

Behavioural insights on energy efficiency in the residential sector



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Executive summary

This report brings together research findings and knowledge gathered by SEAI over the last six years on how to best stimulate home energy efficiency upgrades. The focus of the report centres on consumer behaviour and decision making in the context of energy efficiency in the home. Research is gathered from consumer surveys, focus groups, design thinking exercises, pilots and trials and data analysis. Much work has been done with consumers themselves, to ensure that we understand their motivations and barriers, and what their support needs are when seeking to upgrade the energy efficiency of their homes. We explore what we know about householders' attitudes to improving the energy efficiency of their homes, and how government and its agencies can best encourage and support more households to upgrade. Various models of financing and the design of support schemes are also examined so that we find out what is the most attractive design mix for consumers. We try to answer the big question of how do we encourage more people to deliver deeper energy retrofits, and in doing so, maximise comfort, energy savings and help provide health and wellbeing benefits?

To shed light on these questions, data has been compiled in this report from a range of sources including commissioned studies, funded research, pilots and trials conducted by SEAI, and also from SEAI experience gained via delivery of programmes in the residential sector over the last 10 years. The key findings will be useful to policymakers, programme delivery agents, intermediaries looking to drive and deliver household upgrades and anyone else seeking to support the delivery of improved energy efficiency in the residential sector.

SEAI's detailed analysis¹ of the potential for energy efficiency improvements across all major energy-consuming sectors in Ireland identified that energy savings potential is largest in the residential buildings sector (13.5 TWh); however, much of the available energy saving potential remains untapped due to a number of key barriers facing consumers. These barriers to the uptake of energy efficiency measures can be presented within a conceptual framework for the consumer decision-making process as presented below. Both this process, and key SEAI findings that inform the evolution of policies and measures to drive increased uptake of home energy efficiency retrofits, are summarised within the framework below.

At each stage in the decision making process, there are key considerations and 'touch points' which are critical in supporting householders to make a positive decision for energy efficiency improvements in their homes. A consumer decision to invest in a home upgrade is influenced by and dependent upon on a

combination of enablers. These are understood to be awareness and buy-in; decision factor and frequency; ability to finance; investment behaviour and motivation.

For a given consumer group, a fraction will be already aware and engaged in the idea of making an energy efficiency improvement. A sub-set of this group will make a decision in a given year – more often for room by room upgrades, and less often for major renovations. Fewer still will have the ability to finance a major upgrade, and within that group some will choose energy efficiency and others an alternative investment, like a kitchen upgrade or a holiday for example.

Supporting consumers through this process is critical to drive uptake of energy efficiency improvements that will provide benefits in terms of improved comfort, reduced energy bills and healthier, more valuable homes. The government also has drivers to deliver

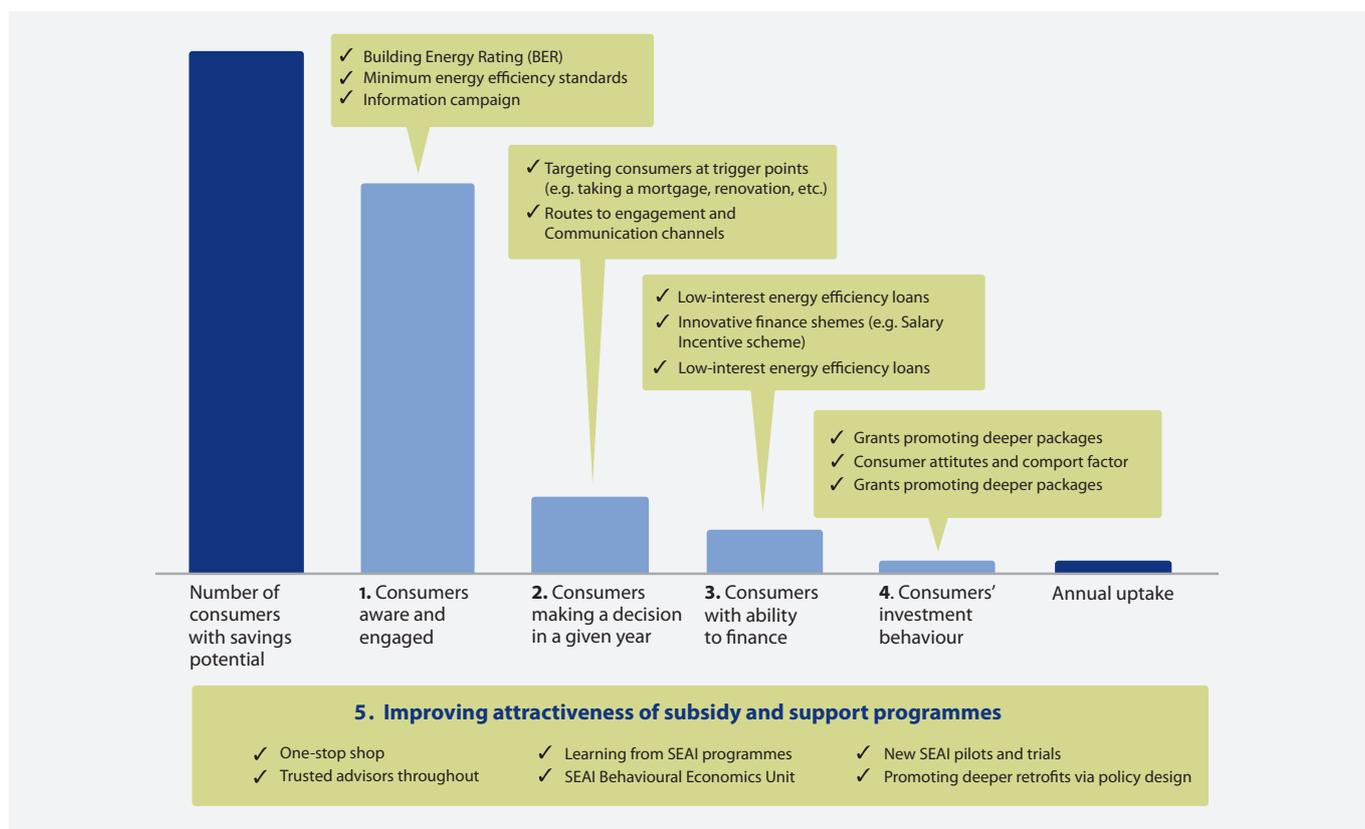
Upgrading the national housing stock is a huge challenge. It is estimated that over 1 million homes need improving – many need deep interventions to make them energy efficient

improved energy efficiency across the nation's housing stock. Ireland is subject to binding EU targets to reduce greenhouse gas emissions in non-Emissions Trading Scheme sectors by 2020 – including in transport, agriculture and buildings sectors. Transport and agriculture have proven difficult to achieve cost-effective reductions. An improved building stock will contribute to reducing national emissions and also provide health and wellbeing gains while reducing pressure on public health resources. The wider economy can gain too from the economic activity associated with delivering upgrades and from increased consumer spending following reduced energy bills.

Upgrading the national housing stock is a huge challenge. It is estimated that over 1 million homes need improving - many need deep interventions to make them energy efficient. To date over 350,000 households have delivered an upgrade with government support through SEAI grants. It is intended that through greater understanding of consumer behaviour and decision making, we can drive the breadth and depth of home upgrades across the country. Below is a summary of key insights gained through studies, consumer surveys and data analysis conducted by SEAI over the last 6 years that will contribute to this aim.

¹ SEAI, 2015, Unlocking the Energy Efficiency Opportunity

² SEAI, 2015 with MCO, Reimagining the Future of Retrofit (unpublished)



Consumer decision-making process - A conceptual framework

1 Consumers' awareness and engagement

Understanding consumer awareness across a range of different householder groups will enable more targeted policies and measures to be designed and delivered. Based on work we have undertaken to date, we know the following:

- The majority of owner-occupiers in Ireland consider energy efficiency options but consumers have different drivers for investment in energy efficiency (i.e. aspirational, comfort/value seekers and cost-driven consumers).² Other factors which affect action include the ease of the overall process and confidence in the offering provided.
- Increasing the awareness of homeowners to the benefit of completing retrofits, and highlighting local opportunities and initiatives to complete retrofits are important to stimulating householder interest. As retrofits are elective, and measures may be unfamiliar to the householder, their engagement is improved where information / initial contact comes from a trusted source, a source perceived as likely to act in their best interests and to provide impartial advice.³
- Private landlords are less likely to invest in energy efficiency due to 'split incentives'; however, minimum energy efficiency standards combined with targeted subsidies can unlock savings.⁴ Some tenants are even willing to contribute via small increases in rent in order to live in a more efficient, cheaper to run home.⁵
- More than one-quarter of Irish households could be in energy poverty using an objective measure i.e. fuel expenditure that would need to be spent to maintain certain standard internal conditions corresponds to more than 10% of household income – a specific cohort that are being targeted via specialised grant and pilot programmes.
- Consumers place strong value on the Building Energy Rating (BER), and with prospective homeowners checking BERs before purchasing, we can see its effect on both the price and pace of the sale. The BER advisory report is also an ideal tool to provide retrofit advice and options for enhancing its impact are in development.
- SEAI is currently working to extend the value of the BER data set by adding a geolocation field to all BER records to enable better targeting of policies and measures through greater understanding of the range of factors that can influence the number of upgrades across the housing stock.

³ SEAI 2016, Retrofit Research Survey with B&A and SEAI pilot participant surveys

⁴ SEAI, IPOA and B&A, 2013, Private landlord survey

⁵ Collins and Curtis, 2017 (publication pending). Can tenants afford to care? Investigating the willingness-to-pay of renters in a stressed rental market and returns to investment for landlords.

2 Decision-making frequency and trigger points

It is important to target consumers at key trigger points to convince them to make a positive decision regarding energy efficiency, especially considering how few consumers are likely to make decisions regarding major home improvements between now and 2030. Examples of potential trigger points and channels of communication are listed below.

Trigger point	Channel of communication
Anticipated home improvement	Architects, supply chain, contractors, banks, 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

- The decision making frequency is greater for minor home improvements such as refurbishing a room. Adding an extension, and/or installing external wall insulation and new windows, for example, will be considered less often. It is important that householders considering any level of retrofit are supported – we know that some consumers like to make a small improvement first in order to be convinced that a deeper upgrade will have the anticipated benefits.

3 Availability of finance

Although clearly not the only barrier, lack of sufficient funds is one of the key reasons why consumers in the residential sector are not willing to invest in various energy efficiency measures and packages.

