



Trigger points: a convenient truth

Promoting energy efficiency in the home



energy saving trust[®]

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Introduction

Building the demand for energy efficiency measures in homes is one of the biggest single issues in the UK's climate change agenda. 27 per cent of the UK's carbon emissions come from homes. Stimulating action means encouraging nearly 20m homeowners to act.

This new research takes a wholly fresh look at how we promote energy efficiency in homes. We didn't want to start with energy-saving measures, which we know people regard as important, but not an urgent priority. We wanted to start with what householders are already doing in their homes.

British people invest billions each year in home improvements. They make those improvements to improve space, value and décor. How can we build from that enthusiasm and investment to encourage them to address energy efficiency in their homes at the same time?

We have looked at the whole range of home improvement projects – from reroofing and rewiring to installing a new bathroom – and we've found householders, across a broad range of ages and household types, are surprisingly enthusiastic about tackling many energy-saving measures when they've already got builders in.

We've also spoken to builders and landlords. Builders are confident in their energy-efficiency knowledge, but not always sure when or how to offer it. Meanwhile landlords continue to be focused on the financial bottom line, but see the logic in tackling energy efficiency when they're improving their properties.

Addressing energy efficiency alongside other refurbishment projects means fitting key measures like insulation or advanced glazing on a room-by-room basis over several years.

That's quite different to a 'one-hit' approach where all rooms and walls and windows are treated at once: to use the jargon, 'whole-house low-carbon retrofit'. Most recent research has assumed that large-scale carbon savings from UK homes will only be achieved through whole-house retrofit. For this reason, alongside our householder research, we have also carried out technical research. These results show how measure-by-measure, room-by-room installation can build to deliver very deep cuts in energy use and carbon emissions.

The knowledge acquired from this new research will help us:

- work with industry to ensure they are equipped to provide advice on what measures are appropriate for each home. (A 'whole house' approach is an unrealistic option for many homeowners – it is impractical and/or unaffordable. We can encourage a practical step-by-step approach to energy efficiency that activates action at key trigger points in the life of homes.)
- develop new approaches that enable people to take action from where they are in their own life, to initiate an increased uptake of energy-saving measures
- use this insight and knowledge to help organisations target those most likely to be responsive to energy efficiency messages
- give builders more confidence in presenting energy efficiency options to homeowners who are making improvements

Summary of key findings

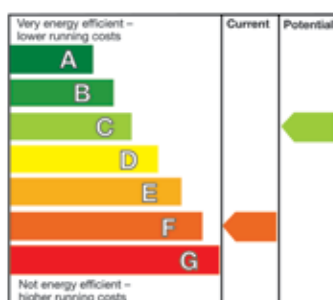
"Once you get someone in, you might as well."

Homeowner, London, May 2010

This research addresses trigger points – the times in the life of a home where energy-saving measures can be fitted as part of an existing or planned home improvement project. How prepared are people to be nudged to take energy efficiency into account as they undertake refurbishment projects to improve space, value or décor?

For this research we spoke principally to owner-occupiers, because 70 per cent of British householders own the home they live in. We also spoke to other key groups involved in home refurbishment. First, private landlords (who own 14 per cent of homes): do they feel the same way owner-occupiers do about making energy-saving improvements at trigger points? And we spoke to builders: are they able and willing to sell energy-saving measures when they're working on wider refurbishment projects?

One of our main findings from this work is that home-owners do like the idea of undertaking energy-efficiency improvements on a one-room basis as they undertake work in that room. Based on this insight, we carried out technical modelling to explore the challenges and opportunities posed by a room-by-room approach to upgrading the energy performance of homes.



Key findings:

- 22 per cent of homeowners – 3.9 million – are planning or anticipating a major refurbishment project that could be a trigger for improving energy efficiency within three years.
- 85 per cent of homeowners express a willingness to stretch refurbishment budgets for energy efficiency.
- Across all refurbishment projects, homeowners are willing to stretch their budget by an average of around 10 per cent for energy efficiency improvements. That's £527 on smaller projects, £1,027 on larger projects.
- Homeowners with growing families are most likely to be planning refurbishment projects and to be able to spend extra for energy efficiency alongside the work they've planned.
- People are most willing to stretch their budgets for energy efficiency when they're replacing windows – the householders we surveyed said they're willing to spend nearly 40 per cent more to get a more energy efficient window.
- The most common refurbishment projects are single-room redecorations and refitting. Seven out of ten people like the idea of installing insulation and other energy-saving measures on a room-by-room basis when they're carrying out refurbishment in a given room.
- Homeowners tend to focus on the job in hand, such as kitchen or bathroom refurbishment. Even though they have the builders in, taking the opportunity to upgrade external or cavity wall insulation was seen as a separate job, unconnected with the current project.

- Private landlords are planning bigger refurbishment projects, and planning to spend more on each refurbishment project, than homeowners. Though they are more sceptical about energy efficiency than owner-occupiers, they accept the logic of fitting energy-saving measures alongside other refurbishment jobs.
- Builders are keen to promote energy efficiency but they need support to overcome a trust barrier. They are very wary of being seen as selling unwanted extras to homeowners who have employed them on a refurbishment project.
- Tackling a house on a project-by-project or room-by-room basis can build effectively to a very high standard of energy efficiency. We have identified how several different house types can achieve a 'B' grade on an Energy Performance Certificate by making step-by-step improvements.

