irish solutions, EU supports are explored in detail, including the Smart Finance for Smart Buildings guarantee facility, Private Finance for Energy Efficiency and ELENA. Ireland's experience with credit enhancement schemes is also outlined, along with an overview of the Irish Climate Action Fund as a potential source of support for pilot finance programmes.

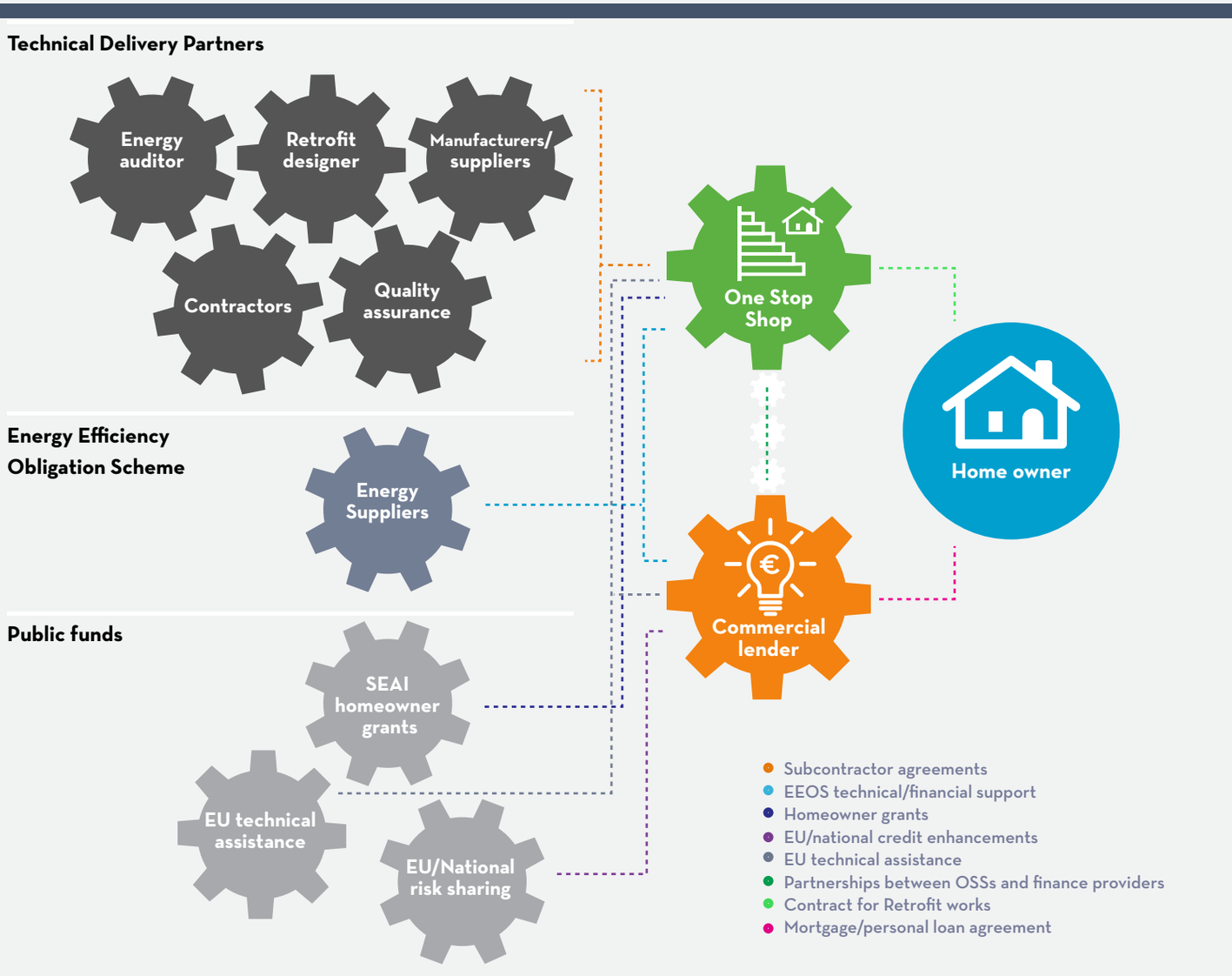
Putting together the puzzle pieces

Chapter 7 concludes with the positive message that there is no new jigsaw piece to be found, no new financing mechanism that needs to be invented and no novel source of finance to discover. The pieces of the puzzle all exist and, based on international experience, there are any number of different ways of slotting the pieces together in a way that will support and accelerate home retrofits nationally. The innovation is in the integration, i.e. in the development of new partnerships across the retrofit value chain, across industry and finance and across public and private sectors.

There are many different ways in which the pieces of the residential retrofit puzzle can be put together. See Exhibit 1 for an illustration how they could fit together for one particular OSS/finance provider/homeowner in an Irish context. The net result for the homeowner is a simplified streamlined retrofit journey with two key touchpoints, one being the OSS and the other being the finance provider.

As noted, On-bill and On-tax financing mechanisms should also continue to be explored, as is envisaged under the national Climate Action Plan. However, these require national legislative and regulatory support and have had very limited success in an EU context to date. Such mechanisms should therefore be considered as a longer-term prospect in the Irish context.

Exhibit 1: An integrated retrofit services and finance solution OSS model



Next steps for finance providers

For finance providers with the appetite and ambition to play a key role in designing and delivering innovative financial solutions to help scale Ireland's residential retrofit market, suggested next steps are outlined in chapter 7.4. Analysis suggests these steps fall into two separate yet complementary approaches – those within an individual finance provider's control and those where the ultimate delivery of financing solutions is dependent on collaboration with other key stakeholders and on finance providers' influence to deliver a sustainable retrofit market.

Key next steps for finance providers to consider include to:

- explore EU and national public finance supports to develop lower-cost loan products at an individual institutional level, e.g. the Private Finance for Energy Efficiency facility, the ELENA facility, the national Climate Action Fund
- engage with policymakers and state agencies on the possibility of accessing EU public funds at a national level, e.g. the Smart Finance for Smart Buildings guarantee facility
- review and consider the innovative and blended financing mechanisms and approaches that have been successful internationally which could possibly be adapted to meet Irish market conditions
- develop a broad understanding of the residential retrofit marketplace and the key stakeholders involved
- develop relationships with OSSs, large energy suppliers, the SEAI and other key stakeholders in order to leverage industry insights to structure tailored retrofitting propositions for homeowners and to identify potential routes to market for finance products
- collaborate with policymakers, state agencies and energy suppliers to explore the possibility of introducing national legislation to enable On-bill and/or On-tax mechanisms
- Keep a watching brief on important reports and developments due over the coming months, in particular the first report of the National Retrofit Taskforce, updates on the new phase of the EEOS and further detail on the EU Renovation Wave Initiative.

A win-win-win scenario

The financial sector has a major contribution to make in delivering on the ambitious climate and energy targets that have been set by international agreements including the Sustainable Development Goals and the Paris Agreement.

One of the core functions of the financial sector is the provision of capital and liquidity to the economy, which means it can play a pivotal role in balancing the trade-offs inherent in achieving sustainability goals. Finance providers are also skilled at identifying, understanding and managing financial risks, including climate-related financial risks. Through lending strategies and investment decisions, finance providers have a very real contribution to make towards solving the big challenges faced by society - a contribution they can demonstrate very effectively to the general public by developing innovative residential retrofit finance products.

Accelerating the depth and pace of residential retrofits nationally is actually a win-win-win scenario for all stakeholders. The more successful the finance providers are, the more comfortable, healthy and cheaper-to-run homes there will be across the country, and the closer Ireland will get to meeting its climate targets. If 2020 has shown us anything, it is that collaboration and resilience are needed as we tackle the climate crisis. It is hoped that this Handbook will act as a catalyst, supporting and accelerating innovation by finance providers in developing new tailored financing solutions for the Irish market, so enabling and even stimulating residential retrofit activity to deliver on national targets.

1. The purpose of this Handbook

The puzzle to be solved

Solving the residential retrofit finance puzzle is key to unlocking home retrofit activity in Ireland – and this in turn is key to meeting national 2030 climate targets.

Residential retrofit market segments

When considering residential energy efficiency, the sector is generally split into three segments based on the ownership profile – namely owner-occupied, private-rented and public-rented homes (including social housing). The rationale for this is that, while there are some commonalities, each segment has different key decision-makers, behavioural drivers and barriers. It is important to note that this Handbook focuses solely on owner-occupied homes. These represent the largest segment of the three ownership profiles, with two-thirds of the 1.7 million residences in Ireland being owner-occupied.

Key elements of the residential retrofit finance puzzle

The key stakeholders that lie at the heart of the solution of this puzzle are private and public finance providers, and retrofit industry stakeholders. Noting that, several elements need to be understood to solve the home retrofit finance puzzle as it relates to the owner-occupier segment, namely:

- the residential retrofit policy context and direction of travel
- the business case for finance providers
- the homeowner perspective on finance
- the Irish residential retrofit marketplace
- innovative finance mechanisms that have been successful, and less successful, elsewhere

The role of commercial finance providers

Commercial finance providers, in collaboration with policymakers and industry stakeholders, have a key role to play in solving this puzzle. They already have all of the skills required to design and deliver innovative finance solutions. However to unlock the residential retrofit finance puzzle, they will need a broad understanding of each of the key elements involved.

This Handbook is designed to provide an overview of these different elements. In doing so, it aims to accelerate knowledge gathering, support strategy development and enable Irish finance providers to build their capacity to deliver on the immense market opportunity of financing Ireland's residential retrofit needs. The Handbook will also be of interest to those working in the energy efficiency sector who want to understand the finance provider perspective, and to anyone looking to understand the Irish residential retrofit marketplace more generally.

A wealth of research

It is important to acknowledge that there is already a wealth of research and information on residential retrofit finance. However, this knowledge can be fragmented, filled with industry jargon (both financial and technical) and often disconnected from the business case for finance providers and from the marketplace. So a key objective of this Handbook is to summarise and condense relevant research on financial barriers and solutions and to increase transparency on how the Irish residential retrofit marketplace functions in practice.

Exhibit 2: Elements and stakeholders involved in the residential retrofit finance puzzle

How to use this Handbook

Each chapter in this Handbook is dedicated to a different piece of the residential retrofit finance puzzle. While noting that there are any number of different ways of slotting the finance puzzle pieces together, the final chapter outlines a potential solution in an Irish context and suggests next steps for finance providers to consider, both individually and collectively.

Reading the Handbook in its entirety should provide a good broad understanding of the issues involved in residential retrofit finance. Alternatively, individual chapters can be read on a standalone basis, depending on the reader's perspective and existing knowledge. For example, finance providers that have already launched a retrofit finance product might want to go straight to chapter 5 for a deeper understanding of the Irish residential retrofit marketplace. Others may be more interested in the innovative finance mechanisms explored in Chapter 6. Those at an earlier stage in their thinking may prefer to read the whole way through to get a fuller sense of the subject.

Throughout, there is a mix of factual information, case studies, insights and analysis in an Irish context. Given the extensive amount of terminology and jargon used in the sector, this Handbook provides all terms in full on initial use and thereafter uses their acronyms. A full list of acronyms and definitions are supplied to support the reader at the end of the Handbook.

Our vision for the Handbook

Our vision is that this Handbook will support and accelerate finance providers' engagement in relation to financing residential retrofits, lead to collaborations across the value chain resulting in innovative and accessible financial products and solutions to enable scaling of home retrofit activity and, ultimately, help Ireland achieve its 2030 climate targets.

2. Ireland's residential retrofit policy and targets

National policy is a key driver of residential retrofit demand in Ireland. However, energy efficiency policy at both an EU and national level can be a confusing web of ever-escalating targets, initiatives and action plans, all embedded within a complex legislative framework.

This chapter provides an overview of Ireland's current residential retrofit policy and targets, within the context of both EU policy and global ambitions on climate action.

Key points covered include:

- The climate crisis is deepening, and the policy response is continuing to strengthen. The trajectory of ambition and action on decarbonisation is clear at both an EU and national level.

- The retrofitting of existing homes has a large role to play in meeting national climate targets, as the residential sector currently contributes 10.9% of Ireland's annual greenhouse gas emissions.

- Under the national Climate Action Plan, relevant targets to be delivered by 2030 are to:
  - complete 500,000 building retrofits to achieve a B2 BER rating (or cost optimal level)
  - install 400,000 heat pumps in existing homes.

- There is a clear recognition at both national and EU policy level that, due to national budgetary constraints and the quantum of support required, public funds alone simply cannot deliver these targets, with a very conservative estimate of the investment required in Ireland to 2030 being €10 billion.

- As a result, policymakers are increasingly focused on mobilising private capital for retrofits, and where necessary, using public funds to ensure that risks are allocated appropriately between the public and private sector.

- The national Climate Action Plan includes a number of "smart finance" actions. These include exploring access to national and European credit enhancement supports and considering other innovative finance mechanisms such as On-bill schemes, Pay As You Save mechanisms, On-tax mechanisms and green mortgages. This Handbook will define and explore all of these terms.

- Many of the home retrofit actions under the Climate Action Plan are tasked to the National Retrofit Taskforce. This is chaired by the Secretary General of the Department of the Environment, Climate Action and Communications (DECC) and comprises representatives from key departments and state agencies. Its first report, due in Q1 2021, will outline further policy measures and initiatives to accelerate home retrofit action in Ireland.

- There is a potentially immense market opportunity for finance providers with the vision to be part of the solution to scaling up the residential retrofit market. As policy priorities in this area intensify, finance providers have the potential both to build market share and play a key role in meeting national climate targets.

2.1 The wider context of the climate crisis

The scientific consensus is clear. The earth's climate is warming, a change driven largely by increased carbon dioxide (CO_2) and other emissions into the atmosphere as a result of human activities. These emissions are collectively termed greenhouse gas emissions (GHG), with CO_2 being the dominant contributor. This is the reason people talk about carbon emissions or simply carbon.

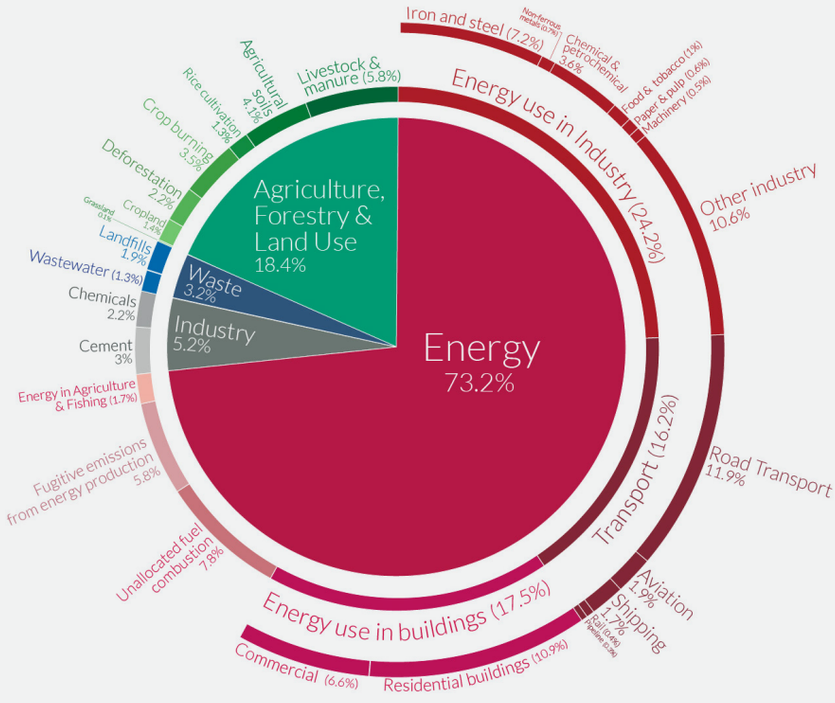
Humans have released over two trillion tonnes of carbon into the Earth's atmosphere since the first industrial revolution[1]. The thickening blanket of carbon around the atmosphere is heating the planet and changing the climate, resulting in a rise of 1.0°C in the planet's average temperature since the 1800s. Scientists have warned that if the temperature increase is not limited to 1.5°C there are liable to be catastrophic consequences for human life and for the planet[2]. Climate impacts are already being felt all around the world, evidenced by increases in temperature and changing weather patterns.

Many regions are being devastated by extreme weather events, such as fires, droughts, floods, hurricanes, and rising seas. The trend is very clear. Immediate and decisive action to reduce and eliminate carbon emissions is essential.

The main sources of these emissions include: the energy sector, through the burning of fossil fuels to generate electricity and heat and to power transport; agriculture and increasing levels of deforestation; and emissions from waste and industrial processes. See Exhibit 3 for an overview.

All sectors of the economy will have to decarbonise. Buildings, for example, use energy for light, heat and to power electrical appliances. Within the broader built environment, residential buildings account for 10.9% of all global GHG emissions[3]. So decarbonising homes will be essential in tackling the climate crisis and meeting the ambitious targets that have been set at a global and national level.

Exhibit 3: Global Greenhouse Gas Emissions by Sector (2016 data)[3]



1 Global Carbon Budget, Summary Highlights, 2019

2 IPCC, Global Warming of 1.5°C, 2018

3 World Resources Institute, World Greenhouse Gas Emissions, 2016

2.2 The international political consensus on climate action

The scale of the climate challenge means that no one country can tackle the climate crisis alone. It requires a co-ordinated global response at a policy level. Thankfully, a political consensus has been achieved. United Nations (UN)-led negotiations culminated in the 2015 Paris Agreement, when 187 signatory countries pledged to take significant action to reduce GHG emissions in order to limit global warming to well below 2°C above pre-industrial times, ideally limiting it to 1.5°C. Under the Paris Agreement, each country must plan how it will reduce national emissions as part of the global effort. While not legally binding in terms of delivery, regular reporting of these Nationally Determined Contributions (NDCs) is intended to bring transparency and accountability to national efforts.

Also, in 2015 and again led by the UN, world leaders agreed on a sustainability to-do list consisting of 17 goals called the Sustainable Development Goals (SDGs). Together, these global goals and the 169 targets that sit beneath them provide a blueprint for a greener, fairer, more prosperous world by 2030. SDG 13 on Climate Action specifically urges countries to take urgent action to combat climate change and its impacts. While the SDGs are again not legally binding, governments are expected to take ownership, establish national frameworks to achieve them and report on their progress.

In 2018, the Intergovernmental Panel on Climate Change (IPCC), the UN body tasked with assessing the science related to climate change, published a landmark report on the impacts of global warming of even 1.5°C[2]. The authors – the world's leading climate scientists – warned of *"rapid, far-reaching and unprecedented changes in all aspects of society"* if emissions are not reduced to 'net zero' by 2050, with a target of a 45% reduction by 2030.

What is being seen globally is that both the Paris Agreement and the SDGs are shaping national and regional policies, leading to initiatives designed to drive action on climate change across both the real economy and the financial sector. See Exhibit 4 for key policy developments since 2015.

2.3 European Union ambition

In response to the global scientific and political consensus, the European Union (EU) has set increasingly ambitious decarbonisation targets – see Exhibit 5. Achieving these targets will require all sectors to decarbonise through a variety of measures, including through energy efficiency and increased use of renewable energy generation. Renovation of buildings will be critical, given that buildings (including residential dwellings) are responsible for approximately 36% of EU GHG emissions[4]. These decarbonisation targets are set out in European policy and underpinned by Directives that must be transposed into Member State legislation.

The key European policy packages, directives and initiatives that relate to the built environment include:

- Clean Energy for all Europeans package 2018
- Energy Performance of Buildings Directive
  Amended in 2018 (original published in 2010)
- Energy Efficiency Directive
  Amended in 2018 (original published in 2012)
- Smart Finance for Smart Buildings initiative 2016
- Sustainable Finance Action Plan 2018
- The European Green Deal 2019
- The Renovation Wave initiative 2020

4 European Commission, A Renovation Wave for Europe, 2020

Exhibit 4: Key Energy Efficiency Policy Developments since 2015 – International, European and in Ireland

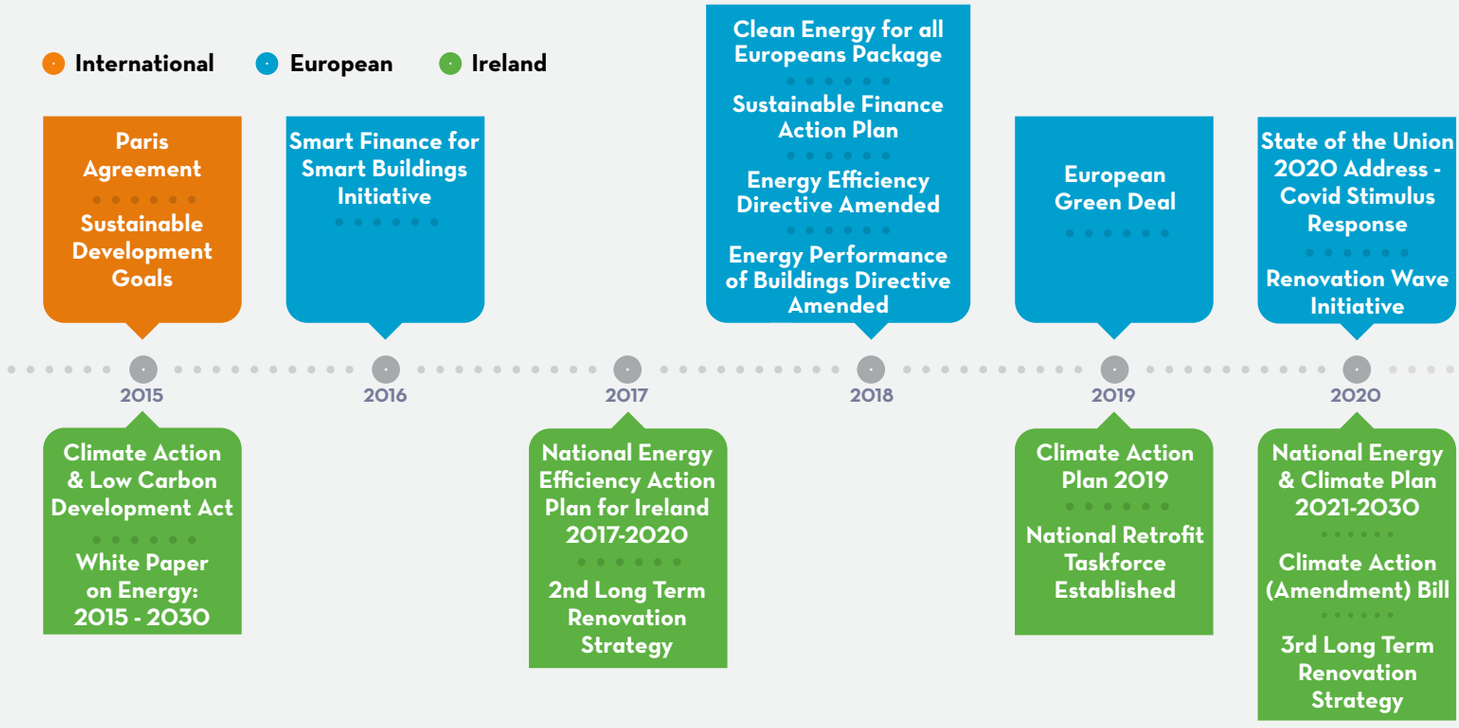


Exhibit 5: Evolution of European Climate Targets

Evolution of European Climate Targets

Year	Status	Date agreed/announced	GHG Emissions
2020	Current legislation	2008	-20%
2030	Current legislation	2018	-40%
	The EU Green Deal[5]	December 2019	-50%-55%
	The 2030 Climate Target Plan[6]	September 2020	-55%
2050	The EU Green Deal[5]	December 2019	Net zero

What is net zero?

Net zero can refer to net zero carbon or net zero GHG emissions. As it relates to GHG emissions, it refers to the balance between the amount of GHG produced and the amount removed from the atmosphere. It simply means that, after all efforts have been made to reduce GHG emissions to zero, any remaining emissions are removed from the atmosphere, either through nature-based methods (e.g. afforestation and rewetting peatlands) or through direct air capture and storage methods. Net zero GHG emissions are also referred to as climate-neutral.

5 European Commission, EU Green Deal, 2019

6 European Commission, Climate Target Plan: Stepping up Europe's climate ambition, September 2020

2.3.1 The Clean Energy for all Europeans package

Europe's overarching energy policy framework is the Clean Energy for all Europeans package[7], which was agreed in November 2018. Its aim was to bring EU energy legislation into line with the new 2030 climate and energy targets. The rules on energy efficiency contain the principle of "energy efficiency first" and set a target of becoming almost a third more energy efficient by 2030. There is particular emphasis on improving energy performance in the built environment.

While the headline targets under this package are fixed at EU level, each Member State decides how it contributes to the EU objectives by drafting a National Energy and Climate Plan (NECP) for 2021-2030. These NECPs are then evaluated by the European Commission to ensure the EU can collectively meet its Paris Agreement commitments. Each Member State must also establish a strong Long-Term Renovation Strategy, aimed at decarbonising its national building stock by 2050, with indicative milestones for 2030, 2040 and 2050. The strategy should contribute to achieving the NECP energy efficiency targets.

2.3.2 The Energy Performance of Buildings Directive (EPBD)

The EPBD came into force in 2010 and contains several provisions designed to improve the energy efficiency of both new and existing buildings[8]. As part of the Clean Energy for all Europeans package, the EPBD was amended in 2018[9], introducing new elements and sending a strong political signal on the EU's commitment. Specifically, it directs that:

- EU countries must set "cost optimal"[10] minimum energy performance requirements for new buildings; existing buildings undergoing major renovation; and the replacement or retrofit of building elements like heating and cooling systems, roofs and walls.
- All new buildings must be nearly zero-energy buildings (NZEB) from 31 December 2020.
- Energy performance certificates must be issued when a building is sold or rented, and inspection schemes for heating and air conditioning systems must be established.
- EU countries must draw up lists of national financial measures to improve the energy efficiency of buildings.

What is a nearly zero-energy building?

NZEB means a building that has a very high energy performance. The nearly zero or very low amount of energy required (for space, heating, hot water and lighting) should be met to a very significant extent by energy from renewable sources, including energy produced on-site or nearby.

The NZEB standard applies to all new residential buildings receiving planning permission in Ireland after 1 November 2019 and to all homes completed after 31 December 2020, regardless of when planning was granted.

7 European Commission, Clean Energy for all Europeans, 2018

8 Directive 2010/31/EU, Energy Performance of Buildings Directive, 2010

9 Directive 2018/844/EU, amending the original EPBD, 2018

10 The cost optimal level is defined in the Energy Performance of Buildings Directive (2010/31/EU) as "the energy performance level which leads to the lowest cost during the estimated economic life cycle of a building or an improvement measure". This assessment includes both capital and operating costs over an agreed time period. The implication is that if a particular energy performance target cannot be justified economically, then the cost optimal solution is an acceptable standard.

2.3.3 The Energy Efficiency Directive (EED)

The EED, which came into force in December 2012, required Member States to set national energy efficiency targets to ensure that the EU would reach its headline target of reducing energy consumption by 20% by 2020[11]. The Directive also introduced compulsory measures to help Member States achieve this target and set legally binding rules for end-users and energy suppliers. The EED required Member States to prepare and submit a National Energy Efficiency Action Plan (NEEAP) and a Long-Term Renovation Strategy every three years.

The EED was also amended in December 2018[12], making the new 2030 energy efficiency reduction target of 32.5% part of EU legislation.

2.3.4 Smart Finance for Smart Buildings initiative (SFSB)

A non-legislative measure, the SFSB initiative was launched by the EU Commission as part of the Clean Energy for all Europeans policy framework[13]. It includes practical solutions to mobilise private finance for energy efficiency and renewables in buildings through:

- more effective use of public funds
- more assistance to create project pipelines
- changing the risk perception of financiers and investors.

The SFSB initiative refers to:

- the need to learn lessons from the Private Finance for Energy Efficiency (PF4EE) facility. This facility included risk-sharing, technical assistance, and credit lines from the European Investment Bank to participating commercial financial institutions.
- support available through technical assistance facilities including ELENA.

A key outcome of the SFSB initiative is a flexible guarantee facility model – the SFSB guarantee facility. Designed to be deployed primarily at a national level, this facility has been developed by the Commission working in conjunction with the European Investment Bank. This facility will be explored further in chapter 6.2.

2.3.5 Sustainable Finance Action Plan

In March 2018, the Commission set out the EU strategy for sustainable finance[14]. It defines this as *"the process of taking due account of environmental and social considerations in investment decision-making, leading to increased investments in longer-term and sustainable activities."* A key aim of this plan is to reorient capital flows, including private sector capital, towards a more sustainable economy. Recognising that a shared understanding of what "sustainable" means would be critical to achieving this aim, the first action under the plan was to establish an EU classification system for sustainable activities, i.e. the EU Taxonomy. The Taxonomy Regulation[15] came into force on 12 July 2020.

The EU Taxonomy is a tool to provide businesses, the financial sector, investors, and policymakers with a common language to identify economic activities that are considered environmentally sustainable. Effectively, it helps market participants ensure that they are investing in truly green opportunities that align with the Paris Agreement, helping them identify greenwashing and climate-related financial risks. The EU Taxonomy underpins the rest of the Sustainable Finance Action Plan, e.g. the new EU Green Bond Standard will require evidence of how green bond proceeds are invested in line with the Taxonomy.

The importance of the EU Taxonomy with regard to energy efficiency retrofits is that it defines the technical standards that a "green" retrofit must meet in order for any related financial product to identify itself as green within the EU. These definitions will be explored further in chapter 6.3.

What is greenwashing?
Greenwashing is the practice of making an unsubstantiated or misleading claim about the environmental benefits of a product (including a financial product), service, technology or company practice.

11 Directive 2012/27/EU, Energy Efficiency Directive, 2012
12 Directive 2018/2002/EU, amending the EED, 2018
13 European Commission, Smart Finance for Smart Buildings Initiative, 2016
14 European Commission, Action Plan: Financing Sustainable Growth, 2018
15 Regulation (EU) 2020/852, EU Taxonomy Regulation, 2020

2.3.6 The European Green Deal

In December 2019, the European Commission intensified its ambition on climate action with the launch of the European Green Deal – a plan to make Europe the first climate-neutral (net zero) continent by 2050[5]. The plan aims to boost the efficient use of resources by moving to a clean, circular economy, restoring biodiversity, and cutting pollution. It outlines the investments that will be needed to achieve this, sets out the financing tools available, and explains how to ensure a just and inclusive transition. The Green Deal is an integral part of the Commission's strategy to implement the SDGs.

Recognising that the challenges involved in achieving this bold aim are complex and interlinked, the plan proposes new policies and measures across all sectors of the economy, as well as aligning taxation measures and social benefits.

The proposals relating to the renovation of buildings recognise that approximately 80% of today's European buildings will still be in use in 2050, that 75% of this stock is energy inefficient and that the current rate of renovations is too low. With these facts in mind, the plan sets out an ambition to stimulate a "renovation wave" of public and private buildings across the EU.

What is a circular economy?

The leading advocacy body for a circular economy, the Ellen MacArthur Foundation, defines it as follows:
Looking beyond the current take-make-waste extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles:

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

2.3.7 The Renovation Wave initiative

On 14 October 2020, the European Commission published the Renovation Wave Strategy[4]. This aims to address the current low decarbonisation and renovation rates across the EU. It also provides a framework for renovation to play a key role in supporting a green and digital recovery following the COVID-19 crisis.

From an investment perspective, the Commission highlights that current expenditure on energy efficiency is woefully inadequate. It estimates that additional investment of around €275 billion a year is needed across both residential and non-residential buildings to meet EU 2030 energy and climate targets[4].
The Renovation Wave initiative therefore aims to:

- remove barriers and incentivise investment to make buildings and districts more energy efficient
- foster deeper renovation
- reinforce an important labour-intensive investment option for public spending in the context of the COVID-19 economic recovery.

The objective is to at least double the annual energy renovation rate of buildings by 2030 and to foster deeper renovations.

In regard to mobilising private investment, the plan is to build on EU experience gained through the SFSB Initiative, the PF4EE facility and the ELENA facility (see chapter 6.2 for further details). There is also an emphasis on the need to aggregate projects, to blend public and private capital, and use On-tax and On-bill finance mechanisms, green loans and mortgages (see chapter 6), and One Stop Shops (see chapter 5.3).

In conclusion, given the ambition of the European Green Deal and the fact that energy efficiency is key to achieving its goals, EU policy and regulation are evolving rapidly and will need to be incorporated into the Irish policy and legislative response.

What is a One Stop Shop?

Retrofit One Stop Shops are gaining traction as research shows they can help overcome many of the behavioural and financial barriers associated with home retrofits through simplifying the customer journey. While there is no one definition or type of a retrofit OSS, they are organisations that guide homeowners through key stages in the renovation process – both from a technical and financial perspective. They also engage in marketing activities to generate customer demand and perform lead-filtering functions. Essentially, a One Stop Shop brings together the fragmented supply side of the value chain, e.g. BER assessors, engineers, surveyors, architects, suppliers, installers, grants, and finance providers into one customer-centric offer. There is a single point of contact for the homeowner and One Stop Shops take responsibility for the process, managing a retrofit project to completion.

2.4 Ireland's climate and energy targets

Ireland's national climate and energy policy and legislation is primarily driven by the Paris Climate Agreement and EU policy. In line with its EU obligations, Ireland pledged to reduce GHG emissions by 20% by 2020[16]. However, in July 2020, the Irish Environmental Protection Agency (EPA) projected that Ireland's emissions will only have reduced by between 2% - 4% by 2020[17]. By failing to meet its EU targets, Ireland may have to purchase allocations from other Member States or else incur significant penalties[18].

That said, the structure of national EU targets is that there is also a specific energy efficiency target to 2020, which effectively sits within the broader GHG emissions target. Significant progress has in fact been made towards the national 2020 energy savings target. The current projection is an achievement of energy savings of approximately 16.2%, compared with the target of 20%[19].

A broad range of sectors contribute to Ireland's national GHG emissions profile – see *Exhibit 6*.

What is a domestic BER rating?

A Building Energy Rating (BER) certificate indicates a home's energy performance. It is similar to the energy label for household appliances. The certificate provides a fair comparison by rating the energy performance of a home on a scale of A-G, with G being the least efficient. However, a BER is only an indication of the energy performance of a dwelling and covers only the main uses: space heating, hot water and lighting. Actual energy usage will depend on how the occupants operate the dwelling and its equipment. The Irish BER scheme is managed by the Sustainable Energy Authority of Ireland. A new enhanced BER Advisory report is to be introduced in 2020.

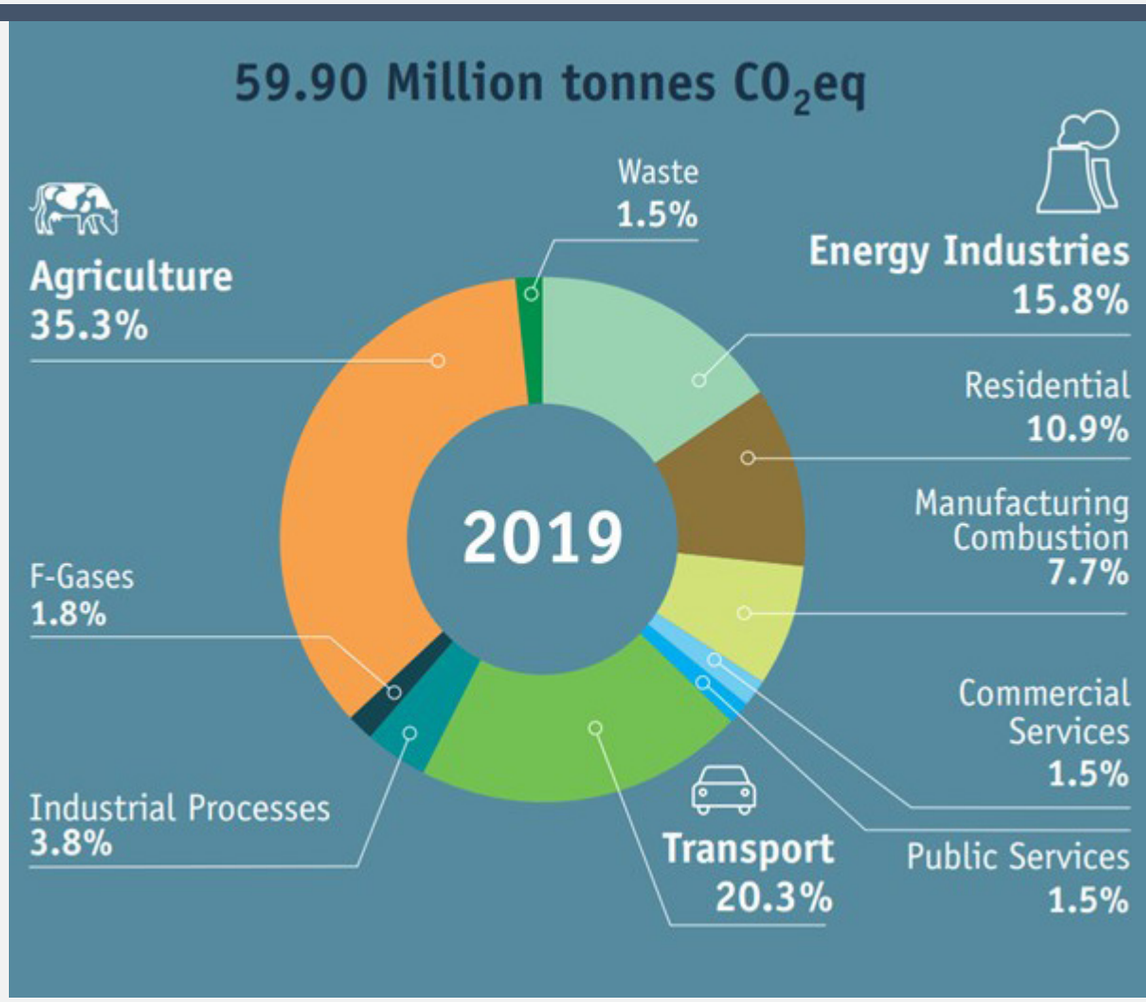
16 Compared to 2005 levels

17 EPA, Ireland's Greenhouse Gas Emissions Projections, 2020

18 Irish Independent article, October 2020

19 Turnkey Retrofit, Market and PESTLE Analysis, 2019

Exhibit 6: Ireland GHG Emissions Share by (End Use) Sector in 2019[20]



The current national target for 2050 is to reduce GHG emissions by 80%. However, the June 2020 Programme for Government confirmed that Ireland would commit to an average 7% per annum reduction in overall GHG emissions from 2021 to 2030 (a 51% reduction over the decade) and to achieving net zero emissions by 2050. The 2020 Climate Action and Low Carbon Development (Amendment) Bill ("Climate Bill") follows through on these commitments. The Climate Bill is currently going through the legislative process and is expected to be enacted before the end of 2020.