- Recent analysis suggests that introducing low-interest energy efficiency loans combined with grants could be an attractive option to improve the uptake of existing grant programmes, and promote deeper retrofits
- Both conventional and innovative ways of introducing energy efficiency loans have been identified ranging from buying-down the interest rate and risk sharing to providing loans via employers or suppliers. Trials led by SEAI in these areas show some promise.
- In research undertaken for SEAI, consumers have indicated the ease of application for finance is important to them as well as preference for flexibility in both lending and payback terms.⁶ The use of consumer finance is therefore a model that may prove attractive to consumers similar to that provided under car finance packages.

4 Understanding consumers' investment behaviour

Consumers do not make purchasing decisions purely on costs and energy savings – the majority of consumers also consider the impact of energy efficiency investment on their comfort level – many citing comfort as their main driver for taking action.

- An alternative way of representing the consumer investment decision is to quantify consumers' attitudes towards various aspects of energy efficiency technologies and policies. A recent survey in Ireland commissioned by SEAI has gathered data on consumer attitudes. The study quantified, that grants have more than 30% additional emotional impact (i.e. 1 Euro grant corresponds to 1.3 Euro in consumers' minds).⁷
- Consumers' final investment decision can be represented by "willingness-to-pay" curves – for instance, around 10% of owner occupiers are 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 groups.

5 Improving attractiveness of subsidy and support programmes

There are already a range of supports available for householders including grant schemes at the individual household level, as well as targeted schemes for the energy poor and community level and innovative financing projects. Informational resources are also available promoting the benefits of home improvement for increased efficiency. Gaining insights into how consumers interact with these schemes is critical in ensuring they are impactful and an efficient use of government resources.

- The great majority of participant householders across all SEAI pilots and trials, when surveyed, identified a trusted source as the key referral source. This is someone with whom they already have a relationship and may for instance be a BER assessor, the local credit union or some other local community group.
- 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.
- Government subsidies can be designed to promote deeper retrofit - for instance, SEAI has introduced additional support

⁶ SEAI 2016, Retrofit Research Survey with B&A

⁷ Element Energy for SEAI, 2016, Survey on consumers' attitudes towards energy efficiency loans in Ireland (unpublished)

for “Residential Combined Fabric Upgrade Packages”, which will increase the total grant level from 35% to 50% to homes that are being retrofitted to achieve a high performance level by installing a combination of fabric measures and heating technologies to achieve certain performance standards.

- A review of relevant subsidy schemes in other European member states have identified that energy consultants (who are trained and subsidised by the government) can increase awareness and confidence of government schemes.
- Considering the framing of offers will be key to driving uptake. SEAI's Behavioural Economics Unit will investigate and test alternative framings to measure potential impacts on scheme uptake. Any positive impacts can then be applied across existing schemes to enhance impact.

Next step and key actions

Designing policies and measures that effectively support the consumer decision making process and deliver increased uptake and greater depth of home energy efficiency retrofit is an ongoing challenge. It is being informed by much of the information and insights summarised above and those expanded on in this report. The ongoing actions and next steps listed below highlight current initiatives that seek to continue to increase our understanding of consumer behaviour and decision making, so that we can better support householders in their energy use and efficiency. In the context of delivering a sustainable energy future for households, SEAI is committed to:

Exploring behavioural economics approaches

SEAI is establishing a Behavioural Economics Unit in 2017 whose overarching ambition is to better understanding the context in which people make decisions; use the latest research in behavioural science; and to design and test interventions, through for example pilots, using rigorous and evidence based methodologies to determine the effectiveness of interventions before they are scaled.

Learning by listening

- Undertaking ongoing surveys of householders, both those who are scheme participants, and those who have not yet engaged in energy efficiency activities, in order to understand what works best for the consumer
- Continuously reviewing both the existing and new schemes and refining scheme parameters based on the various pieces of research and feedback

- Sharing data from such surveys with research groups considering the relevant issues in Ireland

Piloting new ideas

- Continuing the testing and trialling of new routes to engaging with consumers, this includes credit unions, employers and the supply chain
- Building the ‘trusted advisor’ role into our offering so that consumers are confident and convinced to act.
- Ongoing piloting of innovative financing mechanisms to establish what works best for consumers
- Reporting on the results and insights gained from these trials and pilots
- Keeping a watching brief on the introduction of new schemes in other Member States for Irish suitability and replication

Exploring potential new support mechanisms

- The Deep Retrofit Pilot Programme is in place in 2017 to test the market readiness, from both a supply and demand perspective, to deliver major home energy transformations
- Combined fabric upgrade package being introduced in 2017 under BEC will test how focused increased grant levels can affect the depth and nature of home retrofits
- Ongoing research into possible alternative financing mechanisms. With particular consideration being given to the viability and structure of any low-interest loan coupled with grants, in supporting new cohorts of householders who cannot raise the funds required for a home upgrade, but might be willing to borrow to reap the gains now.

Enhancing tailored information

- Getting the right information to the right consumer at the right time is critical to success -SEAI is working on an enhanced BER advisory report that will present tailored options for individual households to improve their BER and provide a clear route directly to financiers and suppliers.
- Continuing to work to identify key influencers in the decision making process and target them with the right information to pass on to householders, as establishing an intermediary market will increase our reach and effectiveness.

Context

Greenhouse gas emission reductions in buildings are crucial for Ireland in terms of meeting national, EU and international climate change and greenhouse gas commitments. Energy efficiency can save households money, make businesses more competitive, reduce Ireland’s reliance on imported fossil fuels and greatly contribute to environmental objectives including reduction of greenhouse gas emissions. The International Energy Agency (IEA) recently highlighted a broader range of benefits including improved health (and reduced health budget spend), increased asset values, poverty alleviation and job creation.⁸

SEAI’s detailed analysis⁹ of the potential for energy efficiency improvements across all major energy-consuming sectors in Ireland identified potential energy efficiency savings that amount

Energy efficiency can save households money, make businesses more competitive, reduce Ireland’s reliance on imported fossil fuels and greatly contribute to environmental objectives

to nearly a quarter of Ireland’s primary energy demand (nearly 35 TWh). In absolute terms, the potential is largest in the residential buildings sector (13.5 TWh); however, much of the available energy saving potential remains untapped due to a number of key barriers consumers are facing.

The analysis went beyond a straightforward estimate of the technical and economic savings potential of energy efficiency measures and incorporated the behaviour and decision-making process of consumers. The extent to which energy users will actually implement energy efficiency measures was considered in the context of a range of targeted policy options designed to influence uptake.

The decision-making process essentially consists of a series of ‘hurdles’ involved in the uptake of energy efficiency measures. The conceptual framework for decision-making relating to energy efficiency measures includes the following aspects:

- **Awareness and engagement:** The first aspect of the decision-making process is the segmentation of the consumer population on the basis of ‘awareness and engagement’. Different consumer segments were identified and assessed in various studies. For instance, some consumers think that they do not need to reduce energy use as energy is not a top priority. Similarly, some of the private landlords do not see the benefit of energy efficiency due

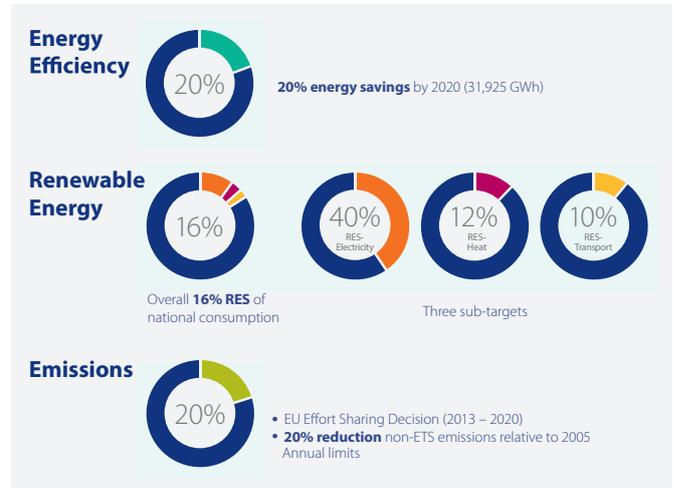


Figure 1: Headline energy and emissions targets¹⁰

to “split incentives”. In order for these consumers to consider energy efficiency measures, regulation might be needed (e.g. minimum energy efficiency standards for private rented properties).

- **Decision-making frequency and trigger points:** The decision frequency is the frequency with which consumers make purchasing decisions (whether positive or negative) regarding their building fabric or equipment, and is thus an important limit to the rate at which energy efficiency measures can be taken up. The decision frequency is typically related to ‘trigger points’ at which consumers are most likely to consider making energy efficiency improvements. For a deep retrofit, this might be an end-of-life replacement for a heating system or other major piece of equipment, or a major building renovation (initially for reasons other than energy efficiency). For a shallow retrofit such as a draught-proofing, this could be related to a minor renovation such as redecoration of a room.
- **Insufficient funds and availability of finance:** Lack of sufficient funds for energy efficiency projects is the most important barrier in the residential sector based on a number of surveys carried out in Ireland.¹¹ SEAI’s Better Energy programmes help reduce the required capital investment by providing grants; however, low cost accessible finance for energy efficiency measures in the residential sector could also be introduced to provide an option for those who cannot save the required level of upfront costs for a retrofit.
- **Consumers’ investment behaviour:** Consumers’ investment decision is not only based on costs and savings. For instance,

⁸ IEA, 2014, Capturing the Multiple Benefits of Energy Efficiency

⁹ SEAI, 2015, Unlocking the Energy Efficiency Opportunity

¹⁰ SEAI, 2016, Ireland’s Energy Targets Progress, Ambition & Impacts

¹¹ SEAI 2013, 2014 and 2016, Retrofit Research Surveys with B&A

one of the most important reasons in determining whether consumers would choose to invest in energy efficiency is “how much the energy efficiency package would improve the comfort of the consumer’s home”. Similarly, a recent survey in Ireland showed that grants have more than 30% additional emotional impact – i.e. 1 Euro grant corresponds to 1.3 Euro in consumers’ minds.¹² Understanding consumers’ attitudes towards different aspects of energy efficiency technologies and policies, and their preferences is crucial.

- **Attractiveness of Government subsidies and programmes:**

A number of key learnings have been identified from various energy efficiency subsidies and programmes (including Better Energy Homes and Better Energy Communities) to improve success and attractiveness of these programmes. For instance, grant programmes could be designed to promote deeper packages of retrofit. How these schemes are designed and

presented to consumers has a direct relationship to scheme participation – an aspect that can be leveraged using behavioural insights.¹³ Scheme attractiveness impacts outcomes at various stages across the decision-making journey.