Next Steps

We believe this research provides a new direction for advice on low-carbon home refurbishment.

Based on this insight, the Energy Saving Trust will:

- make trigger-point guidance available through our impartial consumer advice service, helping householders to build energy efficiency into room-by-room upgrades
- pilot new refurbishment guides, to help builders promote energy-saving measures to householders when they carry out other refurbishment work
- share this insight with manufacturers and retailers of energy-saving products, showing what measures can be achieved and how to achieve them
- carry out additional research on the practicalities of achieving room-by-room refurbishment at a pace sufficient to deliver an 80 per cent carbon reduction from homes by 2050.



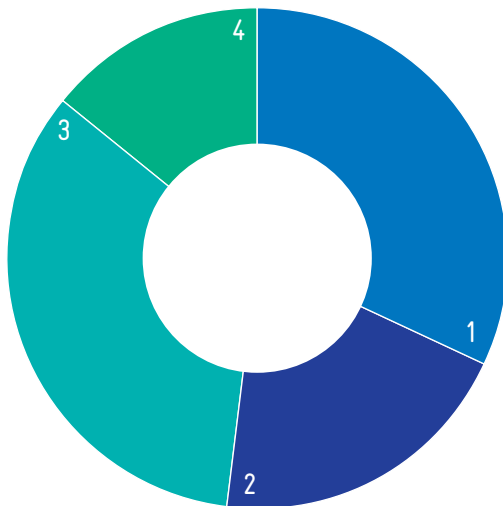
Background: understanding energy-efficiency trigger points

Energy efficiency brings many benefits: it saves money on fuel bills, increases comfort and has a positive impact on the environment. However, we know that while many people like the idea of improving energy efficiency in their homes, they don't take action by installing energy-efficiency measures. Why?

The Energy Saving Trust's report *At home with energy* highlighted the main reasons for the market failure around home energy efficiency:

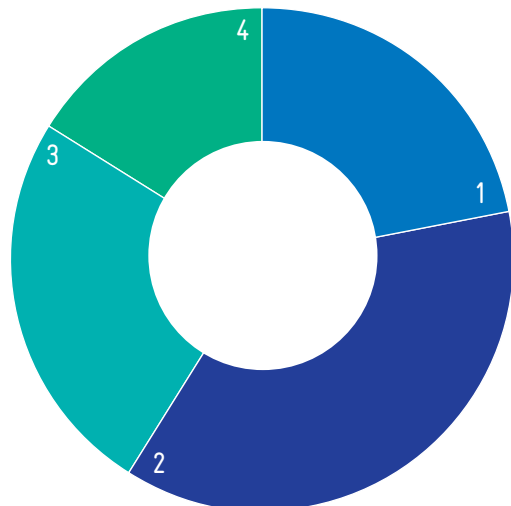
- **Information and awareness:** many homeowners simply aren't aware of key measures, or overestimate the cost and trouble involved.
- **Hassle:** with a perception that the work will be disruptive, and uncertainty over the benefits, many homeowners find that acting on energy isn't a priority for them.
- **Cost:** although our work shows that, for many energy-saving measures, cost is not the primary barrier, finding the cash for insulation, new windows or a new boiler is a challenge for many householders.

Key barriers for cavity-wall insulation



- 1 Awareness 32%
- 2 Motivation 20%
- 3 Affordability 36%
- 4 Other 14%

Key barriers for loft insulation



- 1 Awareness 22%
- 2 Motivation 37%
- 3 Affordability 25%
- 4 Other 16%

Key barriers to loft and cavity-wall insulation, from *At home with energy*

How trigger points can overcome market failure

How it works

The term 'trigger point' can be applied to home refurbishment in different ways. It can refer to an unplanned event in the life of the house, such as a boiler breakdown, which 'triggers' change; or to a human life-cycle event like retirement, marriage or a new home, which can spur refurbishment work. In this research we use the term 'trigger point' to mean any planned or anticipated home improvement project (for which the primary motivation is not saving energy), alongside which energy-efficiency upgrades can be made. Some of the home improvement projects we looked at are re-roofing, rewiring, loft conversion, building an extension, redecorating a living room, and refitting a kitchen.

Our trigger point model suggests that energy-saving measures such as insulation, energy-efficient windows and draught-proofing can be fitted more easily within or alongside other refurbishment projects. That is because taking action at trigger points addresses the three main barriers to installation:

- **Information and awareness** are increased: the homeowner is already engaging with building professionals who can provide advice on energy-saving measures.
- **Hassle** is reduced: at a trigger point the homeowner is already facing and prepared for the disruption of home improvement.
- **Cost** barriers are reduced: at a trigger point it may be cheaper to fit an energy-saving measure because workers and some of the necessary equipment are already on-site.