2.5 How residential buildings contribute to emissions

Irish homes are a significant contributor to national GHG emissions, emitting 10.9% of the total in 2019. In recognition, Ireland has developed a range of policies, strategies, and action plans over the last ten years to support the achievement of its residential energy emissions target. These include, but are not limited to, the documents referenced in Exhibit 7.

20 EPA, Ireland's Provisional Greenhouse Gas Emissions 1990-2019, 2020

Exhibit 7: Irish Policy Documents referencing Residential Energy Efficiency

2009	1st National Energy Efficiency Action Plan[21]
2012	2nd National Energy Efficiency Action Plan[22]
2014	3rd National Energy Efficiency Action Plan[23]
2014	1st Long Term Renovation Strategy[24]
2015	Climate Action and Low Carbon Development Act[25]
2015	The White Paper: Ireland's Transition to a Low Carbon Energy Future 2015-2030[26]
2017	4th National Energy Efficiency Action Plan[27]
2017	2nd Long Term Renovation Strategy[28]
2019	Climate Action Plan[29]
2020	National Energy & Climate Plan 2021-2030[30]
2020	3rd Long Term Renovation Strategy[31]
2020	Climate Action and Low Carbon Development (Amendment) Bill
2021	National Retrofit Taskforce Report

The current energy efficiency targets and actions are set out in the national Climate Action Plan. With regard to retrofitting Irish homes, the ambitious targets to be delivered by 2030 are to:

- complete 500,000 building retrofits to achieve a B2 BER rating (or cost optimal equivalent[10])
- install 400,000 heat pumps in existing homes.

The 2020 Programme for Government strengthened these ambitions, pledging to publish a National Retrofitting Plan, as part of the National Economic Plan, before the end of 2020. In Budget 2021, the Government has signalled again its support for home retrofits, with significantly increased funding of €221.5 million for existing and new residential and community retrofit programmes. This represents an 82% increase on the 2020 allocation and is the largest amount ever allocated for the schemes. Of this allocation:

- €109 million will support lower income households to retrofit their homes
- the balance of €112.5 million will expand existing grant schemes and introduce new ones.

The Minister for Environment, Climate and Communications also announced that a new National Retrofit Office is to be established in the Sustainable Energy Authority of Ireland (SEAI) and that SEAI residential and community schemes will deliver over 29,000 retrofits, including approximately 8,000 to a B2 level in 2021.

What is a heat pump?

Domestic heat pumps are powered by electricity and work by extracting heat from the air or ground outside the house and concentrating it for use inside the home. A heat pump is an alternative to oil, gas, solid fuel and conventional home heating systems. Heat pumps are classified as renewable sources of energy and are especially clean if the electricity used to power them is generated from renewable sources. For heat pumps to work effectively, a relatively high level of energy efficiency in the building envelope (roof, floor, walls, windows and doors) is required.

21 National Energy Efficiency Action Plan, 2009
22 National Energy Efficiency Action Plan, 2012
23 National Energy Efficiency Action Plan, 2014
24 Ireland's Long Term Renovation Strategy, 2014
25 Climate Action and Low Carbon Development Act, 2015
26 The White Paper: Ireland's Transition to a Low Carbon Energy Future 2015-2030, 2015
27 National Energy Efficiency Action Plan, 2017
28 Ireland's Long Term Renovation Strategy, 2017
29 Climate Action Plan, 2019
30 National Energy & Climate Plan 2021-2030
31 Ireland's Long Term Renovation Strategy 2020

2.6 Residential retrofit policy instruments

Before reviewing the policy measures that are currently in place, it is worth considering what Governments can actually do to encourage home energy efficiency, either at the individual consumer level or at a sector level. These measures can be divided into either "Carrots" or "Sticks", including those outlined in Exhibit 8.

Exhibit 8: What Policymakers can do to Encourage Home Energy Efficiency

Carrots	Sticks
• Grants	• Increase carbon tax
• Subsidised low-cost finance	• Increasingly tighter energy performance standards through building regulations
• Tax incentives	• Energy efficiency certification of buildings, i.e. the requirement of BER certificates for all new homes and for sales and leases
• Capital funding for public/social housing	• Introduction of obligations on energy suppliers to deliver certain levels of energy efficiency savings, known in Ireland as the Energy Efficiency Obligation Scheme (EEOS)
• Training and capacity building	• Obligations on other regulated/public bodies to achieve specific efficiency savings
• Consumer awareness campaigns	• Minimum energy performance standards and labelling requirements, e.g. for household appliances – to raise consumer awareness.
• Facilitating One Stop Shops (OSS) to overcome homeowner barriers	• Minimum BER rating requirements, e.g. for homes that are to be rented
• Clear and durable policy frameworks to support national strategies, plans and targets.	• Requirements around phasing out production and sale of inefficient equipment, e.g. incandescent light bulbs, fossil fuel boilers

2.7 From policy to action

Many of the policy measures described in Exhibit 8 have been incorporated into the Climate Action Plan. These include, but are not limited to, the following plans to:

- establish a One Stop Shop (OSS) model for energy efficiency upgrades
- develop a plan to establish a new body responsible for ensuring that the delivery system for retrofits is effective and efficient, including examining how to deliver a major retrofit programme in the Midlands for both local authority housing[32] and private homes[33].
- establish measures to ensure that grant schemes, new finance models and delivery are integrated
- develop and optimise Government funding and grant schemes to drive demand for energy efficiency retrofits that deliver value for money
- identify additional ways to target financing for energy efficiency retrofits in the domestic and commercial sectors, e.g. salary incentive schemes, On-bill finance schemes, and Pay As You Save mechanisms
- provide easier access to tailored finance for residential energy efficiency investment through the European Commission's Smart Finance for Smart Buildings initiative
- require all major renovations (>25% of the building envelope) to bring the rest of the building up to minimum BER rating of B2 or a cost optimal equivalent
- introduce minimum BER standards for local authority social housing retrofit projects
- introduce a carbon tax to discourage the use of fossil fuels and make all energy efficiency measures more economically attractive. This measure is not specific to residential energy efficiency but will have a significant impact.

Many of the home retrofit actions under the Climate Action Plan are the responsibility of the new National Retrofit Taskforce. This is chaired by the Secretary General of DECC and comprises representatives from key state departments and agencies. It is intended that subgroups will include representatives from wider stakeholders.

The Taskforce has the remit of assessing a range of potential approaches across four dimensions that will form the core of the national retrofit solution, for both public and private residential buildings – as set out in Exhibit 9. The Minister for the Environment, Climate and Communications has indicated that a National Retrofit Taskforce report is to be published in Q1 2021 and this report will inform the future design of national energy retrofit schemes.

Exhibit 9: Dimensions of the National Residential Retrofit Solution[32]

Customer awareness and demand generation	**Financing and affordability**	**Supplier capacity**	**Delivery structure**
To improve awareness and drive demand: • A network of OSSs that deliver simple customer journeys and coordinate with contractors and finance providers, as well as minimising hassle • Proactive and targeted marketing campaigns for identified segments • Appropriate regulation	To address long payback periods and the ability of different consumer segments to pay upfront costs: • Exchequer funding, including new and expanded grant schemes • Opportunities for private finance • Possible tax incentives	In order to drive confidence in the long-term attractiveness of the retrofit market: • Consistency and confidence in OSS offerings through clear standards and establishment of contractual obligations • Changes to the existing apprenticeship and education programmes and other initiatives to up-skill the existing workforce and bring in new entrants • Foster aggregation and standardisation • Measures to stimulate innovation	• An appropriate entity with responsibility for driving progress to meet national retrofit targets • The introduction of performance monitoring and evaluation mechanisms

32 Further details on the Midlands Retrofit Programme for local authority homes can be found here.

33 Further details on the related Midlands Retrofit Programme for privately owned homes can be found in Appendix VI.3

2.8 Financing Ireland's policy ambitions

A substantial increase in both public and private investment will be required to deliver residential retrofit policy objectives. The previous Government estimated that over €50 billion would need to be invested in residential retrofits by 2030[34]. The National Retrofit Taskforce is currently updating this estimate. Policymakers recognise that public funds alone simply cannot sustain and deliver this investment and that private capital must be mobilised if targets are to be met.

The Climate Action Plan specifically talks about the role of "smart finance" in funding retrofits in the residential sector. In particular, it mentions the need to:

- *"Develop a smart finance initiative to provide a competitive funding offer with State support. A guarantee-based product will offer both a degree of risk-sharing to lenders, and an additional leverage effect, which means that the funding is used in a more efficient way. A scheme, such as the EIB SFSB programme, could include a package of lower-cost loans that are deployed in conjunction with a grant element and advisory services to both the Small and Medium-Sized Enterprise (SME) and residential sectors.*

- *Expand salary incentive schemes within existing SEAI programmes, including setting up public and private sector pioneer programmes for these models and consider other 'easy pay' methods, such as optional addition to Local Property Tax (LPT) bills.*

- *Examine opportunities associated with green mortgages as part of a portfolio approach to financing energy efficiency improvements, including their application to retrofit a property upon purchase and as a top-up when retrofitting a property already owned."*

The importance of smart finance to deliver the National Residential Retrofit Solution is clear. It is a key pillar of the overall design.

2.9 SustainabilityWorks analysis and insights

European and national residential energy efficiency policy is increasingly ambitious. However, policy ambition can only deliver so much, and public finances are limited. It is therefore critical that public funds are used effectively to mobilise private finance providers to step up with innovative financial solutions for residential retrofits, and deep retrofits in particular. Finance providers with vision and a long-term strategic approach have a significant opportunity – the potential to build market share while also supporting progress to meet national climate targets.

Industry stakeholders and finance providers alike await the next key development in Ireland that will influence the shape of future national home retrofit policy and associated grant schemes, namely the report to be published in Q1 2021 by the National Retrofit Taskforce.

34 Seanad Debate, December 2018

3. The business case for finance providers

It is globally recognised that energy efficiency loans rarely "fly off the shelves". Finance providers entering the market must actively engage across the energy efficiency value chain, working in partnership with other key players and introducing innovative solutions in order to address homeowner barriers to engagement, drive market demand and build market share. This requires resources and commitment supported by a strong business case.

This chapter outlines the business case for finance providers. It covers:

- commercial factors driving the business case including the scale of the market opportunity, the lower risk of default associated with more energy efficient homes, the opportunity to issue green bonds and the potential to access EU and national credit enhancement mechanisms and other financial supports to deliver blended finance solutions for retrofits

- regulatory aspects driving the business case including the focus of financial regulators and supervisors on climate stress testing, climate-related risk management and disclosures. On the other hand, the potential introduction of a supporting risk weighting factor for green lending would be an incentive for finance providers

- reputational benefits driving the business case including the potential to attract and retain new customers and talent as a result of being seen as an active, authentic player in tackling climate change. An additional benefit for regulated banks may be the opportunity to fulfil their obligations under the Principles of Responsible Banking.

- Over the past 18 months, Irish finance providers have launched a number of loan and mortgage products linked to residential energy efficiency. This indicates that the business case is strengthening – and it is likely that this will intensify over coming years.

- Having said this, finance providers need to take a long-term strategic approach when evaluating the size of the market opportunity. It will take time for the market to develop, not least due to practical challenges in scaling up the retrofit delivery framework. Key factors to consider when setting potential market targets include:
    - the extent to which homeowners will use their own savings for energy efficiency measures rather than incurring debt and how this will impact the demand for credit
    - the extent to which the absolute quantum of grant funding available for private homeowners drives and supports the market overall.

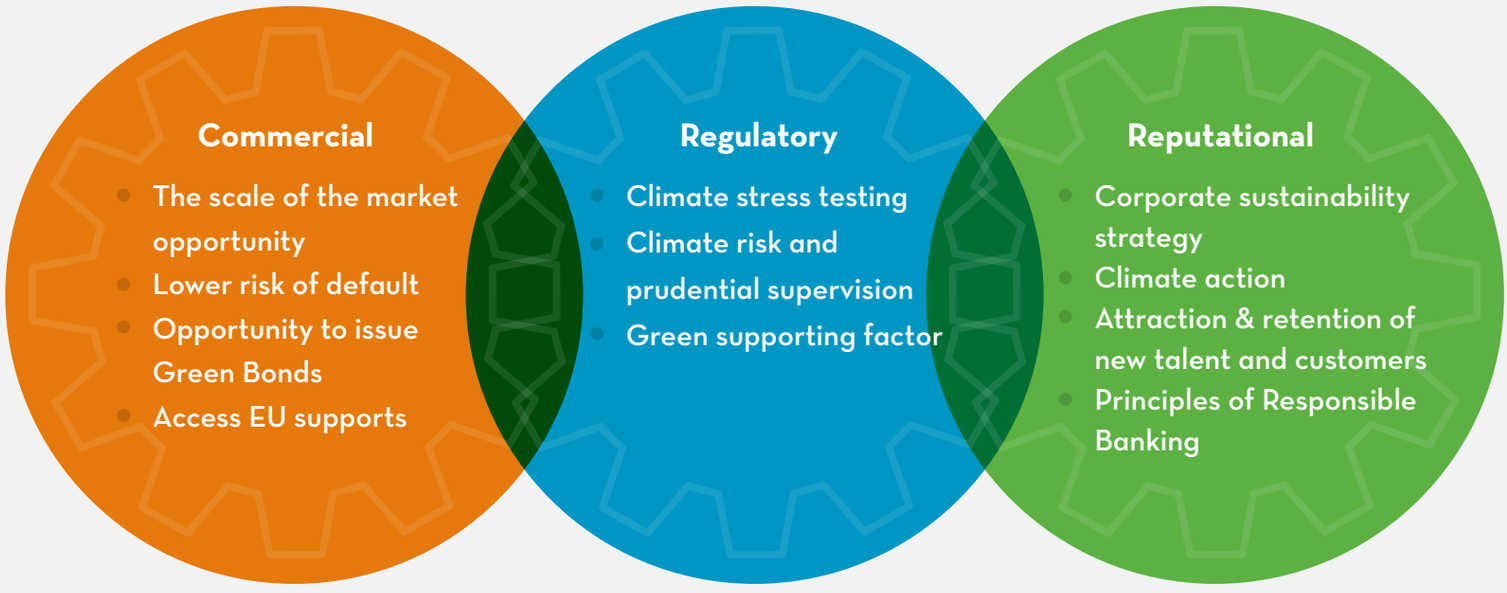
3.1 Developing the business case

It is fair to state that, to date, there has not been significant demand from Irish homeowners for private finance for residential retrofits. Sustainable Energy Authority of Ireland (SEAI) research in 2011[35] found that residential retrofits were mainly financed through homeowner savings. However, attitudes are changing and a more recent 2017 consumer survey found that homeowners are becoming more open to the idea of taking out a loan to invest in energy efficiency[36].

This is not unique to Ireland. It is recognised globally that energy efficiency loans rarely see substantial take up without stakeholder support from policymakers and retrofit service providers, alongside marketing efforts from the finance provider itself. If a finance provider is to be successful in both driving market demand and building market share, retrofit finance products can rarely be considered a stand-alone finance offering. Instead, finance providers must target potential customers with dedicated activities, offers, and communications, working in partnership with key actors in the energy efficiency value chain.

To commit such resources, a finance provider needs to develop a robust business case to gain internal backing and compete for capital and resources within their organisation. The increasing ambition of energy efficiency policy is one of many factors driving this business case. However, it is not the only driver. Other motivational factors have emerged, which can be broadly grouped into three areas: commercial, regulatory and reputational[37]. Some of these factors are only relevant for regulated entities such as banks, whereas others are relevant for all finance providers. See Exhibit 10 for an overview.

Exhibit 10: Motivations for Finance Providers to Develop Green Finance Products



35 J. Curtin & J. Maguire, Thinking Deeper: Financing Options for Home Retrofit, 2011

36 SEAI, Behavioural Insights on Energy Efficiency in the Residential Sector, 2017

37 EeMAP, Creating an Energy Efficient Mortgage for Europe Report, 2018

3.2 Commercial drivers

3.2.1 The scale of the market opportunity

The Irish Climate Action Plan includes the following key targets to be delivered by 2030:

- 500,000 home retrofits to a B2 BER rating (or cost optimal equivalent)
- 400,000 heat pumps installed in existing homes.

No data has yet been published on the expected private/public ownership split of the 500,000 homes target.

Recognising that the interaction of technical energy efficiency measures can be complex, it is important to understand the following points:

- There will be some overlap between the target to bring 500,000 homes to a B2 BER rating and the target to install heat pumps in 400,000 existing homes.
- Reaching a B2 BER rating does not necessarily require moving away from fossil fuel energy sources. For example, in some dwellings it may be possible to reach a B2 rating with a very efficient gas boiler, so an electric heat pump is not always part of a retrofit to a B2 rating.
- Furthermore, some homes are already "heat pump ready", i.e. homes that have a low heat loss and may not require any further insulation or other measures to achieve a B2 rating. Installing a heat pump in one of these homes would count towards both the heat pump target and the B2 rating target.

The scale of the practical challenge

These targets represent an enormous increase in both the number and depth of retrofits that need to be completed annually across all segments of the residential sector.

In this regard, it is important to understand the energy profile of Irish homes, in particular that:

- as of May 2020, approximately 1.35 million homes in the country (out of c.1.7 million occupied residences) are at C1 BER rating or lower[38]
- Irish homes use 7% more energy than the EU average but they emit 58% more GHG emissions than the EU average due to the greater use of high-carbon fuels[39]
- Irish homes are approximately 72% reliant on oil, gas, coal and peat[40]
- the dominant fuel source in the residential sector is oil, accounting for 37% of total residential fuel consumption in 2018. This is because a large number of dwellings are in rural areas, have no access to the gas grid and use oil fired boilers for space and water heating[40].

The practical challenges involved in scaling up retrofit delivery structures should not be underestimated. As Exhibit 11 shows, even if delivery is scheduled to scale up exponentially towards the end of the decade, Ireland will still need to retrofit over 50,000 homes per annum on average. This is a significant increase on current levels, which are that:

- approximately 23,000 Irish homes are retrofitted annually, although the majority only receive a shallow retrofit[30].
- in 2019, 1,500 homes were retrofitted to a B2 rating[32] and 1,203 homes had heat pumps installed[40].

Exhibit 11: National Milestone Residential Retrofit Targets to 2030[32]

Year	Number of Homes to be Retrofitted to BER B2 per annum	Number of heat pumps to be installed in residential buildings per annum
2021	13,000	53,865 (cumulative to date)
2022	33,500	21,500
2023	55,000	42,875
2024 - 2030	56,215 each year	42,875 each year

38 Central Statistics Office, Domestic Building Energy Ratings, 2020

39 SEAI, Data and Insights: Energy in the Residential Sector, 2018

40 DECC, Climate Action Data Portal, 2020

The scale of investment required

Apart from the practical challenges, the scale of investment required to meet the targets is immense. The average cost to retrofit a home that is most frequently quoted by policymakers is €20,000. This equates to a total investment of €10 billion by 2030 if the target of 500,000 home retrofits is to be met. A recent analysis commissioned by the Department of Housing, Local Government and Heritage estimated that the cost of achieving a B2 BER rating from a starting point of a D or E rating is in the range of €21,000-€39,000[41]. Taking the upper estimate of €39,000, the total investment required could therefore be as high as €19.5 billion.

The Minister for Environment, Climate and Communications signalled in July 2020 that work is ongoing to finalise an estimate of the total cost of the retrofit programme as well as a new average cost per home[42]. More accurate figures should therefore be available by Q1 2021 at the latest.

It is recognised globally that public funds alone cannot deliver the full investment required to meet climate and energy targets, including the cost of retrofitting Irish homes. Under the National Development Plan (NDP), the Irish Government has allocated €3.7 billion for residential retrofits to 2027[43]. There is no published breakdown of how this funding will be allocated, but, in keeping with previous NDP funds, it is likely that it will be split between public housing (local authority and approved housing bodies) and grant programmes for private home retrofits.

Even taking the lower estimate of €10 billion, this leaves a headline investment gap of at least €6.3 billion, which will require hundreds of thousands of citizens to make individual decisions to retrofit their homes and to decide whether to do so using savings, loans or other more innovative financial solutions.

While it will be up to each finance provider to develop an attractive proposition to engage customers and win market share, the scale of the market opportunity is clear. To put this in perspective, the total of all existing loans to Irish private householders (excluding mortgages) is currently €13.7 billion[44]. Those who wish to be key players in this sector have the opportunity to gain competitive advantage and align themselves clearly with policy efforts to tackle climate change.

What is the difference between a deep and a shallow retrofit?

A shallow retrofit involves one or more single energy efficiency measures that are relatively easy to install and may have a low upfront cost, e.g. heating controls, roof insulation etc.

A deep retrofit takes a whole-house approach looking at the overall impact of the most appropriate energy efficiency measures, e.g. insulation of walls, roof, floors, window upgrades, a more efficient heating system and mechanical ventilation to maintain good indoor air quality. Renewable energy technologies such as solar water heating panels and solar photovoltaic panels may be involved. The aim is to achieve a material improvement in energy efficiency while ensuring that these measures work together successfully over the long-term. Given the national Climate Action Plan target, it is likely that, going forward, a deep retrofit will mean achieving a minimum BER rating of B2.

41 AECOM, Report on the Development of Cost Optimal Calculations and Gap Analysis for Buildings in Ireland under Directive 2010/31/EU on the Energy Performance of Buildings, Revised 2020

42 Dail Debates Written Answers, July 2020

43 Opening Statement by Assistant Secretary General of the Department of Communications, Climate Action and Environment to the Joint Oireachtas Committee on Climate Action, July 2019

44 Central Bank of Ireland Statistics, accessed December 2020

3.2.2 Lower risk of default

An increasing volume of evidence indicates that energy efficiency measures have a positive effect on real estate value and homeowner solvency. Analysis undertaken by the Bank of England in January 2020 concluded that mortgages against energy efficient properties are less frequently in payment arrears than mortgages against properties with poor energy efficiency. This result is robust when controlling for other relevant determinants of mortgage default, including borrower income and the loan to value ratio of the mortgage. The report concludes that energy efficiency is a relevant predictor of mortgage defaults[45].

The UK is not the only jurisdiction to undertake this analysis. Additional evidence is summarised in a recent report by the EU Horizon2020-funded EeDaPP project which provides a current summary of literature evaluating the link between energy efficiency, credit risk and property value[46].

What is a green bond?

A green bond is a type of fixed-income instrument that is specifically earmarked to raise money for climate and environmental projects. These bonds are typically asset-linked and backed by the issuing entity's balance sheet, so they usually carry the same credit rating as the issuer's other debt obligations.

3.2.3 Opportunity to issue green bonds

The opportunity to issue green bonds to finance or securitise green loans (which could include home retrofit loans) may also be a driver for some finance providers. The benefits of green bonds to an issuer include:

- potential pricing benefits
- diversification of investor base
- positive marketing opportunities and enhanced reputation
- the potential to create synergy and develop a more strategic approach to sustainability through joining up internal teams.

With regard to the pricing benefit, there is evidence that issuing a green bond could lead to lower long-term financing costs. That said, the pricing advantage from issuing a green bond, if any, appears to be small, particularly in current markets with the overall low level of wholesale interest rates. The pricing advantage is also not universal, i.e. while there may be a moderate pricing advantage where green bonds are issued by supra-nationals and corporates, to date none has been observed where the issuer is a financial institution[47].

3.2.4 Potential to access EU/national public funding supports for retrofit lending

Given the broader leverage that can be achieved for public funds through credit enhancement or debt structures, there is currently a clear shift by both the EU and national governments away from grant funding and towards a more diverse portfolio of finance mechanisms. There is also a trend towards tailored financing solutions in the residential sector in order to overcome the multiple barriers that constrain uptake of residential retrofits. In developing credit solutions, finance providers should consider the suite of national and EU credit enhancement supports available (directly and indirectly) to deliver enhanced interest rates and terms. It is also possible for finance providers to access EU grant funding for "technical assistance" under the ELENA facility. These financial supports will be explored in detail in chapter 6.2.

45 B. Guin & P. Korhonen, Does Energy Efficiency Predict Mortgage Performance?, 2020

46 EeDaPP, Final Report on Correlation Analysis between Energy Efficiency and Risk, 2020

47 JRC, The Pricing of Green Bonds: Are Financial Institutions Special?, 2019

3.3 Regulatory drivers

3.3.1 Climate risk and financial stability

Globally, financial regulators are considering the introduction of climate stress testing and mandatory climate disclosures by financial institutions. The background is that, in 2015, the G20 Finance Ministers and Central Bank Governors asked the Financial Stability Board (FSB) to review how the financial sector could take account of climate-related issues.

The concern from a financial stability perspective arises from the fact that climate-related financial risks are unusual for several reasons:

- The effects are broad-based – affecting all agents in an economy across all sectors and across all geographies.
- There is a high degree of certainty that these risks will crystallise at some point in the future. But, at the same time, the nature, scale, and time horizon of these risks are highly uncertain.
- In general, the horizon over which the financial sector needs to plan to manage these risks is considerably longer than their typical business planning cycle.

The FSB established the Task Force on Climate-related Financial Disclosure (TCFD) to develop voluntary, consistent, climate-related financial disclosures that would be useful to investors, lenders, and insurance underwriters in understanding material risks. The TCFD published its recommendations in 2017 and these are applicable to individual organisations across all sectors and jurisdictions.

The TCFD identifies two categories of climate-related risk – physical risks and transition risks. The latter refer to the impact of the inevitable need to transition to a low-carbon economy. Here, risks include potential changes in policy and regulation, consumer preferences, technological disruption etc. The disclosure recommendations, which are currently voluntary, are structured around four thematic areas that represent core ways in which organisations operate. These are: governance; metrics and targets; strategy (including scenario analysis) and risk management. Importantly, the TCFD Recommendations also apply to the financial sector, including banks[48].

3.3.2 Climate stress testing

Ensuring that the financial system is resilient to climate-related financial risks falls squarely within the mandate of financial regulators. Since the publication of the TCFD recommendations there has been increasing engagement on the topic from regulators and supervisors globally. The Network for Greening the Financial System (NGFS) was established as a platform for central banks and supervisors to exchange experiences and share best practices to contribute to the development of climate risk management in the financial sector. The Central Bank of Ireland is an active member of the NGFS.

In June 2020, the NGFS published a guidance document for central banks and supervisors providing practical information on how to use scenario analysis[49] to assess climate risks to the economy and financial system. The purpose of climate stress testing is to give regulators and supervisors a clear understanding of how resilient the largest banks and insurers in their jurisdiction are to the physical and transition risks associated with different climate scenarios. The Bank of England announced its climate stress testing plans in 2019 and since then other regulators in France, Australia, Singapore and at the ECB have announced their plans[50].

It is worth noting that in a recent speech, Vasileios Madouros, Director of Financial Stability at the Central Bank of Ireland, identified the distribution of the mortgage stock by BER rating as an example of climate-related risk[51]. In practical terms, this is because a property with a poor BER rating that uses more energy will be more exposed to increasing carbon tax on energy bills. This, in turn, may impact on the homeowner's ability to repay their mortgage.

What is technical assistance?

Technical assistance is non-financial assistance provided by specialists. It can take the form of instruction, skills training and consulting services. It may also involve the transfer of technical data. The aim of technical assistance is to maximise the quality of project implementation and impact by building capacity and supporting administration, management and policy development, etc.

48 TCFD, Task Force on Climate related Financial Disclosures, 2020

49 NGFS, Guide to Climate Scenario Analysis for central banks and supervisors, 2020

50 S. Breeden, Leading the Change: Climate Action in the Financial Sector, 2020

51 V. Madouros, Climate Change, the financial system and the role of central bank, 2020

3.3.3 Climate risk and prudential supervision

Even though the TCFD is a voluntary reporting initiative, it is likely that financial sector will adopt its recommendations, given the increasing focus of financial regulators and supervisors on climate risk. The UK Prudential Regulatory Authority is one of the first movers in this regard. It has published guidance to the banking sector setting out its expectation that firms under its supervision should fully embed their approach to managing climate-related financial risks by the end of 2021[52]. In May 2020, the ECB published a guide for consultation that explains how it expects banks to safely and prudently manage and disclose climate-related risks[53].

In July 2020, in response to the consultation on the renewed EU Sustainable Finance strategy, the Central Bank of Ireland stated that it would seek to embed climate risk into prudential supervision. It says this will involve engagement with regulated firms to ensure that they identify relevant exposures and are incorporating climate-related risks into their risk management processes[54].

3.3.4 Green supporting factor

The 2018 EU Sustainable Finance Action Plan included a specific action to explore the idea of a "green" supporting risk-weighting factor as an approach to recognise the lower risk associated with low carbon assets. This proposal has been extensively discussed in policy, regulatory and banking circles. Those in favour refer to the positive systemic value of green projects and activities as an approach for risk management. Those against put forward the argument that capital requirements must remain risk-based and that green projects are not necessarily lower risk[55].

Recent Central Bank of Ireland commentary states that:

"Our strong view therefore remains that any changes to the prudential framework must first be underpinned by an accurate assessment of climate-related risks in order to ensure the framework remains risk-based. The Bank is supportive of measures that develop accurate risk profiling and asset pricing in order to assess financial institutions' exposure to non-green and brown assets."[55]

The current position is that the European Banking Authority has been tasked by the European Commission to research and report on this topic by 2025[56].

3.4 Reputational factors

The introduction of innovative green financial products is seen as positive by stakeholders, both among policymakers and society more generally. There are therefore associated benefits for all commercial finance providers in the market from a brand perspective, including the ability to attract and retain new customers and talent.

Specific to the banking sector, several banks serving the Irish market have now signed up to the Principles of Responsible Banking (PRB)[57]. Launched in 2019, this is the UN-supported initiative that sets the global standard for what it means to be a responsible bank that is creating value for both shareholders and society. The Principles provide the framework for a sustainable banking system and help the industry to demonstrate how it makes a positive contribution to society.

Under the PRB, banks commit to three steps, namely to:

- analyse the institution's current impact on people and the planet
- set targets where they have the most significant impact, and implement them
- publicly report on progress.

52 Bank of England, Enhancing banks' and insurers' approaches to managing the financial risks from climate change, 2019

53 European Central Bank, Public consultation on its guide on climate-related and environmental risks, 2020

54 Central Bank of Ireland, Consultation on the Renewed Sustainable Finance Strategy, 2020

55 NGFS, A Status Report on Financial Institutions' Experiences from working with green, non-green and brown financial assets and a potential risk differential, 2020

56 European Banking Authority, Action Plan on Sustainable Finance, 2019

57 UNEP FI, Principles of Responsible Banking, 2019

Signatory banks commit to aligning their business with – and achieving – ambitious targets that contribute to global and national sustainability goals. There is a robust governance framework, with signatories held to account against their commitments through an annual review of their individual progress. Banks that cannot evidence the necessary changes will lose their status as a signatory. The Principles are therefore expected to drive concrete and ambitious sustainability targets and actions by banks in order to deliver on their commitments.

3.5 SustainabilityWorks analysis and insights

The business case for finance providers to develop financial products for energy efficiency is strengthening. Several Irish finance providers have launched products in the past 18 months, signalling their belief in and support for this emerging market.

This business case will continue to strengthen over coming years given the reputational benefits, the increasing ambition of policymakers and the increased focus of financial regulators on active management of climate risk.

While it is early days, the transparency and accountability required under the PRB will require banks to take a hard look at their impact on the environment and society.

For those banks with a significant residential mortgage portfolio, setting targets on reducing the carbon emissions associated with those portfolios may become part of their obligations under the PRB. This could bolster the business case further.

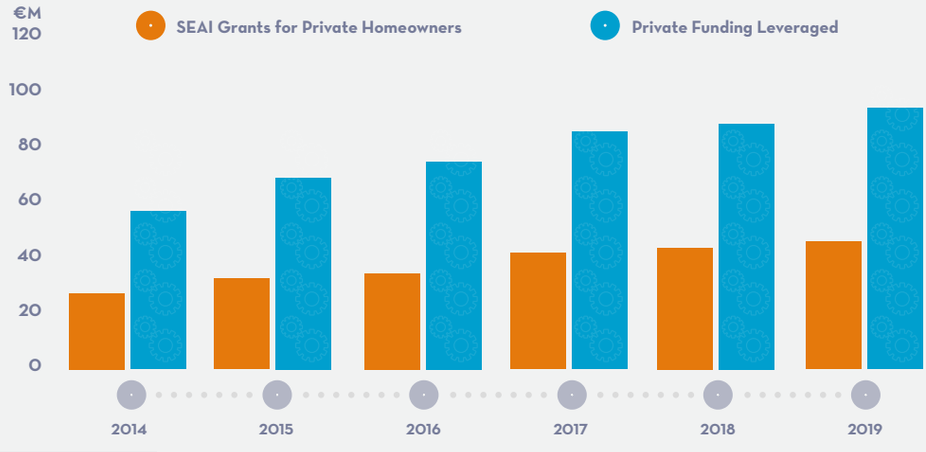
When evaluating the size of the market opportunity, a long-term strategic outlook is essential as it will undoubtedly take time for the market to scale up, not least due to practical challenges in scaling up the national retrofit delivery framework. When setting targets, financial providers need to consider:

- the extent to which homeowners will use their own savings for energy efficiency measures rather than incurring debt
- the extent to which the absolute quantum of grant funding available for private homeowners drives the market.

To illustrate the relationship between grant funding and private expenditure leveraged, Exhibit 12 provides an overview of the estimated private expenditure that has been leveraged by public grants over the past five years. It is estimated that the 2019 figure is €115 million.

Finance providers considering their positioning in this market will want to assess their customer proposition, review innovative finance mechanisms and evaluate potential partners in the retrofit value chain to ensure that their products do in due course "fly off the shelves". The remaining chapters of this Handbook will address these elements of the puzzle.

Exhibit 12: Residential Retrofit Private Spend Leveraged by SEAI Residential Grant Programmes (2014-2019)[58]



58 Extrapolated from SEAI spend on grant programs available to private homeowners – see SEAI Annual Reports. These figures do not include SEAI funding for the Warmer Homes and the Warmth and Wellbeing Schemes, as these programmes are fully funded by the SEAI. These figures also do not include the SEAI Solar PV scheme figures

4. Understanding the homeowner perspective on finance

Homeowners that undertake a retrofit project will have a warmer more comfortable home with improved air quality, lower energy bills and an increase in the value of their property. In addition, investments in energy efficiency measures pay for themselves over time and result in additional savings overall (although the payback period for deep retrofits may be long and is dependent on access to low-cost finance). Furthermore, one of the most significant ways in which individuals can help to tackle climate change is by making their home more energy efficient. Despite this, the uptake of home retrofit measures is not sufficient to deliver on national climate targets. This lack of uptake can be attributed to a broad range of barriers for homeowners.