This report summarises the key findings of a number of SEAI studies on consumers’ decision-making process in the residential sector. These pieces of research together with trials, pilots and lessons learned via programme delivery by SEAI and others provide a knowledge bank to inform future policy design with a view to maximising the number of householders choosing to undertake an energy efficiency retrofit in their home. These insights inform both how to support more householders to take action, and for that action to lead to greater (deeper) energy savings per dwelling. The subsequent sections include more detailed information on each stage of the consumer decision-making process as illustrated in Figure 2.

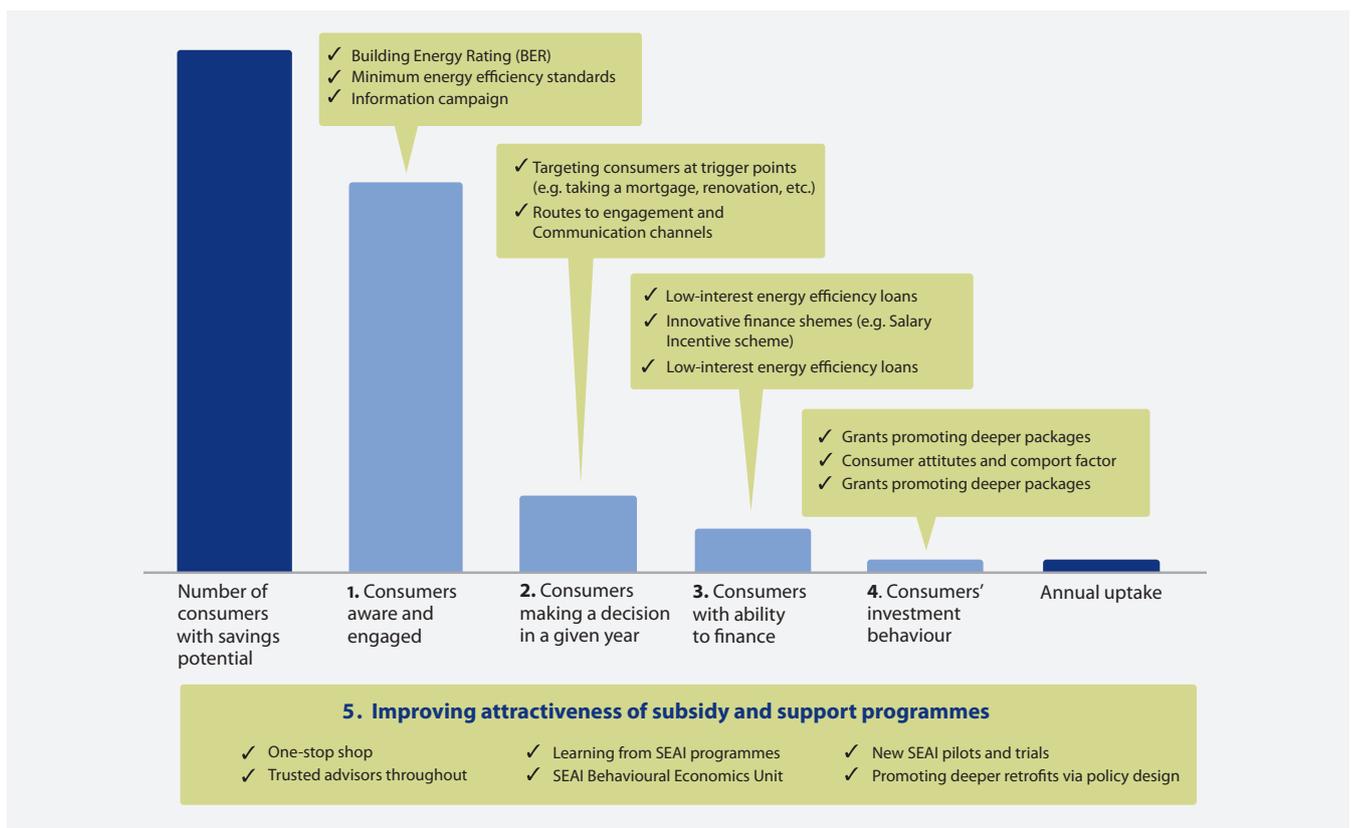


Figure 2: **Consumer decision-making process and relevant SEAI activities**

¹² SEAI, 2016, Survey on energy efficiency loans in Ireland and SEAI, 2016, Retrofit Research Surveys

¹³ See further detail in section 4

1 Consumers' awareness and engagement



1.1 Consumer segments

In 2015, SEAI commissioned research to gather data on consumer attitudes in Ireland towards energy efficiency improvements.¹⁴ Based on the survey of a representative sample of 1,500 respondents, four consumer segments were defined on the basis of 'awareness and engagement' that describe consumers' attitude towards energy efficiency.

The survey found that around 70% of owner-occupiers and around 60% of tenants think they can reduce energy use and consider energy efficiency options. In other words, majority of consumers in the residential sector might be willing to invest in energy efficiency if other barriers, which are explained in the next sections, are addressed by a combination of policy interventions.

Grouping consumers in this way helps us to understand how to influence more positive decisions for a retrofit and how to tailor messages and supports. For instance, consumers in group A (for whom energy is not a top priority), are assumed not to participate in decision-making regarding energy efficiency unless regulation is applied to make this mandatory. Consumers in group B (who think they have already put in place

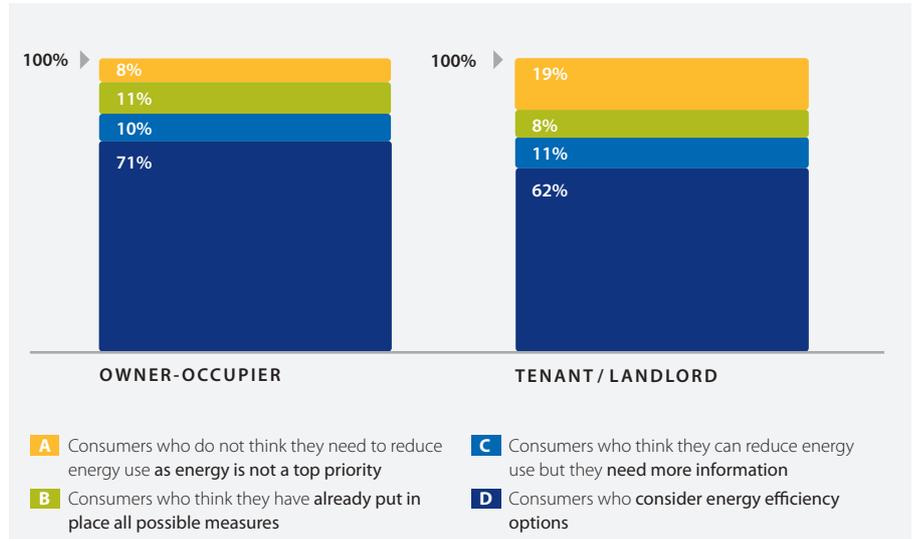


Figure 3: Consumer segments in the residential sector¹⁴

all possible energy efficiency measures) could be encouraged to participate through either regulation or 'active promotion' of interventions (e.g. energy suppliers could present tailored estimates of energy saving potential directly to customers). In other words, a more direct and personalised approach may be required. Generic, 'untargeted' information campaigns are not assumed to change the behaviour of consumers in groups A or B. Consumers in group C (who identify themselves as 'needing more information'), on the other hand, are assumed to consider energy

efficiency technologies when an information campaign is undertaken. Consumers in group D (the largest group) consider energy efficiency options but they still base their decisions on the suite of programmes and incentives available.

A recent exercise carried out by SEAI identified alternative consumer segments based on consumers' drivers as illustrated below. This segmentation was used to identify targeted actions in order to ascertain how best to realise more retrofits of homes in Ireland.

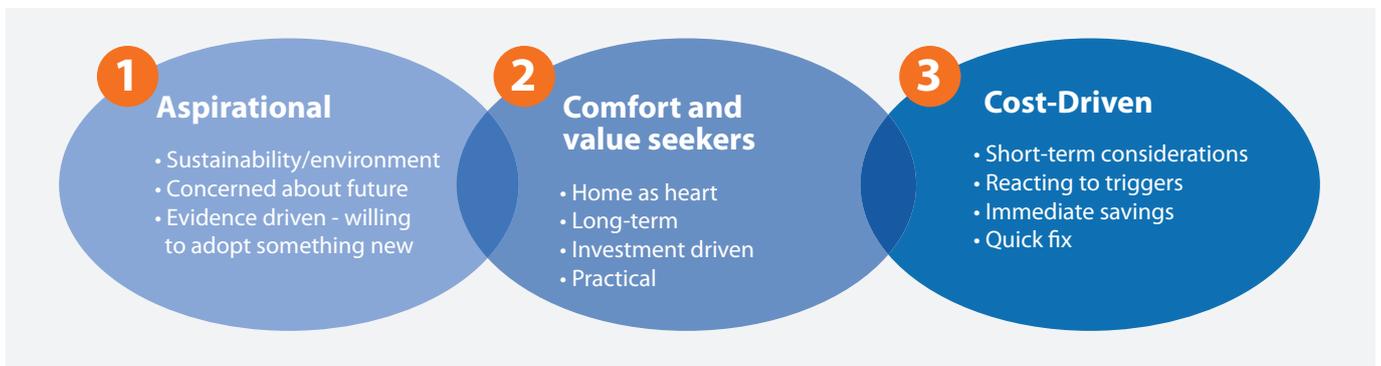


Figure 4: Consumer segments in the residential sector¹⁵

¹⁴ SEAI, 2015, Unlocking Ireland's Energy Efficiency Potential

¹⁵ SEAI, 2015 with MCO, Reimagining the Future of Retrofit (unpublished)

Private landlords in Ireland

A further consumer group that requires an alternative policy approach are private landlords. The private rented sector in Ireland is a growing sector. According to recent Census data, 29% of households nationally lived in rented accommodation. However, the so-called 'landlord/tenant split incentives' represents a market failure which significantly constrains the uptake of efficiency measures in rented property. This failure results from the common situation whereby a landlord is responsible for meeting the cost of the improvement work, but only receives a benefit where the work increases the rental or re-sale value of the property. The tenant, who is typically responsible for paying the energy bills and would thus see the benefit of the work, is unlikely to be willing to invest in a property they do not own, or may not be permitted to undertake the improvement work.