The three kinds of measure

We know from consumer research that not all energy-efficiency improvements need a trigger point to get them going. Our research shows that homeowners think of energy-saving improvements in three distinct ways:

- **easy energy-saving addition:** this includes things like low-energy light bulbs, or loft insulation: affordable measures often done on a DIY basis. Easy additions are one-off actions that are considered and undertaken independent of other home improvements, so they don't rely on trigger points.
- **replacements:** for window, boiler or appliance replacements, the trigger point is the replacement job itself, and the opportunity is to choose the most energy-efficient products.
- **major improvements:** some energy-saving measures, particularly wall (both cavity and solid-wall insulation) and floor insulation, are seen as creating two of the main barriers – cost and hassle. In this research we particularly wanted to see whether homeowners would be more receptive to installing these major improvements at refurbishment trigger points.

Trigger points and building regulations

Building regulations already require energy-efficiency measures at some refurbishment trigger points. For example, nearly everyone replacing a new central heating boiler is required to install a high-efficiency condensing boiler, and also to fit heating controls if these are not already present. Similarly, in England and Wales, when more than half the inside surface of an external solid wall is stripped back to the brickwork, building regulations require that internal solid wall insulation be installed.

A broad trigger-point approach in building regulations is often called 'consequential improvements'. Under consequential improvements regulations, building owners carrying out larger and higher-cost refurbishment projects have to make energy-saving improvements across the property. Scottish Building Standards incorporate a version of this approach where home extensions are planned. In Scotland, when owners of an energy-inefficient home build an extension, they have the option either to upgrade the energy performance of the existing building, or to build the planned extension using higher than normal standards of insulation.

In England and Wales, consequential improvements only apply for buildings over 1000m² – which excludes the vast majority of homes.



The who, what and why of home refurbishment

One in five households is planning a major refurbishment project in the next three years, usually for the following year. The most common projects are room upgrades: 19 per cent of people at any given time are planning on refitting their bathroom or kitchen. This compares to the five per cent who are planning to build an extension, and the two per cent who are expecting to undertake a whole-house upgrade in the next three years.

Who is planning refurbishment

In order to analyse how different types of households undertake refurbishment we looked at households in five life-stages:

- singles (of all ages), or people sharing.
- young couples.
- families with young children.
- families with growing children.
- families with older (16+) children.
- empty nesters, whose children had moved on.

Number of projects planned

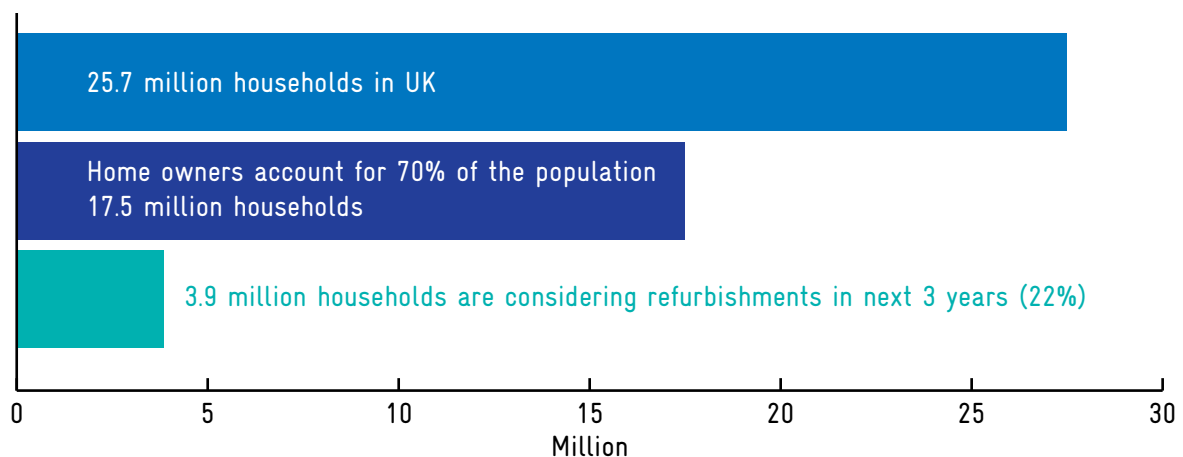
Overall, we found that families with dependent children are planning the most refurbishment projects – on average, three major and more minor refurbishment projects in the next three years. Other types of household are thinking about 2.5 projects, on average, over the same period.

Typical refurbishment projects for different householders

Singles are considering projects to update their home, rather than to add space. Perhaps reducing energy bills is a more important motivator for this group, reflecting the added financial pressure of living alone. They have the lowest average project budgets (£3,795).

Young couples are most likely to be updating their homes to suit personal tastes and improve the property value. They're likely to engage in upgrade projects, such as room-by-room refurbishment.

For **families with young children**, running out of space is a big trigger for refurbishment projects, and extensions and conversions are important projects



Source: Ipsos Nat Rep CapiBus – wtd data

undertaken by this group. Average spend on refurbishment projects is the highest (£6,775 per project) in this group.

Families with growing children are also focused on space, though they may also look at modernisation projects such as kitchen upgrades. More than in other groups, there is reliance on financing projects from debt rather than from personal savings.

Families with non-dependent children are once more likely to be thinking about room upgrades rather than major projects. They may be planning to leave larger projects until after children move out; many are aware of potential refurbishment projects, but are not actively planning them.