The key points covered in this chapter include:

- There is a wealth of publicly available international and Irish-specific research and analysis on the barriers for home retrofits and on how best to overcome them. Financing the upfront cost of a deep home retrofit is only one of these barriers – albeit a key one. Other barriers include other higher priorities for personal spending, the disruption and hassle involved in a retrofit, the length of time that a homeowner intends to stay in a particular house and the lack of a designated trusted adviser/service provider. Together, these barriers can add up to a lack of confidence in taking action.

- International experience suggests that the availability of low-cost finance, underpinned by grants and integrated with a One Stop Shop business model, is an effective way to increase renovation levels and unlock more private investment in home retrofits.

- Extensive Irish research and analysis on residential retrofit finance supports this. It identifies the importance of lower-cost, longer term finance that is easy to apply for, flexible to repay, underpinned by a robust grant process and integrated with a relatively seamless customer experience delivered through a One Stop Shop.

- The ability of commercial finance providers to deal with high-volume small ticket credit makes them crucial to the delivery of homeowner retrofit finance solutions. It is very encouraging to see Irish finance providers developing and launching innovative green loans and mortgages targeted at residential retrofits. However, certain structural and technical issues lessen the attractiveness of some of these offers:

    - Although ease of access and less bureaucracy mean that personal loans, even with security requirements or personal guarantees, are generally more appealing to consumers than mortgages, international experience and national research suggest that market rate personal loan terms are not sufficiently attractive to homeowners.
    - Mortgage interest rates, especially for discounted green mortgages, are already at the lower-cost and longer tenure levels that research suggests are important to incentivise take-up for retrofit projects. However, the perceived legal and process barriers for accessing top-up mortgages can prove prohibitive.

- Given these challenges, finance providers need to consider how they can adapt their traditional financing models and product offerings to help overcome the barriers to home retrofits. This is where innovative finance or smart finance comes into play. This is a broad term that includes alternative repayment mechanisms, blended finance solutions and higher discounts for more ambitious retrofits. It also includes innovations around processes or simply collaborative partnerships across the value chain to help overcome non-financial barriers facing homeowners.

4.1 Barriers for homeowners

Retrofitting a home results in a warmer more comfortable home, improved air quality, lower energy bills and an increase in the value of the property. In addition, analysis by the SEAI shows that home retrofit projects pay for themselves over time and result in additional financial savings overall (although the payback period for deep retrofits may be long and is also dependent on having access to low-cost finance)[59].

Furthermore, one of the most significant ways in which individuals can help to tackle climate change is by making their home more energy efficient. According to a poll conducted for Friends of the Earth in May 2020, the need to reduce Ireland's emissions is supported by almost two thirds of Irish citizens, who believe it is important that the Government prioritises climate change. There is also considerable support (92%) for Government initiatives to support jobs by encouraging home energy efficiency measures[60].

But despite all of these positive indicators, the depth and scale of retrofit activity is not happening at the rate needed to meet national climate targets. This lack of uptake is in line with global experience on home retrofits and can be attributed to a broad range of barriers in the perceptions, attitudes and priorities of homeowners. Exhibit 13 provides an overview of the key barriers[61]:

Exhibit 13: Key Barriers for Home Retrofit Projects

- Energy efficiency projects are relatively low on homeowners' personal spending priorities (e.g. car or kitchen purchase)
- Disruption and hassle factors through the retrofit process
- The length of time that a homeowner intends to stay in the property
- Lack of information – or confusing information – on everything from costs to technology
- Lack of access to a trusted and independent adviser, together with a mistrust of contractors
- Mistrust in the potential savings from retrofit measures
- Hidden costs, e.g. researching suitable solutions, unplanned maintenance
- Split incentives (landlord/tenant)
- The upfront capital investment required

What is the split incentive barrier?

A split incentive occurs where the benefits do not primarily accrue to the person who pays for the transaction. In the case of rented properties where landlords meet the cost of improvements, the tenants would usually reap most of the benefits through reduced energy bills. On the other hand, tenants do not control their rental property and so have little incentive to make it more energy efficient. This means that neither party is strongly motivated to upgrade the building. The result is poorer energy efficiency outcomes in rented properties – in both residential and commercial sectors.

A national public consultation on this specific barrier was launched in Q4 2019 and the outcome will inform some of the work of the National Retrofit Taskforce.

59 SEAI, Unlocking the Energy Efficiency Opportunity, 2015

60 Irish Times, Irish climate-change policies should turn on 'science, not politics', 2020

61 See A. Gillich & M. Sunikka-Blank, Barriers to domestic energy efficiency – an evaluation of retrofit policies and market transformation strategies, paper European Council for Energy Efficient Economy (ECEEE), 2013 and also J. Curtin & J. Maguire, Thinking Deeper: Financing Options for Home Retrofit, 2011

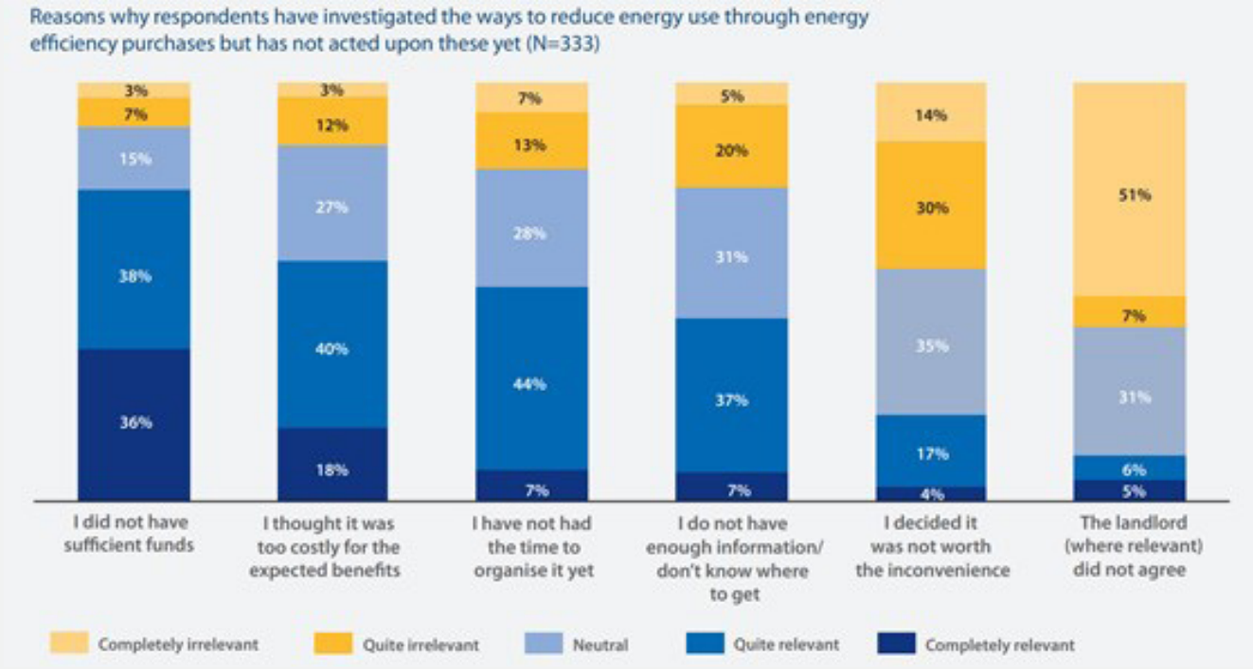
In an Irish context, homeowners cite a lack of funds for the upfront costs[62] as a key barrier. SEAI research in 2016 found that[37]:

- over 70% of homeowners who had investigated energy efficiency but not yet acted, cited a lack of funds
- over 70% of homeowners who had undertaken some energy efficiency measures said a lack of funds was a barrier to doing more
- 44% of homeowners would consider taking out a loan to cover costs not supported by grants.

Exhibit 14 provides further insights on these research findings.

More recent research on homeowner barriers was compiled by the Tipperary Energy Agency (TEA) in 2020 based on information gleaned from 761 homeowners who applied for its SuperHomes deep retrofit scheme. The TEA findings show that half of the applicants cite the high up-front cost of the energy retrofit (in this case typically between €30,000 and €80,000) as the main barrier to going ahead with improving their home. The second biggest barrier to uptake of deep retrofits was poor information, with homeowners confused about the process of retrofitting and the best technologies[63].

Exhibit 14: Reasons why homeowners have not acted upon energy efficiency purchases yet[37]



62 The upfront cost of a residential retrofit refers to the total cost of the works to deliver the project. While grant funding is currently available to cover an element of the cost, it is reimbursed after completion and certification of the project.

63 Tipperary Energy Agency, Press Release relating to the EU Horizon2020-funded SuperHomes2030 project, 2020

4.2 Overcoming homeowner barriers

Government policy must ensure that homeowners are sufficiently motivated to undertake energy efficiency retrofits and that the tools, mechanisms, supply chains and infrastructure are in place to enable them to do so.

A recent report identified national policies that appear to be particularly effective in raising home retrofit rates and unlocking private investment[64]. Using case studies from France, Germany, the Netherlands and Scotland, the report notes that each of these countries is achieving higher renovation rates through a combination of:

- clear, actionable plans and goals for renovation
- policy mechanisms explicitly designed to encourage private investment alongside attractive, specialised finance deals that can be combined with widely available capital subsidies
- high energy performance standards that, if achieved, unlock higher levels of support while also requiring higher investment from homeowners
- national communication campaigns combined with locally relevant renovation advice.

For the purposes of this Handbook, the focus will be on finance aspects of the above, namely:

- attractive, specialised finance deals
- that can be combined with grants

4.2.1 Attractive, specialised finance deals

The reference to attractive, specialised finance deals covers a number of aspects, including the cost of the finance, whether an innovative financing mechanism is involved and the integration of the finance offer and the delivery of the retrofit service as part of a One Stop Shop.

Low-cost finance
Low-cost finance is recognised as an important enabler of home retrofit activity, with both secured and unsecured credit options important. Commercial finance providers play a key role in providing these options as they can deal with the high-volume and (relatively) low value credit assessment that will be required.

Mortgage interest rates are already at the lower-cost, longer term level that research suggests is important. This is particularly true of discounted "green mortgages". However, mortgage top-up applications can be complex and time-consuming, and this can be a barrier for some homeowners. That said, there is certainly a role for discounted green mortgage products, particularly for deeper retrofits carried out as part of a larger renovation project. Further detail is provided in chapter 6.3 on green mortgages.

Generally, personal loans are easier to apply for and are approved faster, depending on the level of security required by the finance provider. However, international experience and national research show that market rates are generally not low-cost nor long-term enough to be sufficiently attractive to homeowners. This is where public funds, national and/or EU, can play a key role, as they can be used to supplement private funds to deliver enhanced loan terms and conditions for homeowners. The rationale for using public funds in this way is that it is essential to achieve national climate policy targets. There have been a number of EU schemes where low-cost finance has had some success in scaling up retrofit activity and these will be reviewed in chapter 6.2.

On-bill and On-tax financing mechanisms
On-bill schemes are a way of financing energy efficiency projects by using energy bills (electricity or natural gas) as the repayment vehicle. On-tax or Property Assessed Clean Energy (PACE) schemes allow energy efficiency and renewable energy improvements on private property to be funded through voluntary property tax assessments. Neither type of scheme has yet been shown to be effective in a European context. Either mechanism would require national legislation to be implemented. Further detail on both mechanisms is provided in chapter 6.4 and 6.5 respectively.

One Stop Shops
Both European and Irish domestic policy are keen to promote One Stop Shops as research shows they can help overcome many of the behavioural and financial barriers associated with home retrofits through simplifying the customer journey. While there is no one definition or type of a retrofit OSS, they are organisations that guide

64 P. Guertler, Silver Buckshots? Opportunities for Closing the Gap Between Ambition for, and Policy and Investment to Drive, UK Residential Energy Efficiency Renovation, E3G, 2018

homeowners through key stages in the renovation process – both from a technical and financial perspective. They also engage in marketing activities to generate customer demand and perform lead-filtering functions. Essentially, a One Stop Shop brings together the fragmented supply side of the value chain, e.g. BER assessors, engineers, surveyors, architects, suppliers, installers, grants, and finance providers into one customer-centric offer. There is a single point of contact for the homeowner and One Stop Shops take responsibility for the process, managing a retrofit project to completion.

Based on international experience, finance providers who are launching a green loan or mortgage product also need to address the non-financial barriers that homeowners face when considering a residential retrofit project. Collaborations between finance providers and OSSs are important as they combine technical and financial support in one package. This simplifies the end-to-end customer journey, overcoming many of the barriers that homeowners face. Ireland is now seeing an increasing number of such collaborations. The different types of OSS models are considered in chapter 5.3.

4.2.2 Grants

Grants are a key policy measure used to incentivise home retrofits. They can be a useful (often vital) way of stimulating the market by subsidising investments which otherwise could not be fully supported by the market due to high upfront costs.

The SEAI is Ireland's national energy authority, reporting to DECC. It works with homeowners, businesses, communities and Government to create a cleaner energy future, with a mandate across both energy efficiency and renewable energy. Alongside its mandate to provide policy analysis, forecasting and modelling support to DECC, the SEAI designs and administers Ireland's energy efficiency grant programmes.

The SEAI has developed a range of grants targeted at residential energy efficiency, with different terms, conditions and ways of applying. Full details of these grants are explored in chapter 5.4.

4.3 Irish research on residential retrofit finance

Over the past ten years, the SEAI has carried out extensive research and analysis to identify what the Irish market would regard as an attractive credit offering. A clear picture has emerged from this research and this is set out in Exhibit 15 which is effectively an Irish homeowner wish-list for residential retrofit finance. Finance providers may not be able to meet all these expectations. However, it is helpful to use this list to identify gaps that providers may wish to address when developing their propositions for this marketplace. The SEAI research and analysis supporting this summary is detailed in Appendix I.

Exhibit 15: Summary of Irish Research on Residential Retrofit Finance

Criteria	Detail
Lower-cost	5% or lower[65]
Longer term	Preferably in line with payback – or else as long-term as possible
Ease of application	Limited paperwork/bureaucracy
One stop shop approach	Integrated technical and financial solution
Ease/flexibility of repayment	On-bill or on-tax schemes
Grants	Continuing to be underpinned by grants

65 Please note that this figure was referenced in 2015 in the context of 11%+ unsecured personal loan rates, which are of course now much lower in 2020.

Exhibit 16: Review of Irish Home Retrofit Loan Products

Criteria	Personal Term Loan Products	Mortgage Products
Lower-cost	Yes	Yes
Longer term	Yes	Yes
Ease of application	Yes	No
One stop shop approach	Yes	No
Ease/flexibility of repayment	No on-bill/on-tax schemes	No on-bill/on-tax schemes
Grants	Yes	Yes

4.4 Current home retrofit loans in the Irish market

It would be difficult for a single finance provider to develop a product that ticks all the boxes on the Irish homeowner's wish list as On-bill and On-tax schemes would require national legislation and so are not within the control of a single finance provider. However, a number of attractive financial solutions have been launched by Irish finance providers since the start of 2019 and some address many of the homeowner's asks.

Using the key criteria identified in 4.3 as a framework for the review, Exhibit 16 reviews the financial products currently available in the market.

At the time of writing, the best terms available in the Irish market for loan products targeting retrofit customers (subject to terms and conditions) appear to be those outlined below. Some of these products involve collaborations and partnerships with a pre-existing OSS, so creating a homeowner offering that combines both technical and financial support.

Green mortgages
Available for new or retrofitted homes that reach a certain level of energy performance post-retrofit, loan terms currently available include:

- fixed rate of 2.25% APR for five years available for homes with a BER rating of B3 or above
- fixed rate from 2.4% APR for four years for homes with a BER rating of B2 or above
- discount of 0.2% APR off any fixed rate options from one to ten years for homes with a BER rating of A3 or above.

Green personal term loans
Specifically targeting home retrofits, loan terms currently available include:

- for loans over €20,000, a fixed rate of 4.9% APR for a term of up to ten years. This compares to "non-green" ten-year personal loan terms ranging from 8.2% APR to 8.95% APR (variable)
- 5.5% APR fixed rate for a period of up to five years (not available nationwide). This compares with "non-green" rates which range from 5.9% APR fixed to 10.5% APR variable for the same term
- 6.5% APR variable rate for a period of up to seven years (available nationwide). This compares with "non-green" rates which range from 5.9% APR fixed to 8.95% APR variable for the same term.

4.5 SustainabilityWorks analysis and insights

It is very encouraging to see Irish finance providers developing and launching innovative green loans and mortgages targeted at residential retrofits. The ability of commercial finance providers to deal with high-volume small ticket credit makes them crucial to the delivery of homeowner retrofit credit solutions. However, certain factors mean that these solutions may not be as attractive as they might be:

- Although ease of access and less bureaucracy on security issues mean that personal loans are more appealing to consumers than mortgages, international experience and national research suggest that market rate personal loans are generally not low-cost nor long term enough to be sufficiently attractive to homeowners.
- Mortgage interest rates and green mortgages are already at the low-cost and long-term levels that research suggests is important to incentivise take-up for retrofit projects. However, given that the focus of these products to date appears to have been on new builds rather than older properties at the point of sale, the perceived legal and process barriers for accessing top-up mortgages can prove prohibitive.

Given these challenges, finance providers need to consider how they can adapt their traditional financing models and product offerings to help overcome the barriers to home retrofits. This is where innovative finance or smart finance comes into play. This is a broad term that includes alternative repayment mechanisms, blended finance solutions and higher discounts for more ambitious retrofits. It also includes innovations around processes or simply collaborative partnerships across the value chain to help overcome non-financial barriers facing homeowners. In considering such initiatives, there should be no need to reinvent the wheel as many innovative finance mechanisms have already been trialled in other countries and have the potential to be adapted to an Irish context. These will be explored in chapter 6.

Furthermore, if finance providers are to deliver a retrofit offer that fits customer requirements, they need to build a broad understanding of the residential energy efficiency value chain in Ireland. This includes understanding the policy levers that are being used to stimulate demand, the market structure, business models, and key actors involved. Knowledge of the national housing stock profile and the intervention points and triggers for homeowners in relation to retrofit projects would also be helpful in terms of customer segmentation and targeting. An overview of these aspects will be included in chapter 5.

5. Understanding the residential retrofit marketplace

The aim of this chapter is to provide finance providers with a broad understanding of the residential retrofit marketplace as they consider how best to structure and launch new financial products and solutions.

The chapter includes information that will help providers identify:

- potential routes to market
- appropriate industry partners for collaboration
- risk reduction measures, and
- suitable intervention points in the customer retrofit journey at which finance offers can be made.

This chapter will explore the following topics:

- the key stakeholders across the residential retrofit value chain
- the different types of contractors involved and the services they provide
- the evolution of business models towards One Stop Shops
- the range of national grant programmes targeted at encouraging homeowners to undertake energy efficiency measures
- the implications of the national Energy Efficiency Obligation Scheme, which requires large energy suppliers to support both commercial and residential
  energy efficiency projects
- the implications of recently introduced building regulations that require a “major renovation” of a home to meet certain energy efficiency performance standards
- the national housing stock profile, including some insights on the nature of the occupancy and financial position of the occupants
- homeowner behavioural insights
- the Building Renovation Passport concept
- the national retrofit skills and training challenge
- the likely impact of carbon tax increases from a home retrofit perspective.

Exhibit 17: Irish Residential Retrofit Value Chain

5.1 The value chain

Finance providers lending for residential retrofits in Ireland will need to understand the value chain and the key stakeholders. Exhibit 17 sets out a simplified overview of the stakeholders involved at each stage of the Irish residential retrofit value chain. Some stakeholders will be involved at more than one stage, but this diagram assigns them to the stage where they are most closely linked.

5.2 The contractors

In the context of delivering residential retrofits, there are several different organisations that are often referred to generically as "contractors". It is important to understand some of the official terms for the different type of contractor involved as these terms are often used in grant programmes and policy documents. See Exhibit 18 for an overview of contractor types and the services that they typically provide.

What are energy credits?

The national Energy Efficiency Obligation Scheme (EEOS) places obligations on large energy suppliers and distributors (Obligated Parties or Participating Energy Suppliers) to deliver specific annual targets for energy efficiency savings in homes and in businesses. Energy credits, which count towards these targets, are awarded for energy saved through an energy efficiency project supported by a Participating Energy Supplier.

Exhibit 18: Overview of Residential Retrofit Contractors

Contractor Type	Description of Services
BER Assessors	• SEAI maintains the National Register of BER Assessors, which can be accessed online through the SEAI website, and currently contains c.500 entries. • A BER assessment indicates the home's energy performance and can help decide on the best energy efficiency improvements to make. • An advisory report comes with a BER certificate, which offers high level advice on improving a building's energy performance. • Individuals, rather than companies, are registered as BER Assessors.
Better Energy	• There are c.1,500 approved Better Energy Homes Contractors on the SEAI Homes Contractors National Register, which is accessible online. • Contractors range from small sole traders to larger firms. • In this category, contractors are typically plumbers who can install heating/ solar systems, electricians that install heating controls and lighting and general contractors to install insulation etc. • All Registered Contractors work to a code of practice issued by the SEAI. • Many of these contractors are sub-contractors to Energy Partners, Participating Energy Suppliers, Project Coordinators and One Stop Shops.
Energy Partners	• There are a small number of Energy Partners, who are both registered as a Better Energy Homes Contractor and authorised by SEAI to co-ordinate and submit grant applications on behalf of homeowners. • The benefit of applying for a grant through a registered Energy Partner is that they will manage the grant application process and submission of all grant related paperwork on behalf of the homeowner. • The grant is paid directly to the Energy Partner, who in turn passes on the grant savings in the form of a discount to the homeowner on the cost of works being carried out by them. • Energy Partners that have an arrangement with a Participating Energy Supplier can pass on to the building owner additional cost savings linked to the valuation of the energy credits available under the EEOS. • The SEAI maintains a list of Energy Partners.
Obligated Parties/ Participating Energy Suppliers	• Under the EEOS, Obligated Parties, most often referred to as Participating Energy Suppliers, have annual targets for making energy efficiency savings in homes and businesses. • A Participating Energy Supplier is a supplier or distributor selling more than 600 GWh of energy per year to final customers. • An up to date list is maintained by the SEAI and as of December 2020 there are 11 Participating Energy Suppliers.
National Home Retrofit Scheme – Project Coordinators and One Stop Shops	• This grant scheme is not available to individual homeowners directly. • For homeowners seeking to apply for a grant, the SEAI has published a list of One Stop Shops and Project Coordinators. • The SEAI specifically cautions that this list should not be interpreted as a register or endorsement of any of the companies listed.
Better Energy Community Grant Schemes - Project Coordinators	• This grant scheme is not available to individual homeowners directly. • For homeowners seeking – as part of a Community – to get involved in a Community Grant application, the SEAI has published a list of Project Coordinators. • Again, the SEAI specifically cautions that this list should not be interpreted as a register or endorsement of any of the companies listed.

In addition to the SEAI registers and lists outlined above, there are builders and tradesmen who carry out energy efficiency work but are not registered with SEAI. Their work therefore does not qualify for grant support. It is also worth highlighting that homeowners who engage such contractors have no post-completion support from the SEAI if the quality of the work does not achieve required standards.

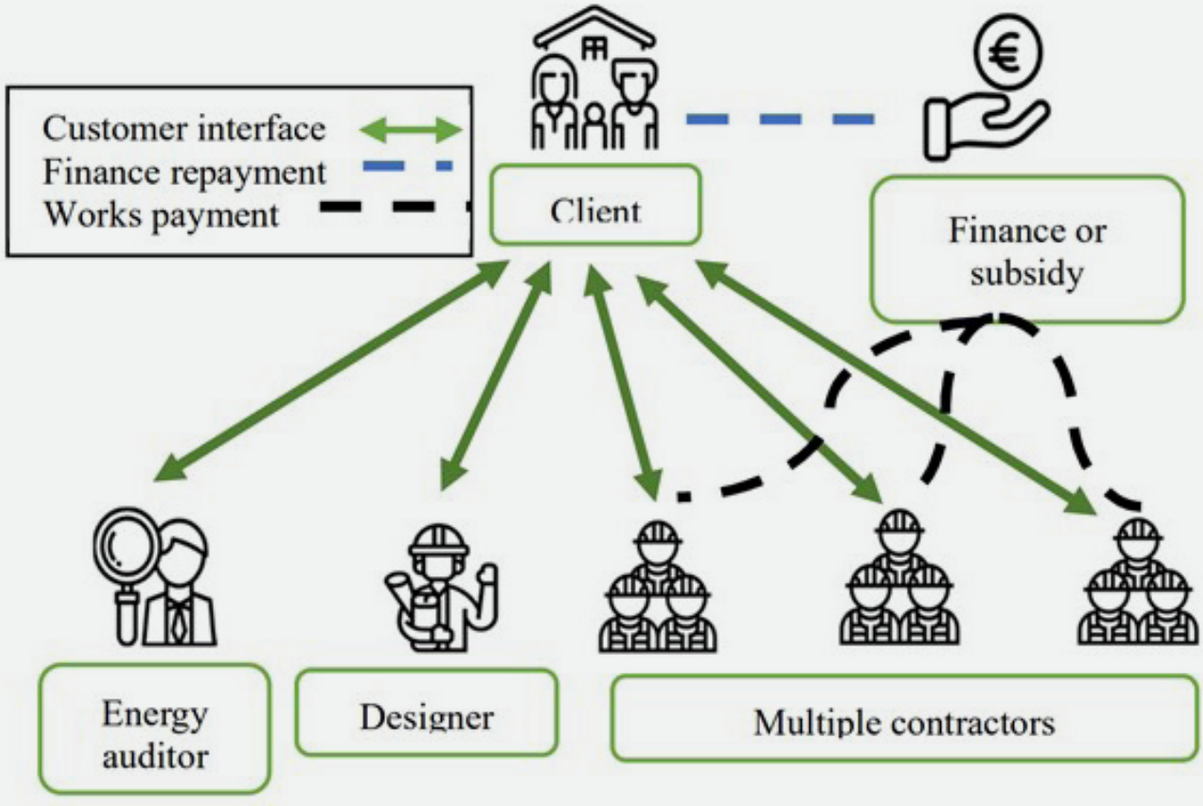
5.3 The One Stop Shop (OSS)

Historically, the residential energy efficiency marketplace has been highly fragmented. Customers have had to procure energy audits, arrange for the design and installation of individual energy efficiency measures, access grants and source finance separately – see Exhibit 19. Doing all this can bring significant complexity, uncertainty and frustration for homeowners.

However, the market is evolving, and OSS models are being introduced that simplify the customer journey. This is in line with policy and market trends across the EU and globally. Defined as providing or offering a comprehensive range of goods or services in a single location for the ease of the customer, OSSs are not a new concept and not specific to energy efficiency. Outside the retrofit arena, the retailer Walmart is recognised globally as one of the first OSSs.

While there is no one definition or type of a retrofit OSS, they are organisations that guide homeowners through key stages in the renovation process – both from a technical and financial perspective. They also engage in marketing activities to generate customer demand and perform lead-filtering functions. Essentially, a One Stop Shop brings together the fragmented supply side of the value chain, e.g. BER assessors, engineers, suppliers, installers, grants, and finance providers into one customer-centric offer. There is a single point of contact for the homeowner and One Stop Shops take responsibility for the process, managing a retrofit project to completion[67]. See Exhibit 20 for an illustration of an OSS model.

Exhibit 19: The Traditional Retrofit Model[66]



66 McGinley, Moran, Goggin, Key considerations in the design of a One Stop Shop retrofit model, 2020

67 E. Mlecnik, I. Kondratenko, J. Cre, J. Vrijders, P. Degraeve, J. Aleksander van der Have, T. Haavik, S. Aabrekk, M. Gron, S. Hansen, S. Svendsen, O. Stenlund and S. Paiho, Collaboration Opportunities in Advanced Housing Renovation, Energy Procedia , vol. 30, pp. 1380-1389, 2012.

An OSS has benefits both for the supply and demand side of the value chain. Having a sole point of contact can be valuable for those delivering retrofit products and services as they can often find it difficult to access and manage clients due to the varied and complex requirements of each project. From the homeowner perspective, the OSS transforms a cumbersome and complex set of decisions and actions into a customer-friendly offer. See Exhibit 21 for an overview of how a OSS supports a customer through all stages of the retrofit journey.

Exhibit 20: The One Stop Shop Retrofit Model

Globally, there are many variations on the OSS model with a recent report including 23 different case studies[68]. Appendix V gives an overview of three of these, namely SPEE Picardie (France), BetterHome (Denmark and Sweden) and Octave (France).

In line with international trends, there are several OSS service providers in Ireland, predominantly providing design and delivery of a retrofit project, grant application support and access to energy credits from energy suppliers. Important recent developments include OSSs that have added a financial solution or partnership into their offering.

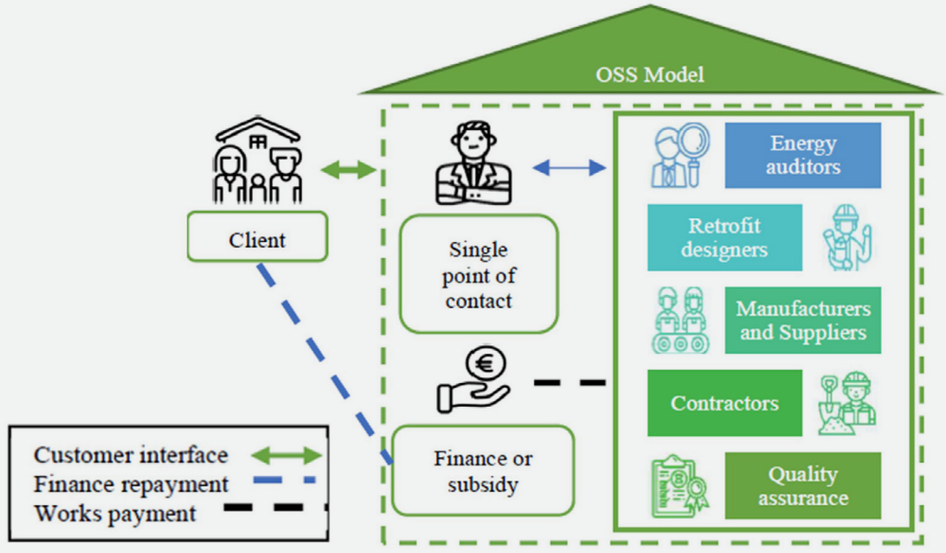
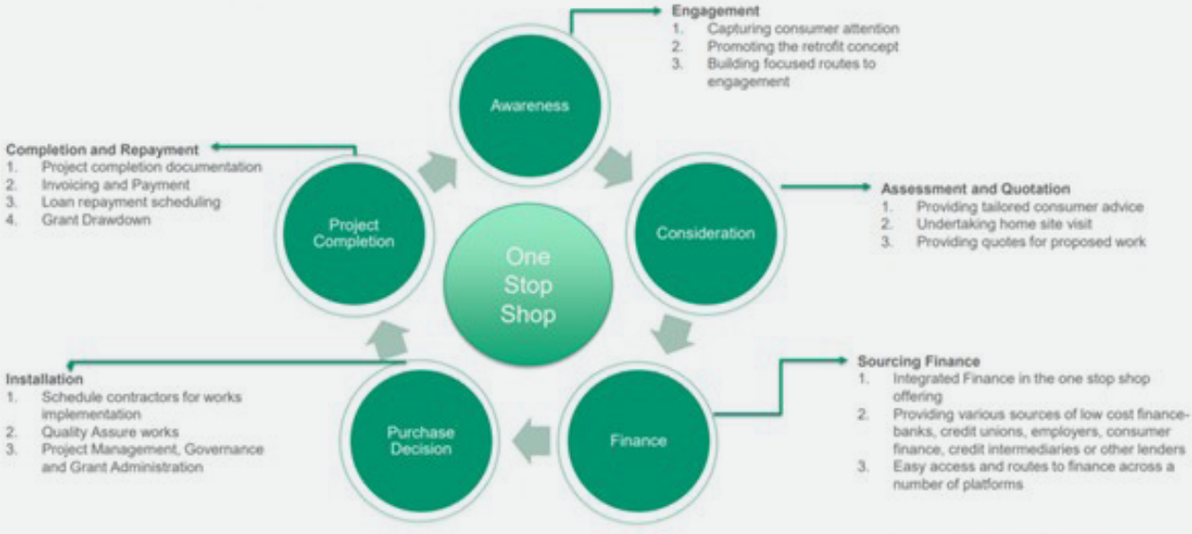


Exhibit 21: OSS Supports throughout the Customer Retrofit Journey (SEAI)



68 B. Boza-Kiss, One Stop Shops for energy renovation of residential buildings, 2018

There are also several ongoing EU Horizon2020-funded research projects on OSS frameworks and business models. Of particular relevance is the Turnkey Retrofit Project[69], which has two Irish partners – the Irish Green Building Council (IGBC) and the National University of Ireland Galway (NUIG). Leveraging the experience of two existing OSS businesses in France[70], the Turnkey Retrofit Project aims to improve on their existing processes and then replicate the model in Ireland and Spain, adapted to the local market context. A recent report issued by this project carried out an in-depth review of best practice OSSs to identify the optimal customer journey for a residential retrofit customer – see Exhibit 22 for an overview[71].

What is energy poverty?

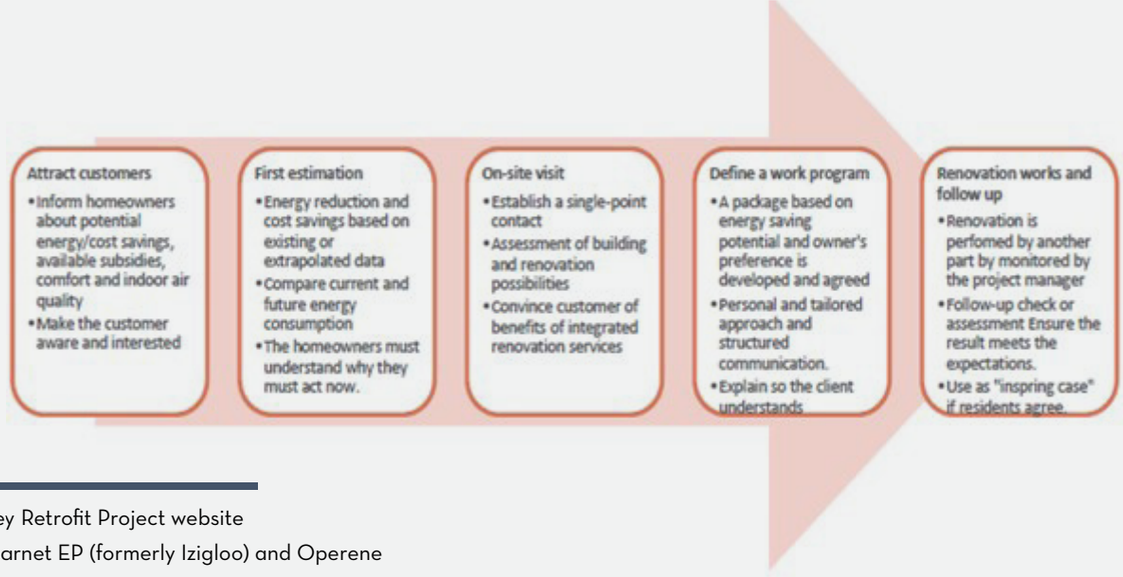
There is no universally agreed definition of energy poverty but it is often described as the "inability to keep homes adequately warm". Other terms include 'fuel poor' and 'energy poor'. In Ireland, it is defined using what is known as the expenditure method of measurement. This is where a household that spends more than 10% of its income on energy is considered to be in energy poverty.

5.4 Grants

Grants can help stimulate the market by subsidising the upfront costs of a retrofit project for homeowners. To date, they are the most common financing mechanism used by EU countries, including Ireland, to encourage energy efficiency upgrades, with grant levels varying based on the following parameters[73]:

- energy performance – with increased grant support available for more ambitious retrofits, e.g. for reaching a B2 BER rating or higher
- household income – with more favourable conditions available for low-income homeowners or the energy poor
- specific target groups – e.g. a higher grant intensity for Approved Housing Bodies
- intervention measure – e.g. higher grant rates for harder-to-implement measures such as heat pumps
- innovative technology – new and emerging technologies may receive more support to help their entry into the market.

Exhibit 22: Proposal for Turnkey Retrofit Customer Journey - Single Family Homes



69 Turnkey Retrofit Project website

70 Mon carnet EP (formerly Izigloo) and Operene

71 Turnkey Retrofit, Benchmarking of promising experiences on integrated renovation services in Europe, 2019

Clearly, grants rely on limited public finance resources and cannot offer a sustainable long-term solution to stimulate the scale of investment required. Having said this, SEAI research shows that grants are likely to remain an important signal and incentive for homeowners as, when offered low-cost finance without a grant top-up, consumers do not proceed with projects[37]. Exhibit 23 lists some of the strengths and challenges associated with home energy retrofit grants.