A recent paper on 'willingness-to-pay of rental tenants' shows that tenants are willing to pay higher rents for improved energy efficiency in Ireland, which would be of interest to policy with regard to encouraging landlords to invest. Similarly, other research¹⁶ found that rental tenants are in some cases willing to pay more for improved energy efficiency than they should expect to save on costs as a result of the improvement.

Key findings from a survey recently commissioned by SEAI¹⁷ to understand the main drivers of private landlord's investment in energy efficiency in Ireland suggest:

- Almost 3 in 4 landlords indicated they invest in improved energy efficiency in order to keep the property well maintained and to a good standard. Additionally, half felt these improvements would make tenants more comfortable and hence lengthen tenancies.
- No 'spare funds' was the main reason for delaying improvements.
- When presented with the idea of minimum energy performance standards for rented dwellings, half of landlords believe that meeting the energy efficiency standards would be too costly and it would force them to consider the viability of remaining a landlord. Longer term landlords indicate most resistance to the concept.
- Over half of all landlords cited the grant scheme as 'very important' in prompting energy efficiency measures on their property/properties, increasing to 7 in 10 for those who have previously availed of a grant.

Minimum thermal efficiency standards policy in the private rented sector is expected to target (at least in the first instance) properties with the lowest thermal efficiency, in accordance with their disproportionate contribution to energy consumption. A project



Figure 5: Landlords' key reasons to invest in improved energy efficiency on rental property¹⁷

commissioned by SEAI and DCCAE examined the potential impacts of three policy scenarios for minimum thermal efficiency standards in the residential and commercial rented sectors – including number, type and location of buildings affected, cost of investment, energy and CO₂ saving, and potential impact on private rented market and fuel poverty. A consultation report based on the findings of this study is expected to be published by DCCAE in 2017 but early indications suggest that such a policy could affect more than 150,000 dwellings achieving more than 800 GWh of primary energy savings per annum in Ireland. However, the potential impact on the rental market should be carefully considered, in particular in more rural regions and in low rent category dwellings.

Residential sector	
Total number of dwellings/buildings affected	Up to ~176,000
Total capital investment needed	€650m – €670m
Total annual primary energy savings	~840 GWh/yr
Total annual CO ₂ savings	170 ktCO ₂ /yr
Total annual fuel bill savings	€110m per yr
Net Present Value (10%) 2015-2035	€105m-€195m

Table 1: Summary of the quantitative impact assessment¹⁸

¹⁶ Carroll et al, 2016, Low energy efficiency in rental properties: Asymmetric information or low willingness-to-pay

¹⁷ SEAI, IPOA and B&A, 2013, Private landlord survey

¹⁸ SEAI and DCCAE, 2016, Minimum thermal efficiency standards for the private rented sector in Ireland

1.2 Energy poverty in Ireland

Energy poverty is a policy concern as it can have a serious impact on both the individuals and society as a whole. DCCAE's Strategy to Combat Energy Poverty in Ireland¹⁹, which was launched in 2016, highlights that energy poverty has links to excess winter mortality, to increased rates of cardiovascular and respiratory diseases and increasingly, to overall states of mental health and wellbeing.

This strategy was accompanied by an assessment of the level of energy poverty in Ireland using a methodology which compared fuel expenditure that would need to be spent to maintain certain standard internal conditions to household income using three thresholds of percentages of household income spent on energy (i.e. 10%, 15% and 20%). Using the 10% threshold, this assessment suggested that more than a quarter of Irish households could be in energy poverty.

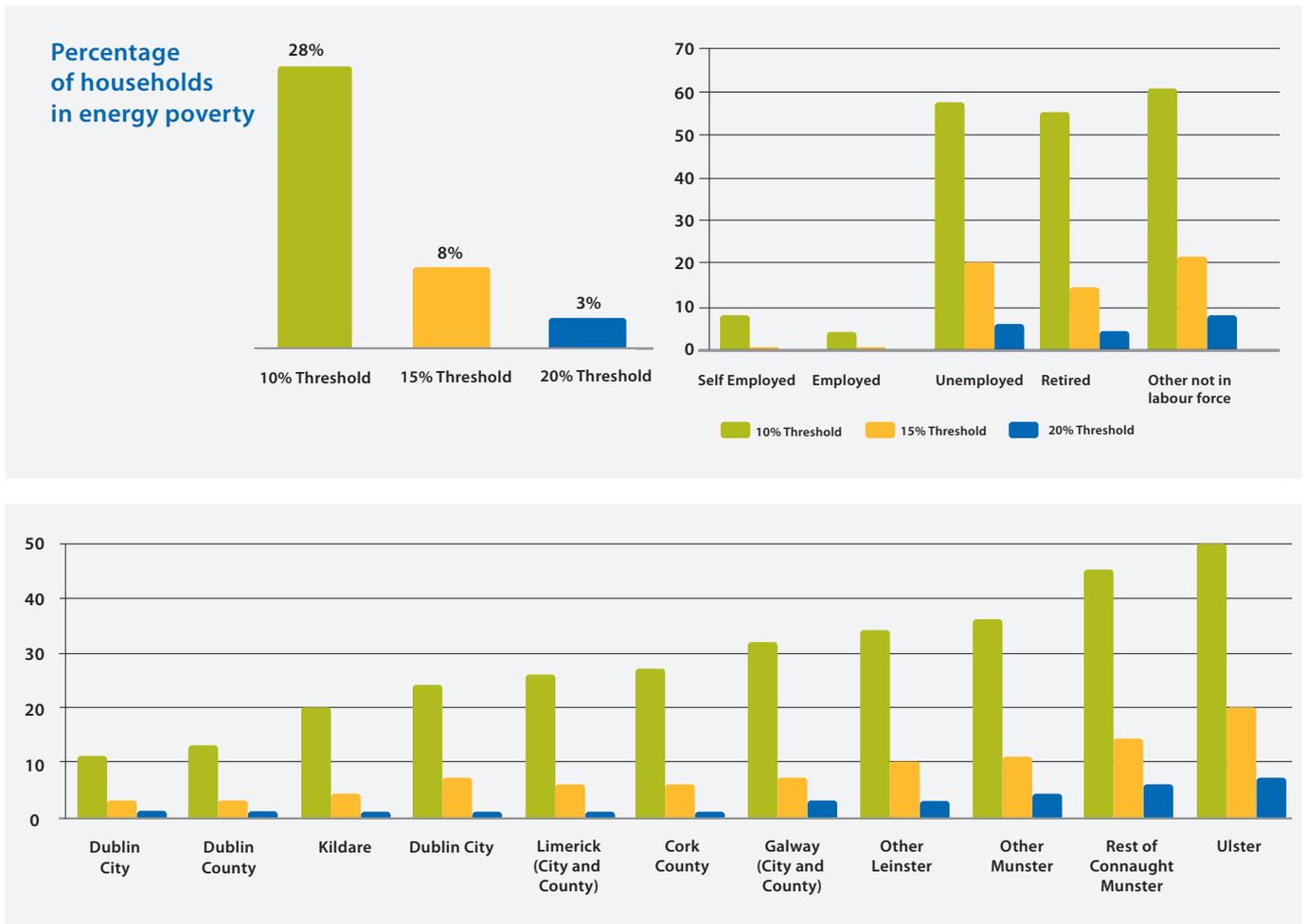


Figure 6: Bottom-up estimate of energy poverty in Ireland²⁰

¹⁹ DCCAE, 2016, Strategy to combat energy poverty in Ireland

²⁰ DCCAE, 2016, Bottom-up analysis of energy poverty in Ireland

To tackle fuel poverty, DCCAE committed to a number of key actions including a new three year pilot energy efficiency scheme. The “Warmth and Wellbeing Scheme” will combat energy poverty by targeting those suffering from acute health conditions, living in poorly insulated homes; and expanding the eligibility criteria for existing energy efficiency schemes to capture more people suffering basic deprivation.

Warmth and Wellbeing Scheme

The Warmth and Wellbeing Scheme aims to make homes warmer and healthier to live in. It does this by providing extensive energy efficiency upgrades to those in energy poverty who are living with Chronic Obstructive Pulmonary Disease (COPD) and Asthma.



This initiative is being led by the Department of Communications, Climate Action and Environment (DCCAE), in conjunction with the Department of Health and the Health Services Executive (HSE).

This scheme is administered by the Sustainable Energy Authority of Ireland (SEAI) on behalf of DCCAE, in association with the HSE. This scheme is a pilot scheme established initially for a three-year period and will be subject to review.

1.3 Future insight: gathering better data to target consumers in Ireland

SEAI is currently working to extend the value of the BER data set by adding a spatial field to all BER records, of which there are now circa 660,000 domestic and 42,000 non-domestic. The ability to represent BERs spatially unlocks a new realm of analysis around the building stock and its relationship to other data such as that collected via CSO surveys, including the census. Indicative analysis includes many recommendations with the main ones highlighted opposite.

Future insight

- Linkage of building quality to income and other socio-economic data to highlight, for example, areas most at risk of energy poverty. Outputs could be leveraged to undertake work in these areas via a number of existing programmes
- Analysis of possible multiplier effects of deep retrofit e.g. do deep retrofits, with measures such as external wall insulation, lead to localised clusters of retrofit given the visual nature of the works
- Highlighting key projects, such as BEC spatially and appending useful information to promote community action
- Establishing county / small area comparisons to encourage action, e.g. through nudging
- Enabling consumers to see the BERs of the houses on their street (in an anonymised way) to see what is possible for their dwelling type

1.4 Creating the conditions for awareness and engagement

Awareness and Trust

Increasing the awareness of homeowners to the benefit of completing retrofits, and highlighting local opportunities and initiatives to complete retrofits are important to stimulating householder interest. As retrofits are optional, and measures may be unfamiliar to the householder, householder engagement is improved where information / initial contact comes from a trusted source, a source perceived as likely to act in their best interests and to provide impartial advice. Research²¹ suggests that such sources include:

- nationally recognised expert groups, e.g. BER assessors, energy suppliers, or qualified local contractors
- Independent government bodies (such as SEAI)
- local community groups that the householder has a particular trust in or affinity with, e.g. the local credit union or a community organisation such as an SEC
- their employer

Engaging with the Homeowner

Research carried out with B&A in late 2016²¹, found that only 10% of homeowners actually intend carrying out retrofit works in the

coming few years. To change this paradigm we need to look at the consumer decision making journey and see where we can positively affect their choices along the way.