Empty-nesters generally have a number of larger projects in mind; planning for retirement is an important factor in their thinking about refurbishment. They also recognise that they may need to undertake some unplanned projects such as replacing the boiler. However, their plans can be constrained by financial reality: project budgets are more limited for this group than for families with children.

Does energy-saving motivate people to start refurbishment projects?

The primary reasons people cite when planning to **upgrade a room** are:

- aesthetics
- modernisation
- improving property value.

Not many people start a project for energy-related reasons. Energy-saving is a primary motivator for ten per cent of people planning a room upgrade, and carbon-saving for five per cent of them.

Surprisingly, among the householders we asked, addressing cold and damp rated lower than saving energy and, for most projects, even lower than carbon-saving as a reason to start a room refit. But once people have decided to carry out a refurbishment project, our work shows that warmth and comfort are very good drivers for selling the ancillary benefits of additional energy-saving action. In other words, although very few people start a room refurbishment project just to tackle cold and damp, they may very well be persuaded to take on a side project of insulation to address it.

Among people who are planning **major refurbishment projects**, such as building a conservatory, converting a loft or refurbishing the whole property, primary reasons for starting the project are much the same as for room refitters:

- space
- modernisation
- improving property values.

When refurbishing a whole house, or fitting a new roof, saving energy does become more important as a motivator: saving energy is important for 35 per cent of the whole-house refurbishers, carbon reduction for 29 per cent, and addressing cold and damp for 21 per cent.

Unsurprisingly, saving energy is an important primary issue for well over half of people thinking about replacing their boiler or windows, while saving carbon is a factor for a quarter of these people.

Most households (79 per cent) are planning to pay for their home improvements from savings. ten per cent will take out a bank loan, and a further ten per cent will use a mortgage extension.

The energy-saving stretch

Of households planning refurbishment projects, 85 per cent expressed willingness to stretch their refurbishment budget to pay for some energy-efficiency measures.

Across a range of refurbishment projects and across our six life-stage groups, we asked householders how big that stretch might be. On average, for both large and small projects and at all life stages, people were willing to allocate an extra ten per cent – typically between £500 and £1,000 – on top of their project costs. The one exception to this was people who were considering replacing windows, who were willing to stretch their budgets by around £1,800 for the most energy-saving choice.

The persuasive benefits

We gave homeowners a list and asked them which energy-saving benefits would influence them to consider stretching their budget. The main benefit cited as persuasive (by 68 per cent) was savings on energy bills. Half wanted to make the room warmer, while a third wanted to increase the value of their home. Reducing carbon emissions was cited as a persuasive benefit by 21 per cent of the people we surveyed.

Variation across projects

For room-by-room projects we found that homeowners were fairly consistent in the amount of stretch they felt their budget would tolerate. For most single-room projects the amount was between £500 and £600: 27 per cent on the average cost of redecorating a living room, and 10 per cent on refitting a kitchen.

For larger projects – re-roofing, building an extension or complete rewiring – people were willing to stretch by between £600 and £1,025. (This highest amount was for people undertaking whole-house refurbishment, where it represented a nine per cent stretch.)

People were prepared to consider paying £570 more to ensure that a boiler replacement was as energy-saving as possible.

And people who were who were considering replacing windows were willing to spend the most extra on energy-saving, at 39 per cent on average – a stretch of £1,832 on a typical cost of £4,680.

Variation across life stages

Across all our six life-stage groups, the willingness to flex budgets for energy-saving was very consistent at around 10 per cent of project budgets. However, because families with young and growing children were generally undertaking larger projects, the absolute amount they were prepared to spend on energy-saving was also higher: an average of £680, compared to between £400 and £450 for young couples and singles.

We have created a simple picture of the potential for the energy-saving stretch between different life-stage groups, based on:

- expressed willingness to stretch budgets for energy efficiency
- the number of projects undertaken
- the size of those projects

Trigger point potential

Young couples

Carefully planning their future. Starting a family, moving home, making property more contemporary, adding value.

Families with young or growing children

Often running out of space. Involved in higher value projects. Recognise the benefit of future-proofing and reducing CO₂.

Families with older children

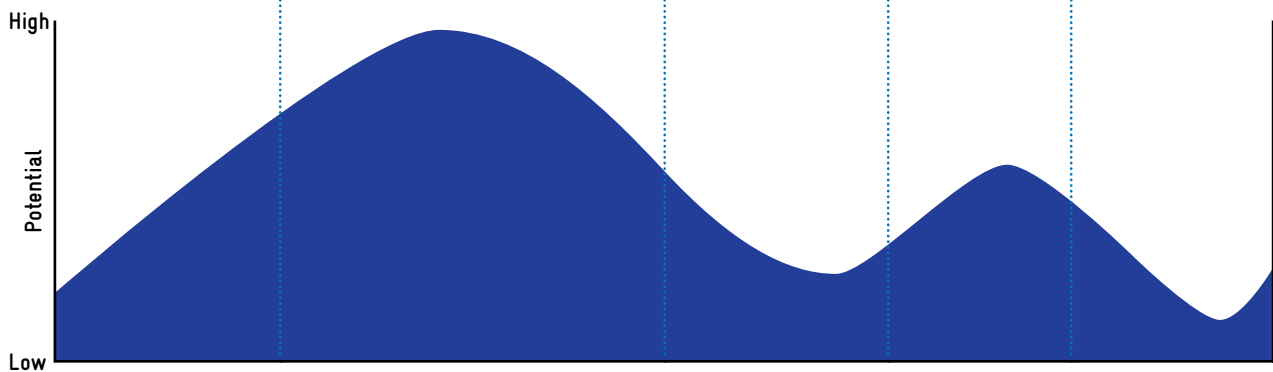
Primarily driven by functional need to update their properties. Considering fewer projects overall.