Exhibit 23: Strengths and Challenges of Grant Support for Energy Efficiency[72]

Strengths:	**Challenges:**
• 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	• 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

72 JRC, Accelerating energy renovation investments in buildings, 2019

Irish grant programmes

The SEAI has a range of grant programmes targeted at encouraging homeowners to undertake energy efficiency measures. Exhibit 24 provides an overview of the schemes available to owner occupiers and highlights some key characteristics. In addition, the SEAI delivers programmes for low-income/energy poor homeowners where the energy efficiency measures are provided for free, e.g. the Warmer Homes Scheme. As private finance is not required by homeowners under any such schemes, details are not included in Exhibit 24. The Better Energy Finance programme is also not included in Exhibit 24 and detail is provided separately below.

The SEAI grant programmes continue to evolve, with learnings from previous iterations informing ongoing development so that they become better targeted at the policy objectives they are seeking to achieve. The programmes shown are a 'snap-shot' of those available for private homeowners at the date when this Handbook was published. Clearly, they will change over time.

For example, Budget 2021 announced two new schemes that are to be introduced – namely a Heat Pump Ready Homes scheme and a new Community Activation scheme. The Heat Pump Ready Homes scheme will use key data from the BER database to target homes that are suitable for the installation of a heat pump. The Community Activation scheme will be similar to the Better Energy Communities scheme but will have a stronger focus on supporting small-scale, capacity-building projects, pilots and feasibility studies and in particular supporting Sustainable Energy Communities (SECs).

Exhibit 24: Overview of SEAI Grant Schemes for Owner Occupiers

SEAI National Grant Programmes for Owner Occupiers

Grant Programme Type	Single Measures	Bundled Measures		
Grant Programme Name	Home Energy Grants	National Home Retrofit (Main Scheme)	National Home Retrofit (Midlands Scheme)	Better Energy Communities
Grant %	Specific € value per measure	Standard: up to 35%	Standard: up to 35% Energy Poor: up to 80%	Standard: up to 35% Energy Poor: up to 80%
BER Rating to Achieve	N/A	B2 or Cost Optimal	B2 or Cost Optimal	B2 or Cost Optimal
Requirement for collaboration	N/A	Encourages OSS to partner with Employers, Financial Institutions. Available for private rented accomodation subject to conditions. Partnership with Participating Energy Supplier recommended	OSS-led application linked to a specific midlands LA project to upgrade local authority homes. Applicant should show collaboration with LA to deliver benefits of aggregated delivery Partnership with Participating Energy Supplier recommended	Community and partnership approach essential Inclusion of a SEC strongly encouraged Res & non-res buildings owned by public & private & NFP Partnership with Participating Energy Supplier recommended
Advantage for Application with Integrated Finance Solution	N/A	Yes	Yes	No

Some key points to note with regard to the existing grant programmes include:

- To date, grant funding has been weighted towards single measures, with a smaller budget allocated to energy efficiency packages or "bundled measures"[73]. In 2019, €28.0m was allocated to single measure programmes, with €16.7m available for programmes that supported bundled measures. However, the Climate Action Plan includes a specific action to review the phasing out of grants for single measures by 2022, indicating the future direction of policy travel.

- The level of grant for single measures is set at a specific monetary value. This is generally about 25%-30% of the standard cost of installing this measure in the average house, rather than the actual cost incurred by the homeowner. No single measure grant is available for windows or doors although these would generally qualify under bundled measures.

- The Deep Retrofit Pilot that ran from 2017 to 2019 provided 50% grant funding to homeowners to achieve a minimum A3 BER rating. Learning from that experience has informed current residential retrofit programmes. These are offering up to 35% grant funding[74] to achieve a B2 BER rating (or cost optimal).

- There is a clear trend in SEAI schemes towards encouraging partnerships to aggregate projects, with a view to delivering economies of scale. Specifically, collaborations are being encouraged between contractors, energy suppliers, local authorities, employers, SECs and finance providers. See Exhibit 25 for further detail.

- It should be noted that the current call under the National Home Retrofit Scheme is referred to as a "One Stop Shop Development Call", signalling again the intent to support the development of the OSS concept in Ireland.

- There is a trend in the evaluation of applications for SEAI bundled measure grant programmes towards awarding extra points for integrated financial solutions.

- For grant programmes supporting bundled energy efficiency measures, there has historically been an annual budget envelope with an annual call for applications. In practice, this has meant that grant applications are made in January and grant offers issued in April/May (before which the work cannot be started). The work then needs to be completed by October/November in order to process grant payments before the end of the calendar year. This is often cited as a challenging timeframe by retrofit service providers and a factor that restricts their ability to scale up. However, a call was opened in September 2020 (for the National Home Retrofit Scheme), indicating a welcome move towards a multi-annual budget framework.

- By contrast, the SEAI's Better Energy Home grant scheme, which provides support for installation of single measures, is open all year round for direct applications by homeowners.

See Appendix VI for further detail on the key terms and conditions of each of the above grant programmes.

While grants are generally not intended to be a permanent feature of any market, given the EU and national focus on climate action and delivery of decarbonisation policy, grant support for energy efficiency is likely to continue at least in the medium term. In fact, the Government commitment in Budget 2021 largely doubles the level of grants available in 2021 relative to 2020.

73 Energy efficiency packages or bundled measures refers to several measures being implemented at the same time – generally with a view to achieving a particular BER rating, e.g. heating controls, insulation and new windows to achieve a B2 rating.

74 It is worth noting that the SEAI has its own inhouse view on market rate costs. As a result, the value of the grant can be less than 35% of actual cost.

Better Energy Finance Programme

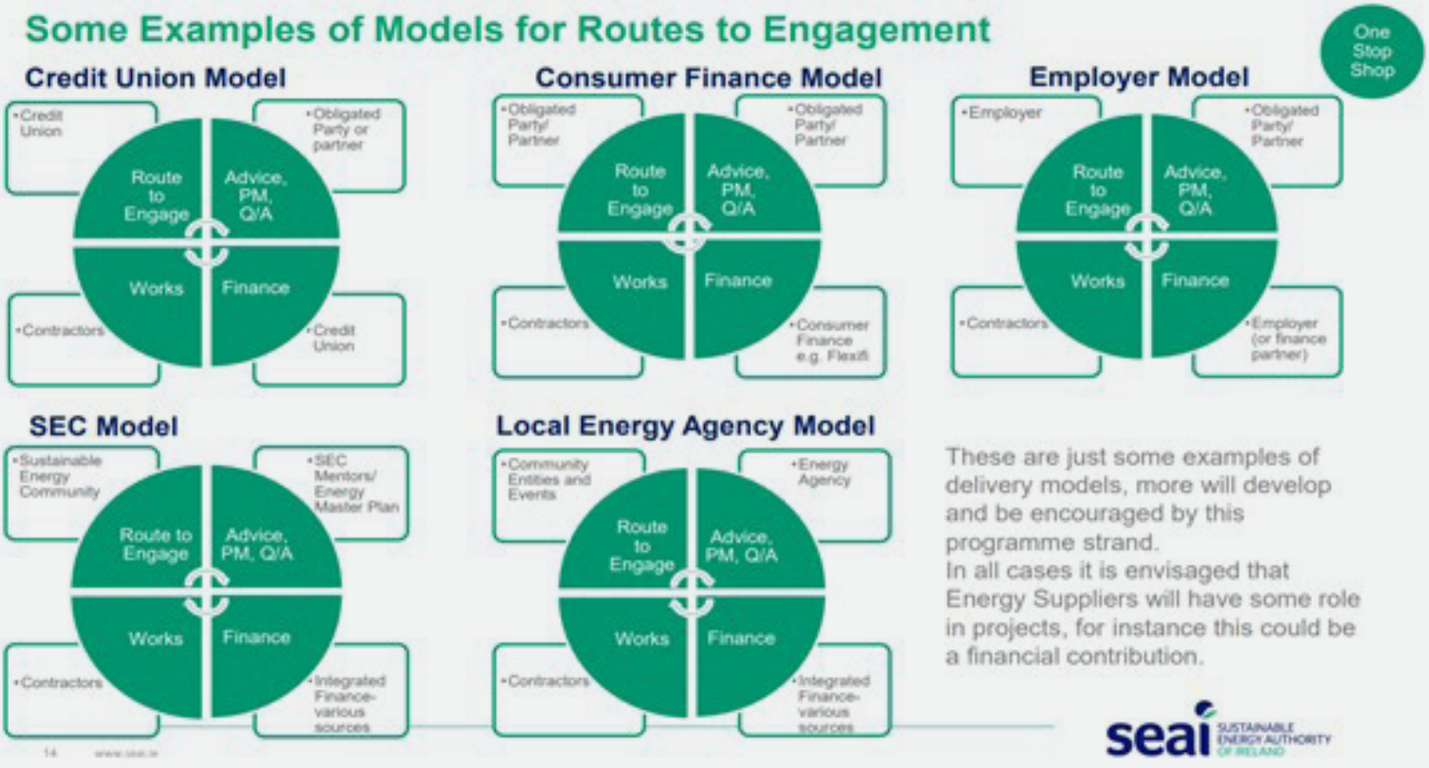
The SEAI's Better Energy Finance Programme has a dedicated budget envelope, €800,000 in 2019, to provide grants for trialling innovative finance mechanisms. Grant support may be provided on less onerous terms and conditions than would apply for a mainstream programme. If the finance mechanism in question proves successful, it may then be integrated into mainstream SEAI grant programmes. Areas of focus include:

- credit solutions provided by banks, credit unions, consumer finance agencies and employers
- trial projects where a financing package is offered together with other support such as tailored advice and project implementation support – essentially an OSS model.

The Better Energy Finance Programme supports stakeholders with potential retrofit projects at all stages of development, from those bringing initial ideas for discussion to fully formed concepts that are ready to go. In addition to the grant funding, the SEAI also provides advice and support and can help in making contacts with potential partners. The SEAI engages with finance providers both unilaterally and through collaborative forums like the Banking and Payments Federation of Ireland (BPFI).

Exhibit 26 illustrates the range of innovative projects supported by the Better Energy Finance programme. See Appendix VI.5 for further details.

Exhibit 25: Models for Routes to Engagement (SEAI)[75]



75 SEAI, National Home Retrofit Scheme Workshop Presentation, 2020

5.5 Energy Efficiency Obligation Scheme (EEOS)

The purpose of the EEOS, which was launched in 2014, is to help Ireland meet its obligations under the Energy Efficiency Directive (EED) in a cost-effective way. Under the EEOS, large Irish energy suppliers (Participating Energy Suppliers) must provide in-kind or financial support to energy efficiency projects in businesses and homes across Ireland.

In practice, the EEOS means that there is potentially additional funding and other support available from Participating Energy Suppliers to support energy efficiency projects. This is in addition to the SEAI grant funding. The quantum of resources allocated to a project by a Participating Energy Supplier will depend on the type of project and the estimated energy savings.

The EEOS sets an annual legally binding target, currently 700GWh, which is split across the Participating Energy Suppliers relative to their market share. Under the Irish scheme, this target must be achieved by supporting energy efficiency projects across three categories:

- 75% non-residential/commercial
- 20% residential
- 5% residential 'energy poor'.

Energy suppliers may achieve their targets by:

- working directly with businesses and homeowners on energy efficiency upgrades
- partnering on projects with local authorities, housing associations or service providers
- exchanging energy credits with another Participating Energy Supplier
- "buying-out" up to 30% of their target each year.

To claim the energy credits associated with a particular retrofit, Participating Energy Suppliers must show that their involvement contributed materially to the retrofit work. This means it would not have been carried out at all, as quickly, or to the same extent without their involvement. The support they provide may be technical, financial, or a mixture of both. See Exhibit 27 for further information on this. Interestingly, facilitating low interest loans qualifies as financial support under the EEOS.

Exhibit 26: Better Energy Finance Pilots (2017/2018)[76]

Financing Pilots 2017/2018

2017/18	Project Lead	Partner Organisation	Description
2017	REIL	CUDA and a no. of Credit Unions	Low cost finance to CU members with end to end offering for upgrade of homes
2017	SSE	Blackraven Staff CU	Low cost finance to staff members of 3 Dublin councils with end to end offering for upgrade of homes
2017	Churchfield Home Energy Services (CHS)	Navan CU (& Tara Mines)	Salary Incentive adaptation with low cost finance to Tara Mines staff by CU and payback through Tara Mines salary- with end to end offering by CHS to upgrade homes
2017	Veolia	SSE	Zero cost finance provided by Veolia to their staff as part of a BEC, to upgrade their homes energy efficiency, with end to end offering provided by SSE on their behalf
2018	Retrofit Energy Ireland Ltd (REIL)	CUDA, The Solution Centre and a no. of CUs	Low cost finance to CU members in 5 CUs across the Dublin area, with end to end offering for upgrade of homes
2018	Churchfield Home Services Ltd (CHS)	Flexifi Consumer Finance	Low cost finance through CHS, using digital marketing and offering value-added enhancements to existing CHS customers, with end to end offering to upgrade homes
2018	REIL	Flexifi Consumer Finance	Low cost finance to REIL customers through testing a number of routes to market engagement including priority contractors, door to door sales, private home infills in social estates and tidy towns engagement; all with end to end offering to upgrade homes

76 SEAI, Financing Energy Efficiency in Homes, 2019

Each Participating Energy Supplier can buy-out up to 30% of their target, with the buy-out price for annual energy saved set at[77]:

- 6c per kWh in the non-residential sector
- 20.4c per kWh for residential projects
- 88c per kWh for residential projects for those in energy poverty

These buy-out prices act as a price ceiling, since any Participating Energy Supplier faced with a higher cost of delivering the energy savings could choose to avail of the buy-out price. Based on the last Commission for the Regulation of Utilities (CRU) report addressing the topic, no Participating Energy Suppliers bought out their energy savings target in the period to 2017[78]. It is understood that this continues to be the case.

On this basis, it appears that, to date, it has been possible for Participating Energy Suppliers to reach their targets at a cost below the buy-out price for each category. This is supported by CRU analysis that shows that the average cost per kWh of the EEOS scheme (across all categories) was 4.4c per kWh in 2015 and 5.6c per kWh in 2016. On this basis, the annual cost for all Participating Energy Suppliers to meet the 700GWh target is approximately €40 million per year, which is a significant amount of funding available to support energy efficiency projects nationally.

The EEOS has been very successful and has driven uptake of energy efficiency measures among households and businesses. A new phase of the scheme will be effective from 1 January 2021. It is likely to set more demanding targets but no details are as yet available. However, it is worth noting that the potential for energy suppliers to pilot a Pay As You Save mechanism and On-bill finance scheme as part of the new EEOS is a specific action under the Climate Action Plan[80].

Exhibit 27: Types of Support that can be provided by Participating Energy Suppliers under the EEOS[79]

Financial Support	Technical Support
• A direct monetary contribution towards a project • Facilitating low interest loans • Negotiating discounts on materials (e.g. lighting supplies, highly efficient pumps and motors) • Reduced energy prices or tariffs	• Providing a certified energy practitioner to carry out energy audits • Implementing energy management systems • Identifying energy efficiency opportunities • Measuring and verifying savings one opportunities have been realised

5.6 Building regulations

In considering routes to market, finance providers should be aware that building regulations now require a high standard of energy efficiency for "major renovations". This will impact those that are doing home renovations generally as well as the "buy-to-renovate" home market.

With effect from 1 November 2019, new building regulations came into force meaning that where a major renovation is being carried out, the whole building should achieve an energy efficiency rating of B2 (or cost optimal level) in so far as this is technically, functionally and economically feasible. A major renovation means the renovation of a building where more than 25% of the surface of the building envelope undergoes renovation.

5.7 National housing stock profile

The 2020 Long-term Renovation Strategy provides a comprehensive updated overview of the housing stock profile[32]. Key points to note are that:

- There are approximately 1.7 million occupied residences in Ireland.
- The vast majority of homes are single family houses, with only one in eight homes in Ireland being an apartment or part of a multi-residential unit
- Approximately two-thirds of residential buildings in Ireland are owner-occupied
- The private rental sector represents 18% of the Irish housing stock
- Approximately 10% is rented from a local authority or social housing body
- 36% of housing units are owner-occupied without a loan or mortgage
- 32% of housing units are owner-occupied with a loan or mortgage.

77 Iris Oifigiuil, Number 24, 2014

78 CRU, Energy Supply Costs Information Paper, 2017

79 SEAI, Online EEOS Guidance, 2020

80 Government of Ireland, Climate Action Plan, First Progress Report, Action 53, 2019

Exhibit 28 shows the profile of BER certificates weighted to the stock of permanently occupied dwellings across Ireland. It is estimated that over 1.35 million homes (80%) in the country are at C1 or less and over half at D1 or less[81].

In regard to how energy efficiency performance requirements under national building regulations have tightened over time – see Exhibit 29[82]. While building regulations that specifically address energy efficiency were introduced in 1992, approximately 58% of the national housing stock pre-dates that year.

Recent research for the EU Horizon2020-funded Turnkey Retrofit Project reviewed the nature of occupancy and financial position for Irish housing units according to the 2016 Irish census – see Exhibit 30[20]. The report finds that:

- 87% of the housing units which are owner occupied without a loan or mortgage have owners who are more than 49 years old.
- 67% of the housing units which are owner occupied with a loan or mortgage have owners who are 49 years old or younger.

However, the report's authors found no publicly available data showing a correlation between homeowners who decide to undertake a retrofit and whether they own their house with or without a loan or mortgage.

Exhibit 28: Residential BERs weighted to national level (2009-2020)

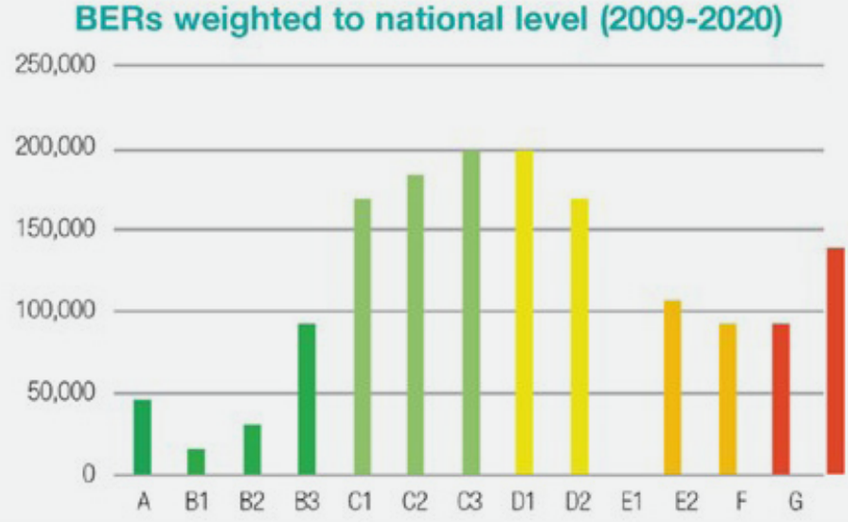
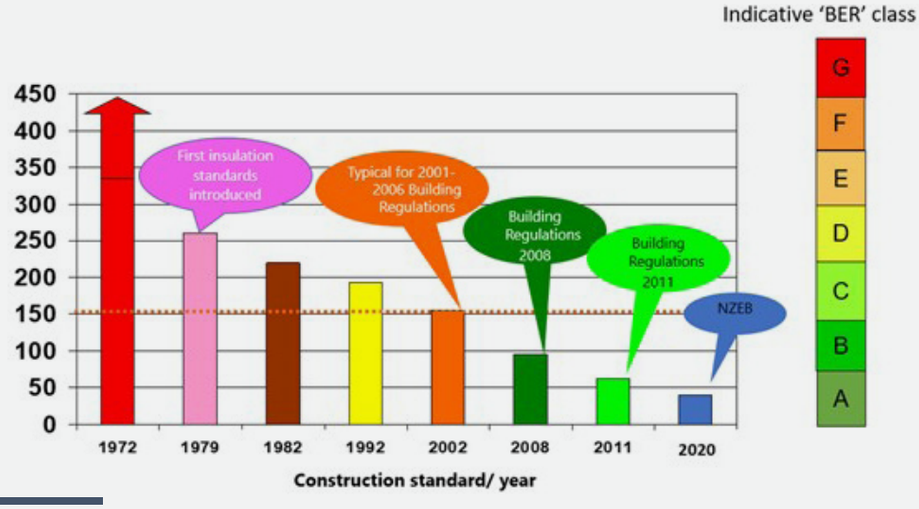


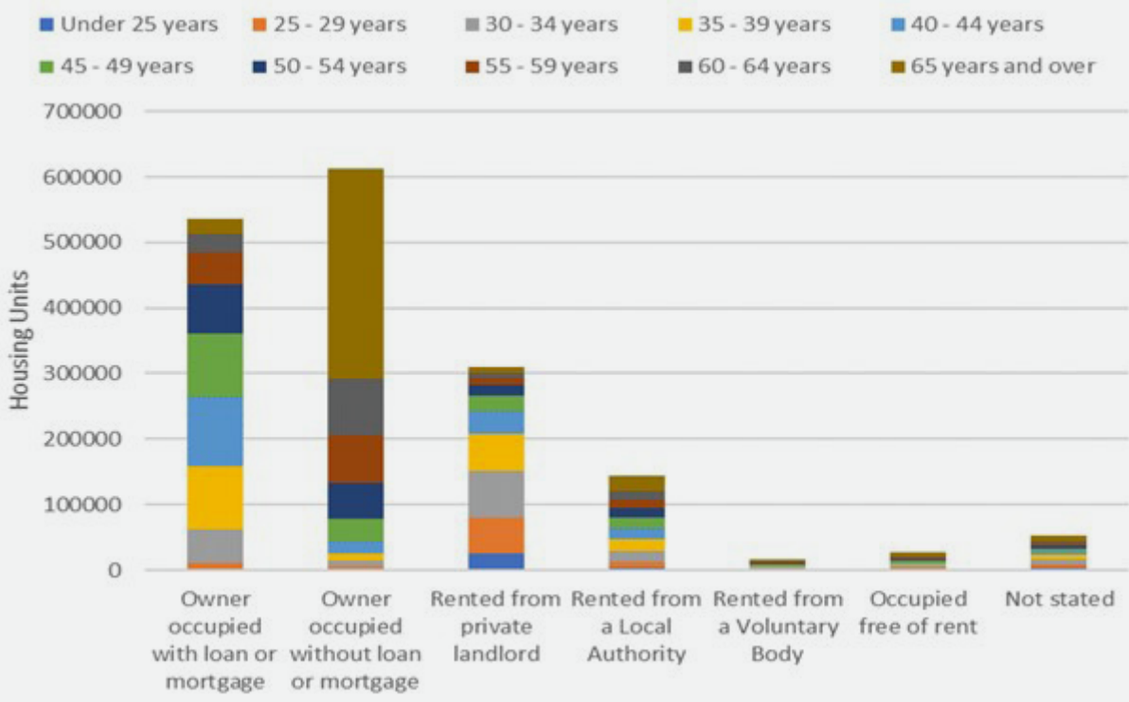
Exhibit 29: Energy Performance Requirements for New Dwellings under Irish Building Regulations



81 J Scheer, Ireland's Housing Retrofit Imperative, 2020

82 Courtesy of Kevin O'Rourke, Marchena Management Services, 2020

Exhibit 30: Nature of Occupancy and Financial Position



5.8 Behavioural insights influencing the uptake of home retrofits

Many human and psychological factors influence the uptake of residential energy efficiency projects. As a result, internationally there is an increasing focus on using behavioural science and behavioural economics techniques to identify solutions and interventions that will help overcome key barriers facing homeowners and encourage them to undertake home retrofits.

Extensive research has been carried out on this topic in Ireland, including by the SEAI, the Economic and Social Research Institute (ESRI), the IGBC and several universities. This research is useful and should help finance providers as they consider how best to bring financial products and solutions to the market.

The SEAI established its Behavioural Economics Unit in 2017 to identify testable and scalable solutions to encourage sustainable energy behaviours in Irish households, businesses, and communities. It has since published several reports offering insights into the best strategies for activating behaviour-related energy savings in Ireland. As stated in its 2018 report "Changing Energy Behaviour – What Works"[83] :

"It is clear that for policy to succeed in supporting these potential energy savings, it will need to be underpinned by a strong understanding of human behaviour"

In addition, ESRI research has identified that perceived cost reductions and comfort gains are the main motives for homeowners to undertake energy efficiency improvements[84]. These motives are also highlighted in SEAI research on residential retrofits and declared consumer behaviour – see Exhibit 31. This is in line with international research on strategies for stimulating home retrofit demand. There is therefore an increasing focus from policymakers, retrofit service providers and finance providers alike to "sell" the comfort and wellbeing gains alongside the energy bill savings.

83 SEAI, Changing Energy Behaviour - What Works?, 2018

84 M. Collins and J. Curtis. Identification of the information gap in residential energy efficiency: How information asymmetry can be mitigated to induce energy efficiency renovations, ESRI, 2017

The 2017 Behavioural Insights on Energy Efficiency in the Residential Sector report[37] provides a comprehensive overview of research findings and knowledge gathered by the SEAI in relation to consumer behaviour and decision making in the context of residential retrofits. As part of this research, the SEAI developed a conceptual framework for the consumer decision-making process, highlighting key hurdles and also key touchpoints that are critical in supporting homeowners to make a positive decision to proceed with a retrofit. See Exhibit 32.

As referenced in Appendix I, the 2017 report contains some key insights on what consumers would regard as an attractive finance offering for energy efficiency measures. It also highlights the importance of targeting consumers at key trigger points. See Exhibit 33.

Exhibit 31: Factors determining whether respondents would invest in energy efficiency[37]

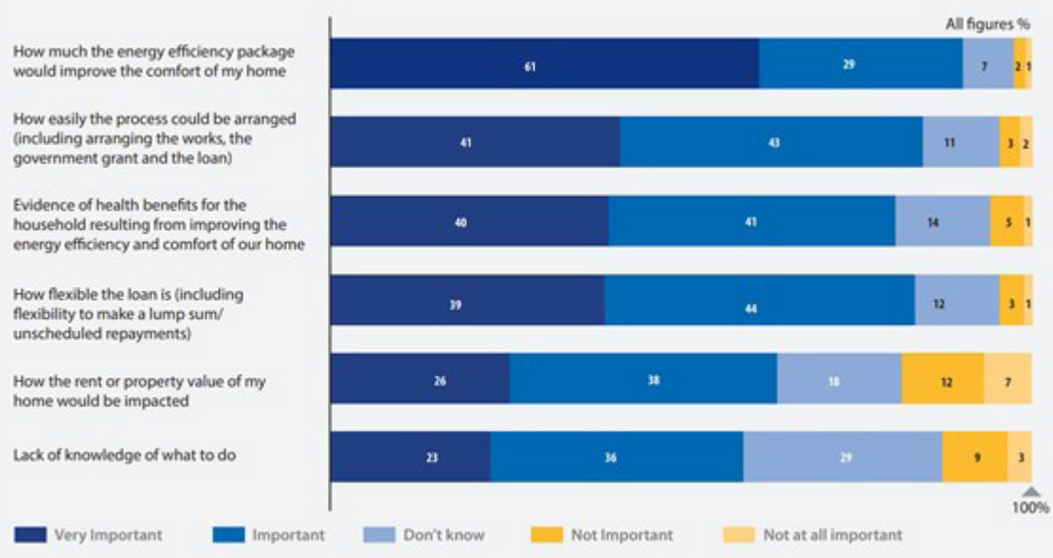


Exhibit 32: Consumer decision-making process - a conceptual framework

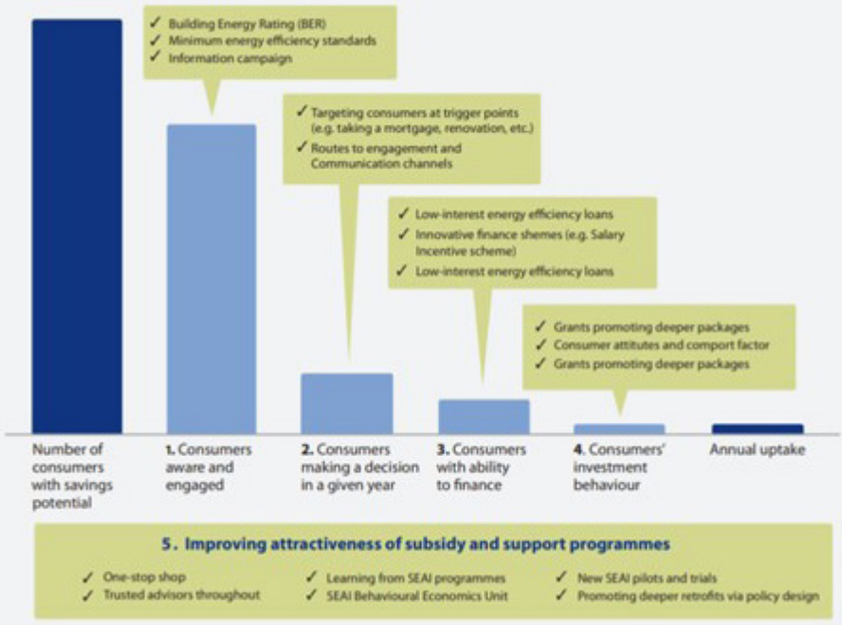


Exhibit 33: Example of Potential Trigger Points

Trigger Point	Channel Of Communication
Anticipated Home Improvement	Architects, Supply Chain, Contractors, Banks, Obligated Parties, Obligated Energy Suppliers
Buying A New House	Mortgage Broker, Ber Assessor, Estate Agent
Retirement	Pension Provider, Employer
Illness Or Extending Your Family	Hospitals, Community-Based Services

Following an extensive review of the international evidence on what works in encouraging sustainable energy behaviours, the SEAI Changing Energy Behaviour report concludes that, in relation to home energy use:

- providing households with regular feedback on their energy use and encouraging them to set energy-saving commitments in public can generate energy savings
- providing households and businesses with free independent energy audits may spur investment in energy efficiency measures.

Follow-up research by the SEAI investigated whether home energy events could increase the installation of home energy efficiency measures[85]. Home energy events involve people from the local community inviting their neighbours, friends, and family to their homes to learn more about the importance of energy upgrades. An independent energy assessor provides energy efficiency information at the event and subsequently undertakes a free BER assessment of all attendees' homes, advising them on how their homes could be made more energy efficient.

Following a pilot programme in Ireland, key findings were as follows:

- There was an extremely high level of satisfaction with the information provided, and the format of the events. Satisfaction was high among both home energy event hosts and guests, both indicating strong intentions to install energy efficiency upgrades.
- The programme was therefore successful in generating awareness and engagement.
- However, these intentions did not translate into action with very few hosts or guests installing home energy upgrades after a three-month follow-up period.

The feedback from the pilot indicates that the process of installing energy efficiency upgrades is still considered costly and complex from the homeowners' perspective, with many failing to upgrade due to a lack of funds and time. The report concluded that:

"It is likely that multiple interventions, including customer support and access to finance, will need to be combined with programmes, such as the home energy event programme, if the number and depth of energy efficiency upgrades undertaken by homeowners are to be increased."

Interestingly, with regard to routes to market for finance providers, this report also refers to previous Irish research which found that structured community organisations such as SEAI's community network may also generate peer effects, stimulating investment behaviours. It notes that this may occur because structured community organisations can deliver locally trusted information and provide people with access to contractors, so helping to convert a homeowner's intention into action. This report also has some good case studies of different types of home energy events (or parties). It outlines the structure of the home energy parties that SEAI themselves developed and suggests how these could be modified to be more successful in the future.

5.9 Building Renovation Passports

The latest update to the Energy Performance of Buildings Directive (EPBD) proposes that Member States consider developing Building Renovation Passports (BRPs) to enhance existing energy performance certification systems[86]. A BRP is a long-term renovation plan or roadmap tailored to a building and the needs of the occupant.

85 SEAI, Home Energy Events, 2020

86 European Commission, Building Renovation Passport Definition, December 2019

It is a tool to enable recognition of phased renovations by recording all actions on a given building (energy audits, previous interventions, recommendations, etc.) over time, independently of its owner. Such an approach allows the new owner of a building to know the history of the initiatives and diagnoses already made on the property. It thus saves on the cost of information and avoids unnecessary repetition of actions.

BRPs can help the owner ensure that work they undertake now does not inadvertently make it more difficult, or more costly, to undertake further work in the future – a problem sometimes referred to as 'lock-in'. Preventing lock-in is a key principle in helping to put buildings on a performance improvement pathway that is aligned to wider climate and energy goals.

BRPs can also be a valuable source of data for finance providers and can help de-risk investments in retrofits. Research carried out as part of the EU Horizon2020-funded EeMAP Project identified BRPs as one of three instruments perceived as critical by banks in relation to energy efficient mortgages[38].

In 2019/2020, the IGBC, in partnership with Limerick Institute of Technology (LIT) and with support from the SEAI, explored the role of a voluntary passport system in supporting large scale deep renovation in Ireland. Key findings from that work include[87]:

- BRPs could have a positive impact on the rate and depth of energy renovation.
- 89% of the homeowners involved in the pilot felt the BRP would enable and motivate them to realise concrete renovation measures in the near future.
- BRPs would provide policymakers with valuable information on Ireland's building stock and progress towards carbon targets.
- By improving quality assurance, BRPs would de-risk energy renovation investments.
- To increase impact and reduce cost, BRPs should be integrated with the existing BER system.
- For the recommendations of the BRP to be implemented and become actual renovation activity, the process must be associated with supporting measures, especially in relation to finance and regulation. Having a BRP could for instance be a requirement to receive retrofit grants, trigger discounts on stamp duty or property/inheritance tax or be combined with other incentives.

5.10 Retrofit skills and training

It is important to note that specific and dedicated training is required for retrofit work, which often requires a high level of technical knowledge. This can be an area where competing policy objectives arise due to the need to attract skilled construction workers to deliver deep retrofit projects at a time when new homes are urgently needed and the construction workforce is approaching full employment. However, this challenge may be less of an issue as the economy recovers from the COVID-19 crisis. In fact, the potential for job retention and creation in this sector has been and remains large and research has found that energy efficiency renovation projects are the largest generator of jobs per million euros invested[4].

In an Irish context, the lack of skilled installers to implement renovation services and the presence of non-qualified companies providing services that lack quality are key barriers to scaling up residential retrofits. A recent report from the EU Horizon2020-funded Turnkey Retrofit Project highlights the following issues[20]:

- Approximately 40% of professionals surveyed reported a lack of skilled workers in the Irish retrofit industry as a barrier.
- Moreover, the lack of skills is associated with incoherent advice, poor quality, and a general loss of confidence in energy renovation, as building and health problems emerge from inappropriate upgrading works.
- In Ireland, approximately 60,000 to 100,000 building construction workers were identified as having considerable gaps in their construction knowledge in the area of energy efficiency.
- To facilitate successful renovation in Ireland, upskilling of construction workers is vital. Policymakers have recognised this, and there are ongoing efforts to roll out skills initiatives to support national retrofitting objectives.

The IGBC recently launched the Build Up Skills Advisor app[88], which has been designed to enable building professionals and construction workers to identify energy renovation training courses that truly suit their needs. The Irish version of this app was designed by the IGBC in partnership with LIT and with support from the SEAI. The IGBC and LIT have also worked with the Irish construction institutes on the development of an energy efficiency accreditation system for building professionals[89].

87 IGBC, Introducing Building renovation Passports in Ireland, 2020

88 IGBC, Build Up Skills Advisor App, accessed December 2020

89 IGBC, National Renovation Upskilling Committee, launched February 2019

5.11 Carbon tax

The link between increasing carbon tax and the transition away from fossil fuels is another critical policy measure that should be tracked by finance providers.

In line with the "polluter pays" principle, carbon tax is a charge applied to CO_2-emitting fuels including natural gas, coal, peat, and home heating oil in order to reduce emissions. Although the imposition of a carbon tax has faced strong political headwinds, decades of research show that it is the most economically efficient way to reduce emissions. A carbon tax was introduced in Ireland in 2010, with the Government setting a price per tonne of CO_2 that is then translated into a cost per unit charged by suppliers.

The rate of carbon tax in Ireland from 1 May 2014 was €20 per tonne. In 2020, the rate increased by €6 to €26 per tonne. It was announced in Budget 2021 that this will increase by €7.50 to €33.50 from 1 May 2021. The Minister also announced that the rate would increase by €7.50 per year up to 2029 and by €6.50 in 2030, to achieve a target by 2030 of €100 per tonne of CO_2 emitted, in line with the Programme for Government.

As carbon tax increases, there will be an increasing incentive for homeowners to consider cost-effective energy efficiency options and also to move away from fossil fuels for heating towards electric and renewable sources.

It should be noted that electricity is not subject to carbon tax. It is however subject to the EU Emissions Trading Scheme, under which the price was approximately €27 per tonne at the end of 2020. Under the EU Commission's most ambitious scenario for emissions reduction this is projected to rise to as much as €65 per tonne by 2030[90]. However, the cost impact of this will be diminished by the fact that Ireland's electricity system has decarbonised significantly, with over 30% now supplied by renewable energy and with emissions intensity cut by 41% since 2005. The Climate Action Plan projects that 70% of electricity will be generated from renewable energy sources by 2030.