Despite strong evidence that grants and loan offerings are required to drive actual retrofit uptake, it would seem that initially the most important factors given by homeowners in evaluating whether to consider an energy efficiency package are:

- comfort of the home
- the level of energy savings that can be realised
- the cost of achieving these savings
- the ease at which the various elements of the overall process could be arranged
- the evidence of health benefits for the household resulting from improving the energy efficiency

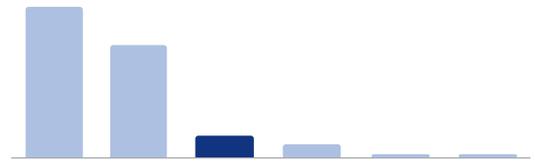
These points resonate with other research findings, as shown in figure 14 later in the report.

Consumers' awareness and engagement: Summary of key findings

- Majority of owner-occupiers in Ireland consider energy efficiency options but consumers have different drivers for investment in energy efficiency (i.e. aspirational, comfort/value seekers and cost-driven).
- Private landlords are less likely to invest in energy efficiency due to 'split incentives'; however, minimum energy efficiency standards combined with targeted subsidies can unlock savings.
- More than one in every four Irish households could be in energy poverty (using an objective measure of energy poverty i.e. energy expenditure that would need to be spent to maintain certain standard internal conditions corresponds to more than 10% of household income). Energy poverty in Ireland is being tackled by a number of targeted grant and pilot programmes.
- Advice to householders need to come from a trusted source – understanding who is trusted is important
- SEAI is currently working to extend the value of the BER data set by adding a spatial field to all BER records to enable targeting of specific areas and certain demographics.

²¹ SEAI 2016, Retrofit Research Survey with B&A

2 Decision-making frequency and trigger points



The decision frequency is the frequency with which consumers make purchasing decisions (whether positive or negative) regarding their building fabric or equipment, and is thus an important limit to the rate at which energy efficiency measures can be taken up.

The decision frequency is typically related to 'trigger points' at which consumers are most likely to consider making energy efficiency improvements. The trigger points are generally anticipated home improvement projects – often initially for reasons other than energy efficiency. For a deep retrofit, this might be an end-of-life replacement for a heating system or other major piece of equipment, or a major building renovation/improvement – sometimes these are undertaken at the time of purchase of the home. For a shallow retrofit such as a draught-proofing, this could be related to a minor renovation such as redecoration of a room. The figure below illustrates the frequency with which survey participants undertook specific household improvements in the last three years – these are potential trigger points for energy efficiency investments. The frequency with which they are undertaken allows us to make estimates of how often there might be opportunities to target consumers with information that might lead to these improvements incorporating an energy efficiency element.

Figure 8 below shows the estimated 'average' decision-making frequencies for shallow, medium and deep 'packages' of energy efficiency measures in terms of number of years required to make a decision and fraction of consumer making purchasing decisions annually. Using the survey data, the decision frequency for these packages are around 6, 9 and 15 years, respectively. The implication of this is that it might take up to

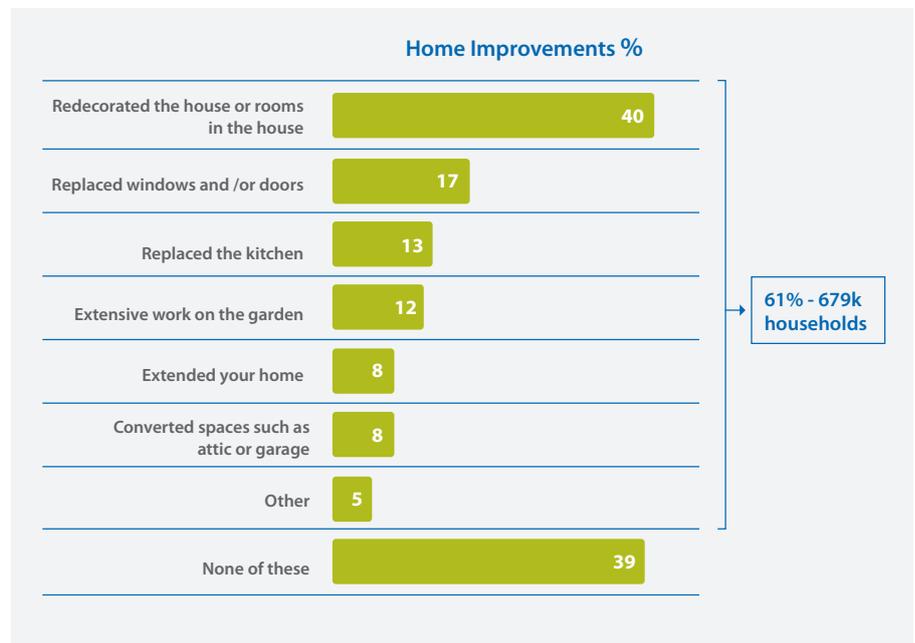


Figure 7: Potential trigger points for energy efficiency investment (home improvements carried out in the last 3 years)²²

15 years for all consumers in the residential sector to make a decision regarding a deep retrofit (i.e. until after 2030). In other words, a homeowner who has just carried out an extensive renovation of their house but has not installed all the potential energy efficiency measures, might not consider renovating the house again before 2030. It is therefore very important to target consumers at their trigger points to convince them to make a positive decision regarding energy efficiency – especially considering how many consumers are likely to make decisions between now and 2030.

The triggers points are not always home improvement projects. For instance, people who are extending their family or those who are suffering from illness might consider energy efficiency improvements due the need for increased comfort or for health benefits. These trigger points can be used as gateways to promote energy efficiency

projects. Methods might include²³ :

- Promoting energy efficiency in the supply chain to improve awareness
- Embedding energy efficiency as a concept in the wider finance sector as an added value for consumers seeking loans for home improvements
- The introduction of mandatory energy efficiency improvements to properties on change of ownership or for certain levels of works
- Promoting energy efficiency via mortgage brokers, BER assessors, architects, estate agents, pension advisors, employers, hospitals and energy efficiency consultants
- Incentivising obligated energy suppliers to promote deep retrofit (e.g. a consumer who engages with the grant scheme for a boiler replacement might be assigned an agent who can help promote further additional measures).

²² SEAI, B&A and The Research Perspective, 2016, Retrofit Research Survey

²³ SEAI, 2013, Better Energy Financing Barriers to the Uptake of a National Retrofit Scheme

Decision-making frequency of shallow, medium and deep packages

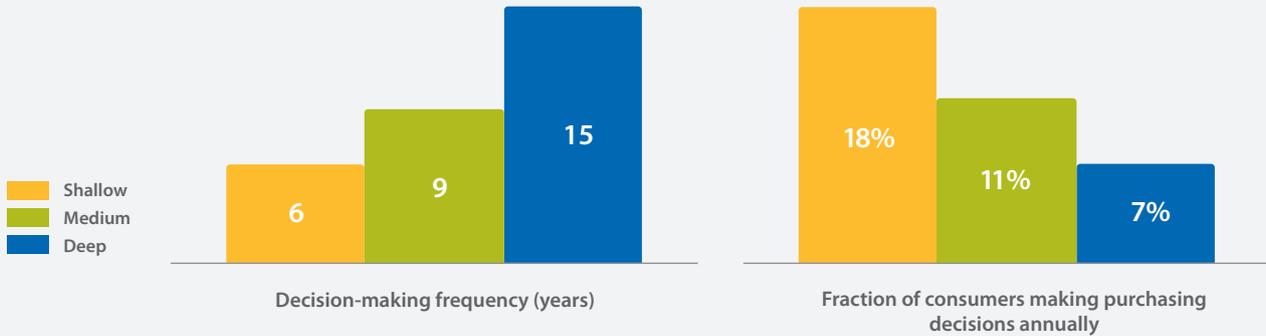


Figure 8: Estimated frequency of decision-making in the residential sector

It was noted above that the extent to which the source of advice and guidance is trusted by consumers is an important consideration. A recent survey in Ireland showed that independent BER assessors are the main sources of advice when considering carrying out

energy efficiency improvements. Other preferred options include local accredited contractor, neighbour/family/friend, energy supplier and independent Government body (e.g. SEAI).

Decision-making frequency and trigger points: Summary of key findings

- It is very important to target consumers at their trigger points to convince them to make a positive decision regarding energy efficiency, especially considering how few consumers are likely to make decisions regarding major home improvements between now and 2030.
- Decision making frequencies for shallow medium and deep home energy efficiency improvement upgrades are estimated at around 6, 9 and 15 years, respectively
- This suggests that 18 in every 100 homes make a decision on a shallow retrofit every year, 11 in every 100 for medium and only 7 in every 100 for a deep renovation. Ensuring these are positive decisions for energy efficiency improvements is key.
- Potential trigger points and channels of communication are listed below:

Trigger point

Anticipated home improvement

Buying a new house

Retirement

Extending family or illness

Community initiative

Channel of communication

Architect, supply chain, contractors, banks, energy suppliers

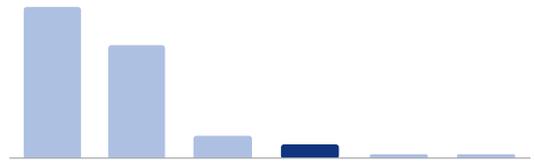
Mortgage broker, BER assessor, estate agent

Pension provider, employer

Community-based services or doctors/hospitals

Sustainable Energy Communities

3 Availability of finance



3.1 Budget constraints in Ireland

A number of surveys in Ireland confirmed that the lack of sufficient funds is one of the key reasons why consumers in the residential sector are not willing to invest in various energy efficiency measures and packages. In SEAI's recent survey of Irish consumers²⁴, of respondents who have investigated the ways to reduce energy use through energy efficiency purchases but had not acted upon these yet, over 70% identified "not having sufficient funds" as the most relevant barrier to action.

This becomes an even more important barrier for deeper energy efficiency retrofits which are more costly and include measures such as solid wall insulation and triple glazing. The total capital investment required for a deep retrofit package could be €30,000 -€40,000 for home that starts off as a G-rated

detached house on the BER scale and It is estimated that there are over 150,000 such G-rated dwellings in Ireland, which need deep retrofits. Retrofitting all of these G-rated dwellings in Ireland would require several billions of Euros of capital investment. As shown in the figure 10 overleaf, over 1 million dwellings in Ireland have a BER rating of C and lower, which need some level of retrofit.