Empty nesters

Preparing for retirement. Interested in specific projects -upgrading the heating, adding a conservatory.

Singles

Undertaking modernisation projects. Lower budgets.



This chart highlights the fact that families with children (young and growing families) represent the best potential audience for the energy-saving stretch message.

Taking advantage of trigger points

As well as the potential for the energy-saving stretch, we wanted to discover how best to promote additional energy-saving action at trigger points.

To do this we carried out research with homeowners who were undertaking different home improvement projects. All the homeowners we spoke to at this stage were undertaking home improvement projects for spatial, aesthetic or modernisation reasons.

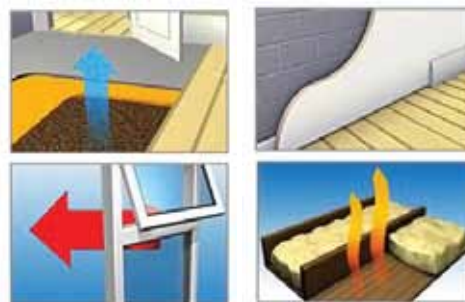
We asked the homeowners to review written materials representing two distinct approaches to energy-saving as an addition to other planned work. The first set of materials encouraged the homeowner to undertake energy-saving refurbishment in just one room, augmenting a planned single room refurbishment project. The second set encouraged the homeowner to undertake whole-house insulation measures, such as cavity wall insulation.

Approach 1: room by room

We showed homeowners a set of materials that explained the benefits of improving insulation when redecorating an individual room. We highlighted internal wall or floor insulation as measures that could be undertaken as part of a room refurbishment, particularly when walls were being stripped or new flooring put down.

Our materials presented the benefits of reducing heat loss and carbon emissions and suggested that homeowners could install insulation as a way of future-proofing against the building standards that all homes in future may be expected to reach.

Homeowners seemed responsive to this proposition. In both pre- and post-1930 properties, around 70 per cent of people liked the idea of room-by-room energy-efficiency refurbishment. We also spoke to builders about the idea. Based on the proposition, 73 per cent felt that their customers would be interested in installing additional insulation when refurbishing a room.



Approach 2: The whole house

Our second approach was designed to explore whether whole-house insulation measures could be promoted to homeowners who were undertaking a range of improvement projects (including, but not only, room upgrades). This approach particularly involved promoting wall insulation – principally external wall insulation for pre-1920 homes, and cavity wall insulation for mid-20th century homes. Our materials suggested that installing whole-house insulation would be less disruptive when there were already builders or installers in the house.

This whole-house insulation approach was less popular than the room-by-room approach. Homeowners struggled to see the connection between the improvements they were planning to make and the suggestion that they should install insulation across their whole home. Some people cited cost as a reason for rejecting the proposal; indeed, the Energy Saving Trust report *At home with energy* has shown that many householders believe cavity wall insulation to be significantly more expensive than it actually is. In spite of this, we found that a range of financing options – a grant of up to 30 per cent, or a ‘Pay as You Save’ option – did not significantly change householders’ enthusiasm for the whole-house approach.



Landlords: A different trigger point opportunity

Landlords' motivation

Currently 16 per cent of homes in England are privately rented, so landlords are clearly an important part of this equation. We carried out a survey of their attitudes towards refurbishment and energy-saving. Most private landlords own fewer than three properties, so we concentrated on talking to these small-portfolio landlords.

We found that landlords take a functional, economic approach to upgrading their properties.

"You want something that is modern, but not too nice like you would have it in your house, there's no point."

Landlord, London

Landlords were undertaking refurbishment projects for three principal reasons:

- to ensure that properties look up-to-date and clean in order to rent out
- to target the property to a certain type of tenant such as families, or tenants not on benefits
- to improve the ultimate saleability of their housing stock

Refurbishment undertaken by landlords

The refurbishment projects undertaken by landlords are significantly different to those undertaken by homeowners. In particular, landlords are much more likely to undertake a whole-house project, using the void period between tenancies to refurbish several rooms in one go. Because they are more often looking at whole-house projects, the budgets they have in mind are also higher.

Landlords' attitudes

Most landlords remain sceptical about the value of energy-saving improvements, because they don't currently envisage it being reflected in rental or capital values.

"It would be a big waste of money... tenants would not know if that would make a difference or not."

Landlord, Birmingham

The exception to this rule is double glazing: landlords believe double glazed windows attract a better-quality tenant and a longer lease. Reflecting their belief that tenants aren't particularly interested in energy-saving, only a third of the landlords we surveyed said they have ever been asked for the EPC (Energy Performance Certificate) by tenants. Having said this, nearly half (44 per cent) of the 400 landlords in our survey don't know the energy rating of their properties. The rest stated that their rating is B or C.