90 Six potential pathways to achieving higher GHG emissions cut targets in the EU would see the price of EU ETS allowances at €32-65/t CO2e in 2030, according to an impact assessment published on 17 September 2020 by the EU Commission available here.

5.12 SustainabilityWorks analysis and insights

Finance providers will need a broad understanding of the residential retrofit marketplace as they consider how best to structure and launch new financial products and solutions.

In particular, they need information that would help them identify:

- potential routes to market
- appropriate industry partners for collaboration
- risk reduction measures
- suitable intervention points in the customer retrofit journey at which to make finance offers.

Analysis suggests that key aspects to be explored include:

- the key stakeholders across the national residential retrofit value chain
- the evolution of business models towards OSSs and the role of finance providers within, or in conjunction with, this model
- the increasing focus of policy on project aggregators to accelerate the pace and scale of projects
- the SEAI grant programmes. These are key to driving the market but are dynamic and constantly evolving, with learnings from previous programmes informing the next iteration
- the EEOS – whether and how the energy credits linked to a particular residential retrofit under the EEOS are being monetised. In particular, providers will want to understand how energy suppliers can 'claim' energy credits for projects. An interesting route for a finance provider and an energy supplier to explore jointly would be the possibility for energy suppliers to claim credits where they have facilitated a low interest rate loan.
- the development of new building regulations requiring minimum energy performance levels for major renovations. Providers will want to consider how these rules will implemented, supervised and enforced, with a view to developing routes to market for finance products for home retrofits and for the "buy-to-renovate" home market
- Ireland's housing stock profile for customer segmentation and targeting purposes
- the non-financial human and psychological factors that influence the uptake of residential retrofits, with a view to identifying solutions and interventions to overcome barriers and thereby drive demand for retrofit finance
- the key trigger points for a retrofit as identified by the SEAI and appropriate interventions that could be made at these times
- the Building Renovation Passports concept and the plans for how this will be rolled out in Ireland
- the challenge in relation to scaling up retrofit skills, considering the importance of this from a risk mitigation perspective
- the impact of rising carbon tax, as a policy measure of relevance right across national decarbonisation plans.

6. Exploring innovative finance mechanisms

Grants and subsidies represent the principal mechanism of public support for energy renovations across Europe. However, there is now a clear shift towards a more diverse portfolio of innovative finance mechanisms, often referred to as "smart finance".

This chapter provides an overview of these mechanisms, which include publicly supported lower-cost loans, green mortgages, On-bill schemes and On-tax (or PACE) schemes. It highlights advantages and disadvantages and shows how these schemes are working in practice through case study examples. EU supports are also explored, including the Smart Finance for Smart Buildings (SFSB) guarantee facility, Private Finance for Energy Efficiency (PF4EE) and ELENA. Ireland's experience with credit enhancement schemes is outlined, along with an overview of the Irish Climate Action Fund as a potential source of support for pilot finance programmes. In addition, the chapter also explores the EU Taxonomy ruleset on green buildings, and the development of innovative green building standards and labels to guide finance providers.

The appropriateness of each of the above mechanisms for individual Irish financial institutions and suggestions for next steps can be summarised as follows:

- Publicly supported lower-cost loans appear to be the most common and successful approach in an EU Member State context. In developing credit solutions, finance providers should consider the suite of national and EU credit enhancement supports available (directly and indirectly) to deliver enhanced interest rates and terms for homeowners. Providers should bear in mind that the use of any national or European sourced financing supports such as guarantee structures is likely to carry conditions around demonstrating additionality, i.e. evidencing that the financing that would not have taken place anyway without such support. Providers may also want to explore opportunities to access grant funding for technical assistance under the ELENA facility.

- Discounted green mortgages are already available on the Irish market. Mortgage finance providers should consider how they can stimulate additional demand for retrofits through the way they design these products, e.g. incremental discounts for deeper retrofits. They could also consider introducing the concept of green mortgages for retrofit on older properties at the point when they are purchased. Again, providers need to consider additionality concerns, i.e. whether a finance product is really boosting retrofits of existing homes or will effectively only be available for new homes due to the requirement for a high BER rating that is beyond cost optimal standards. The implications of the EU Taxonomy definition of a green retrofit should be considered, alongside the developing range of standards and labels for green mortgages and loans.

- On-bill mechanisms are generally not within the control of single finance providers as national legislation to secure consumer protection around energy switching would be needed.

- On-tax or PACE mechanisms are also not within the control of a single finance providers as national legislation would be needed to allow repayment of finance on property tax bills. Furthermore, given the political headwinds in relation to local property tax, it is likely that this would be challenging in an Irish context.

- With both On-bill and On-tax mechanisms, it is likely that public credit enhancement support would still be necessary to deliver preferential interest rates and terms. In any case, while these mechanisms have had some success in the US and Canada, they have been slower to take off in Europe. A watching brief should be kept on the EU Horizon2020-funded RenOnBill and EuroPACE research projects. Consideration could also be given to developing discussions with energy suppliers and policymakers in these areas.

6. Exploring innovative finance mechanisms

6.1 Innovative finance mechanisms

As discussed in chapter 5.4, grants and subsidies continue to represent the principal way in which public support for energy renovations is channelled across Europe[73]. However, given the broader leverage that can be achieved for public funds through credit enhancement or debt structures, there is currently a clear shift by both the EU and national governments towards a more diverse portfolio of finance mechanisms. There is also a trend towards tailored financing solutions in the residential sector in order to overcome the multiple barriers that constrain uptake of residential retrofits. A number of distinct innovative finance mechanisms have been identified in research literature, namely[91]:

- publicly supported lower-cost loan mechanisms
- On-bill financing/ On-bill repayment
- On-tax financing/Property Assessed Clean Energy (PACE)
- green mortgages
- energy services agreements
- community financing

Exhibit 34 summarises the key features of each of the above mechanisms.

Exhibit 34: Typology and Key Features of Retrofit Finance Mechanisms[92]

		FEATURE OF FINANCE MECHANISM					
TYPE OF FINANCE MECHANISM	**EXAMPLE SCHEMES**	**SOURCE OF CAPITAL**	**FINANCIAL INSTRUMENT**	**PROJECT PERFORMANCE**	**POINT OF SALE**	**SECURITY AND UNDERWRITING**	**REPAYMENT CHANNEL**
PUBLIC LOAN/CREDIT ENHANCEMENT	HES and HEEPS equity loan (Scotland)	Government Spending	Debt	Minimum CO_2 saving	Third party finance provider	No security – basic credit check	Unsecured Loan/equity release
	KfW CBRP (Germany)	Public Bank	Debt (bonds)		Retail bank	Normal banking security requirements	Unsecured
	JESSICA->LEEF (EU->London)	Hybrid – EIB, LEEF & Private lender	Debt		Housing provider	Varies	Revolving phase then full repayment
ON-BILL FINANCING/ON-BILL REPAYMENT	UK (OBR) Green Deal	Third party private sector	Debt	Bill Neutrality	Third party finance provider	Energy meter & bill history	Energy Bills
	USA & Canada (OBF) schemes	Energy Utility & public/credit enhancements	Debt (some securitised examples)	Often Bill neutrality	Energy utility		
PROPERTY ASSESSED CLEAN ENERGY (PACE)	RE:NEW Financial (US)	Municipal bond -> Private capital	Debt (bonds)	None – approved contractor schemes	Contractor	Lien on property & tax bill-based underwriting	Property taxes
GREEN MORTGAGE	EMF Green mortgage project (EU)	Covered bond market	Mortgage (equity & debt)	EPC improvement	Mortgage provider	Detailed credit check	Mortgage payments
	Ecology Building Society (UK)	Member deposits	Equity				
ENERGY SERVICES AGREEMENT	RENESCO (Latvia)	ESCO -> Public Bank	Debt & Equity	Energy Performance Guarantee	Contractor	Based on ESCO	Energy performance contract
	SEA (Italy)	ESCO-> Institutional investor				Based on ESCO & Bill payment history	
COMMUNITY FINANCING	BHESCo (Brighton, UK)	Member share issue	Equity	None	Contractor	Credit Check	Hire Purchase agreement -> dividends

91 Brown, Sorrell & Kivimaa, Worth the Risk? An evaluation of alternative finance mechanisms for residential retrofit, 2019. The term unsecured may be misleading as KfW advise that they rely on their banking partners to obtain security for these loans and may require additional security depending on the credit

Further detail will now be provided on the first four mechanisms listed in Exhibit 34. The other two are more tailored for either single larger real estate assets or for communities and are therefore outside the scope of this report.

It is worth highlighting that the SEAI has reviewed and piloted many innovative finance mechanisms in Ireland, including buying-down the interest rate of loans from private finance providers, EU risk sharing initiatives, consumer financing, supplier credit models and providing credit via employers. An overview of some of these pilot schemes is provided in chapter 5.4 and Appendix VI.5.

6.2 Publicly supported lower-cost loan mechanisms

These mechanisms typically involve lower-cost loans provided by public funding through government agencies. They may also include a range of credit enhancements that are blended with private capital to provide enhanced loan terms and lower interest rates to the homeowner.

Credit enhancements use public funds to reduce private finance provider risk by providing some form of credit guarantee in the event of default, bankruptcy or delinquency. They are used in many different circumstances where there is a perceived market failure requiring public intervention to stimulate investment and so meet policy aims. The benefit of using public funds in this way, rather than through simpler grant mechanisms, is that the public funds achieve a multiplier effect through attracting private capital co-investment.

Loans supported by credit enhancements provide a valuable solution where private finance providers cannot or will not provide financing to a particular sector due to perceived risks, market size or where a considerable stimulus is needed to enable the required scaling. Energy efficiency financing fits these criteria given the perceived high risks, transaction costs and investment activity needed to achieve scale.

Credit enhancements utilising public funds can be structured in a number of different ways. These include:

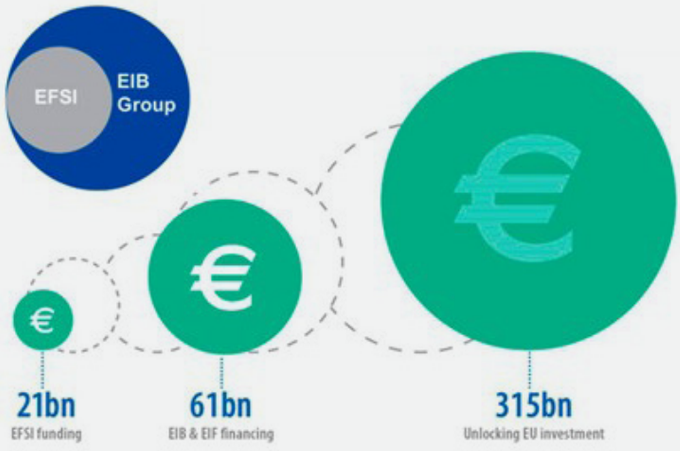
- risk sharing facility/loan loss reserve. This is where funds are available to cover some portion of losses associated with non-payment of loans
- guarantee. This is where there is a commitment to pay for all or part of a finance provider's losses without necessarily establishing a dedicated account for this purpose
- first loss capital. This is where public funds are provided to be loaned alongside funds from a private finance provider. There is a commitment that any losses will first impact the returns on the public capital
- interest rate buydowns (IRB). This is where public funds pay some of the financing costs incurred by the consumer, e.g. by paying directly for some or all of the interest costs charged by a particular finance provider. The IRB is typically structured so that the borrower sees a reduced rate to account for the fact that a government is paying some of the interest costs.

These approaches can be interlinked and generally the terms risk sharing, guarantee and first loss capital are used interchangeably. They are often combined in blended finance structures, with both national and EU funds and credit enhancements sitting alongside each other to deliver a tailored solution for a particular financing challenge.

The EU is a strong advocate of blended finance approaches. An example is the European Fund for Strategic Investments (EFSI)[92] and, more recently, plans to deliver The European Green Deal. It is also expected that blended finance will be key to post-COVID recovery investment plans. Exhibit 35 illustrates the multiplier effect of EFSI funds in terms of unlocking European Investment Bank Group and private investment.

92 The Investment Plan for Europe was a policy initiative launched by the Juncker European Commission in 2014 to boost investment, increase competitiveness and support long-term economic growth in the EU. One of the key elements of that plan was to launch EFSI, which is not a fund in the traditional sense but rather a guarantee instrument allowing the EIB to increase its risk bearing capacity to lend to sound but higher risk projects, enabling such projects go ahead.

Exhibit 35: The multiplier effect of EFSI[93]



In addition, the development of EU "investment platforms" is gaining considerable attention from the European Commission and the EIB. In this context, investment platforms are dedicated flexible financing structures channelling public and private funds to co-finance sectors with a defined geographical or sectoral theme, e.g. the SFSB guarantee facility structure discussed below. These platforms are often considered necessary in sectors which have fundamental viability or feasibility of delivery issues, including where grant funding is essential to absorb upfront costs or very long payback periods are involved. Given the bespoke nature of investment platforms to address national economic issues, a watching brief should be kept by finance providers for new initiatives led by the EIB as tailored financial solutions are sought to address local financing barriers in energy efficiency.

6.2.1 European Member State case studies

Several EU countries have used public support to deliver finance for residential energy efficiency. Given the diverse housing stock typology and ownership profiles across the EU, a number of these programmes address multi-family buildings (apartment blocks) and housing associations particularly in eastern Europe and the Baltics. Others are more tailored for single family homes.

In terms of useful case studies, Germany, the Netherlands, France and Estonia have all created schemes that deliver finance to homeowners at rates between 0% to 4%, underpinned by grants. In each country, the schemes operate slightly differently, showing how this approach can be tailored to meet specific jurisdictional market conditions and financing norms. All encompass different types of pricing mechanisms, different distribution routes to homeowners and include both secured and unsecured loan offerings. The Estonian model is focused predominantly on multi-home buildings/apartments but does include some single-family homes. Despite the differences, all four schemes have been successful in securing complementary private investment in residential retrofits. See Appendix II for an overview of these four schemes.

These national schemes were all developed before the introduction of more broadly available EU financial instruments for energy efficiency. They therefore lean heavily on national public finance support. The exception is the Estonian Kredex example which involved the use of European Bank for Reconstruction and Development (EBRD) funding to develop loan guarantee mechanisms. In the other schemes, loan facilities were made available from EU or European development sources such as the EIB, the Council of Europe Development Bank (CEB) or the EBRD. It is also worth highlighting that some other successful locally tailored multi-home retrofit programmes have used a mix of European Structural and Investment Funds (ESIF), EFSI and national funds, including examples in Eastern Europe[94].

6.2.2 EU targeted supports

The EU commitment to climate action and the environment has been part of its financing programme for a considerable time. Large budgetary contributions have been allocated, including through the EFSI, the EU Horizon2020 programme and more recently through the Green Deal. While the use of credit enhancements in the residential retrofit sector has been relatively limited in Europe to date, there has been extensive use of public risk sharing facilities to boost private investment in the commercial energy efficiency market[95]. This supports the use of the same approach for residential energy efficiency.

93 EIB, Factsheet on the role of EFSI in financing urban and regional projects, 2016

94 EUKI, Financing Energy Renovation in Buildings, 2019

95 AECM, Financing Energy Efficiency Measures in Buildings, 2018

The EU's 2021-2027 Multiannual Financial Framework and the COVID-19 Recovery and Resilience Facility are expected to allocate significant resources to trigger an EU Renovation Wave. Building on the positive experience of the EFSI, InvestEU will act as an integrated EU-level investment support programme, providing technical assistance and financing backed by an EU budget guarantee. The aim is to unlock private investment and stimulate the creation of dedicated financial products for home retrofits[4].

A range of EU supports are already available to help efforts at a national level and/or at an individual financial institution level. In each case, the EIB Group is involved.

6.2.3 The role of the European Investment Bank

The EU's bank since 1958, the purpose of the EIB Group (which includes the European Investment Fund that is responsible for risk sharing programmes) is to promote European economic development and integration. While it has effectively been the EU's climate bank for a long time, it has recently increased its ambitions in this area. Now, its vision is to align all its financing activities with the principles and goals of the Paris Agreement by the end of 2020. It also wants to increase the share of its financing that is dedicated to climate action and environmental sustainability to 50% of its operations by 2025.

To date, the financing of energy efficiency initiatives across Europe has been led by larger economies who historically have had better access to funding from capital markets. For example, the cheaper funding sources available to Kreditanstalt fur Wiederaufbau (KfW) have enabled Germany to build its national energy efficiency initiatives over the last twenty years. See Appendix II.1 for further details on this.

For smaller nations, the EIB has supported lower-cost lending to the real economy to address financing gaps or market failures in key market segments, under specific on-lending conditions, through national promotional institutions and/or individual financial providers.

Further to the immense increase in market liquidity and hence lower interest rates since the banking crisis of 2008, the EU, through the EIB Group, has focused on delivering support through guarantee/counter-guarantee facilities or bespoke risk sharing structures. Given the multiplier effect of guarantees, providing leverage in this way through the EIB can deliver much greater impact. The EIB has also recently established the European Initiative for Building Renovation. This will step up its support for building renovation projects by:

- aggregating such projects into portfolios
- providing tailored financial support, ranging from traditional long-term loans to guarantees, equity and receivables financing.

An overview is provided in the next section of three EU financial instruments that are focused on energy efficiency and that specifically target private finance providers, namely:

- the Private Finance for Energy Efficiency financial instrument
- the Smart Finance for Smart Buildings guarantee facility
- the ELENA facility

Both the PF4EE and the SFSB guarantee facility utilise credit enhancement structures but are different in a number of aspects. A comparison of key features of both financial instruments is provided in Exhibit 36.

The European Investment Advisory Hub is a good source of further information on EU support. There are also direct channels depending on the financial instrument or facility in question, e.g. directly through the EIB and/or through Irish government agencies.

6.2.4 Private Finance for Energy Efficiency (PF4EE)

The PF4EE is a joint agreement between the European Commission and the EIB and supports private financial institutions to target lending at projects that support the implementation of National Energy Efficiency Action Plans or other energy efficiency programmes of EU Members States[96].

Launched in 2014, the PF4EE is a portfolio-based credit risk protection provided by the EIB (acting on behalf of the European Commission) that enables local financial institutions to offer better financial terms to the ultimate borrowers. The final recipients benefiting from the PF4EE may include homeowners undertaking energy efficiency retrofits. Finance providers can apply directly for the PF4EE facility, i.e. they do not need Government support or involvement.

The PF4EE has three components:

- A risk mitigation mechanism, partially covering losses incurred in the portfolio of energy efficiency loans granted by the financial intermediary.
- Expert support, enabling local finance providers to develop and market new energy efficiency financing products tailored to customer needs.
- The potential for longer term financing from the EIB, at request of the finance provider and at the sole discretion of the EIB.

Through the LIFE Programme, the European Commission has committed €80 million to fund the PF4EE credit risk protection and expert support services. The EIB leverages this amount, making a minimum of €480 million available in long-term financing.

The expert support provided under the PF4EE is noteworthy as it can provide services, generally at no additional cost, to local financial institutions, including:

- staff training on energy efficiency
- development of energy efficiency products
- energy efficiency loan portfolio development
- appraisal of energy efficiency investments
- risk analysis of individual projects and programmes
- reporting and energy audits.

An overview of how PF4EE is structured is shown in Exhibit 37.

Exhibit 38 depicts the theoretical distribution of losses of a portfolio between a financial institution (FI) and the PF4EE:

The PF4EE has now been in existence for a number of years and, as a result, useful guidance has been developed as well as numerous case studies outlining how it has been used[97].

Exhibit 36: Comparison of PF4EE and SFSB guarantee facility

	PF4EE	SFSB
Applicant	Single finance provider	Must be State involvement
National funding	No national public finance required	Must be some State funding
EU funding sources	LIFE Programme	ESIF, EFSI
Technical assistance	Part of the PF4EE facility	Separate application to the EIB through ELENA (albeit linked to SFSB application
Managed by	EIB	EIF
Case studies	Publicly available	No detail publicly available as yet

96 PF4EE, Unlocking Europe's energy savings potential through Private Finance for Energy Efficiency, 2019

97 PF4EE, Energy Efficiency Manual, 2019

Exhibit 37: Private Finance for Energy Efficiency (PF4EE) - Structure Overview[98]

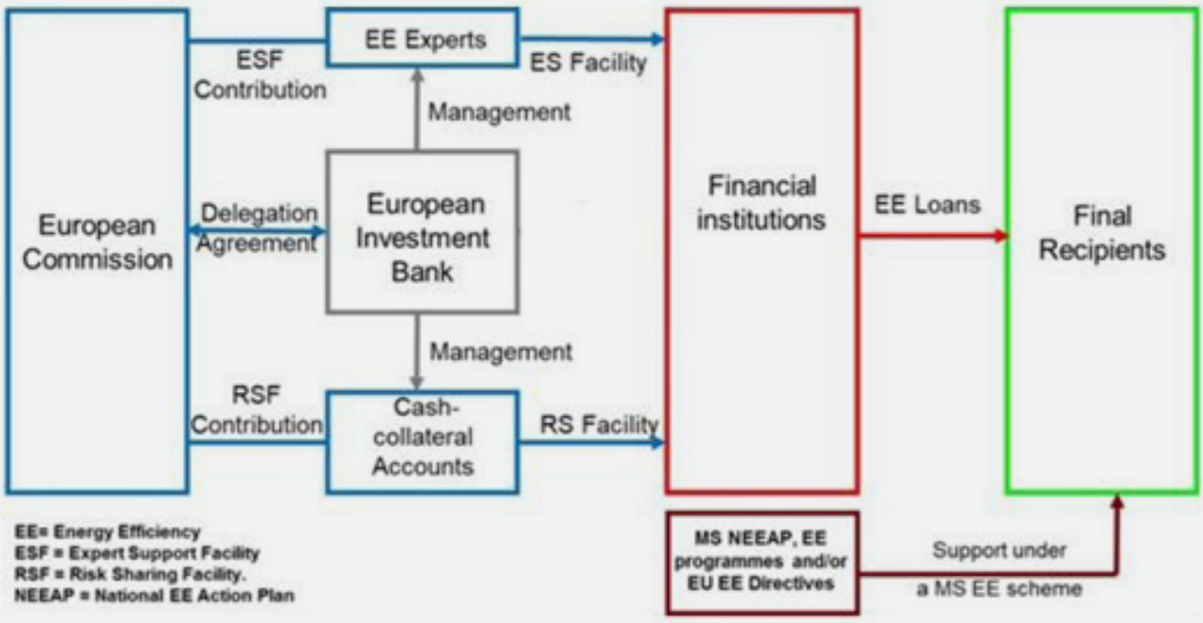


Exhibit 38: PF4EE - Distribution of Losses of a Portfolio[98]

98 EIB, Third Request for Proposals in order to Become a Financial Intermediary under the PF4EE, 2019

A guide has been developed by the PF4EE team that aims to support pro-active loan pipeline development by financial institutions[99]. Two online tools are also helpful – the PF4EE WebCheckTool and the Energy Efficiency Quick Estimator. These aim to support financial intermediaries to market dedicated energy efficiency financing, raise awareness of the energy savings potential in different sectors, and facilitate on-lending for energy efficiency. The tools focus mainly on larger commercial and industrial projects. This reflects the fact that, to date, most of the finance providers[100] that have accessed the PF4EE have focused on larger projects that provide scale, such as the retrofit of commercial and industrial buildings and apartment blocks. However, it is important to be aware that the PF4EE is also available to support loans to private homeowners for single family homes.

The most recent (third) call for proposals under the PF4EE is open to private sector financial institutions and to public sector financial institutions that operate in a similar manner in the market. The deadline for submitting a proposal is 30 September 2022. The PF4EE can only be accessed by one finance provider in each Member State, although it is anticipated that it may be open to other providers over time. At the date of writing, an Irish finance provider has not yet been confirmed as a partner in this facility.

6.2.5 Smart Finance for Smart Buildings guarantee facility

The European Commission launched the Smart Finance for Smart Buildings (SFSB) Initiative as part of the Clean Energy for all Europeans package. Building on lessons learned from the PF4EE, it includes practical solutions to mobilise private financing for energy efficiency and renewables in buildings. Under the SFSB Initiative, the Commission and the EIB have developed a flexible guarantee facility that is designed to be deployed primarily at a national level. Exhibit 39[101] provides an example of how a typical SFSB guarantee is structured.

The aim of the SFSB facility is to make private investment in residential energy efficiency projects more attractive by using EU grants as a guarantee. The SFSB facility combines funding from both ESIF and the EFSI in a guarantee instrument managed by the European Investment Fund (EIF). Financial intermediaries who use the SFSB facility can also access technical assistance. To do so, they need to apply to the European Local Energy Assistance (ELENA) facility.

The SFSB pilot phase is being tested in five main EU markets: Malta, France, Spain, the Netherlands and Portugal. An application to develop a pilot is a political decision by a competent authority, i.e. an application cannot be made by a single financial institution without government support. Given the requirement for national deployment, any initiative, even at pilot level, would require State funding to provide a risk reserve.

ELENA grant funding

An example of a successful application for ELENA funding in Ireland is the grant to the Tipperary Energy Agency for an investment programme to realise the Tipperary Sustainable Energy Action Plan. The investment programme includes deep retrofit of homes under the SuperHomes initiative, public lighting, renewable heat projects and community energy efficiency projects. The ELENA grant funding was used to fund staff within the TEA and external subcontractors to deliver these projects.

ELENA grant funding

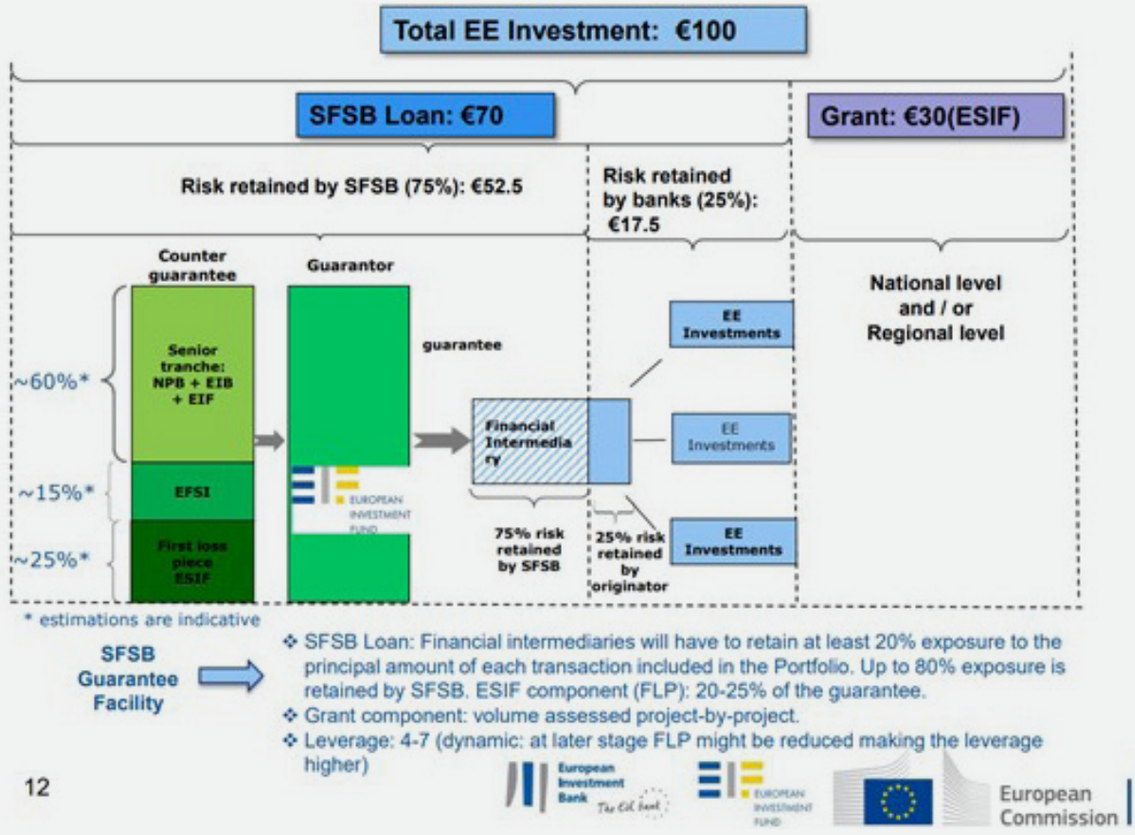
An example of a finance provider accessing ELENA is the ING Bank in the Netherlands, which has received an ELENA grant of €2.7million to support a large-scale retrofit programme mobilising investment of €97.5million in both commercial and residential properties across its client base in the Netherlands. ING intends to use the funding for market analysis; client engagement, awareness-raising and support; provision of energy audits and recommendations for energy efficiency and renewable energy measures; development of investment plans (technical scope and financing) and support with contracting and implementation.

99 PF4EE, Pipeline Development Manual, 2019

100 PF4EE, Powerful Partners, 2020

101 European Commission, Smart Finance for Smart Buildings Initiative – Guarantee Facility, 2018

Exhibit 39: Smart Finance for Smart Buildings Guarantee Structure Example



6.2.6 European Local Energy Assistance (ELENA)

The European Local Energy Assistance (ELENA) facility is an important EU programme to support energy efficiency[102]. Managed by the EIB, it is designed to stimulate market activity by providing grants for technical assistance for energy efficiency and renewable energy investments that target buildings and innovative urban transport.

Initially ELENA funding was only available to public institutions, e.g. local authorities or energy agencies. More recently, its scope has expanded, and it is now open to private finance providers. To date, nine EU finance providers have been granted ELENA support, and of this, four grants relate to residential energy efficiency investment.

Where granted to financial institutions, the funding can be used to help with developing skills and capacity in aspects of energy efficiency financing. Grants can be used to improve internal know-how and capacity (by adding new staff) or to pay external experts. ELENA funding can cover up to 90% of the costs of such skills development. It is important to note that grant support is conditional on the ultimate capital investment in energy efficiency being made. If this investment does not happen, then some of the grant may be clawed back. The minimum capital investment level required is €30million (over an agreed period), though this may be reduced in the context of residential energy efficiency projects.

102 EIB, ELENA – European Local Energy Assistance, 2020

6.2.7 Irish credit enhancement/ risk sharing experience

A number of the case studies from across Europe where public credit enhancement mechanisms have been used for residential retrofits could be adapted in Ireland, customised to national socio-economic, legal and banking conditions.

While EU risk sharing or guarantee backed facilities have been available through the EIB Group for over twenty years, particularly in the areas of microcredit and SME finance, Ireland did not take full advantage of these programmes until the Strategic Banking Corporation of Ireland (SBCI) was established. In 2015, the SBCI developed risk sharing capability and several risk-sharing schemes have since been launched to the Irish market. The SBCI approach is to provide a partial guarantee to on-lending partners (i.e. commercial finance providers) who lend directly to customers.

The first risk-sharing product launched by the SBCI was the Agriculture Cash Flow Support Loan Scheme. This was developed to support farmers impacted by the change in the sterling exchange rate and lower commodity prices in 2016 and 2017. It involved a guarantee structure under the EU COSME facility[103] support. Together, these enabled participating commercial finance providers to offer loans with rates and credit terms not previously seen in the Irish market. There was a very positive reaction to the scheme, which was fully subscribed within weeks of launch. Since then, the Brexit Loan Scheme, Future Growth Loan and COVID-19 related schemes have been launched using EU supported COSME, InnovFin[104] and other bespoke negotiated guarantee facilities to address areas of market failure. However, to date there is no risk-sharing scheme in Ireland relating to energy efficiency.

The SBCI's legal mandate is to address credit market failures for Irish SMEs rather than for individual consumers. However, it is understood that it may possible to amend this mandate (either through legislation or a Ministerial direction) to enable the SBCI to operate in areas such as residential retrofit finance for consumers. Clearly, if a national loan scheme for residential retrofit is developed, then the SBCI has the necessary distribution routes through commercial finance providers to deliver such a scheme. This is recognised in the national Climate Action Plan, with the SBCI identified as a key stakeholder with potential to provide accessible, tailored finance for SME and residential energy efficiency investment utilising the SFSB Scheme[105].

6.2.8 Irish Climate Action Fund

In 2018, the Government established the Climate Action Fund (CAF) as one of four funds under the National Development Plan 2018-2027. The CAF was created to provide financial support to projects that will help Ireland achieve its climate and energy targets. It offers the potential for innovative interventions that otherwise would not be able to access funding. It also seeks to facilitate projects that, as well as having a climate impact, also contribute to other Government policy priorities, e.g. projects that support innovation, build capacity, promote a just transition, generate wider socio-economic benefits and leverage non-exchequer sourced investment.

The CAF will provide at least €500 million in Government grant funding in the period to 2027. The first call for applications for funding was in July 2018. Seven significant projects were successful, securing a combined total of €77 million in funding. This in turn should leverage a total investment of €300 million. The projects were all major infrastructure projects offering significant GHG reductions.

In December 2019, the DECC opened a call for Expressions of Interest (EOI) in advance of the next formal CAF call for applications. The purpose of the EOI was to gather information on prospective funding requests, in terms of scale, scope, sector and type, with a view to launching a second call for applications before the end of 2020. A recent statement by the Minister for Environment, Climate and Communications refers to the fact that over the next 12 months alone, more than €150 million will be available to commit to projects and calls[106].

It is not yet known if the 2020 call for applications will specify particular types of projects or initiatives, but it is mentioned here in case there is scope in that call or in future calls to apply for funding for innovative residential energy efficiency finance proposals[107].

103 EU COSME Financial Instruments

104 EU InnovFin financing tools

105 Government of Ireland, Climate Action Plan 2019, Annex of Actions, 2019

106 Minister for Communications, Climate Action and Environment, press release on NORA levy legislation, July 2020

107 SustainabilityWorks submitted a response to the December 2019 EOI Call requesting that consideration should be given to allowing requests for funding for innovative climate-related financial initiatives to be included in Climate Action Fund calls.

6.3 Green mortgages

As referenced in chapter 4.4, a number of green mortgages linked to the energy efficiency performance of a home have already been launched in the Irish market. The purpose of this section is to provide some more context on the definition of a green mortgage, the EU Taxonomy ruleset on green buildings, and the development of innovative green building standards and labels to guide finance providers.

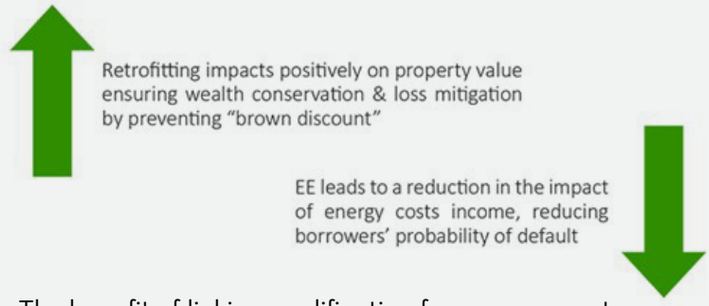
6.3.1 What is a green mortgage?

For larger renovation projects involving deeper retrofits, green or energy efficient mortgages are an attractive alternative to personal term loans. The terms "green mortgage" and "energy efficient mortgage" are used interchangeably but technically they mean different things. A discounted mortgage linked solely to the energy performance of a building is an energy efficient mortgage. Whereas a green mortgage has a more holistic approach and, in addition to energy efficiency, takes into account other factors such as water usage, indoor air quality pollution, waste reduction measures, and embodied carbon. In practice, however, most of what are called green mortgages on offer in Ireland and elsewhere are based purely on energy efficiency and for the purpose of this report we shall use the term green mortgage to refer an energy efficient mortgage, unless otherwise stated.

Green mortgages can offer consumers a range of benefits including reduced interest rates, an increase in the loan amount or other benefits. Crucially, these preferential terms are provided by the financial institution themselves without public finance support.

The rationale for preferential terms is that the property's energy efficiency has a risk mitigation effect for banks, due to reduced energy (and other) costs for the homeowner, enhanced property value and lower probability of default. See Exhibit 40 for an illustration of this concept developed as part of the EU Horizon2020-funded Energy efficient Mortgages Action Plan (EeMAP) Initiative.

Exhibit 40: The Business Case for Energy Efficient Mortgages[108]



The benefit of linking qualification for a green mortgage solely to energy efficiency is that Energy Performance Certificates (EPCs) are a requirement of EU legislation and hence present in every Member State. This simplifies processes for finance providers as national EPCs can be used as proof of eligibility, allowing them to leverage the quality and transparency of EPCs and the underlying quality assurance systems. For example, as outlined in chapter 4.4, BER certificates (the Irish EPC system) are used as proof of eligibility for green home loans and mortgages. While it is generally acknowledged that there is some variation in the efficacy of EPC schemes around Europe, the Irish BER quality assurance system, operated by the SEAI, has been identified as one of the most robust in Europe[109].