3.2 Low-interest energy efficiency loans in Ireland

Existing grant schemes provide householders with financial support for the upfront cost of energy efficiency upgrades. However, many consumers are not able to provide the remaining capital required. The Better Energy Financing project (2012-14) recommended analysis be undertaken on options for reducing the interest rate

on loans to stimulate more home energy upgrades. Similarly, the "Unlocking the Energy Efficiency Opportunity" report identified "offering low interest loan" finance for residential retrofits as a policy option that could contribute to meeting Ireland's 2020 energy efficiency target.²⁵

Since then, SEAI has undertaken analysis using choice modelling to identify the effect of various lever options of grant support and low cost finance on the number of home retrofits likely to be undertaken by consumers. Modelled results show that introducing low-interest rate energy efficiency loans combined with grants could increase the participation levels in existing grant programmes in Ireland. It could also encourage more consumers to engage in deeper retrofits. It is estimated that the total lifetime cost of introducing low-interest rate energy efficiency loans is negative –

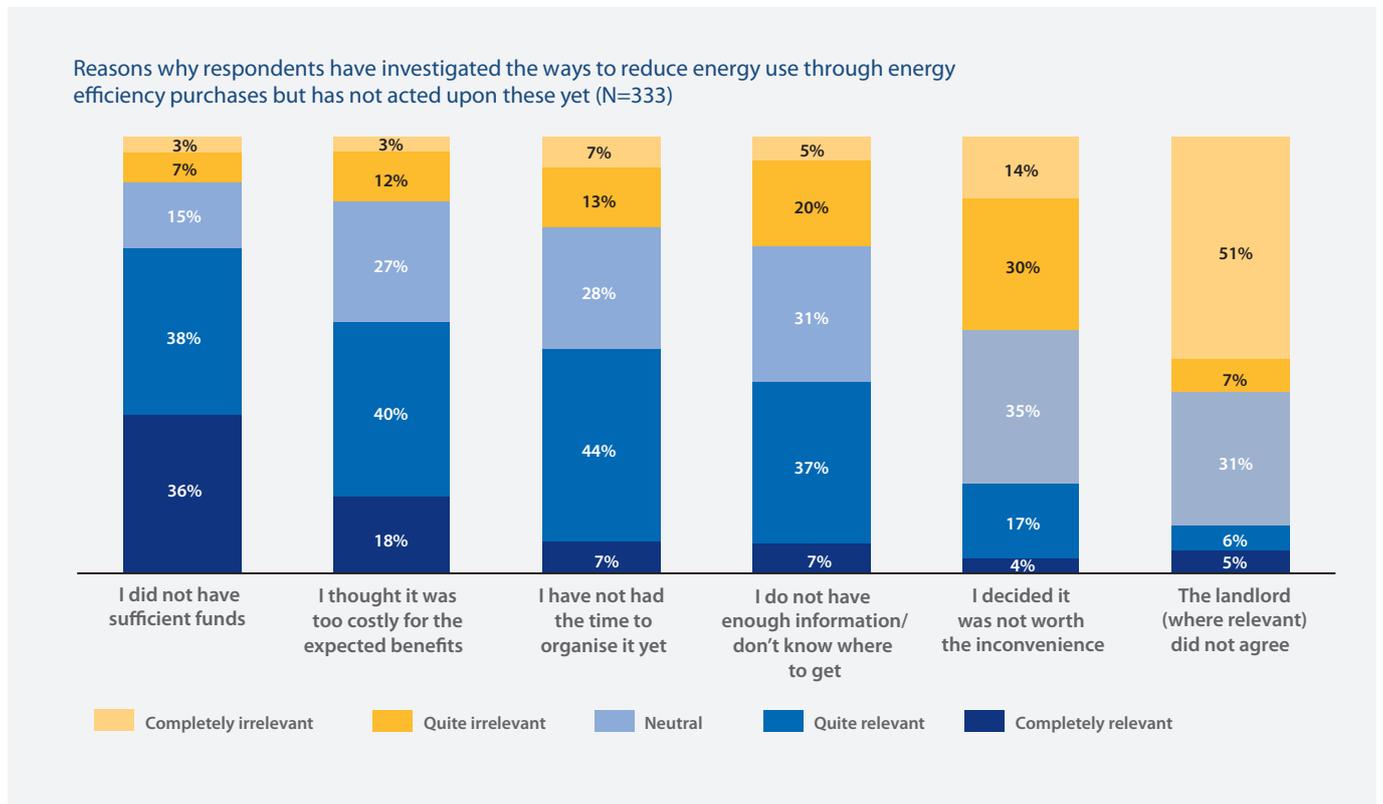


Figure 9: Reasons why respondents have not acted upon energy efficiency purchases yet²⁴

²⁴ SEAI, 2016, with Element Energy - Survey on energy efficiency loans in Ireland

²⁵ SEAI, 2015, Unlocking Ireland's Energy Efficiency Opportunity

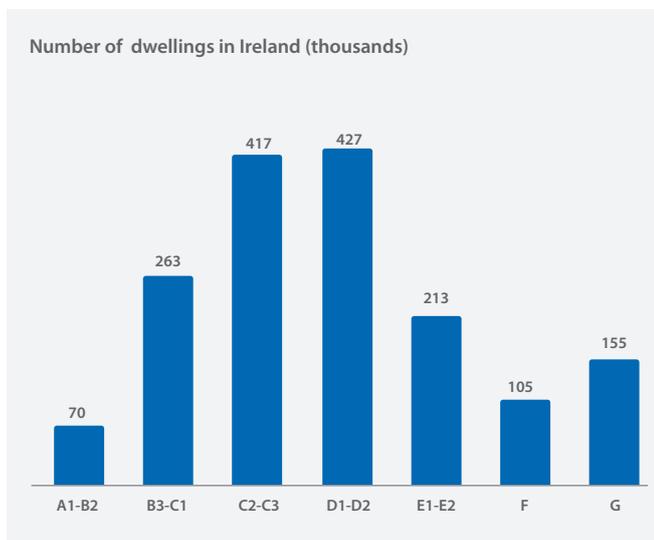


Figure 10: **Number of dwellings in Ireland by BER category (estimated)**²⁶

which means programme benefits are expected to be higher than the costs but this projection is highly dependent on the level of consumer take-up.

Recent consumer survey findings suggest that homeowners are becoming more open to the idea of taking a loan of more than €5,000 to pay for energy efficiency investment (see Figure 11).

Findings from the modelling exercise also suggests that low-interest loan scenarios lead to the uptake of deeper packages. For instance, many consumers who would invest in Shallow measures/packages under current conditions indicated that they would consider installing Medium/Deep packages instead if low-interest loans were available.

However, as experience in other jurisdictions has demonstrated translating positive consumer sentiment into effective scheme design is of critical importance. In particular, many consumers indicate that they are motivated by increased comfort and well-being, or discouraged by lack of understanding. Therefore, any financing offerings must be fully integrated with 'packages' of energy efficiency measures that have been carefully designed to meet the needs and values of target householders. SEAI will be working with the Department of Communications, Climate Action and Environment to test and pilot the potential for affordable financing in the Irish residential energy efficiency market, and how EU funds may be used, with a view to developing a suitable offering in the Irish market in the longer term that will complement, and leverage the funds available for grant aid.

3.3 Recent pilots to test innovative energy efficiency loan schemes

These trials and pilots have been undertaken to test new models of financing and delivery in the market, as a means of identifying new routes to achieve greater and deeper levels of home retrofit. An outline of the various models tested is described below.

Salary Incentive Scheme

These are employer led schemes where an employer facilitates a low or interest free loan to an employee to undertake retrofit works in their home. The approach involves approximating the tax relief that Revenue would provide to an employee under a Bike to Work scheme. The employer appoints a trusted energy consultant who conducts home assessments, generates works quotes, manages contractors and undertakes quality inspections for all participants in the scheme. The employer also relieves the householder of much of the administrative burden associated with the project, including the securing of grant funding from SEAI.

SEAI provides funding which is deducted from the employer loan amount advanced. The net loan is then repaid by the employee through the payroll system over a term agreed between employer and employee.

For the employer, the scheme provides a value-added service to employees at minimal cost and builds loyalty and tenure, for the employees, they gain access to the opportunity, expertise and finance to upgrade the energy efficiency of their homes through a trusted party, with minimum hassle.

The retrofit works under these trials have typically been of a medium size, and measures include heating and insulation with costs in the €7,000 - €10,000 range.



Figure 11: **Loan amount consumers are willing to take (percentage)**

²⁶ Source: Element Energy analysis for SEAI

Salary Incentive Pilots have been completed with EPS, Veolia and a credit union version is ongoing with Tara Mines.

Local / Community Schemes

This is where the scheme is promoted through a trusted local agency in the Community, and householders are accessed via the agency's own distribution channels. Specialist support is provided by an energy consultant or energy supplier and administrative support for SEAI grants and project management is provided for the householder. The key models tested to date are

- **Credit Union schemes:** For these schemes, the basic proposition is that credit unions will, similar to the employer above, work in conjunction with a trusted energy consultant and facilitate loans and retrofit works among their client base. The credit union uses

its distribution capabilities and knowledge of its membership to market to and engage with potential customers for medium sized retrofits and offer loan financing at attractive rates. The energy consultant will, on behalf of the credit union, conduct home assessments, generate works quotes, manage sub-contractors and undertake quality inspections for all participants in the scheme.

- **Energy Agency schemes:** Local Energy Agency schemes have been completed in 2015 and 2016 by North Tipperary Leader Programme (NTLP). NTLP partnered with the Tipperary Energy Agency (TEA) who fulfilled the role of energy consultant, project manager and coordinator. These schemes target deep retrofits and required homeowners to move to a non-fossil fuel source of heat as a basis for acceptance into the scheme.

Availability of finance: Summary of key findings

- The lack of sufficient funds is one of the key reasons why consumers in the residential sectors are not willing to invest in various energy efficiency measures and packages.
- Over 70% of householders who responded to a recent survey identified "not having sufficient funds" as the most relevant barrier to action.
- A recent modelling exercise shows that introducing low-interest rate energy efficiency loans combined with grants is an attractive option for Ireland because it is expected to improve the efficacy of existing grant programmes.
- The combined policy measures (grants and loans) promotes deeper retrofits with a minor increase in funding to buy-down interest rate.
- The total lifetime cost of introducing low-interest rate energy efficiency loans is negative – which means programme benefits are expected to be higher than the costs.
- Both conventional and innovative ways of introducing energy efficiency loans have been identified ranging from buying-down the interest rate of loans from private lenders, risk sharing initiatives, consumer financing, and supplier credit models to providing loans via employers.
- Responses from trial projects show that much higher numbers of consumers participate if there is already a trusted relationship with one of the project organisers.