Landlords and the energy-saving stretch

Despite their scepticism about the value of installing energy-saving measures, nine out of ten landlords claim to be willing to stretch their budgets to include an element for energy-saving measures. The average stretch envisaged by landlords is nine per cent – which works out as £1,118.

Because they tend to undertake more whole-house refurbishments, landlords are more open to installing whole-house insulation, and less motivated than owner-occupiers by the idea of insulating within single-room refurbishment projects. Despite caveats (would it increase rental opportunity? Could I increase the rent to cover it? Would it add to the property value?), 66 per cent found the prospect of introducing insulation alongside a whole-house refurbishment motivating.



Builders: overcoming the trust gap

Eighty per cent of small builders work on refurbishment jobs in the owner-occupier sector. Alongside our research with homeowners and landlords, we also asked builders about promoting energy-saving to their customers.

Builders' views on projects and budgets

We asked builders about the refurbishment projects they were employed to carry out. Their understanding of the most common reasons to start refurbishment projects matched the homeowners' – namely, modernisation, more space and adding value to the home. Builders' estimates of project costs were rather higher than the more optimistic estimates of householders, averaging £19,000 for the highest-value projects (conservatory, loft conversion, extension), compared to homeowners' predicted £14,000.

In line with our homeowner research, builders expected young families to undertake the most refurbishment projects.

Builders say that around a third of their clients ask about energy-saving, but that the proportion who actually include it is much lower. They are very clear that this is client-led: most builders feel they have a good knowledge of insulation and other energy-saving measures, but they are reluctant to make suggestions for extra work for fear of losing business.

The trust gap

According to builders, the main barrier to promoting additional energy-saving measures to their clients is trust. They are wary of promoting additional measures because homeowners would see it as an attempt to add to the final bill.

.....
"Builders have quite a bad reputation so you're always viewed suspiciously. The minute you walk into people's homes it's like a battle."

Builder, Birmingham

.....
This view was backed by homeowners in our study:

.....
"These tradesmen are businessmen – they're going to try and sell you to do more rooms."

Homeowner, London

.....
However, both builders and homeowners agreed that, once trust is established, homeowners view builders as experts with valuable experience. At this point, suggestions of additions to the project that are logical and make economic sense often are taken up.

.....
"Once they trust you and see that you will do a good job, that is the time to say 'have you thought about x?'"

Tradesman, London

.....

Often these additional suggestions are made once the work is underway, rather than at the start, when the homeowner is more wary of the cost implications.

Reputation is important. Word of mouth, seeing examples of work, and recommended lists are all trust-builders for employers.

"You find that if you get a good tradesman you spread the word."

Homeowner, London

Builders' attitudes to the energy-saving stretch

We showed builders the materials we had put together to encourage homeowners to take action on energy-saving alongside room-by-room refurbishment (see page 14). Agreeing with homeowners, builders felt their clients would be motivated by this. The builders expected a project budget of £5,000 to include around a 20 per cent energy-saving stretch.

Just as important, builders felt that independent guidance and information about energy-saving measures would be a useful tool to help them overcome the trust gap with householders.



Technical analysis: achieving whole-house low-carbon refurbishment through trigger points

Most studies of the potential for significant energy-efficiency improvements in existing homes focus on whole-house retrofits – where the homeowner refits walls, floors, roof, windows and heating system all in one go. But the trigger-point approach suggests that in real life people are more likely to install different energy-saving measures over time, particularly on a room-by-room basis.

Is it possible to achieve the same carbon and energy savings from a trigger-point-based approach as by a whole-house retrofit? What are the technical challenges posed by improving rooms one at a time?

To investigate the technical issues we worked with BRE. Using SAP, the standard software for modelling home energy performance in the UK, we modelled staged energy improvements to different parts of the home. We found that energy-saving measures installed in a typical home on a trigger-point basis can build effectively over time to achieve a 'B' rating on an Energy Performance Certificate. (The average home in the UK is rated 'D' on the EPC's A-G scale.) Depending on the condition of the house before refurbishment, achieving a 'B' rating can often mean an 80 per cent saving on the home's previous carbon emissions.

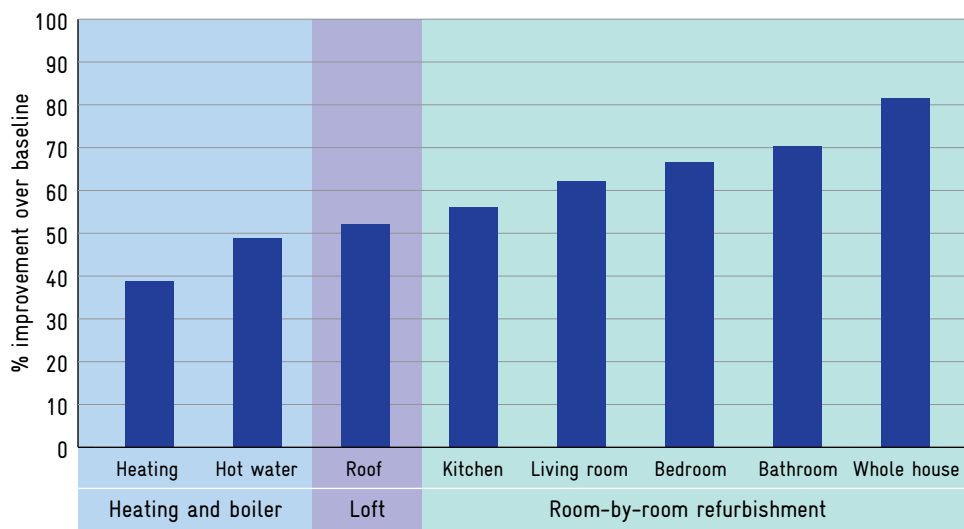
The trigger-point approach in an end-of-terrace home