6.3.2 The EU Taxonomy - a new ruleset on "green"

The EU Taxonomy is a tool to provide a common language to identify economic activities that are considered environmentally sustainable. It is basically a ruleset to determine what is "green" in a European context.

Its aim is to direct private capital towards long-term environmentally sustainable activities, support the identification of climate-related financial risks and help avoid "greenwashing". It will be used in a variety of ways, including to underpin disclosures by the financial sector and corporations when reporting on climate-related risks and sustainable investments to financial markets and regulators. Standards and labels for green finance products will also reference the Taxonomy, with the first example being the EU Green Bond Standard. At the time of writing, there are also discussions in the EU that suggest that the stimulus and recovery packages launched after COVID-19 may be linked to the Taxonomy to ensure alignment with the EU's long-term ambitions.

108 Energy Efficient Mortgages Action Plan (EeMAP) Initiative, accessed December 2020

109 BPIE, Energy Performance Certificates Across the EU, 2014

The Taxonomy Report published by the EU-appointed Technical Expert Group (TEG) in March 2020 adopts a science-based approach and defines what is green based on technical criteria. To align with the Taxonomy, an economic activity must "substantially contribute" to one of six environmental objectives[110] and must do no significant harm (DNSH) to any other. Generally, the DNSH measures are already addressed by regulation in a particular sector. There are also minimum social and governance standards that must be met. Unsurprisingly, buildings are identified as having the potential to substantially contribute to climate change mitigation. Three categories are identified – new builds, renovations (i.e. retrofits) and existing buildings.

The EU Commission reviewed the criteria outlined in the TEG Taxonomy Report and on 20 November 2020 published, for consultation, a delegated regulation containing the technical screening criteria for the first two environmental objectives (climate change mitigation and climate change adaptation). The plan is that the Commission will adopt the final agreed version before the end of 2020, with legislation entering into force in January 2022.

See Exhibit 41 for the relevant criteria that must be satisfied for a building in one of these categories to be regarded as "green" for the purposes of the draft EU Taxonomy Regulation[111].

Exhibit 41: EU Taxonomy Requirements for Green Buildings

Building Category	Main Criterion	Do No Significant Harm
Renovations (i.e. retrofits)	• Delivers 30% energy savings, or • Complies with the national implementation of the "major renovation" requirements under EPBD	• Minimum requirements for water appliances • Min 70% of non-hazardous construction and demolition waste is prepared for re-use, recycling and other material recovery • No asbestos • Assess and reduce material physical climate risks
Acquisition/Ownership of existing buildings	• If built before 31/12/20, EPC of at least class A • After 31/12/20 – meet criteria for new build (20% better than NZEB etc) • Additional requirement for large non-residential buildings is that they must also have dedicated energy management systems	• Environmental Impact Analysis has been completed • No building in protected natural areas or land of recognised high biodiversity value • Assess and reduce material physical climate risks
New builds	• 20% lower than national Nearly Zero Energy Building (NZEB) requirements • Certified using EPC • Large buildings (>5,000m2) must be tested for airtightness and thermal integrity • Large buildings' (>5,000m2) life cycle Global Warming Potential calculated for each stage in life cycle	• Minimum requirements for water appliances • Minimum 70% of non-hazardous construction and demolition waste is prepared for re-use, recycling and other material recovery • No asbestos • Site has to be checked to ensure it isn't contaminated • EIA completed • Assess and reduce material physical climate risks

110 The 6 environmental objectives defined in the Taxonomy are (i) climate change mitigation (ii) climate change adaptation (iii) sustainable use and protection of water and marine resources (iv) transition to a circular economy, waste prevention and recycling (v) pollution prevention and control (vi) protection of healthy ecosystems

111 EU Commission, Consultation on the Taxonomy, 20 November 2020

The renovation (i.e. retrofit) category is important in an Irish context. To qualify as green under the Taxonomy, an Irish residential retrofit project will either be required to achieve at least a B2 BER rating or deliver at least 30% energy savings compared to the pre-retrofit energy performance. In addition, the DNSH criteria and minimum social and governance standards must be met[112].

Recommendations for future developments outlined in the final Taxonomy Report include:

- regular review and tightening of the main criteria over time
- the introduction of embodied carbon thresholds by 2025
- requiring ongoing retrofits/renovations of buildings in long-term ownership, in order to maintain eligibility under the Taxonomy.

6.3.3 Standards and labels for green buildings

The Taxonomy does not constitute a financial product standard or label. However, it does provide a ruleset to define the potential activities that an environmentally sustainable financial product might finance. The benefit of standards and labels is to provide visibility, transparency, and quality assurance by ensuring that specific criteria are met. Several market-led initiatives are already piloting innovative standards and labels to support and guide finance providers who are developing green retrofit loan/mortgage products. Furthermore, the Commission has stated that it is looking into additional standards and labels including green loans and mortgages as part of the Renewed Sustainable Finance Strategy.[4]

6.3.3.1. Energy efficient homes – standards and labels

Led by the European Mortgage Federation-European Covered Bond Council (EMF-ECBC), the Energy Efficient Mortgage Initiative (EEMI)[109] is the driving force behind the discounted energy efficient mortgage (EEM) concept in Europe. This initiative, funded by the EU Horizon2020 programme, is an excellent source of research, analysis, market support and standards in relation to energy efficient mortgages. The EEMI definition of an energy efficient mortgage, which informed the EU Taxonomy, is as follows:
"Energy efficient mortgages are intended to finance the purchase/construction and/or renovation of both residential (single family and multi-family) and commercial buildings where there is evidence of:

- *energy performance which meets or exceeds relevant market best practice standards in line with current EU legislative requirements*
  and/or:
- *an improvement in energy performance of at least 30%.*

This evidence should be provided by way of a recent EPC rating or score, complemented by an estimation of the value of the property according to the standards required under existing EU legislation. It should specifically detail the existing energy efficiency measures in line with the EEM Valuation & Energy Efficiency Checklist."[113]

The output of the project to date includes specific practical guidance for banks, including the EEM Valuation & Energy Efficiency Checklist[114]. This is a useful product framework to support banks in their development of a green mortgages. It includes: implementation guidelines for banks; building performance assessment guidelines; and valuation guidelines.

The EMF-ECBC is now leading efforts to establish an EEM label which will:

- secure quality and transparency for market stakeholders
- facilitate further data collection to substantiate the correlation between energy efficiency and the probability of default.

While there are no Irish banks currently involved in piloting the EEM definition and label, there are strong Irish links with this initiative. Prof Andreas Hoepner and Dr Theodor Cojoianu of University College Dublin and Queens College Belfast respectively are on the Advisory Board. The Irish Green Building Council (IGBC) has also provided supporting research and analysis and the Banking and Payments Federation of Ireland (BPFI) is an active observer.

112 While less relevant for this report, it is important to note that the energy efficiency requirements for new buildings goes beyond national building regulations. Given NZEB is mandatory across the EU from 2021 on, the aim of the Taxonomy is to drive more ambitious efforts. It is also worth noting that each EU Member State is required to define its own NZEB performance levels, according to a common set of principles, and there is variance across member states in terms of their setting and implementation of NZEB standards.

113 Energy Efficient Mortgages Initiative, Definition of an Energy Efficient Mortgage

114 EeMAP, EEMI Valuation Checklist Background Explanation and Guidance, 2019

6.3.3.2. Green homes – standards and labels

EPC systems focus on energy performance. At present, given that the other DNSH requirements for buildings are already part of EU regulations, then in the short term finance providers can reasonably continue to use EPC certificates as criteria for a mortgage product to qualify as green under the Taxonomy. However, the Taxonomy is signposting that criteria will be tightened and that, in time, embodied carbon and broader sustainability performance factors will be included.

In assessing broader sustainability criteria, there are many building assessment tools and approaches available, with a comprehensive list maintained by the World Green Building Council[115]. Rating tools vary in their approach and can be applied to the planning and design, construction, operation and maintenance, renovation, and eventual demolition phases of a green building.

In an Irish context, the Home Performance Index (HPI)[116] has been developed by the IGBC with the support of the Irish Environmental Protection Agency (EPA). This certification system allows owners and investors to go beyond energy efficiency and access reliable information on wider sustainability criteria of a new home, including indoor air quality, water efficiency, embodied carbon, and location etc. It also includes criteria around flood risk, circular economy, and ecosystems – all criteria that are expected to be included in the Taxonomy in due course. The HPI certification is already in line with net-zero ambitions and with the Paris Agreement. While currently focused on new homes, consideration is being given to extending its application to home retrofits in due course.

Linked to the HPI label, the IGBC is involved in an EU Horizon2020 funded project called Smarter Finance for Families[117]. One of the objectives of this project is to drive awareness and ambition in relation to green building standards in Ireland generally. The project also aims to engage with finance providers in developing green mortgages that are linked to the HPI certification.

Clearly, as the Taxonomy criteria tighten, finance providers who go beyond energy efficiency and use broader sustainable building standards and labels as criteria, will be future-proofing the qualification of their home loans as green.

6.4 On-bill schemes

On-bill schemes are a way of financing energy efficiency projects by using energy bills (electricity or natural gas) as the repayment vehicle. Energy savings made by the upgrade are used to repay or partially repay the loan for the upfront cost. Part of the thinking behind such schemes is that it is conceptually attractive to display energy cost savings resulting from a renovation alongside the loan repayment on the utility bill.

The first On-bill scheme was launched in the US in 1978. Since then many other programmes have followed, particularly in the US and Canada. It is estimated that On-bill schemes have delivered finance of over $2billion, of which 60% has been for residential buildings[118].

On-bill schemes have been slower to take off in Europe. The first European programme was the UK Green Deal, which was particularly unsuccessful and has discouraged other countries from pursing similar initiatives. Launched in 2013, it was hoped that the Green Deal would be revolutionary and would lead to the renovation of a large portion of the UK's housing market. However, it was a dramatic policy failure and was effectively terminated two years after launch.

Case studies of successful On-bill schemes in the US and Canada are provided in Appendix III.1 and Appendix III.2 respectively. An overview of the structure of the UK Green Deal scheme and some of the lessons learned is provided in Appendix III.3.

6.4.1 On-bill scheme types

There are two main types of On-bill schemes:

- On-bill financing (OBF) – where capital is provided by the energy utility or through public funds.
- On-bill repayment (OBR) – where capital is provided by a private third party and the utility acts as repayment intermediary.

Exhibit 42[119] highlights the advantages and disadvantages of each of these methods.

115 World Green Building Council: Rating Tools, accessed December 2020

116 The Home Performance Index, accessed December 2020

117 SMARTER Finance for Families, accessed December 2020

118 RenOnBill, Overview of On-bill Buildings Energy Renovation Schemes, 2020

Exhibit 42: Advantages and Disadvantages of On-bill Mechanisms

Model	Pros	Cons
On-bill Financing Scheme	• Implementation of a large number of interventions • Possibility to finance a large range of interventions, e.g. from LED substitution to building envelope insulation • Utilities as unique interface with final users	• Possible impact on the utility debt position • Necessary to implement substantial organisational procedures for the management of the programme
On-bill Repayment Scheme	• Massive involvement of financial institutions in the energy efficiency market with substantial mobilisation of private capital • Implementation of a large number and range of interventions (i.e. like in OBF)	• Longer value chain and lower margin for utilities with respect to OBF • Possibility to have multiple interfaces with final users • Collateralisation as a relevant issue for financial institutions (e.g. financial vs. industrial approach)

Exhibit 43: Strengths and Challenges of On-bill Schemes[73]

Strengths:	Challenges:
• 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	• 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

Exhibit 44: RenOnBill Summary of Findings from National Workshops[119]

	Target market segments		Preferred on-bill model		
	Owner-occupied single family-houses	Owner-occupied multi-family buildings	Social housing entities	On-bill financing (OBF)	On-bill repayment (OBR)
Lithuania		✓			✓
Italy		✓	✓		✓
Spain	✓	✓			✓
Germany	✓	✓			✓

119 RenOnBill project, Summary of Findings from National Workshops, 2020

6.4.2 Key features of On-bill schemes

- The underlying finance can be provided by the state, the energy utility or third-party private finance providers. Some On-bill schemes use public money to reduce risk for private investors through project finance structures or through the provision of the "at risk" or junior tranche of a fund.
- A key design feature of these schemes is that the finance is attached to the property's energy meter (rather than to the homeowner). This is a robust form of security and research has shown low levels of default ranging from zero to three per cent (median 0.08%). This is low compared to common types of consumer lending.
- A range of interest rates are available, from as low as zero percent to as high as eight percent. Loan tenures range from one to 15 years.
- Schemes are not necessarily linked to grants or other public support, although they may be.
- Schemes can be structured to ensure "bill neutrality", also known as the "Golden Rule". This simply means that the projected energy cost savings offset the fixed monthly loan or tariff instalment. In this way, the final user does not pay higher bills than before the intervention and, once the pay-back period is reached, will experience real financial savings. However, most of the existing programmes are not based on bill neutrality as this may prevent deep retrofit measures as the amount of the loan is effectively limited to the quantum of energy cost savings over a specific period. The inclusion of a bill neutrality requirement in the unsuccessful UK Green Deal highlights some of the difficulties – see Appendix III.3.
- With regard to the underwriting and risk assessment processes of the ultimate finance provider, a number of different methodologies have been applied, ranging from traditional metrics (credit score and debt to income ratio) to expanded or alternative methods (e.g. where the historical rate of default in paying bills is taken into account).
- On-bill programmes that have achieved significant uptake in their target market typically offer discounted or lower-cost financing, and either
  - allow consumers to finance almost any "energy-related" improvements with a particular focus on single measures (e.g., high-efficiency equipment, windows etc) or
  - couple On-bill lending with robust financial incentives and rebates.
- There is one additional challenge that is specific to the Irish market. Oil is the dominant fuel to heat Irish homes which results in separate bills for heating and electricity costs. On-bill energy efficiency measures would, in this case, result in savings on an oil bill but lead to a much-increased electricity bill.
- It is also worth noting that disconnecting electricity from a home in the case of default can become politically contentious where it is as a result of a retrofit loan rather than due to arrears on bill payments.
- Theoretically, the debt passes with the property on sale/transfer of tenancy. This would address the occupancy duration barrier and the split incentive landlord/tenant challenges associated with retrofits. However, studies from the US have shown that the debt in On-bill schemes (and On-tax/PACE schemes) is transferred to the new occupant only about 50% of the time[120].

6.4.3 Key strengths and challenges

An overview of the key strengths and challenges associated with On-bill schemes is provided in Exhibit 43.

6.4.4 EU research project to watch: RenOnBill

The EU Horizon2020-funded research project RenOnBill is exploring On-bill schemes in a European context and its outcomes may be relevant to the Irish market in due course. This project is producing useful and publicly available research and analysis and is one to watch. Its overall objective is to promote the development and implementation of On-bill schemes, based on cooperation between energy utilities and financial institutions. It focuses on four countries, namely Germany, Italy, Lithuania and Spain.

A series of national online workshops were held in the Spring of 2020 targeting stakeholders in the four focus countries. The workshops aimed to select the target markets for On-bill schemes and to develop collaborative solutions. See Exhibit 44 for a summary of the key findings from the national workshops.

120 Leventis, G., Kramer, C., Schwartz, L., Zetterberg, J., Ludwig, V. Energy Efficiency Financing for Low-and Moderate-Income Households: Current State of the Market, Issues, and Opportunities, 2017

6.5 On-tax or PACE Schemes

The US and Canada have led the development of On-tax schemes, where they are referred to as Property Assessed Clean Energy (PACE) schemes. Land-secured financing districts, also called special assessment districts, have been used in the US for more than 100 years to pay for infrastructure improvements deemed to be in the public interest. PACE schemes, introduced in 2007, allow the state and local government to extend the use of land-secured financing districts to fund energy efficiency and renewable energy improvements on private property through voluntary property tax assessments.

In the US, cumulative residential PACE lending to date is $6.3 billion, with 280,000 home upgrades delivered[121]. There are currently 36 US states with PACE enabling legislation, 12 with active programmes and others in the process of programme development. As with On-bill finance, these schemes have been slower to take off in Europe but there is an ongoing Horizon-2020 funded project that aims to pilot a scheme in a number of Member States, the EuroPACE project. See Appendix IV for two PACE scheme case studies.

6.5.1 Key features of On-tax schemes

- Originally, local governments raised funding for retrofits by issuing municipal bonds. Most PACE funding now comes from the private sector, although retaining use of the bond issuance and tax collection powers of municipal or local government.
- PACE financing is secured as a senior lien on the property and is repaid along with other municipal charges through the property tax bill. This provides investors with robust repayment security as property taxes are paid ahead of other loans secured on the property, including mortgages. However, due to US regulatory concerns, PACE finance providers can now voluntarily agree to subordination to the mortgage in the event of serious default or foreclosures.
- There is no national or state requirement for energy bill neutrality within PACE schemes and the schemes generally allow for wider renovation measures to be funded.
- Interest rates range from six to nine percent. Loan tenures of up to 30 years are available.
- PACE financing does not impact an individual's credit score and eligibility is based primarily on the equity in the home rather than the individual's credit history.
- PACE loans are often sold by the retrofit contractor at the point of sale of the retrofit, with streamlined underwriting processes and approval provided over the phone or online during or prior to the contractor's visit.
- Theoretically, loans pass with the property on sale, so addressing the occupancy duration barrier and the split incentive landlord/tenant challenges associated with retrofits. However, in practice, studies from the US show that the debt from PACE (and On-bill schemes) is transferred to the new occupant only about 50% of the time[120].

121 PACENation, PACE Market Data, accessed December 2020

6.5.2 Key strengths and challenges of On-tax schemes

An overview of the key strengths and challenges associated with On-bill schemes is provided in Exhibit 45.

6.5.3 EU research project to watch: EuroPACE

The EU Horizon2020-funded research project EuroPACE is exploring whether the PACE model could be replicated in Europe. The consortium partners are from Spain, Italy, the UK and Poland.

The first step of the EuroPACE project was to review the 28 member states to identify those most suitable for On-tax schemes from a legal and fiscal perspective. Overall, the conclusion was that there is no perfect EuroPACE candidate and all member states would need to adjust their legislation to some extent. Ireland fell within the second category of suitability, with a determination of "moderately adequate". The conclusions with respect to Ireland are summarised in Exhibit 46[122] below but it was not chosen for a pilot.

The next stage is that the first residential EuroPACE pilot will be developed, to be run in Olot, Spain. The project will then facilitate and support four 'leader cities' willing to set up EuroPACE platforms.

Exhibit 45: Strengths and Challenges of On-tax Schemes[73]

Strengths:

- 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

Challenges:

- 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

Exhibit 46: Review of Ireland to determine suitability for EuroPACE implementation

Ireland

Moderately adequate country for EuroPACE implementation – overall grading for suitability: 75%

SWOT Analysis

Strengths	Weaknesses
Well-structured and transparent property taxation system with a very good collection rate.	The imposition of senior liens can be an expensive process undertaken only by Revenue Commissioners, not the municipality.
Opportunities	**Threats**
Irish cities develop their own ambitious strategies on EE. For example, the "Cork City Development Plan"[177] provides an exhaustive list of actions the city plans to introduce to meet ambitious sustainable development goals. Therefore, the EuroPACE mechanism might be a good complementary tool for their strategies.	Mortgage lenders in Ireland may not like to be subordinated to EuroPACE. The financial industry is very strong in Ireland and has a say in legislative processes.

122 EuroPACE project, Report on on-tax financing feasibility, 2018

6.6 SustainabilityWorks analysis and insights

Recent developments in innovative and collaborative financial solutions in the Irish market are very positive. However, only about 1,500 deep retrofits were delivered to a BER B2 rating in 2019[31]. If the national target to retrofit 500,000 homes to a B2 rating by 2030 is to be achieved, then much more needs to be done to stimulate and scale up retrofit activity. There is an immense opportunity for finance providers to play a key role in delivering this through smart finance initiatives.

In fact, based on international evidence and experience, it is essential that finance providers play a role in stimulating customer demand. This is core to seizing the market opportunity. As customer demand for retrofits increases, so the demand for finance will naturally follow. As a result, it is important to understand the range of innovative finance or "smart finance" mechanisms that have been trialled internationally, as they may help inform the development of finance products and solutions suited to the Irish market. In particular, it is worth considering how working with public finance institutions can lead to the development of solutions that work to the benefit of all stakeholders in the energy efficiency value chain.

The relative appropriateness of each mechanism for individual Irish financial institutions and recommendations for next steps can be summarised as follows:

- Publicly supported low-cost loans appear to be the most common and successful approach in an EU Member State context. The case studies considered in this report use both on-lending and some guarantee components and reflect the tailored approach used in different jurisdictions. While energy efficiency initiatives have historically been funded by national budgets, more recently EU funds have been made available through the EIB Group to structure risk sharing initiatives such the PF4EE and the SFSB facility. As a next step, finance providers may want to consider the national and EU credit enhancement supports available (both directly and indirectly) to support the delivery of enhanced interest rates and terms for homeowners. They may also want to explore opportunities to access grant funding for "technical assistance" under the ELENA facility. In doing so, they should bear in mind that the use of any national or European sourced financing support such as guarantee structures is likely to have conditionality around demonstrating additionality and not displacing financing that would have taken place anyway without such support.

- Discounted green mortgages linked to BER rating certificates are already available on the Irish market. Mortgage finance providers should consider how they can stimulate additional demand for retrofits through the way they design such products, e.g. incremental discounts for deeper retrofits. Finance providers could also consider introducing the concept of green mortgages for retrofit on older properties at the point of property purchase. Again, they need to be aware of demonstrating additionality. The implications of the EU Taxonomy definition of green buildings should also be considered, alongside the developing range of standards and labels for green mortgages and loans.

- On-bill mechanisms are generally not within the control of single finance providers as national legislation to secure consumer protection around energy switching is needed.

- On-tax or PACE mechanisms are again not within the control of a single finance provider as national legislation would be needed to allow the repayment of finance on property tax bills. Given the political headwinds in relation to local property tax, it is likely that this would be challenging.

- With both On-bill mechanisms and On-tax mechanisms, it is likely that public credit enhancement support would still be necessary to deliver preferential interest rates and terms. In any case, while these schemes have had some success in the United States and Canada, they have been slower to take off in Europe. A watching brief should be kept on the EU Horizon2020-funded RenOnBill and EuroPACE research projects and consideration could be given to developing discussions with energy suppliers and policymakers in these areas.

7. Solving the puzzle

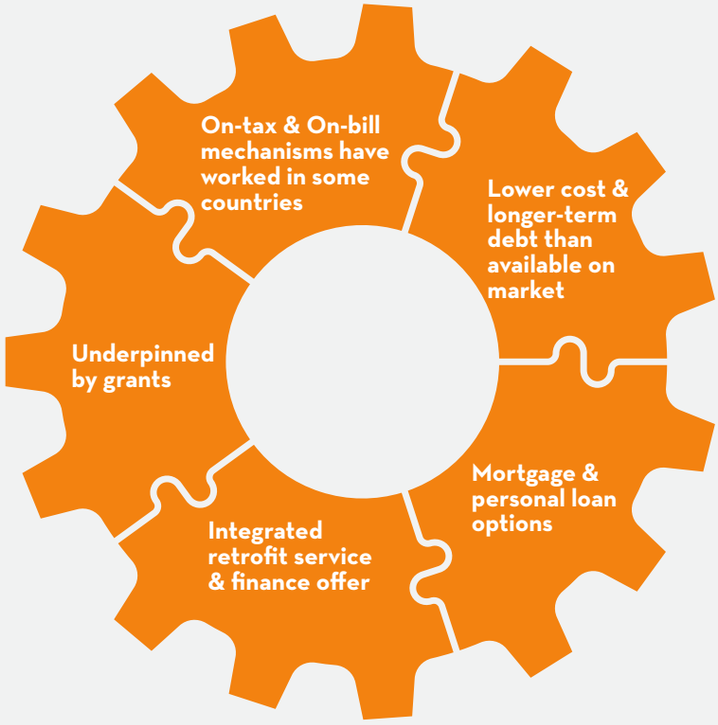
7. Solving the puzzle

7.1 The innovation is in the integration

As illustrated by the preceding chapters, there is a great deal of research and information that must be assimilated to develop a clear picture of each piece of the retrofit finance puzzle as it relates to the owner-occupier segment of the residential sector.

That noted, the positive to take from this review is that there is no new jigsaw piece to be found, no new financing mechanism that needs to be invented and no novel source of finance to discover. The innovation is in the integration, i.e. in the development of new partnerships across the retrofit value chain, across industry and finance and across public and private sectors. The pieces of the puzzle all exist and, based on international experience, there are any number of different ways of slotting the pieces together in a way that will support and accelerate home retrofits nationally.

Exhibit 47: Common characteristics of successful residential retrofit finance solutions



Common features of successful international residential retrofit projects include, see Exhibit 47:

- the availability of lower-cost, longer-term debt than is generally available in the market
- both mortgage and personal loan options available
- underpinned by grants
- integration of retrofit services and finance solutions through One Stop Shop (OSS) partnerships
- On-bill and On-tax mechanisms have worked in some countries

Given the central role of mortgages and personal loans in any solution, commercial finance providers have a key role to play in solving this puzzle and unlocking retrofit activity. They have the skills and capability to design innovative financial solutions. They also have the capacity to handle the high-volume and the (relatively) low value credit involved, both from a risk assessment and a process perspective. However, from a commercial viewpoint, sustainability is about more than the climate crisis and involves balancing environmental, social and economic objectives. Doing the right thing must bring a positive return. A new product or service must be commercially viable as well as making a positive contribution to the environment. Clearly, providing finance at below market rates on an unsecured or reduced security basis incurs more risk and additional capital costs for a commercial finance provider. This is not economically sustainable and means that new approaches to credit product solutions for the sector need to be considered. This is where innovative and blended finance solutions come into play.

7.2 Application in an Irish context

In an Irish retrofit market context, targeted loan offers from finance providers should cover the range of offerings from personal loans to adapted mortgage products.

For personal unsecured loans, below-market terms could be enabled by national and/or EU public credit enhancements, using existing mechanisms such as the Smart Finance for Smart Buildings guarantee facility and the Private Finance for Energy Efficiency financial instrument. Such public finance supports could potentially be supplemented by a contribution from large energy suppliers under the national Energy Efficiency Obligation Scheme (EEOS).

For mortgage products, discounted rates are already being achieved by Irish commercial finance providers without public finance support, thanks to increasing evidence of the correlation between lower risk of default and the energy efficiency of a home.

These loan products would need to continue to be underpinned by robust SEAI grant programmes and energy supplier support under the EEOS, at least in the short to medium term as the market scales up. Finance providers that will be well positioned to build market share are likely be those who, in addition to launching competitive green personal loans and/or mortgage products, also:

- actively engage with public finance agencies and state departments to develop the innovative public credit enhancement programme required
- engage with energy suppliers to assess opportunities to partner under the EEOS
- develop routes to market through partnerships across the retrofit value chain, particularly with OSSs and energy suppliers
- maximise their access to EU grants and supports to develop internal capacity and enhance processes and systems for retrofit financing
- actively stimulate demand for retrofits at key trigger points. These coincide with the life events at which homeowners often engage with finance providers, for example when making home improvements, buying a new home, retiring etc.

On-bill and On-tax financing mechanisms should also continue to be explored, as is envisaged under the Climate Action Plan. However, these require national legislative and regulatory support and have had very limited success in an EU context to date. Such mechanisms should therefore be considered as a longer-term prospect in the Irish context.

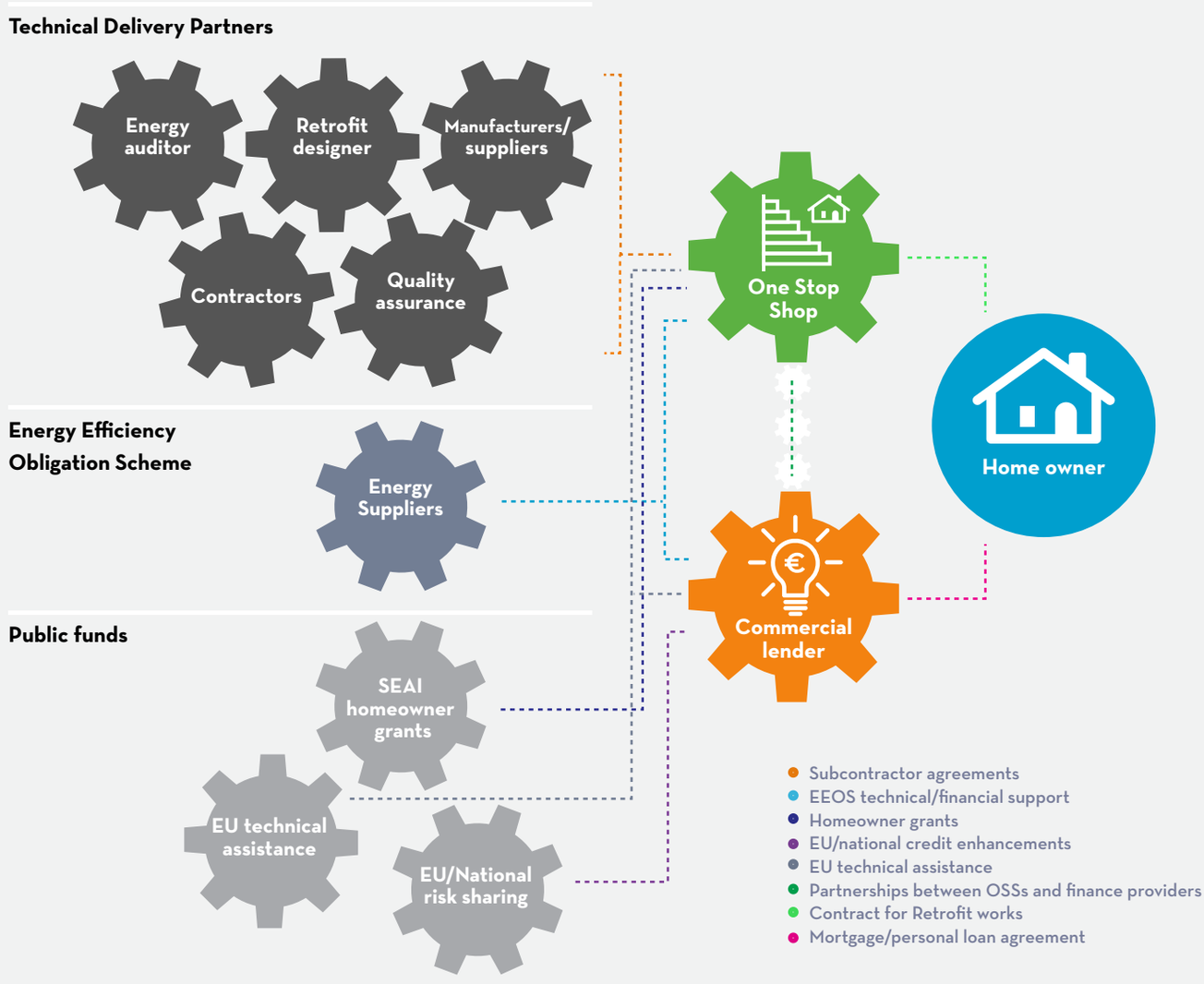
7.3 Visualising an Irish solution

As previously noted, there are many different ways in which the pieces of the residential retrofit puzzle can be put together. See Exhibit 48 for an example of how they could fit together for one particular OSS/finance provider/homeowner. There are any number of permutations and combinations of the key stakeholders – on both an exclusive and a non-exclusive basis – and all will be required in order to, quite literally, turn Ireland's homes green.

As illustrated in Exhibit 48, the OSS retrofit service provider is the main contact point for the homeowner. They take care of sales and marketing, generate and filter leads, arrange for the energy audit and retrofit design, and agree and cost the project. The OSS has relationships with technical delivery partners across the assess, design, deliver and quality assurance stages of the project. They also engage with energy suppliers to ensure that financial or technical supports available for the project are maximised, advise on possible grants, submit grant applications and draw down grants from the SEAI on behalf of the homeowner. A dedicated project manager in the OSS supports the homeowner through the retrofit journey and ensures that the project is delivered on time, on budget and in line with SEAI quality standards. Final payments to the delivery partners are only released when the project has been signed off by the homeowner.

The OSS is not a regulated financial intermediary and cannot provide financial advice or guidance. However, it partners with one or more finance providers that have attractive green finance products. The commercial finance provider is supported through EU/national credit enhancements to deliver credit that is lower-cost and longer-term than otherwise available on the market. For their part, the finance provider maximises its access to EU grant funding, e.g. under the ELENA facility, using this funding to upskill its team and develop appropriate processes and marketing collateral. The finance provider may also engage with energy suppliers to ensure that it has optimised any financial and technical support available under the EEOS. The net result for the homeowner is a simplified streamlined retrofit journey with two key touchpoints, one being the OSS and the other being the finance provider.

Exhibit 48: One solution to the Irish residential retrofit finance puzzle



7.4 Next steps for finance providers

For finance providers with the appetite and ambition to play a key role in designing and delivering innovative financial solutions to help scale Ireland's residential retrofit market, suggested next steps are outlined below. Analysis suggests these steps fall into two separate yet complementary approaches – those within an individual finance provider's organisational autonomy and those where the ultimate delivery of financing solutions is dependent on collaboration with other key stakeholders and on finance providers' influence to deliver a sustainable retrofit market.

7.4.1 Within a finance provider's control

Next steps include to:

- develop a broad understanding of the residential retrofit marketplace, with an initial focus on the key issues explored in chapter 5
- collaborate with OSSs, large energy suppliers, the SEAI and other key stakeholders in order to leverage industry insights to structure tailored retrofitting propositions for homeowners and to identify potential routes to market for finance products
- explore EU and national public finance supports to develop lower-cost loan products at an individual institutional level, e.g. PF4EE, ELENA, the national Climate Action Fund
- review and consider the innovative and blended financing mechanisms and approaches that have been successful internationally which could possibly be adapted to meet Irish market conditions
- streamline and simplify mortgage top-up application processes where they relate to home retrofit borrowings
- develop relationships with the various EU research projects and initiatives that are driving financial innovation and ambition in this arena
- consider how to engage and advocate, alongside the wider energy efficiency market actors, for clear and durable policy frameworks to support the national retrofit strategy. Specifically, this could include:
  - advocating for a durable multi-annual funding framework for grant programmes to build momentum and give retrofit service providers the confidence to expand.
  - advocating for tax incentives linked to energy performance upgrades, e.g. a lower rate of stamp duty for homes with a higher energy performance; stamp duty rebates for homes retrofitted within a certain period after purchase; the reintroduction of the Home Renovation incentive for specified home energy upgrades
- keep a watching brief on evolving policy and developments, both nationally and at an EU level, given the accelerating pace of action in this policy field.

7.4.2 Requiring broader collaboration

Next steps include to:

- engage with policymakers and state agencies on the possibility of accessing EU public funds at a national level, e.g. the SFSB guarantee facility
- collaborate with policymakers, state agencies and energy suppliers to explore the possibility of introducing national legislation to enable On-bill and/or On-tax mechanisms
- contribute to the establishment of a national collaborative forum for engagement on retrofit finance by both public and private stakeholders across industry and finance. This forum could focus on the residential sector or be broadened to include commercial projects and public buildings as projects evolve[123]
- contribute to collaborative projects to examine the relationship between energy performance and credit risk/market value at a national level
- engage with the Central Bank with regard to mortgage lending rules as they relate to buy-to-renovate projects, e.g. by relaxing loan to value or loan to income rules in the case of home retrofits after purchase.

7.4.3 Key reports/developments due in Q4 2020 / 2021

- The 2020 Climate Action and Low Carbon Development (Amendment) Bill is currently going through the legislative process and is expected to be enacted before the end of 2020.
- A second call for applications for the national Climate Action Fund is due before the end of 2020, which should be reviewed in case applications for funding to support innovative residential retrofit mechanisms can be made.

123 In September 2020, University College Dublin, the Banking and Payments Federation of Ireland, the European Mortgage Federation, Bucharest University of Economic Studies, CRIF and SustainabilityWorks made a submission for Horizon2020 funding for such a forum. Horizon2020 is a competitive call and details of whether funding has been awarded should be available in Q1 2021.

- The first report of the National Retrofit Taskforce is expected in Q1 2021. The Taskforce was established to oversee the design and development of a new retrofit delivery model with a specific focus on the residential sector. Its work is also expected to include an estimate of the total cost of the retrofit programme as well as a new average retrofit cost per home.
- The new phase of the Energy Efficiency Obligation Scheme will be effective from 1 January 2021. It is likely to set more demanding targets on large energy suppliers and to adjust the range of energy efficiency measures that qualify for energy credits.
- Further detail on the EU Renovation Wave Initiative should be made available over coming months.
- A watching brief should be kept on the EU Horizon2020-funded RenOnBill and EuroPACE research projects.
- Finance providers should follow the development of new investment platform initiatives, led by the EIB, as tailored financial solutions are sought to address local financing barriers in energy efficiency.