4 Understanding consumers' investment behaviour

There are a number of ways to represent how consumers make a final investment decision after they go through the steps outlined in the previous sections. First, consumer decision-making in a wide range of contexts can be represented through their willingness to pay, expressed in terms of the fraction of decision-makers willing to purchase a technology for a given simple payback period. In this case, the effect on uptake of policy interventions including direct financial support can be examined by calculating their impact on payback. In research consumer constantly reiterate that grants are very important in their decision to invest. This is likely because they provide an upfront incentive and lower the payback period of energy efficiency projects.

In many situations, such as when a building is undergoing a major renovation, it may be the case that a 'package' of several energy efficiency measures is implemented at the same time. An important finding of SEAI analysis²⁷ is that promoting the implementation of packages of measures could be a useful mechanism by which to lower the payback period of a relatively less cost-effective deep measure (e.g. solid wall insulation).

Figure 12 shows the simple payback time requirement for energy efficiency investments for two consumer groups (owner-occupiers and private landlords) in the UK.²⁸ It can be seen in that study that the fraction of private landlords willing to pay for a measure decreases from 100% for a simple payback time of around 1 year to almost 0% for a simple payback time greater than 4 years. By contrast around 10% of owner occupiers are willing to invest in energy efficiency measures for a payback time of 4 years, falling to 0% for a payback time of 6 years.

Willingness-to-pay is a useful methodology to represent various consumer groups in the market; however, uptake rate is calculated based on simple payback period. Other factors such as hidden costs,

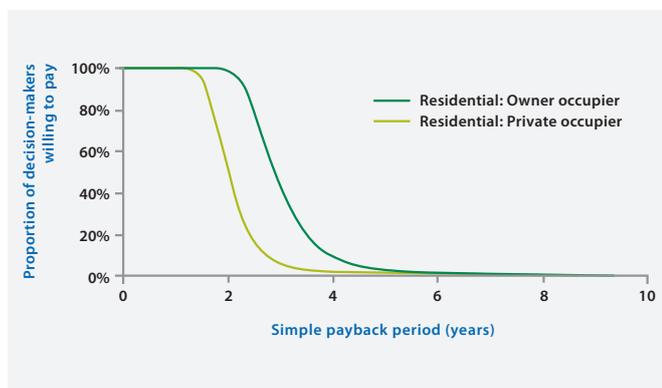


Figure 12: Payback requirements in the residential sector (illustrative)



hassle factors and comfort factors can be quantified/monetised and included in the calculation.

An alternative way of representing consumer investment decision is to quantify consumers' attitudes towards various aspects of energy efficiency technologies and policies. The methodology for this is to gather quantitative data on consumer attitudes - results of a recent of a recent survey in Ireland are presented in the subsequent sections.

4.1 Methodology to gather quantitative data on consumer attitudes

A recent survey designed by Element Energy for SEAI²⁹ gathered quantitative data on consumer attitudes towards energy efficiency loans in Ireland. The survey was designed to provide the required data for consumer choice modelling of energy efficiency loans.

Choice modelling aims to replicate as closely as possible the decision making process followed by consumers in the real world. In other words, consumers are presented with a range of "alternatives", each described by certain "attributes". For choosing an energy efficiency loan, this could involve consumers considering the design aspects of the loan such as repayment amount and interest rate as well as the expected energy bill savings of the improvement.

The prospective customer evaluates each alternative, and chooses the one that provides the highest "utility" or "attractiveness" to them. The aim of the choice experiment is to capture as many as possible of the most important factors people consider when considering financing options for energy efficiency. This will ensure that the resulting model has the maximum predictive power when calculating the likely uptake of these financing options.

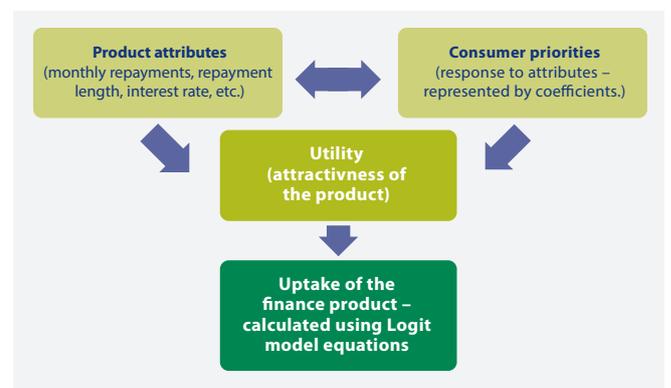


Figure 13: Consumer choice modelling

²⁷ SEAI, 2015, Unlocking the Energy Efficiency Opportunity

²⁸ Element Energy, 2009, Uptake of energy efficiency in buildings for the Committee on Climate Change

²⁹ Element Energy for SEAI, 2016, Survey on consumers' attitudes towards energy efficiency loans in Ireland (unpublished)

4.2 Consumer choice model coefficients

Coefficients for use in the uptake modelling were calculated using the survey results. This represents the relative weighting attached to each of the attributes that determine the overall attractiveness of an energy efficiency package/option.

Some of the key survey findings are summarised below

- Reducing the interest rate can increase the uptake rate significantly (this has a double impact: both an emotional + indirect impact on repayment amount, term of the loan, etc.)
- Grants are still needed to maximise uptake rate even if low interest loans are introduced. Grants have more than 30% additional emotional impact: i.e. 1 Euro grant corresponds to 1.3 Euro in consumers' minds²⁹

- Government-backed loans, credit union type loans and retail financing similar to car loans are all more preferred options compared to normal Bank loans.

4.3 Comfort factor

Consumers do not make purchasing decisions purely on costs and energy savings. The majority of consumers also consider the impact of energy efficiency investment on their comfort level. In a recent survey, we asked questions on the importance of reasons determining whether respondents would choose to purchase any of a number of energy efficiency packages. As figure 14 below illustrates, the most important factor is "how much the energy efficiency package would improve the comfort of the respondent's home", with the next most important being:

- How easily the process could be arranged (including arranging the works, the government grant and the loan)

- Evidence of health benefits for the household resulting from improving the energy efficiency and comfort of our home
- How flexible the loan is (including flexibility to make a lump sum/unscheduled repayments).

This resonates with research previously carried out by SEAI with homeowners who had carried out retrofits and drawn down a grant where the two most important factors identified by respondents were savings and comfort gains.³⁰

It is therefore important to explore how much consumers are willing-to-pay for their comfort. Some utility companies in Europe explore alternative business models to provide consumers with an agreed "comfort level" rather than gas or electricity via installation of energy efficiency technologies and smart devices/sensors.

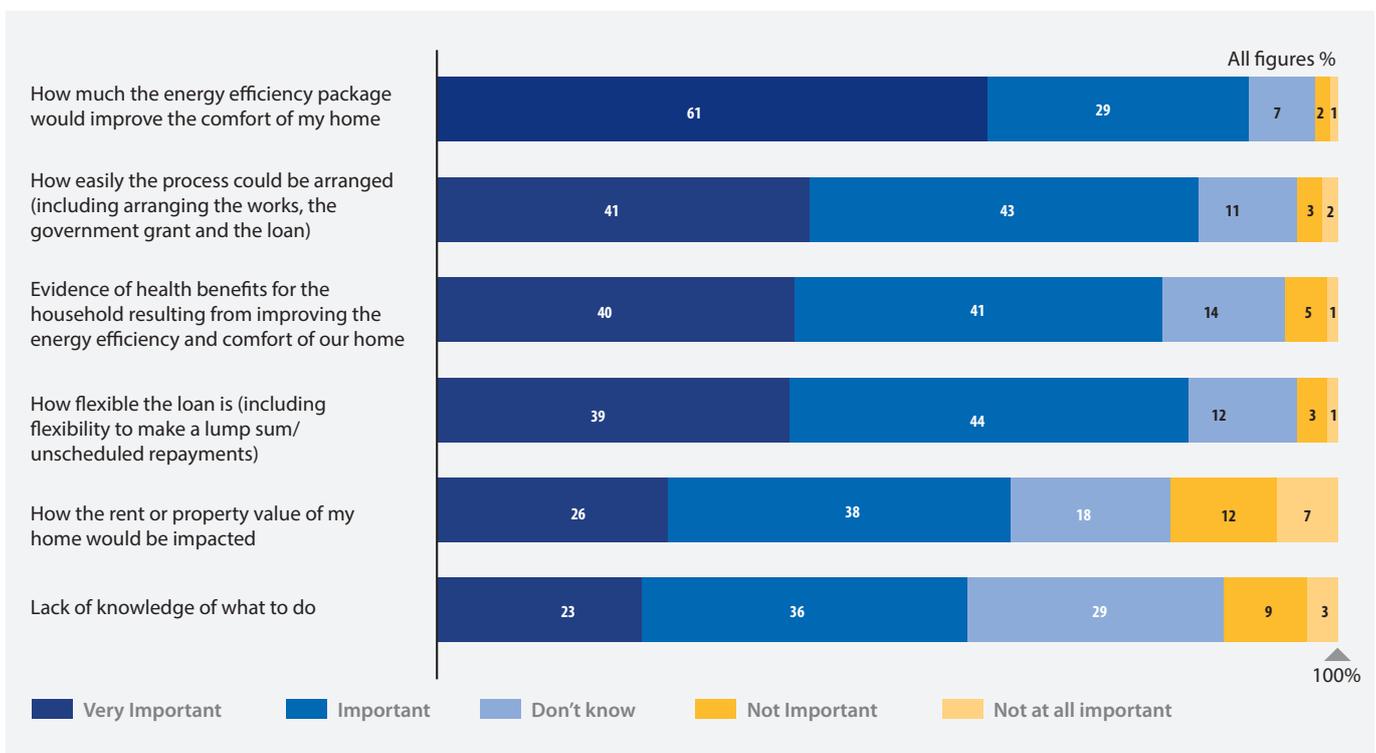


Figure 14: Factors determining whether respondents would invest in energy efficiency ²⁹

³⁰ SEAI Publication: Bringing Energy Home

4.4 Changing consumers' investment behaviour

Changing consumers' habitual energy consumption behaviour to use less energy is an almost no-cost energy efficiency measure, which does not generally require the purchase of new equipment. In residential buildings, these measures could include turning off lights when not in use, reducing room temperature, and turning off heating in unused rooms. Evidence collected for the UK Department of Energy and Climate Change³¹ shows that training provided at the same time as the adoption of new technology can act as a stimulus for implementing behavioural measures. In addition, the uptake of certain behavioural measures could be linked to the rollout in Ireland of smart meters with in-home displays.³²

In addition to changing consumers' energy consumption behaviour, it is important to understand how consumers' investment

decision can be changed. For instance, a recent paper examined revealed preference data on retrofits completed under the Better Energy Homes scheme in Ireland and found that households who had previously completed a retrofit were found to be willing to pay more than twice as much as homes retrofitting for the first time.³³

Recognising the importance of consumer behaviour, SEAI is establishing a Behavioural Economics Unit whose overarching ambition is to help citizens and business to avail of the benefits of clean energy – both energy efficiency and renewable energy - through the use of behavioural insights and rigorous evaluation. The work programme aims to develop better understanding of the context in which people make decisions; use the latest research in behavioural science; and to design and test interventions, through for example trials and pilots, using rigorous and evidence based methodologies to determine the effectiveness of interventions before they

are scaled to larger programmes with more investment. In particular, the Behavioural Economics Unit will aim to understand the decision making of consumers and business in relation to sustainable energy choices. It will systematically apply insights from behavioural sciences and how consumers and businesses act into the delivery of SEAI's pilots and programmes.