Our analysis assumes that the following energy-efficiency measures would be installed at trigger points, in the following order, for a typical unrefurbished solid-wall end-of-terrace home with single glazing, minimal loft insulation and an old, G-rated boiler:

- **loft insulation:** undertaken as a one-off project to bring loft insulation to modern standards.
- **boiler and heating system improvement:** undertaken when the old boiler breaks down: installing a modern A-rated condensing boiler, lagging pipes and installing a fully-insulated hot-water cylinder with cylinder thermostat. When the heating system is refurbished, we assume that an electric room heater would be taken out, as the improved heating and insulation mean this is no longer needed.
- **room-by-room refurbishments:** When each room is refurbished, 'A' rated double glazing, internal solid-wall insulation, low-energy lighting are installed. Floor insulation is fitted in ground-floor rooms. In the kitchen and bathroom, water-saving measures are installed.



Carbon savings from trigger point refurbishment to EST advanced standard: end-of-terrace property



The chart above shows how, by tackling heating systems and lofts and then taking a room-by-room approach, we can arrive at a carbon emissions reduction of 70 per cent. The next step, to 80 per cent for the whole dwelling, is achieved by insulating the remaining spaces: additional bedrooms, hallways and any other central spaces.

In terms of financial savings, we have found that the biggest bill savings – starting from an unimproved house – are delivered from making the heating system improvements, which for our typical end terrace house save 45 per cent on energy bills. Again, starting from a typical unimproved end-terrace, the impact on bills from upgrading individual rooms varies between five per cent for a bedroom and nine per cent for the living room. This could equate to a £135 per year fuel bill saving. The biggest saving comes from the living room in an end terrace because it is the largest room and has a large single glazed bay window: applying double glazing achieves a big reduction in heat loss.

Achieving these modelled savings in a real home will depend on several factors, including:

- **The order** in which energy efficiency work is undertaken: For example, if a boiler and heating system is renewed before other energy efficiency projects are undertaken, the boiler may end up being larger than required once the whole house has been insulated. However, the advantage of tackling the heating system first is that it delivers the largest single impact
- **The size of rooms** in relation to the overall property
- **Behavioural factors:** how the homeowners occupy their home (particularly in regard to which rooms are occupied and heated the most) and whether they change their behaviour after installing energy-saving measures

Stepping stone and advanced standards

We have modelled the impact of two levels of refurbishment. The advanced standard shown in our end-of-terrace example achieves an 80 per cent carbon saving. This standard is based on our Energy Saving Trust Sustainable Refurbishment Guidance, which identifies best practice for installing energy-saving measures in existing homes.

The stepping stone standard is based on minimum building regulations for the energy-saving measures concerned. That does not imply that it's a basic standard, because it still encourages homeowners to undertake energy-saving measures (for example, fitting floor insulation) that they might not otherwise undertake.

Challenges for a room-by-room approach

A room-by-room approach does pose some special challenges. Firstly, internal wall insulation – a key measure in our model of room improvements – may not be suitable for all rooms, particularly very small rooms or rooms with period features.

Secondly, it's best if insulation forms a continuous layer around walls and floor. So when installing internal wall insulation in a ground-floor room in an old house, homeowners should aim to fit floor insulation at the same time, to avoid cold bridges. These are cold points where different elements of a room join, such as at the edges of windows or between walls and floor. Condensation and then mould often build up around cold bridges. If homeowners can't afford, or don't want, to insulate the floor and walls together, they will need to discuss with their builder how to avoid problems that could lead to damp and mould.

Conclusions

Our research tells that there is a trend towards home improvement, rather than moving house. Room refurbishments are the most common home improvement projects, though the type of project undertaken varies considerably by life stage.

Incorporating energy efficiency on a project-by-project, room-by-room basis is attractive to most homeowners, and they are willing to stretch budgets accordingly. The biggest drivers for installing energy-saving measures are a desire to cut energy bills and the anticipated benefit of a warmer, more comfortable home.

Considering volume of work planned, refurbishment budgets, and willingness to stretch for energy efficiency, the most promising groups to target with a trigger-point energy-efficiency message are households with young and growing children, and empty nesters.

Builders are enthusiastic in theory about promoting energy-saving measures alongside or within other jobs, but in practice they rarely lead discussions about installing extra measures. They are understandably loath to risk losing business by suggesting expensive additional projects. Builders would welcome independent information materials and other mechanisms to help them overcome the trust barrier with their customers.