7.5 In conclusion: a win-win-win scenario

The financial sector has a major contribution to make in delivering on the ambitious sustainability and climate targets that have been set by international agreements including the Sustainable Development Goals and the Paris Agreement. One of the core functions of the financial sector is the provision of capital and liquidity to the economy, which means it can play a pivotal role in balancing the trade-offs inherent in achieving sustainability goals. Finance providers are also skilled at identifying, understanding and managing financial risks, including climate-related financial risks. Through lending strategies and investment decisions, finance providers have a very real contribution to make towards solving the big challenges faced by society - a contribution they can demonstrate very effectively to the general public by developing innovative residential retrofit finance products.

Accelerating the depth and pace of residential retrofits nationally is actually a win-win-win scenario for all stakeholders. The more successful the finance providers are in delivering solutions, the more comfortable, healthy and cheaper to run homes there will be provided across the country, and the closer Ireland will get to meeting its climate targets. If 2020 has shown us anything it is that collaboration and resilience are needed as we tackle the climate crisis. It is hoped that this Handbook will act as a catalyst, supporting and accelerating innovation by finance providers in developing new tailored financing solutions for the Irish market, so enabling and even stimulating residential retrofit activity to deliver on national targets.

Appendix I
Summary of Irish research on residential retrofit finance

Over the past 10 years, the SEAI has carried out extensive research and analysis specific to the Irish market on what would be regarded as an attractive loan offering from a homeowner perspective and a clear picture emerges, namely that it should potentially be:

- Lower-cost and longer term than market rates for similar borrowings
- Easy to apply for and easy and flexible to repay
- Integrated into a One Stop Shop approach, and
- Continuing to be underpinned by grants

Further detail is provided on each of these aspects in Exhibit 49 and in the following sections.

I.1 Lower-cost

The research clearly finds that, for energy efficiency finance to be attractive to consumers, it needs to be at a lower interest rate than generally available for the credit profile of similar borrowing. This point was highlighted as far back as 2011 in an Institute for International and European Affairs Report[36] (the 2011 IIEA Report) and was reiterated in the 2015 SEAI Unlocking the Energy Efficiency Opportunity Report[60] (the 2015 SEAI Report). The modelling analysis carried out for the 2015 SEAI report showed that reducing the interest rate from 8% to 5% would materially encourage the uptake of the finance offered, albeit that this analysis reflected the market and interest rate conditions at that time in the context of 11%+ personal term loan rates (which would be much lower in 2020). The report concluded with a recommendation to:

"Explore potential financing mechanisms to provide consumers with low interest loans (i.e. 5% or lower) for residential retrofit".

This low interest rate point preference was noted again in 2017 in the SEAI Behavioural Insights on Energy Efficiency in the Residential Sector report[37] (the 2017 SEAI Report), which summarised the research findings and knowledge gathered over six years in relation to residential retrofits and consumer behaviour. The 2017 SEAI Report findings included the following comment:

"Reducing the interest rate can increase the uptake rate significantly as this has a double impact: both an emotional plus indirect impact on repayment amount, term of the loan, etc."

To supplement the formal research pointing to the need for lower-cost finance, more recent anecdotal evidence from Irish retrofit contractors would suggest that the cost of the finance should be sub 4%. With regard to this anecdotal evidence, these expectations may be driven by awareness of low rates that are available internationally to support home retrofits particularly over the last decade, or may be due to the increasing awareness of the interest rate levels available in the Strategic Banking Corporation of Ireland (SBCI) risk sharing product range, which are supported by national and EU credit enhancement mechanisms.

I.2 Longer term

With respect to the term of the finance, there is significant research investigating whether it is beneficial to link the term of the finance provided to the term over which the energy cost savings from the retrofit can be realised, so that the repayments are equal to or less than the predicted savings. This is generally referred to as a Pay As You Save (PAYS) arrangement. Internationally, PAYS terms are usually linked to alternative repayment/security mechanisms, i.e. where the finance is repaid through energy bills (On-bill schemes) or through property tax bills (On-tax or PACE schemes).

Exhibit 49: Summary of Irish research on residential retrofit finance

Criteria	Detail
Lower-cost	5% Or Lower
Longer Term	Preferably In Line With Payback – Or Else As Long-term As Possible
Ease Of Application	Limited Paperwork/Bureaucracy
One Stop Shop Approach	Integrated Technical And Financial Solution
Ease/Flexibility Of Repayment	On-Bill Or On-Tax Schemes
Grants	Continuing To Be Underpinned By Grants

The 2011 IIEA Report concluded that the PAYS models examined would appear to overcome many of the demand and supply side barriers identified that deter investment in home retrofit. It is understood that a cross-industry/ finance working group was formed to explore the potential for an Irish PAYS trial (2011/2012), albeit the results of that working group have not been published.

The 2015 SEAI Report also referred to PAYS, including in its recommendations that a "PAYS-type scheme with lower interest rate" should be explored.

However, by the time of the 2017 SEAI Report, which notably was after the outcome of the UK Green Deal approach became apparent (which is explored in Appendix III.3), there was no reference to a PAYS Scheme other than the comment that:

"Payback times are as important to consumers, with around 10% of owner-occupiers willing to invest in energy efficiency measures for a payback time of 4 years, falling to 0% for a payback time of 6 years for some consumer cohorts."

To supplement the formal research, it is noted that, depending on pre-retrofit BER rating of a home and the depth of the retrofit measures required to reach a B2 BER rating, payback periods can extend to over 20 years. However, the term of personal loans rarely goes beyond seven years, exceptionally to 10 years in some situations. A pragmatic approach would seem to be to ensure that the term of the debt is as long as is possible under credit market conditions and security requirements, and that extending the term is given consideration where public credit enhancements may be available through negotiation.

I.3 Ease of application and ease/flexibility of repayment

The 2017 SEAI Report also noted that *"consumers have indicated... preference for flexibility in both lending and payback terms" and "consumers have indicated the ease of application for finance is important to them".*

The use of alternative repayment/security mechanisms such as On-tax or On-bill schemes can supply elements of flexibility and ease of use to the customer. Both of these scheme formats have been implemented successful internationally. In both cases, the loan stays with the property/energy meter and, theoretically at least, can be transferred to a new owner on a property sale. However, both schemes require national legislation.

With regard to the question of flexibility to repay, this can be an important feature for those that need finance for the construction stage of the retrofit works. SEAI grants are only paid post completion and verification of the work and flexibility in loan repayment terms allow the grant to be used to pay down a loan at that point.

I.4 One Stop Shop approach

Research also refers to the need for collaboration and co-ordination across the energy efficiency value chain, with the 2015 SEAI Report referring to the need to assist *"home energy suppliers to partner with third-party lenders to provide homeowners with low interest loans".*

The 2017 SEAI Report noted specifically the need for an OSS approach, namely the

"offer of a full end-to-end service which includes advice, quality assured works and process administration including grant drawdown is a very attractive and hassle-free proposition for consumers to agree to when included as a project offering".

It is noted that provision of financial advice other than by a finance provider regulated by the Central Bank of Ireland would likely be problematic. Therefore, the inclusion of authorised finance providers for this element of the customer journey is essential in delivering a complete end-to-end residential retrofit offering.

I.5 Continuing need for grants

Another finding from the 2017 SEAI Report notes that low-cost finance mechanisms are not (currently) a replacement for grants, stating:

"Grants are still needed to maximise uptake rate even if low interest loans are introduced; and Grants have more than 30% additional emotional impact: i.e. €1 grant corresponds to €1.30 in consumers' minds"; and

"Combined policy measures (grants and loans) promote deeper retrofits with a minor increase in funding to buy-down interest rates".

The 2017 SEAI Report findings also concluded that *"Introducing low-interest rate energy efficiency loans combined with grants is an attractive option for Ireland as it lowers the cost of finance and is expected to improve the efficacy of existing grant programmes".*

Appendix II
Case studies of EU publicly supported lower-cost loan Schemes

II.1 Germany

Kreditanstalt fur Wiederaufbau (KfW) is Germany's national promotional bank, with a long history going back to its post war establishment in 1948. The KfW Energy Efficient Refurbishment Programme is the most often referenced example of a successful low-cost loan scheme for residential energy efficiency. Loans to households are arranged through commercial banks. The scheme started in April 2009 and more than 5.4 million homes[73] have been refurbished under the programme.

Introduced in 2009, current rates under its energy efficiency scheme are 0.75% per annum or -1.82% effective annual interest for a term of 20 years, with one repayment-free start-up year and ten years of fixed interest. The negative APR is due to the debt write off available (where chosen instead of a grant). Up to €120,000 per dwelling is available if a certain energy performance standard is achieved, with up to €50,000 available per dwelling for individual measures[124].

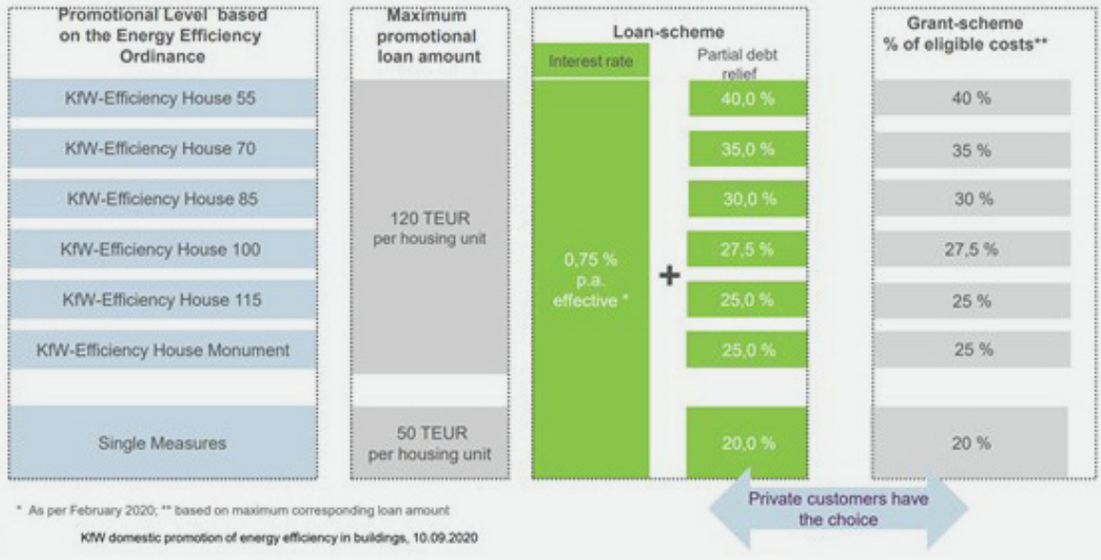
It is important to highlight that this is not an unsecured personal loan option. These loans are backed by normal banking securities in the form of a secondary land charge on the home, with the first ranking charge normally assigned to the first mortgage from the initial purchase[126].

These loans are combined with federal subsidies and the higher the energy performance sought, the higher the subsidy (either a grant or a debt write off) available. Interestingly, KfW manages the grant process, with applications directly to KfW and disbursement directly with recipients (rather than in Ireland where this the grant aspect is managed by the SEAI). This probably reflects the broader sectoral financing mandate of KfW in the German economy, when compared to the multi-agency approach in Ireland. KfW also developed the standard that determines the level of the loan and grant available – the KfW Efficiency House standard.

Two mechanisms enable KfW to offer loans at discounted interest rates. Firstly, KfW can raise financing at very low interest rates on the capital markets as it is rated AAA. And secondly, federal funding allocated annually in the national budget is used to further decrease interest rates specifically for energy efficiency.

The KfW uses a network of commercial on-lending partners to distribute these low-cost loans to homeowners.

Exhibit 50: KfW Energy Efficient Refurbishment Loan Terms[125]



124 KfW, Overview of efficiency house standards and funding

125 Schroder et al. The KfW Experience in the Reduction of Energy Use in and CO2 Emissions from Buildings: Operation, Impacts and Lessons for the UK, 2011

126 KfW, Promotional programs for energy efficiency in buildings Main elements and success factors, 2020

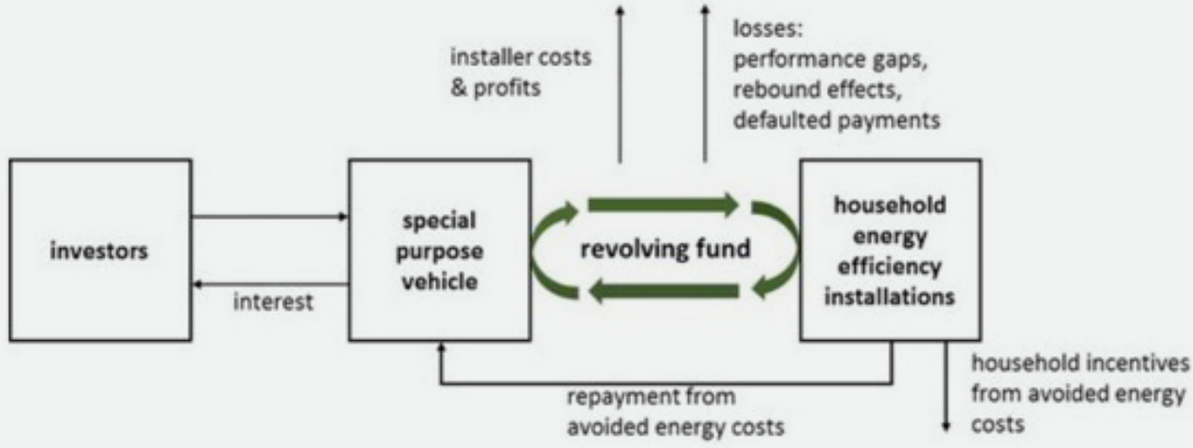
II.2 Netherlands

The Netherlands took the route of establishing a revolving loan facility fund, the National Energy Savings Fund, recently renamed the National Heat Fund. Since 2014 the fund has been providing the Energy Saving Loan – a discounted loan to private homeowners, housing owner associations and schools to undertake energy efficiency upgrades. The Fund is capitalised by the national Government, national commercial banks and European bank entities. The Dutch Municipal Housing Stimulation Fund (SVn) – an independent non-profit foundation – is the fund manager and takes care of the management and administration of the Fund. The route to market is by direct application to the Fund Manager. The Fund had granted approximately €400 million in loans by the end of 2019[127].

Loans of up to €65,000 are available for private homeowners at a fixed rate of 1.8% with a term of up to 10 years. Early repayments are free of charge and the repayments and the loans are on an unsecured personal loan basis[128]. Expected savings in energy costs are not taken into account when assessing an application. To qualify for a larger loan increasingly higher efficiency criteria must be met, with the €65,000 amount only available for those meeting the highest standards. Together with the loans there are grants on offer for owner occupiers for energy efficiency measures and low carbon heat[65].

A revolving loan fund, it was established with €75m from the government and a €225m commitment from commercial banks[129]. Further investments have been made and the European Investment Bank (EIB) and the Council of Europe Development Bank (CEB) have also provided capital, resulting in the fund now having €1.2billion available[130]. As a revolving fund, interest and loan repayments flow back into the fund to enable further lending. See Exhibit 52[131] for an example of a revolving fund structure.

Exhibit 52: Basic Structure of a Revolving Fund for Financing Household Energy Efficiency Measures



127 SVn, Annual Report, 2019

128 Energiebespaarlening, Energy saving loan for private individuals, 2020

129 Fourth NEEAP for the Netherlands, 2017

130 Energiebespaarlening, About Us, 2020

131 N. Bergman and T. Foxon, Reorienting finance towards energy efficiency in the UK, 2017

II.3 France

The French Eco-PTZ Scheme is a good example of an interest rate buydown arrangement. Since 2009, the French Government through its Ministry for Economy, Finance and Recovery has offered a 0% interest eco-loan to homeowners to finance energy refurbishment works, available through commercial banks. From 2009 to 2015 the number of loans granted was 311,260, with 22,725 eco-loans granted during 2016[132].

Depending on the type of work being undertaken, the loan amount ranges from €7,000 to €30,000 for personal unsecured loans. The maximum repayment term of the loan is 15 years[133]. Increasing loan amounts are available depending on the number of energy efficiency measures being carried out and/or the overall energy performance to be achieved. The route to market is through commercial banks, with the public finance support provided to banks in the form of reimbursement for interest not received when benchmarked against commercial rates.

The public finance support to banks is provided through tax credits given to the participating banks over five years. The cost to the Government has been lower than forecast as interest rates have remained low to date. However, it appears that insufficient return to finance providers has contributed to low take up, while approval processes relating to the subsidy have created delays in smooth delivery of the initiative. These loans can be combined with eco-renovation tax credit subsidies for individuals (rather than grants), albeit grants are available for low income private households.

II.4 Estonia

The KredEx Foundation is a Government owned non-profit provider of financial services established in 2001 by the Estonian Ministry of Economic Affairs and Communications. While not technically a national promotional institution, it operates with a similar mandate to address access to finance issues for specific sectors. The 'KredEx Fund'[134], is a revolving energy efficiency fund founded in 2009. The KredEx Fund evolved from discussions with KfW which instigated a change in the Estonian Government's energy support strategy from grant only focus to a broader support system based on a combination of loans, loan guarantees and grants, aligning it with the EU policies and directives. KredEx uses an on-lending model similar to that used by the SBCI in Ireland. While this fund is not strictly comparable with other residential retrofit schemes discussed above, insofar as it provides revolving project finance to multi-family apartment building owners and housing, it is an early example of the blending of both private and public financing for energy efficiency purposes in the residential sector.

The Fund was capitalised with funds from the European Regional Development Fund, the Council of Europe Development Bank, the Estonian Government and from the KredEx Foundation's own capital. KredEx has provided loans at fixed 10-year term at average interest rate of 4.0%, which can be extended for up to 20 years. These rates are below commercial market rates due to the mix of funding and original ERDF grants. These loans are unsecured and are mostly reimbursed with the realised energy savings.

132 European Commission, Report of France, 2017

133 CEDEF, What is the zero rate eco-loan?, 2020

134 KredEx Revolving Fund for Energy Efficiency in apartment buildings

Appendix III
Case studies of On-bill schemes

Utility On-bill schemes have been used in Canada and the US for many years, with the majority of cases having the investment secured via a right to disconnect a home from its electricity or gas supply. The experience there shows that while On-bill financing can successfully overcome important barriers such as upfront cost and split incentives, there are still challenges that need to be addressed such as the need to modify energy supplier billing systems, the role of utilities as financial institutions/intermediaries, 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 UK Green Deal. The scheme initially gained momentum before it was effectively ended due to several key barriers/challenges including uncompetitive interest rates[73]. The UK experience and case studies of American and Canadian Schemes are provided below.

III.1 Oregon Municipal Utility Scheme[119]

Location	Oregon – USA
Brief description	EWEB, a municipal utility, offers a wide range of loan programmes for residential or business customers. The first pilot programme was launched in 1990 to test customer interest. In 1992 a residential programme was initiated and in 1995 the programme was fully approved and expanded to business customers and residential multi-family buildings. Currently the company offers zero interest loans up to $20,000 for residential users and interesting bearing loans, with 4% interest, for business customers.
Year in force	1995
Current status	Active
Project size	From 1995 to 2011, 1156 loans were financed
Supported interventions	- Heat pumps - Heat pump water heater - Insulation - LEDs installation - Programmable digital thermostats installation - Window replacements
Possible beneficiaries	All the EWEB customers, residential and business buildings. Generally eligible homes must have permanently installed electric heat as their primary heating source.
On-bill scheme	- On-bill financing programme financed with company funds - Revolving fund now established - Disconnection in case of non-payment allowed - 0% loan up to $20,000 and unsecured loan up to $5,000. If necessary, standard loans security mechanisms considered - Four to five years of payback term on the bill - Depending on the amount, loan awarded on the basis of utility bills payment history and credit check
Strategic Analysis	Strengths: - High loans amounts (up to $20,000) for residential and no fixed cap for businesses - 0% interest rate for residential customers and 4% for business - Process completely governed by the utility - Wide range of possible improvements Weaknesses: - Limitations in the utilisation of the programme more than once - Administrative complications if the loan is over $5,000
Source	https://www.eesi.ord/files/Mark_Freeman_100815.pdf https://www.eesi.ord/files/OBFprimer.pdf

III.2 Manitoba Hydro Power Scheme[119]

Location	Canada – Manitoba Province
Brief description	Manitoba Hydro offers its residential customers Pay as You Save (PAYS) financing for eligible energy efficiency upgrades, notably space heating, insulation, and water heating equipment. Monthly payments are added to the utility bill and are transferable to the next homeowner.
Year in force	2001
Current status	Active
Project size and results	- Around 5,000 participants per year, with approximately $6,000 of investment - In 13 years, it reached 15% of the target market - Loan default rates equal 0.48% - On average, one project saves 825kWh/year, or 7.5% of energy used
Supported interventions	- Residential space heating equipment - Insulation - Residential water heating and conservation - Drain water heat recovery systems - Water efficient toilets
Possible beneficiaries	Residential customers of Manitoba Hydro with homes where energy improvements are made and have an active Manitoba Hydro account in good standing
On-bill scheme	- Capital for the Manitoba programme comes from public money that is generated internally by the Manitoba government and lent to Manitoba Hydro at low-cost. The Manitoba government does not back any of the loans - The maximum term depends on the upgrade, but the most common terns go up to 20-25 years - When the programme was launched, the interest rate charged by Manitoba Hydro was set at over 6%, but this has changed over the years and currently sits at 4.8%
Strategic Analysis	Strengths: - Relaxed underwriting criteria resulting in rejection rate of 5% - Interest rates are kept relatively low - A quick turnaround time for approval of around 48 hours Weaknesses: - Limited range of supported interventions
Source	https://www.hydro.mb.ca/your_home/pays/

III.3 UK Green Deal

The UK Green Deal was launched in 2013 – an innovative Pay As You Save scheme for the owner occupier, with bill neutrality at its heart and the loan attached to the property meter rather than the consumer. At the time of launch, it was hoped that the Green Deal would be revolutionary and would lead to the renovation of a large portion of the UK's housing market. While the Scheme is still technically available[135], with the Green Deal Finance Company (GDFC) having been acquired by new private shareholders in 2017[136], the Scheme was a dramatic policy failure and it was effectively terminated two years after launch.

At the final count, the cost of establishing the scheme infrastructure, supporting finance providers and providing grants was a £240million cost to the UK Government. An amount of £44millon was also incurred by 14 private sector companies/local authorities. The original intention was that it would support the retrofit of 14million homes but by 2015 only 15,000 green deal loans had been issued.

Structure of the Scheme

Primarily established as a finance mechanism, the scheme also involved an OSS model as both technical and financial advice was combined through a Green Deal Provider. There were no public subsidies involved (no grants, no public supported credit enhancements). The interest rate applicable depended on the finance provider involved but ranged from 7%-9%. The term of the loan was aligned with the life of the efficiency measures installed. The Green Deal loan needed to meet the "Golden Rule", i.e. bill neutrality.

The bill payer would only be liable to make Green Deal payments whilst liable to pay the energy bill at the property, i.e. they would stop paying once they moved out. Subsequent homeowners of buildings with Green Deal measures would continue to benefit from the energy bill savings and so the liability transferred automatically to new occupier, who had to be made aware of liability before moving in. Owners were required to disclose details about Green Deal plans before selling or renting a property.

Part of the conditions were that customers would be disconnected if they did not pay their bills, however there were protections put in place in relation to disconnections in winter months. Customers were also able to repay early, in part or in full, at any time. Importantly from a consumer protection perspective, customers with a Green Deal charge were still able to switch energy suppliers. Finance providers and energy suppliers signed up to an agreement so loan administration would pass to the new energy supplier. A range of finance providers were involved in offering Green Deal finance, each with different packages but certain minimum terms. Green Deal Providers needed a Consumer Credit Licence and were regulated.

Learnings from UK Green Deal

The Green Deal has been strongly criticised for a number of reasons and is often cited as an example of failure in energy policy. The failure is attributed to three primary areas[137]:

- Limited financial appeal due to the high interest rates and the fact it was intended there would be no public grants nor public credit enhancements available to support the scheme as the Government believed the market could deliver without such supports
- Poor policy delivery as the final design of the scheme was not tested with consumers. Policymakers and politicians were repeatedly warned the design had not been tested and would likely not work. Complex vetting and application process with separate interfaces were involved – see Exhibit 55[138]. Furthermore, the use of the Golden Rule at high interest rates meant that only limited measures could be financed - see Exhibit 56[139].
- Narrow engagement with customers, which didn't focus on what consumers actually wanted from their homes – comfort, well-being and health. The analogy often made is that they sold the 'loan instead of the car'. There were also problems with overall governance which were exploited by scams that eroded overall trust in the scheme.

135 GOVUK, Green Deal: Energy saving for your home, 2020

136 The Green Deal Finance Company

137 J. Rosenow & N. Eyre, A post mortem of the Green Deal: Austerity, Energy Efficiency, and Failure in British Energy Policy, 2016

138 UK National Audit Office, Report on Green Deal and ECO, 2016

One positive to take from the UK Green Deal is that the challenge of protecting the consumer's ability to switch energy supplier was surmounted. Legislation was put in place to secure this, with electricity suppliers, finance providers and green deal providers required to sign up to the Green Deal Arrangements Agreement (GDAA)[139].

This agreement sets out the governance for payment, collection and remittance of UK Green Deal charges and both the agreement and the learnings of those involved in delivering it would clearly be helpful for other countries that would need to surmount this issue in the context of introduction of an On-bill scheme initiative.

Exhibit 55: Key Roles and Responsibilities for the Green Deal

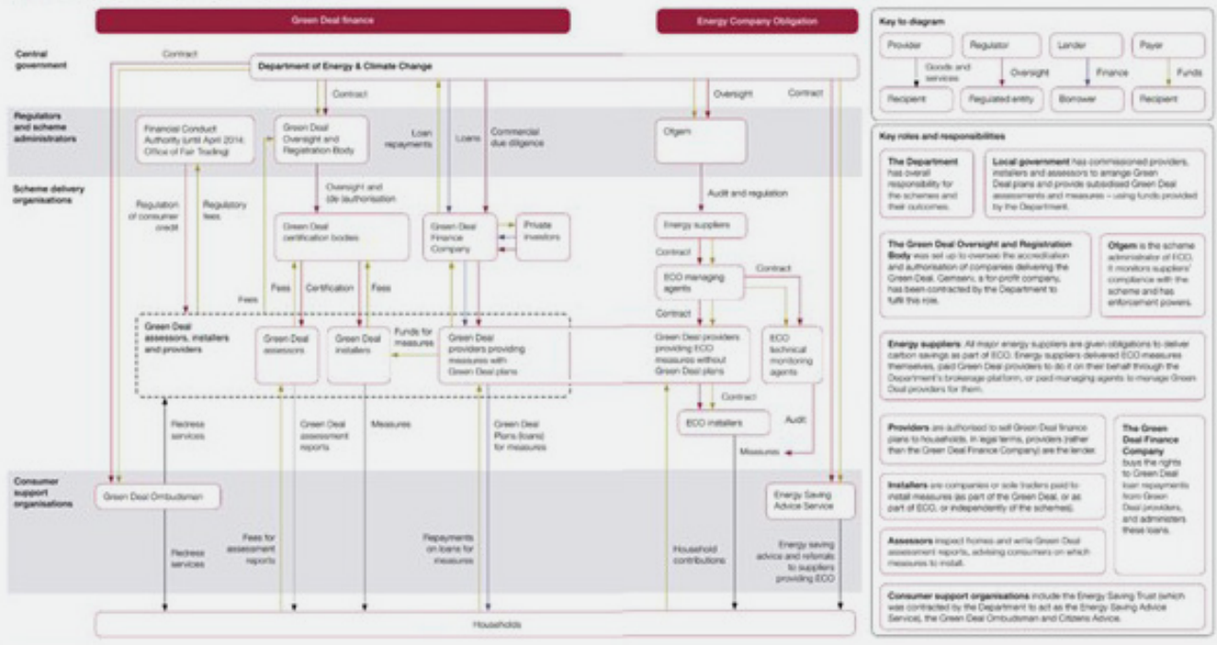


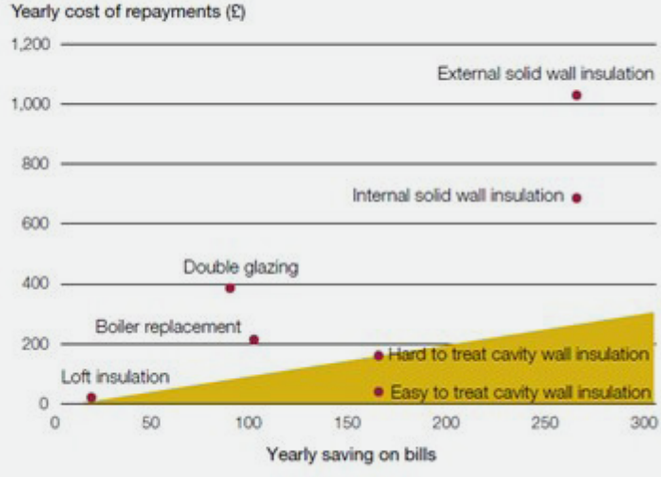
Exhibit 56: Impact of Golden Rule in the UK Green Deal

Most measures do not meet the golden rule if consumers cannot find additional funds to reduce the amount they borrow with a Green Deal plan

The rule limits the amount that households can borrow, dictating that total repayments must be lower than total savings on the energy bill over 25 years.

The chart shows a hypothetical example of different measures financed with a 25-year loan at a 7% rate of interest.

Only easy-to-treat cavity wall insulation would qualify on its own, while other measures would require some form of subsidy to be installed at zero net cost for the householder.



Source: Energy Saving Trust; Department of Energy & Climate Change; National Audit Office analysis

139 OFGEM, Green Deal Arrangements Agreement

Appendix IV
Case studies of On-tax / PACE schemes

IV.1 RENEW Financial[140]

The pioneer of Property Assessed Clean Energy (PACE) financing, Renew Financial was founded in 2008 and operates in California and Florida. It has developed a very simple customer journey with financing arranged online and over the phone. As well as an example of a PACE scheme, it is also a good example of a One Stop Shop. Eligibility is based primarily on equity in the home and there is a defined list of suitable projects (depending on State conditions). Contractors are all vetted and pre-approved. See Exhibit 57[141] for a comparison of Renew's PACE finance offer with other financing methods.

Exhibit 57: Renew Financial - Comparison with Other Finance Methods

	Renew Financial PACE Financing	Home improvement Personal Loan	Credit Union Loan	Deferred Interest Solar Loan	Credit Card
Affordability					
Competitive interest rates	✓	Depends on FICO score	Depends on FICO score	Depends on FICO score	
Fixed rate	✓	Varies	✓	Varies	
Interest rate based on repayment term, not personal credit	✓				
Up to $250,000 maximum financing amount	✓				
Up to 30-year repayment term*	✓				
Simplicity					
Same-day approval	✓	✓		✓	✓
No minimum FICO score	✓				
Soft credit pull (no credit score impact)	✓				
Quality					
Contractors must meet program standards and be registered with Renew Financial	✓				
Customer signoff required for contractor payment	✓				

140 RENEW Financial, PACE Home Improvement Financing

IV.2 Ygrene[141]

Operating in Florida, California and Missouri, Ygrene is a leading PACE Finance Provider. The consumer journey is also designed to be straightforward, with all financial aspects completed online. As well as a good PACE scheme case study, it is also a good example of a One Stop Shop. Eligibility is based primarily on equity in the home and the advantages include low, fixed term interest rates, no upfront costs and no repayment penalties. There is a defined list of energy efficiency projects that can be financed. Depending on the location, a property may also be eligible for upgrades to help conserve water and protect against storm damage, dependent on the US State.

Contractors are all vetted and approved and the Ygrene offer also focuses on consumer protection, which includes a review of the contractor's estimate, resolution of issues with contractors, and the final payment not being released until work signed off by the customer. See Exhibit 58 for the simple process outline of the Ygrene offering.