As an example, SEAI is supporting the expansion of the Home Energy Saving Kits³⁴ to Dublin City libraries to investigate how the kits can influence habitual energy behaviour in the home, and if they can be used as a route to influence consumer investment in energy efficiency measures in the home. Homeowners can borrow the kit which contains six practical tools to help them identify common problems such as lack of insulation and poor ventilation and energy intensive appliances.

Understanding consumers' investment behaviour: Summary of key findings

- Consumers' final investment decision can be represented by "willingness-to-pay" curves – for instance, around 10% of owner-occupiers are 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.
- An alternative way of representing consumer investment decision is to quantify consumers' attitudes towards various aspects of energy efficiency technologies and policies. A recent survey in Ireland has gathered quantitative data on consumer attitudes – for instance, the study quantified that grants have more than 30% additional emotional impact (i.e. 1 Euro grant corresponds to 1.3 Euro in consumers' minds).
- Consumers do not make purchasing decisions purely on costs and energy savings – the majority of consumers also consider the impact of energy efficiency investment on their comfort level.
- Recognising the importance of consumer behaviour, SEAI is establishing a Behavioural Economics Unit whose overarching ambition is to help citizens and business to avail of the benefits of clean energy through the use of behavioural insights and rigorous evaluation.
- Tools to help consumers understand and engage with their energy use are deployed to test the best pathways to create homeowner awareness and engagement. These include home energy kits and the energy efficiency pop-up shop.

³¹ RAND Europe for DECC, 2012, What works in changing energy-using behaviours in the Home?

³² Home Energy Management Systems, Available at SEAI website:

http://www.seai.ie/Renewables/Smart_Grids/The_Smart_Grid_for_the_Consumer/Home_Consumer/Home_Energy_Management_Systems

³³ SEAI, ESRI and TCD, 2016, Willingness-to-Pay and Free-Riding in a National Energy Efficiency Retrofit Grant Scheme

³⁴ Available at: <http://www.codema.ie/media/news/home-energy-saving-kits-now-available-from-all-dublin-city-libraries/>

5 Improving attractiveness of subsidy and support programmes



Government interventions are expected to have an impact on all steps of the consumer decision-making process – as explained in the previous sections. It is therefore crucial to improve attractiveness and efficiency of these programmes via learning by doing. Important learnings have been identified over the last couple of years through various SEAI programmes, pilots and trials. Some of these learnings are summarised below:

- Use trusted intermediaries such as BER advisors, nationally trusted experts and local references
- Get the right information to decision makers at trigger points, through intermediaries
- Target people who are already engaged in energy efficiency e.g. including those who have already taken some action (use BERs and new advisory report)
- Design and commissioning is an integral requirement for deeper retrofit
- Supply side constraints need to be addressed – deep retrofit requires a sufficiently skilled supply market
- Cost and lack of funds is still a big barrier, so availability of finance is essential

A review of relevant subsidy schemes in other Member States have identified the following learnings

- **Reducing the complexity of energy efficiency projects and financing:** Because energy efficiency projects are relatively complex, there is often low knowledge and confidence with homeowners undertaking these projects. To tackle this, homeowners in Germany are provided with mandatory support from energy consultants, which are subsidised by the government. The KfW also supports low cost training seminars for consultants. By introducing such consultations, more homeowner awareness and confidence is raised in the home retrofit schemes.
- **Fusion of centralised / decentralised activities:** A combination of centralised marketing efforts, advice and financing arrangements, project managed with a distributed network of contractors allows schemes to benefit from economies of scale for administration, reducing overheads, whilst using local infrastructure.

Government subsidies can be designed to promote deeper retrofit. For instance, SEAI has introduced additional support for “Residential Combined Fabric Upgrade Packages”. The Better Energy Communities programme will increase grant levels from 35% to 50%

Residential Combined Fabric Upgrade Packages (Better Energy Communities)

To promote deeper retrofits through incentive design, SEAI has introduced additional support for “Residential Combined Fabric Upgrade Packages”. All fabric measures listed under Step 1 below need to be achieved to receive additional support. Heating technologies under Step 2 and Step 3 can also be installed at higher grant levels after achieving Step 1.

- **Step 1: Combined Fabric Upgrade:**
 - Roof Insulation (As per TGD L 2008)
 - External Wall Insulation (U-Value 0.27 W/m²K)
 - Full Window Replacement (incl. doors with > 60% glazing, to U-Value 1.4 W/m²K)
 - External Door Replacement (U-Value 1.4 W/m²K)
 - Air tightness (Min. air permeability test perf. level of 5 m³/(h.m²) @ q50
 - Mechanical ventilation system (MVHR or DCV – TGD F 2009)
- **Step 2: Additional heating installation**
 - High Efficiency Gas or Oil fired Boiler with Fully integrated Heating Controls Upgrade or
 - Heat Pump with Fully integrated Heating controls Upgrade or
 - Biomass boiler with thermal store and Fully integrated Heating Controls Upgrade
- **Step 3: Additional renewable installation (Solar Water Heating)**

for homes that are being retrofitted to achieve high performance level by installing a combination of fabric measures and heating technologies.

Another important policy consideration is reducing abandonment rates of existing subsidy programmes. A recent report³⁵ examined the likelihood of grant application abandonment in Ireland and identified the following learnings:

- Obligated parties possess a learning phase of six months, after which applications made via obligated parties are less likely to be abandoned than private applications.

- Attic and cavity insulation retrofits, which are the most popular combination, are relatively unlikely to be abandoned, while more complex retrofit combinations are most likely to be abandoned.
- Rural households are more likely to abandon an application than urban households, while apartments are more likely to abandon than houses.
- Older dwellings are also more likely to abandon an application than newer dwellings.

All of this points to the need for an integrated support system to help consumers undertake the journey of home retrofit.

Improving attractiveness of subsidy and support programmes: Summary of key findings

- The great majority of participant householders across all SEAI pilots and trials identified a trusted source as the key referral.
- A review of relevant subsidy schemes in other Member States have identified that energy consultants (who are trained and subsidised by the government) can increase awareness and confidence of government schemes.
- Government subsidies can be designed to promote deeper retrofit - e.g. SEAI has introduced additional support for “Residential Combined Fabric Upgrade Packages” with grant levels of 50%, to achieve high performance level by installing to standard, a combination of fabric measures and heating technologies to homes.
- Skilled workforce for deep retrofit is essential for confidence and quality.

³⁵ SEAI, ESRI and TCD, 2017, An examination of the abandonment of applications for energy efficiency retrofit grants in Ireland

6 Next steps

The various analysis and research that SEAI is undertaking means we are in a continuous loop of learning and improvement based on findings from Better Energy programmes and other research. This research is carried out directly with the consumer market, leading

to design of mechanisms and to implementation of trials; we refine models based on consumer feedback and test again, only moving to larger scale pilots when we have a programme design that we are confident will deliver.

For SEAI the next steps across the various pillars of the consumer decision making process include:

Testing New Routes to Engagement

Using the consistent messages from consumer feedback that the factors influencing investment are savings, cost, comfort and health benefits and coupling this with their desire for an end to end service which is hassle-free, we need to design and test new routes to create awareness and garner consumer engagement. As the trusted advisor role is key, intermediaries are needed who already have relationships with consumers; these include BER assessors, local community groups and energy suppliers as well as the supply chain.

Existing channels will be optimised by incorporating specific actions to reflect these priorities. Wider use will be made of the existing pop-up shop and energy saving kits in targeted locations (e.g. employers' premises) to garner awareness and encourage engagement.

Trigger Points for Decision-Making

We know that there are key decision points at which we need to inform and engage consumer interest to enable them to make energy efficiency investment decisions; these include renovation, house purchases, and lifestyle changes such as retirement or starting a family. Supporting the consumer through their existing relationships at key landmark decision points is crucial.

Intermediaries who are part of these existing relationships include architects, estate agents, brokers and financial advisors – SEAI is exploring the various options to channel information through these intermediaries so that energy efficiency is on the consumer agenda when decisions are being made.

Financing Energy Efficiency

Research shows that targeted grant support coupled with low cost finance is the strongest formula for promoting greater numbers and more comprehensive home energy efficiency improvements. In research, consumers have identified lack of finance as one of the main barriers to energy efficiency investment. SEAI will continue to test various low cost finance models and to identify and refine those

best suited to consumer needs. As part of this, ongoing trials and pilots will continue with credit unions, energy suppliers and employers in 2017 and beyond. In addition options for providing low cost consumer finance will be explored with government through banks and other consumer finance entities.

Encouraging Energy Efficient Investment Behaviour

SEAI gathers a significant amount of data from the impact of our schemes each year. We are continually working to better structure and tailor this information for the market supplying energy efficiency upgrades in order to better meet consumer needs. This includes BER and advisory report data, as well as research and demographic information.

Moving the market towards deeper retrofit works means we need to review the attractiveness and focus of the various subsidy programmes so that we are incentivising the right behaviours.

As part of this we will look at the potential for new support programmes as we have already done with deep retrofit in 2017. This may take the form of more focused or new support programmes to encourage home investment in certain measures and systems.

The Energy Efficiency Obligation Scheme (EEOS) provides opportunities, through engagement with energy suppliers and their counterparties, for an offering which includes advice and intervention support rather than just provision of funding and we will seek to expand this through the various supply chain actors as the market grows.

Visit our website for everything on sustainable energy: www.seai.ie

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