Landlords have their own agendas: they are interested in improving their properties on a whole-house, rather than room-by-room, basis, but only if they feel the value of the property will rise and they can recoup the investment through charging higher rent. Nonetheless, nearly all of them also accept the logic of making energy-saving improvements as they are doing other work.



The Green Deal

Through its Green Deal programme, the government wants many more private sector providers to get involved in selling energy-efficiency on a mass scale. Large, established companies should be well placed to seek out customers who are going through energy-efficiency trigger points and to communicate the Green Deal to them.

Our research suggests that the most successful Green Deal providers will be those who can ensure that offers of energy-saving measures fit with homeowners' existing plans. Green Deal financing offers can also be set alongside homeowners' own funding for energy-saving measures. We found that people who were undertaking refurbishment projects were typically willing to put £500 to £1,000 into additional energy efficiency, usually from savings rather than loans.

The government also views the Green Deal as an important mechanism to stimulate uptake of energy-efficiency measures in the private rented sector, which currently has some of the least energy-efficient homes. Our research shows that Green Deal providers will want to work with private landlords, particularly around the void trigger-point between tenancies.

Windows

Our research shows that homeowners are keen to have the most efficient glazing and are willing to stretch their budgets very significantly to achieve it. For companies building packages of measures for the Green Deal, highly efficient glazing may be a powerful part of the package – especially used as leverage for other measures such as internal wall insulation. For practical reasons too, it usually makes sense to have internal wall insulation fitted at the same time as a new window.

Cavity wall insulation and external solid wall insulation

Not all measures lend themselves to our trigger-point approach. We found that whole-house cavity-wall insulation and external solid wall insulation are unlikely to be stimulated through this route except among the small minority of people who are planning a whole-house refurbishment. Homeowners simply don't see the link between a focused refurbishment project, affecting one part of the house, and a major insulation project affecting the whole house.

For cavity-wall insulation, the message still needs to get through that this is a low-cost, low-hassle measure; for most homes it costs under £500, pays back in a few years, and is done in a day with no internal disruption. There is no reason why cavity-wall insulation should not be perceived – and undertaken – as an easy energy-saving addition that doesn't need to wait for a refurbishment trigger point.

For external solid-wall insulation the challenge is greater, and the trigger point for action may need to come from outside rather than inside the house. A community project, or local authority, area-based campaign, may work better for this measure.

Whole-house refurbishment

Two per cent of homeowners are planning a whole-house refurbishment in the next three years. That's relatively few, compared to the number of people who are undertaking room-by-room refurbishment.

Whole-house retrofit is still the best way to deliver large-scale emissions reductions in homes. However, for a third of that two per cent of homeowners, saving energy and carbon is an important motivating factor for starting their refurbishment project. It's a small subgroup, but this 0.6 per cent of homeowners refurbishes well over 100,000 homes a year. It's important to reach and mobilise these 100,000 homeowners who are already motivated and planning for whole-house low-energy retrofit: they can become exemplars of the full potential for large-scale energy and carbon saving in homes.

Next Steps

Based on this research, the Energy Saving Trust is working to ensure that a growing number of people are nudged to tackle energy efficiency at refurbishment trigger points. We're doing that in the following ways:

- piloting guides that builders and other tradespeople can use inside the home to influence more energy efficient upgrades
- sharing our insight on trigger points with key interested parties, including Green Deal providers, builders' merchants, social housing providers and building professionals, to help them take advantage of this opportunity with robust data on savings
- rolling out advice on trigger points through our national advice service, to ensure a robust and practical advice service which supports house-holders who are considering room-by-room upgrades
- looking at the supply chain challenges. (Working with BRE, we have calculated that achieving an 80 per cent carbon-reduction target from homes means improving one room in existing housing stock every minute between now and 2050. We are currently exploring a project to see how the UK can overcome existing supply chain challenges to deliver room-by-room refurbishment at this ambitious pace.)



Find out more

This short research summary presents only the outline of a much richer story, based on five research strands:

Homeowner qualitative research: to gain qualitative insights on the emotional drivers behind home refurbishment process and consideration of energy improvements.

Homeowner quantitative research: to quantify the size of opportunity to introduce energy efficiency into refurbishment projects at different life-stage points, different refurbishment projects and different energy efficiency measures.

Landlord quantitative research: to understand the drivers for smaller landlords (with less than five properties) to undertake refurbishment, and their attitudes to installing energy-saving measures at trigger points.

Builders and tradespeople, quantitative and qualitative research: to understand builders' willingness to discuss energy-efficiency measures with customers, their wider attitude to energy-saving measures and their assessment of customers' willingness to spend.

Technical modelling: SAP-based modelling work to see how energy saving action taken at trigger points could – over time – build to deliver significant whole house carbon savings in a wide variety of different house types.

Opportunities

The data we gained in the course of this research can be drilled down into to create enhanced profiles and forecasts, calculate cost-effectiveness, and identify the best energy-saving measures for a project. Combined with our housing modelling capability, this creates a platform for creating local, regional and socio-demographic pictures of the potential market for energy-saving measures.

If you would like to work with us on projects requiring a more detailed look at this data, contact David Weatherall at the Energy Saving Trust.



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