Exhibit 58: Ygrene PACE Process[73]

141 Ygrene, A new way to finance home improvements

Appendix V
One Stop Shop case studies

V.1 SPEE Picardie, France[69]

Background:	The establishment of the services is part of a complex package of measures that the Picardie Region initiated as implementation actions for the regional Climate Air Energy Scheme 2020 and 2050.
Title of the OSS	Public Energy Efficiency Service/ SPEE Picardie
Auspices	Established by the Regional Council of Picardie
Host organisation	Regional Council of Picardie
Location of the OSS	Amiens, France
Expertise at the OSS	Technical, financial, project management
Geographical coverage of the service	Picardie Region, France
Timeframe	05/04/2013 to 04/04/2016 (project) 2013 start date of the ESCO/OSS (currently operational)
Current status	Running, planned, closed (of the OSS and/or the project)
Operational details	Pilot, established, replicating
Main aims	To pilot ambitious renovation projects with technical, financial and informational assistance, which could be further replicated and multiplied in the following 5 years
Key points in the value chain	Marketing, integration, financial advice, financing, assessment
Content of the service	An integrated service for the energy renovation of residential buildings, which offers advice, accompaniment, and financing of thermal retrofit projects of private homeowners. In this context, the service includes: - local offerings of advice and works - thermal audit and advice to households - financing solution - accompanying homeowners during and after the works Thus, the following initiatives were taken: - Creation of an Energy Information Space – network with 15 advisors - Management of contractors by local actors (e.g. Globe 21, MEF of Vermandois) - Regional experiment with zero interest rate loans for energy efficiency and renewable energy investments for residential homeowners (10,000 cases in 4 years) The financing of the implementation is usually based on third-party financing (where 85% of the energy cost savings are used for reimbursing the investment costs, and 15% remain with the end-customer), which can be combined with White certificates, and grants.
Channels	Mainly personal, supported by online materials for information
Customer relations	- Advice to residential homeowners (realisation of a thermal audit and proposal of measures) - Assistance to the execution of the works (support in choosing contractors, follow-up of the measures, post-works follow-up) - Third party financing ensured by the OSS or by partner financial institutions (long-term loan) in accordance with the debt capacity of the homeowner - Long-term accompaniment and maintenance of the equipment
Key selling point	Creates economies of scale Accompanies the homeowners along the whole process Creates groups of suppliers
Partnerships (focus on financing community)	With local construction actors (who can get training) With local financial services for third-party financing
Target clients	Residential buildings
Target measures	Scenario 1: Insulation of walls, roofs, floors, double glazing, ventilation Scenario 2: Scenario 1 + thicker insulation Scenario 3: Scenario 2 + triple glazing on North side + dual flow mechanical ventilation + heat pump
Social responsibility	Targeting deep renovations to achieve between 50-75% energy savings
Cost of services (business case)	The average cost of the measures is €30,000 VAT excl. for a home and €15,000 VAT excl. for an apartment.
Results (realised or planned)	The ambition is to renovate 2,000 residential homes over a 3-year period with 50 to 75% energy savings, the creation of 33 direct jobs and 650 indirect jobs in the construction sector Over the next 5 years, 10,000 renovations per year, with €300m investment and the creation of 3,500 jobs in the construction sector
Cost of the OSS	The financing need for the operator of the SPEE is €58m for 2,000 projects: €50m for the works €8m for the operations (agency, renovation technicians, pilot sites, first loss guarantee fund)
of which public budget	Total amount
Further information	http://citynvest.eu/content/spee-picardie http://pass-renovation.picardie.fr/
Contact details	Email: contact@picardie-spee.fr Tel: +33 (0)810 140 240

V.2 BetterHome, Denmark & Sweden[69]

Background:	Uncertainty is one of the reasons why the renovation rate continues to linger around 1% and private investments remain limited. A more service-oriented supply-side together with a deeper awareness on the demand-side may be able to change the play.
Title of the OSS	BetterHome
Auspices	Market-based, industry-driven company
Host organisation	Self-standing OSS, launched by supply-side actors Danfoss, Grundfos, the ROCKWOOL and VELUX Groups
Location of the OSS	Frederiksberg, Denmark
Expertise at the OSS	Manufacturers, installers, project management, financing, training
Geographical coverage of the service	Denmark, and recently launched in Sweden
Timeframe	Started in 2014
Current status	Running (the OSS)
Operational details	Operational and extending in geographical and service terms
Main aims	To offer homeowners burden free, organised renovation opportunity to improve energy performance and indoor climate, based on standardised packages.
Key points in the value chain	Based on the products of the four founders, brings together 3,500 installers (from 105 organisations), five banks and mortgage providers and four utilities, which will help to renovate the house with these products.
Content of the service	A burden-free renovation process focused on lowering the energy consumption and improving indoor climate at the same time. In order to inspire homeowners, the OSS offers 3 inspirational packages (Energy Package, Comfort Package and Modernization Package). The homeowner uses an online tool to enter details about their homes and energy consumption and receive a report and recommendations on renovation measures and offers from local suppliers. The local representative comes to the home to discuss the details and fix the offer. After this is accepted, the local craftsmen carry out the implementation, who are also enabled by training to ensure BetterHome standard and can use the digital platforms to structure the works. On the financing side, the customer discusses the renovation project with his/her usual bank, and the bank can use the BetterHome tool to refer to the details. The associated banks trust the BetterHome quality and financial characteristics.
Channels	Mainly online
Customer relations	n/a
Key selling point	For the customer: - Renovation without much hassle, handled by one contact point; - Holistic process, single flow, single payment, assistance in financing; - Inspirational packages. For the installers/contact points: - Training and guidance on how to approach the customer, from the first contact to the finalisation of the process; - Promotion and marketing. Society: - Deeper renovations than average.
Partnerships (focus on financing community)	Partnered with local banks, who can refer their customer to the BetterHome offers, and vice versa.
Target clients	- Mainly single-family houses constructed between 1950 and 1990
Target measures	- Mainly deep renovation projects, with investments of ~ €70 000 and energy savings of approximately 30-70%
Social responsibility	Not really (the packages are in growing depth)
Cost of services (business case)	Market based The financial model: no payments between BetterHome and the installers or the building owners. It receives the whole budget from the four founders, who retrieve indirect sale revenues.
Results (realised or planned)	Approximately 200 projects in 2016, but demand is growing rapidly
Cost of the OSS	After starting in 2014, it became profitable after 3 years. Indirect turnover was ~ €13 million in 2017
of which public budget	n/a
Further information	http://www.betterhome.today/ http://bpie.eu/publication/boosting-renovation-with-an-innovative-service-forhome-owners/
Contact details	Niels Kåre Bruun, administrative director, email: nkb@betterhome.today , tel. +45 35 300 400

V.3 Octave, France[69]

Background:	Private houses in France account for 25% of the total national greenhouse gas emissions. The Climaxion program was initiated as a joint effort between the Greater East Region and ADEME to support the territories in the implementation of concrete solutions towards an energy transition. In this context, the Energy-Climate-Air Plans in the Alsace Champagne-Ardenne Lorraine require a rate of energy renovation of the existing building stock of approximately 19,000 homes/year by 2050, including 10,000 single-family homes/year. The launch of the below organisation, Oktave, is part of these efforts to achieve the objectives of the Plan.
Title of the OSS	Oktave
Auspices	Municipalities-led OSS, which was also supported by the Intelligent Energy Europe programme. It is part of the Climaxion program, a joint initiative between the Region and ADEME to support the territories in the implementation of concrete solutions in terms of energy transition.
Host organisation	New organisation, founded by the Greater East Region and ADEME
Location of the OSS	Main office in Strasbourg, and 11 other places in the Region (collaborates with 9 local refurbishment platforms set up by local authorities)
Expertise at the OSS	n/a
Geographical coverage of the service	The region of Alsace Champagne-Ardenne Lorraine (currently 9 municipalities)
Timeframe	2017 (the date the Regional Council enacted the decision)
Current status	Running
Operational details	Operational (in the initial stage)
Main aims	To contribute to the Energy-Climate-Air Plans in the Alsace Champagne-Ardenne Lorraine by boosting the rate of energy renovations
Key points in the value chain	Renovation, financing
Content of the service	Oktave offers a holistic service combining technical support and financing of projects. For the moment, Oktave works in collaboration with the Alsace Province. In the future, it will be transformed into a "Société d'Economie Mixte (SEM)", i.e. a Company of Mixed Economy. It will build partnerships with the local authorities and the local actors, which will be able to be its relays at the spot. Oktave advisers provide personalised support on technical, financial and administrative aspects of the renovation project and are the primary and only contact point for the renovation project. In this journey, Oktave connects homeowners with qualified and referenced professionals. Oktave also helps to set up the financing plan for the works, which can combine grants, tax rebates, and commercial loans. In this context support includes connection with banks for loans, which can be (at the moment) zero-interest loans, or with third parties/ESCOs in order to repay the loan from the energy cost savings. For the craftsmen, Oktave offers trainings.
Channels	n/a
Customer relations	n/a
Key selling point	Independent, trustful. Compares individual offers by suppliers and pools a holistic solution.
Partnerships (focus on financing community)	Local authorities and local contractors. No special partnership with banks, but arranges offers from banks and ESCOs
Target clients	Homeowners, at present limited to single family homes
Target measures	n/a
Social responsibility	n/a
Cost of services (business case)	n/a
Results (realised or planned)	The target is to support 2,100 renovation projects over the first four years, and 1,500 projects per year from the fifth year.
Cost of the OSS	€ 1.5 million starting grant from the Greater East Region of France (which is representing 50% of the capital of the company).
of which public budget	The starting grant from the Region (€1.5 million), and previously from IEE programme
Further information	https://www.oktave.fr/oktave/qui-est-oktave
Contact details	Région Grand Est - 1 place Adrien Zeller 67000 Strasbourg; email: contact@oktave.fr , tel.: 03 88 15 97 95

Appendix VI
SEAI home energy efficiency grant programmes

The SEAI has a suite of grant programmes targeted at encouraging private homeowners to undertake energy efficiency measures, with different terms and conditions and methods of application for each. Exhibit 24 provides a 'snapshot' of the grant programmes available for private homeowners at the date of this report and further details are provided below. However please note that as these programmes are revised regularly, it is essential to refer to the SEAI website for the most current position.

VI.1 Better Energy Homes Scheme

This Scheme is available to individual private homeowners whose homes were built and occupied before 2006 (special rules apply in relation to the Heat Pump grant and Solar Photovoltaic (PV) grant). There is generally no requirement to reach a particular level of energy efficiency[142] but rather the subsidy is available for specific technical measures that are installed, with a small bonus where more than two measures are implemented. The individual measures for which grant support is currently available are:

- Insulation
- Heat pump systems
- Heating controls
- Solar water heating
- Solar PV panels
- BER assessments

The level of the grant is determined at a specific monetary value, which is generally set at 25%-30% of a standard cost for that measure for an average house, rather than the actual cost incurred by the homeowner. It is also worth highlighting that there is no grant available for windows or doors. One final key point is that homeowners apply online (or by post) directly and there is no specific time period for applications. Works should not be started before the homeowner receives the grant offer, and the homeowner has eight months from the date of grant to complete the works and return the paperwork. To qualify for the grant, the contractor must be an SEAI Registered Contractor.

One alternative to applying directly is to apply through a registered "Energy Partner", which is a contractor that is both registered to carry out works under the Better Energy Home Grant Programme and authorised by the SEAI to submit grant applications on behalf of homeowners. The benefit of applying for a grant through a registered Energy Partner is that they will manage the grant application process and submission of all grant related paperwork. The grant is paid directly to the Energy Partner, who passes on the savings in the form of a discount.

142 The solar PV grant requires a BER C rating or better after the installation.

The grant values currently available (December 2020) under this scheme are set out below[143]:

Exhibit 59: Grant Values Available under Better Energy Homes

Energy Upgrades	Measure	Grant Value
Insulation	Attic Insulation	€400
	Cavity Wall Insulation	€400
	Internal Insulation (Dry Lining)	
	Apartment (Any) Or Mid-Terrace House	€1,600
	Semi-Detached Or End Of Terrace	€2,200
	Detached House	€2,400
	External Wall Insulation ('The Wrap')	
	Apartment (Any) Or Mid-Terrace House	€2,750
	Semi-Detached Or End Of Terrace	€4,500
	Detached House	€6,000
Heat Pumps	Air To Water	€3,500
	Ground Source To Water	€3,500
	Exhaust Air To Water	€3,500
	Water To Water	€3,500
	Air To Air	€600
Heating System	Heating Controls Upgrade	€700
Solar Water Heating	Solar Water Heating	€1,200
Solar PV	Per Kwp Up To 2Kwp	€900
	If Get A Battery, Every Additional Kwp Up To 4Kwp	€300 (Capped At €2,400)
	Battery Storage	€600
Building Energy Rating (Ber)	Ber Survey	€50
Bonus For Multiple Upgrades	Number Of Upgrades	Bonus Value
	For 3rd Upgrade	€300
	For 4th Upgrade	€100

143 SEAI, Home Energy Grants

VI.2 National Home Retrofit Scheme

This National Home Retrofit Scheme[144] is designed to encourage the development of OSSs and engage groups of private households, registered Housing Associations and Local Authorities who wish to participate in delivering residential energy efficiency upgrades.

The objectives include to

"Test and Develop the One Stop Shop model in Ireland, referenced in the Climate Action Plan 2019, with a view to informing and providing learnings to the All of Government Climate Action Plan taskforce developing the model for delivery of energy targets to 2030"

and also, to

"Support financial institutions and employers to participate in delivering energy efficiency works for their employees and customers."

The grant support available is at a rate of 35% for private owner occupiers. The preferred minimum BER is to a B2 rating. Giving an indication of the potential scale of project aggregation expected, the maximum grant available per application is €2million. The applications can have a national scope or be targetted at regional areas, or be employer or finance provider-led. The intention here would appear to be a focus on aggregators of large quantities of domestic units, whether the common thread is a local authority, a social housing body, an employer or a finance provider. Partnership with a Participating Energy Supplier is recommended. The evaluation scoring system has a specific allocation of points for delivery models that have an integrated finance element.

VI.3 Midlands Retrofit – Private Homes Integration

The 2019 national Climate Action Plan calls for the aggregated retrofit of homes in the Midlands as part of the Just Transition initiative. In 2020, the Department of Housing, Local Government and Heritage launched a programme to support the energy retrofit of local authority homes to a minimum B2 rating in the eight Midlands Local Authorities, which are:

- Galway
- Kildare
- Laois
- Longford
- Offaly
- Roscommon
- Tipperary
- Westmeath

While that programme focuses on Local Authority owned homes, it was recognised that there are private homes in the same estates or nearby / community areas whose occupants would also obtain multiple benefits from an energy retrofit. This led to the development of the "Midlands Retrofit – Private Homes Integration" grant programme, which is a strand of the main National Home Retrofit Scheme with broadly the same terms and conditions[145]. One key difference is that an increased grant rate of 80% is available for energy poor homeowners. It is open to applicants that can demonstrate collaboration with the Local Authorities to deliver efficiencies by aggregating retrofit works. Homes included in an application under this scheme must be privately owned, within the Local Authority area of works and leverage Local Authority activities to allow for aggregation of activities.

144 SEAI, National Home Retrofit Scheme

145 SEAI, National Home Retrofit Guidelines

VI.4 Better Energy Communities

The Better Energy Communities (BEC) Scheme[146] supports new approaches to achieving energy efficiency in Irish communities. Upgrades can take place across various building types to reduce energy use and costs throughout the community. All project applications must be community oriented with a cross-sectoral approach. Successful projects must demonstrate some or all of the following characteristics:

- Community benefits
- Multiple elements, not a single focus
- Mix of sustainable solutions
- Innovation and project ambition
- Justified energy savings
- An ability to deliver the project

Partnership is essential for a successful application and this might include collaborations between public and private sectors, residential and non-residential sectors, commercial and not-for-profit organisations, or financing entities and energy suppliers. The community approach does not necessitate physical proximity and an alternative is to consider whether a building could be identified as part of a network, with the example given being a charity's buildings could be linked with similar buildings in different parts of the country. Partnership with a Participating Energy Supplier is recommended. There is no specific mention of additional points for an integrated finance solution in the grant guidelines for 2020.

Residential housing upgrades are included as an eligible category, with the grant support available at a rate of 35%, with the preferred minimum BER rating being B2. Giving an indication of the potential scale of project aggregation expected, the maximum grant available per application is €1.5million.

The programme is run annually through a competitive process. A list of "Project Coordinators"[147] is available on the SEAI website.

VI.5 Better Energy Finance Programme (Innovative Finance Pilots)

VI.5.1 Credit Union Scheme Pilot

Supported by the Better Energy Finance Programme[148], participating credit unions offered lower-cost finance to fund the cost of their members undertaking an energy upgrade of their home, subsidised by an SEAI grant of up to 35% of the cost of the home energy improvements. The first year was 2015 and, each year since, the project expanded so that in 2019 over 20 credit unions participated. Over the 5 years to 2019 the scheme has delivered home energy upgrades to almost 400 homes, with more comprehensive works being carried out in recent years. In 2019 alone, 130 homes were upgraded at an investment of over €2.5million, securing grant funding of €875,000.

Case Study: Pro Energy Homes One Stop Shop

In 2019, 20 credit unions under the representative umbrella organisation of Credit Union Development Association (CUDA) offered the 'Pro Energy Homes Scheme' in conjunction with Retrofit Energy Ireland Limited as the project manager.

The scheme combined a dedicated project manager to support applicants every step of the way, including a heavily subsidised home survey and report, access to SEAI grant funding of 35% as well as lower-cost finance for the balance of the costs from participating credit unions.

VI.5.2 Salary Incentive Scheme

The Better Energy Home Salary Incentive scheme was also developed through the Better Energy Finance programme. Modelled on the Cycle-to-Work scheme, participating employers provide up-front financing to fund the cost to their employees of undertaking an energy upgrade of their home. The cost of the upgrade is repaid via their salary at a discounted rate, subsidised by SEAI. SEAI provides a grant of 35% of the cost of the home improvements so that the employee will only repay the remaining cost over an agreed period.

146 SEAI, Community Grants

147 SEAI Project Coordinator

148 SEAI, Sustainable Models for Financing Home Energy Upgrades, 2019

Case Study: Veolia

The Veolia HomeSaver scheme encouraged employees to upgrade the energy performance of their homes, thereby reducing their heating bills and making their homes more comfortable. The scheme offered employees interest-free loans to pay for the installation of energy efficiency measures as well as SEAI grant funding for 35% of the cost of the work.

A 'HomeSaver' flyer was developed and a webinar session held to communicate the benefits of the initiative to all employees. Sending a flier together with a covering letter from HR to each employee's home address meant the scheme could be discussed with family members. Holding the webinar session with interactive Q&A meant that employees could raise any questions / concerns they had. 28 employees of Veolia Ireland availed of the company's HomeSaver scheme to undertake a variety of energy upgrades. These included cavity wall, attic, and external wall insulation; window replacement; solar water heating; and heating upgrades. The average cost per home was €6,672 with 41% of it funded by grants from SEAI and an energy supplier contribution. Total annual energy savings of 166,000 kWh were achieved as a result.

Acronyms

APR	Annual Percentage Rate
BEC	Better Energy Communities
BER	Building Energy Rating
BPFI	Banking and Payments Federation of Ireland
BRP	Building Renovation Passport
CAF	Climate Action Fund
CEB	Council of Europe Development Bank
COP21	21st Conference of the Parties in 2015, at which the Paris Agreement on Climate was agreed
COSME	Competitiveness of Enterprises and Small and Medium-sized Enterprises programme
CRU	Commission for the Regulations of Utilities
CUDA	Credit Union Development Association
DCCAE	Department for Communications, Climate Action and the Environment
DECC	Department for the Environment, Climate and Communication
DNSH	Do No Significant Harm
EASI	EU Program for Employment and Social Innovation
EBA	European Banking Authority
EBRD	European Bank for Reconstruction and Development
ECB	European Central Bank
EED	Energy Efficiency Directive
EeDaPP	Energy Efficiency Data Protocol and Portal (a Horizon2020-funded research project)
EEM	Energy Efficient Mortgages
EeMAP	Energy Efficiency Mortgages Action Plan (a Horizon2020-funded research project)
EEMI	Energy Efficient Mortgages Initiative (a Horizon2020-funded research project)
EEOS	Energy Efficiency Obligation Scheme
EFSI	European Fund for Strategic Investments
EIB	European Investment Bank
EIF	European Investment Fund
ELENA	European Local Energy Assistance facility
EMF-ECBC	European Mortgage Federation - European Covered Bond Council
EPA	Environmental Protection Agency
EPBD	Energy Performance of Buildings Directive
EPCs	Energy Performance Certificates
ESG	Environmental, Social and Governance factors
ESIF	European Structural and Investment Funds
ESRI	The Economic and Social Research Institute
EU	European Union
FSB	Financial Stability Board
GDAA	The UK Green Deal Arrangements Agreement
GDFC	Green Deal Finance Company
GHG	Greenhouse gas
HPI	Home Performance Index
IEA	International Energy Agency
IGBC	Irish Green Buildings Council
IIEA	Institute for International and European Affairs
IPCC	Intergovernmental Panel on Climate Change
IRB	Interest Rate Buydown
KfW	Kreditanstalt fur Wiederaufbau
LIT	Limerick Institute of Technology
LTRS	Long-term Renovation Strategy
NDCs	Nationally Determined Contributions
NDP	National Development Plan
NECP	National Energy and Climate Plan
NEEAP	National Energy Efficiency Action Plan
NGFS	Network for Greening the Financial System
NZEB	Nearly Zero Energy Buildings
OBF	On-Bill Financing
OBR	On-Bill Repayment
OSS	One Stop Shop
PACE	Property Assessed Clean Energy
PAYS	Pay As You Save
PF4EE	Private Finance for Energy Efficiency financial instrument
PRB	Principles of Responsible Banking
SBCI	Strategic Banking Corporation of Ireland
SDGs	Sustainable Development Goals
SEAI	Sustainable Energy Authority of Ireland
SECs	Sustainable Energy Communities
SFSB	Smart Finance for Smart Buildings initiative
SME	Small and Medium-sized Enterprise
TCFD	Task Force on Climate-related Financial Disclosures
TEA	Tipperary Energy Association
TEG	Technical Expert Group

Definitions

Better Energy Homes Contractors	There are c.1,500 approved Better Energy Homes Contractors on the SEAI National Register, which is accessible online. Contractors range from small sole traders to larger firms. All Registered Contractors work to a code of practice issued by the SEAI.
BER rating	A Building Energy Rating (BER) certificate indicates a home's energy performance. It is similar to the energy label for household appliances. The certificate provides a fair comparison by rating the energy performance of a home on a scale of A-G, with G being the least efficient. However, a BER is only an indication of the energy performance of a dwelling and covers only the main uses: space heating, hot water and lighting. Actual energy usage will depend on how the occupants operate the dwelling and its equipment. The Irish BER scheme is managed by the Sustainable Energy Authority of Ireland. A new enhanced BER Advisory report is to be introduced in 2020.
BER Assessor	Individuals qualified and registered as BER Assessors with the Sustainable Energy Authority of Ireland.
Building Renovation Passport (BRP)	A BRP is a long-term renovation plan or roadmap tailored to a building and the needs of the occupant. It is a tool to enable recognition of phased renovations by recording all actions on a given building (energy audits, previous interventions, recommendations, etc.) over time, independently of its owner
Bundled Measures	Energy efficiency packages or bundled measures refers to several energy efficiency measures being implemented at the same time – generally with a view to achieving a particular BER rating, e.g. heating controls, insulation and new windows to achieve a B2 rating.
Carbon Tax	In line with the "polluter pays" principle, carbon tax is a charge applied to CO2-emitting fuels including natural gas, coal, peat, and home heating oil in order to reduce emissions. Although the imposition of a carbon tax has faced strong political headwinds, decades of research show that it is the most economically efficient way to reduce emissions. A carbon tax was introduced in Ireland in 2010, with the Government setting a price per tonne of CO2 that is then translated into a cost per unit charged by suppliers.
CEB	The Council of Europe Development Bank (CEB) is a multilateral development bank with an exclusively social mandate. Through the provision of financing and technical expertise for projects with a high social impact in its member states, it actively promotes social cohesion and strengthens social integration in Europe.
Circular Economy	The leading advocacy body for a circular economy, the Ellen MacArthur Foundation, defines it as follows: Looking beyond the current take-make-waste extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles: • Design out waste and pollution

- Keep products and materials in use
- Regenerate natural systems

Clean Energy for all Europeans package	Europe's overarching energy policy framework is the Clean Energy for all Europeans package, which was agreed in November 2018. Its aim was to bring EU energy legislation into line with the new 2030 climate and energy targets. The rules on energy efficiency contain the principle of "energy efficiency first" and set a target of becoming almost a third more energy efficient by 2030. There is particular emphasis on improving energy performance in the built environment.
Climate Action Fund	In 2018, the Government established the Climate Action Fund (CAF) as one of four funds under the National Development Plan 2018-2027. The CAF was created to provide financial support to projects that will help Ireland achieve its climate and energy targets. It offers the potential for innovative interventions that otherwise would not be able to access funding. It also seeks to facilitate projects that, as well as having a climate impact, also contribute to other Government policy priorities, e.g. projects that support innovation, build capacity, promote a just transition, generate wider socio-economic benefits and leverage non-exchequer sourced investment.
Climate Action Plan 2019	Launched in 2019, the Climate Action Plan sets out an ambitious course of action over the coming years to address the impacts of climate change on Ireland's environment, society, economic and natural resources. The Plan clearly identifies the nature and scale of the challenge. It outlines the current state of play across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and charts a course towards ambitious decarbonisation targets.
COSME facility	The programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME) is improving access to finance for SMEs through two financial instruments that have been available since August 2014. COSME has a budget of over €1.4 billion to fund these financial instruments that facilitate access to loans and equity finance for SMEs where market gaps have been identified. COSME financial instruments are complemented by resources from the European Fund for Strategic Investments (EFSI).
Cost Optimal	The cost optimal level is defined in the Energy Performance of Buildings Directive (2010/31/EU) as "the energy performance level which leads to the lowest cost during the estimated economic life cycle of a building or an improvement measure". This assessment includes both capital and operating costs over an agreed time period. The implication is that if a particular energy performance target cannot be justified economically, then the cost optimal solution is an acceptable standard.
Credit Enhancements	Credit enhancements use public funds to reduce private finance provider risk by providing some form of credit guarantee in the event of default, bankruptcy or delinquency. They are used in many different circumstances where there is a perceived market failure requiring public intervention to stimulate investment

	and so meet policy aims. The benefit of using public funds in this way, rather than through simpler grant mechanisms, is that the public funds achieve a multiplier effect through attracting private capital co-investment.
Deep Retrofit	A deep retrofit takes a whole-house approach looking at the overall impact of the most appropriate energy efficiency measures, e.g. insulation of walls, roof, floors, window upgrades, a more efficient heating system and mechanical ventilation to maintain good indoor air quality. Renewable energy technologies such as solar water heating panels and solar photovoltaic panels may be involved. The aim is to achieve a material improvement in energy efficiency while ensuring that these measures work together successfully over the long-term. Given the national Climate Action Plan target, it is likely that, going forward, a deep retrofit will mean achieving a minimum BER rating of B2.
EaSI facility	The Employment and Social Innovation (EaSI) programme is a financing instrument at EU level to promote a high level of quality and sustainable employment, guaranteeing adequate and decent social protection, combating social exclusion and poverty and improving working conditions.
Economic and Social Research Institute (ESRI)	Irish research institute that produces independent, high-quality research with the objective of informing policies that support a healthy economy and promote social progress.
ELENA Facility	The European Local Energy Assistance (ELENA) facility is an important EU programme to support energy efficiency. Managed by the EIB, it is designed to stimulate market activity by providing grants for technical assistance for energy efficiency and renewable energy investments that target buildings and innovative urban transport.
Embodied Carbon	In the building life cycle, embodied carbon is the CO_2 equivalent associated with the non-operational phase of a building. This includes CO_2 emissions caused by extraction, manufacture and transport of materials, construction on site, maintenance, replacement, deconstruction and end of life emissions of the materials and systems that make up a building.
Energy Credits	The national Energy Efficiency Obligation Scheme places obligations on large energy suppliers and distributors (Obligated Parties or Participating Energy Suppliers) to deliver specific annual targets for energy efficiency savings in homes and in businesses. Energy credits, which count towards these targets, are awarded for energy saved through an energy efficiency project supported by a Participating Energy Supplier.
Energy Efficiency	Using less energy to perform the same task – eliminating energy waste. Within buildings, retrofits reduce energy usage and costs.
Energy Efficiency Directive (EED)	Came into force in 2012 and established a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. Amended in 2018 under the Clean Energy for all Europeans package

Energy Efficiency Obligation Scheme (EEOS)	The purpose of the EEOS, which was launched in 2014, is to help Ireland meet its obligations under the Energy Efficiency Directive (EED) in a cost-effective way. Under the EEOS, large Irish energy suppliers (Participating Energy Suppliers) must provide in-kind or financial support to energy efficiency projects in businesses and homes across Ireland.
Energy Efficient Mortgage	The Energy Efficient Mortgages Initiative definition is as follows: energy efficient mortgages are intended to finance the purchase/construction and/or renovation of both residential (single family and multi-family) and commercial buildings where there is evidence of: • energy performance which meets or exceeds relevant market best practice standards in line with current EU legislative requirements and/or • an improvement in energy performance of at least 30%. This evidence should be provided by way of a recent EPC rating or score, complemented by an estimation of the value of the property according to the standards required under existing EU legislation. It should specifically detail the existing energy efficiency measures in line with the EEM Valuation & Energy Efficiency Checklist.
Energy Partners	There are a small number of national Energy Partners, who are both registered as a Better Energy Homes Contractor and authorised by the Sustainable Energy Authority of Ireland to co-ordinate and submit grant applications on behalf of homeowners. The benefit of applying for a grant through a registered Energy Partner is that they will manage the grant application process and submission of all grant related paperwork on behalf of the homeowner.
Energy Performance of Buildings Directive (EPBD)	This Directive which came into force in 2010 promotes the improvement of the energy performance of buildings within the Union, taking into account outdoor climatic and local conditions, as well as indoor climatic requirements and cost-effectiveness. Amended in 2018 under the Clean Energy for all Europeans package
Energy Poverty	There is no universally agreed definition of energy poverty but it is often described as the "inability to keep homes adequately warm". Other terms include 'fuel poor' and 'energy poor'. In Ireland, it is defined using what is known as the expenditure method of measurement. This is where a household that spends more than 10% of its income on energy is considered to be in energy poverty.
EU Taxonomy	The EU Taxonomy is a tool to provide a common language to identify economic activities that are considered environmentally sustainable. It is basically a ruleset to determine what is "green" in a European context. At the time of writing, the plan is that the Commission will adopt the final agreed version before the end of 2020, with legislation entering into force in January 2022
European Green Deal	In December 2019, the European Commission intensified its ambition on climate action with the launch of the European Green Deal – a plan to make Europe the first climate-neutral (net zero) continent by 2050. The plan aims to boost the

	efficient use of resources by moving to a clean, circular economy, restoring biodiversity, and cutting pollution. It outlines the investments that will be needed to achieve this, sets out the financing tools available, and explains how to ensure a just and inclusive transition.
Golden Rule (Bill-Neutrality)	In the context of the UK Green Deal, this simply means that the projected energy cost savings from a retrofit offset the fixed monthly loan or tariff instalment. In this way, the final user does not pay higher bills than before the intervention and, once the pay-back period is reached, will experience real financial savings.
Green Bond	A green bond is a type of fixed-income instrument that is specifically earmarked to raise money for climate and environmental projects. These bonds are typically asset-linked and backed by the issuing entity's balance sheet, so they usually carry the same credit rating as the issuer's other debt obligations.
Green Mortgage	The terms "green mortgage" and "energy efficient mortgage" are used interchangeably but technically they mean different things. A discounted mortgage linked solely to the energy performance of a building is an energy efficient mortgage. Whereas a green mortgage has a more holistic approach and, in addition to energy efficiency, takes into account other factors such as water usage, indoor air quality pollution, waste reduction measures, and embodied carbon. In practice, however, most of what are called green mortgages on offer in Ireland and elsewhere are based purely on energy efficiency. Green mortgages can offer consumers a range of benefits including reduced interest rates, an increase in the loan amount or other benefits. Crucially, these preferential terms are provided by the financial institution without public finance support.
Green Supporting Factor	The 2018 EU Sustainable Finance Action Plan included a specific action to explore the idea of a "green" supporting risk-weighting factor as an approach to recognise the lower risk associated with low carbon assets. This proposal has been extensively discussed in policy, regulatory and banking circles. Those in favour refer to the positive systemic value of green projects and activities as an approach for risk management. Those against put forward the argument that capital requirements must remain risk-based and that green projects are not necessarily lower risk.
Greenhouse gas (GHG)	A greenhouse gas is any gas that has the property of absorbing infrared radiation (net heat energy) emitted from Earth's surface and reradiating it back to Earth's surface, thus contributing to the greenhouse effect, or warming of the earth's atmosphere. Carbon dioxide, methane, and water vapour are the most important greenhouse gases.
Greenwashing	Greenwashing is the practice of making an unsubstantiated or misleading claim about the environmental benefits of a product (including a financial product), service, technology or company practice.
Heat Pump	Domestic heat pumps are powered by electricity and work by extracting heat from the air or ground outside the house and concentrating it for use inside the

	home. A heat pump is an alternative to oil, gas, solid fuel and conventional home heating systems. Heat pumps are classified as renewable sources of energy and are especially clean if the electricity used to power them is generated from renewable sources. For heat pumps to work effectively, a relatively high level of energy efficiency in the building envelope (roof, floor, walls, windows and doors) is required.
Horizon2020	Horizon2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.
Nearly Zero-Energy Building	NZEB means a building that has a very high energy performance. The nearly zero or very low amount of energy required (for space, heating, hot water and lighting) should be met to a very significant extent by energy from renewable sources, including energy produced on-site or nearby. The NZEB standard applies to all new residential buildings receiving planning permission in Ireland after 1 November 2019 and to all homes completed after 31 December 2020, regardless of when planning was granted.
Net Zero	Net zero can refer to net zero carbon or net zero GHG emissions. As it relates to GHG emissions, it refers to the balance between the amount of GHG produced and the amount removed from the atmosphere. It simply means that, after all efforts have been made to reduce GHG emissions to zero, any remaining emissions are removed from the atmosphere, either through nature-based methods (e.g. afforestation and rewetting peatlands) or through direct air capture and storage methods. Net zero GHG emissions are also referred to as climate-neutral.
Obligated Party	Under Ireland's Energy Efficiency Obligation Scheme, Obligated Parties (most often referred to as Participating Energy Suppliers) have annual targets for making energy efficiency savings in homes and businesses. A Participating Energy Supplier is a supplier or distributor selling more than 600 GWh of energy per year to final customers.
On-bill schemes	On-bill schemes are a method of financing energy renovation investments in buildings that use energy bills as the repayment vehicle. There are two different types of On-bill schemes, namely On-bill financing and On-bill repayment programs.
On-tax or Property Assessed Clean Energy (PACE) financing	On-tax or PACE schemes allow the funding of energy efficiency improvements on private property through voluntary property tax assessments. These schemes allow a property owner to finance the up front cost of energy or other eligible improvements on a property and then pay the costs back over time through a voluntary assessment. The unique characteristic of On-tax or PACE assessments is that the assessment is attached to the property rather than to an individual.

One Stop Shop	Retrofit One Stop Shops can help overcome many of the behavioural and financial barriers associated with home retrofits through simplifying the customer journey. While there is no one definition or type of a retrofit OSS, they are organisations that guide homeowners through key stages in the renovation process – both from a technical and financial perspective. They also engage in marketing activities to generate customer demand and perform lead-filtering functions. Essentially, a One Stop Shop brings together the fragmented supply side of the value chain, e.g. BER assessors, engineers, surveyors, architects, suppliers, installers, grants, and finance providers into one customer-centric offer. There is a single point of contact for the homeowner and One Stop Shops take responsibility for the process, managing a retrofit project to completion.
Paris Agreement on Climate	An agreement reached in Paris in December 2015 at COP21. The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to increase the ability of countries to deal with the impacts of climate change, and at making finance flows consistent with a low GHG emissions and climate-resilient pathway.
Participating Energy Supplier (PES)	Under Ireland's Energy Efficiency Obligation Scheme, Obligated Parties (most often referred to as Participating Energy Suppliers) have annual targets for making energy efficiency savings in homes and businesses. A Participating Energy Supplier is a supplier or distributor selling more than 600 GWh of energy per year to final customers.
Pay As You Save (PAYS)	A PAYS arrangement means that the term of the finance provided for a retrofit is linked to the term over which the energy cost savings from the retrofit can be realised, so that the repayments are equal to or less than the predicted savings. Internationally, PAYS terms are usually linked to alternative repayment/security mechanisms, i.e. where the finance is repaid through energy bills (On-bill schemes) or through property tax bills (On-tax or PACE schemes).
Principles of Responsible Banking	Launched in 2019, this is the UN-supported initiative that sets the global standard for what it means to be a responsible bank that is creating value for both shareholders and society. The Principles provide the framework for a sustainable banking system and help the industry to demonstrate how it makes a positive contribution to society.
Private Finance for Energy Efficiency (PF4EE) financial instrument	The PF4EE is a joint agreement between the European Commission and the EIB and supports private financial institutions to target lending at projects that support the implementation of National Energy Efficiency Action Plans or other energy efficiency programmes of EU Members States. Launched in 2014, the PF4EE is a portfolio-based credit risk protection provided by the EIB (acting on behalf of the European Commission) that enables local financial institutions to offer better financial terms to the ultimate borrowers.

Property Assessed Clean Energy (PACE)	See On-tax financing
Renovation Wave Initiative	On 14 October 2020, the European Commission published the Renovation Wave Strategy. This aims to address the current low decarbonisation and renovation rates across the EU. It also provides a framework for renovation to play a key role in supporting a green and digital recovery following the COVID-19 crisis.
Retrofitting	Retrofitting is the renovation of a building to make it more energy efficient and comfortable. This involves new heating and cooling systems or better insulation in the walls or roof. Retrofitting reduces the cost of living or working in a building and cuts energy use substantially.
Shallow retrofit	A shallow retrofit involves one or more single energy efficiency measures that are relatively easy to install and may have a low upfront cost, e.g. heating controls, roof insulation etc.
Smart Finance for Smart Buildings initiative	The European Commission launched the Smart Finance for Smart Buildings (SFSB) initiative as part of the Clean Energy for all Europeans package. Building on lessons learned from the Private Finance for Energy Efficiency financial instrument, it includes practical solutions to mobilise private financing for energy efficiency and renewables in buildings.
Smart Finance for Smart Buildings guarantee facility	Under the SFSB Initiative, the Commission and the EIB have developed a flexible guarantee facility that is designed to be deployed primarily at a national level. The aim of the SFSB facility is to make private investment in residential energy efficiency projects more attractive by using EU grants as a guarantee. The SFSB facility combines funding from both ESIF and the EFSI in a guarantee instrument managed by the European Investment Fund.
Split Incentive	A split incentive occurs where the benefits do not primarily accrue to the person who pays for the transaction. In the case of rented properties where landlords meet the cost of improvements, the tenants would usually reap most of the benefits through reduced energy bills. On the other hand, tenants do not control their rental property and so have little incentive to make it more energy efficient. This means that neither party is strongly motivated to upgrade the building. The result is poorer energy efficiency outcomes in rented properties – in both residential and commercial sectors.
Sustainable Development Goals (SDGs)	The SDGs or Global Goals are a collection of 17 interlinked goals designed to be a "blueprint to achieve a better and more sustainable future for all". The SDGs were set in 2015 by the United Nations General Assembly and are intended to be achieved by the year 2030.
Sustainable Energy Authority of Ireland (SEAI)	The SEAI is Ireland's national energy authority, reporting to the Department of the Environment, Climate and Communications. It works with homeowners, businesses, communities and Government to create a cleaner energy future, with a mandate across both energy efficiency and renewable energy. Alongside its

	mandate to provide policy analysis, forecasting and modelling support to DECC, the SEAI designs and administers Ireland's energy efficiency grant programmes.
Sustainable Finance Action Plan	In March 2018, the Commission set out the EU strategy for sustainable finance. It defines this as "the process of taking due account of environmental and social considerations in investment decision-making, leading to increased investments in longer-term and sustainable activities." A key aim of this plan is to reorient capital flows, including private sector capital, towards a more sustainable economy.
Task Force on Climate-related Financial Disclosure (TCFD)	The Financial Stability Board established the Task Force on Climate-related Financial Disclosure (TCFD) to develop voluntary, consistent, climate-related financial disclosures that would be useful to investors, lenders, and insurance underwriters in understanding material risks. The TCFD published its recommendations in 2017 and these are applicable to individual organisations across all sectors and jurisdictions.
Technical Assistance	A term that is commonly used in connection with the EU's ELENA facility, technical assistance is non-financial assistance provided by specialists. It can take the form of instruction, skills training and consulting services. It may also involve the transfer of technical data. The aim of technical assistance is to maximise the quality of project implementation and impact by building capacity and supporting administration, management and policy development, etc.
UK Green Deal	The UK Green Deal was a UK government policy initiative that gave homeowners, landlords and tenants the opportunity to pay for energy efficient home improvements through the savings on their energy bills from 2012 to 2015. At the heart of the Green Deal was the rule that savings on bills would exceed the cost of the work. By meeting this 'Golden Rule', consumers were able to receive energy savings for free. Consumers then paid back the cost of such improvements through the expected savings in their energy bills. See Appendix III.3 for further details.