Insulation

Energy Efficiency in Able to Pay Homes: Meeting Climate Change Goals

Reducing Energy Demand Within Existing Homes

Kingspan®

Aim and Scope of this Paper

This paper aims to outline significant changes in the existing building stock that must occur in order to meet net-zero by 2050 and provides recommendations to incentivise the able to pay market to make the necessary changes to reduce energy demand within existing homes. Energy efficiency should form an important part of the upcoming Heat in Buildings strategy and the mechanisms outlined in this paper should be considered as an integral part of the strategy.

Currently, energy use in domestic properties accounts for 14% of total UK emissions.[1] Whilst we have seen some progress in new build homes with the announcement of the Future Homes Standard and recent consultation on Part L of the Building Regulations for new domestic premises, the existing housing stock requires attention. The UK Green Building Council (UKGBC) states that 80% of the buildings we use in 2050 will already be standing today therefore, it is imperative that we also address the state of the existing housing stock in the UK, which is one of the draughtiest in Europe.

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Introduction

Net-Zero Target

In 2019, the 2008 Climate Change Act was amended from a target of 80% reduction in CO_2 emissions compared to 1990 levels to a new target of 100% reduction, meaning that the UK must now be carbon neutral by 2050. Currently in the UK, housing accounts for 14% of overall CO_2 emissions. The CCC state that *'the 29 million existing homes across the UK must become low-carbon and resilient to a changing climate. This is a UK infrastructure priority and should be supported as such by HM Treasury.'* and *'the uptake of energy efficiency measures such as loft and wall insulation must be increased'*.[2] This shows recognition of the important role that energy efficiency will play in realising net-zero however to date there has been a lack of policy that supports a widespread retrofit programme amongst the able to pay market.

Kingspan Insulation, along with industry bodies such as the Sustainable Energy Association (SEA), support a 'fabric first' approach to decarbonising buildings. This approach advocates firstly driving down the heat demand of a home by increasing its thermal efficiency before the installation of a low-carbon heating system. This means that a smaller low carbon heating system can be installed.

EPC Band C

Energy Performance Certificates (EPCs) are a widely used measure of the energy performance of buildings. They are required when selling or letting a property and are intended to provide information to householders on the performance of a home and to promote energy performance improvements in buildings. EPCs underpin a number of current government policies. They frame the current fuel poverty targets and Government aspirations for as many homes as possible to be EPC band C by 2035, as well as being the foundation of the minimum energy efficiency standards (MEES) regulations for the private rented sector. Lately, they have also started to play an increasing role in Green Finance markets, in which the UK was recently deemed to be a world-leader.[3]

Within the Clean Growth Strategy, the Government laid out plans to make sure all homes are upgraded to EPC Band C by 2035 and fuel poor homes by 2030 *'where practical, cost-effective and affordable'*.[4] This target has not yet been upheld in legislation therefore a Bill has been introduced to the House of Lords to enshrine these targets in law. The Domestic Premises (Minimum Energy Performance) Bill[5] will commit government to uphold EPC targets over the next decade. This will help set certainty for industry and homeowners who will be better able to plan, invest and budget spend on property improvements in line with the targets.

The BEIS Select Committee state in their 2019 Energy Efficiency Inquiry report that *'only around 30 per cent of homes in the UK currently meet EPC Band C. The overriding message of witnesses was that UK Government policy in its current form will fail to upgrade the remaining 70 per cent, equating to around 19 million homes. The CCC told us that the UK Government is off-track to meeting the 2035 target, that progress has slipped, and major policy gaps remain.'*[6]

Along with carbon savings, lower energy use also generates lower energy bills. This can often be seen as the primary reason behind many homeowners undergoing energy efficiency retrofits, rather than the environmental benefits. However, home energy efficiency also has additional benefits beyond carbon targets, with some suggesting that for every £1 spent on energy efficiency, £3.20 is recuperated though increased GDP.[7] In addition, a number of studies have highlighted its value in reducing healthcare, air quality and electricity system costs[8] such as the Sustainable Energy Association who estimate that the total revenue generated by the wider benefits of energy efficiency could be up to £62.97 billion.[9] Others explain how reducing demand from buildings can make a powerful contribution to the economy, for example a whole-scale infrastructure level improvement of Britain's buildings was valued by Frontier Economics as £8.7 billion annually in terms of Net Present Value, which equivalent to a number of major infrastructure projects including the fast rail project, HS2.[10]

Introduction

Creating Warm Affordable Homes and Workspaces

During this unprecedented time, we are finding ourselves spending more time in our homes than ever before. Whilst this brings with it a number of challenges, it also highlights the need to ensure that they are warm, comfortable and affordable to heat. It is clear from opinion polls that many people do not want to return back to normal once the COVID-19 pandemic subsides and this is likely to mean an increased proportion of the workforce working remotely all or some of the time. This time of reflection and a period of change provides us with an opportunity to improve our homes to make sure that they work for us.

Making our homes more adaptable and multi-functional will be key as we move through the next few years and this also means improving the thermal efficiency of the fabric and ensuring adequate ventilation. Buildings that are suitability heated and ventilated allow for increased productivity, provide mental health benefits and reduce absence from work. A recent study found that during the lockdown, over 70% of households took part in some form of DIY or home management activities.[11] Not only are the current circumstances increasing our interest in home improvement and encouraging action to make changes, they are also influencing home buying preferences with many city dwellers looking to move out of the hustle and bustle.[12] Buyers are also looking for larger homes that are more able to meet the needs of working from home. As a consequence, almost half of respondents said a separate space to work from home has assumed increased importance, with good access to Wi-Fi also becoming more valued.

As we emerge from the pandemic and social distancing restrictions are lifted, we are likely to see revitalised action in the domestic home renovation market. However, there is a need to ensure that these improvements not only consider aesthetics with new bathroom suites, extensions and internal redecoration, households must also be encouraged to consider ways to improve the thermal performance of their homes and drive down their carbon emissions. The current circumstances, whilst causing a temporary pause in construction and home renovations which require professional support, could be a driving force behind encouraging investment in our buildings and enabling the UK to meet its net-zero commitments.

Current Market Context

The Able to Pay Market

In England, 63% of households are owner occupiers and of these 92% are classified as able to pay. The able to pay sector represents 13.2 million properties in total. As noted above, the Government is not currently on track to meet its aspiration to improve all homes to EPC band C by 2035[13] in the able to pay market. As recommended by the CCC clear, stable and well-designed policy is needed along with strategic decisions in the 2020s[14] to enable the owner-occupier sector to reach net-zero. To this end, it would be helpful to set out an ambitious, clear and stable pathway that homeowners can understand they need to reach to achieve climate change goals.

Currently, the majority of homes in the UK fall within EPC Band D. Within the domestic sector, the able to pay market has the worst energy performance ratings compared to the privately rented (PRS) and social rented sector (see figure 1). Although there are regulations in place, which are being tightened over time to ensure the performance of private rented homes are gradually increased, regulation and incentives for owner-occupiers is obviously lacking. Therefore, Kingspan Insulation believes that a package of finance mechanisms supporting the sector that makes up the largest proportion of housing should be introduced, with regulation forming a backstop for those that are to take action.

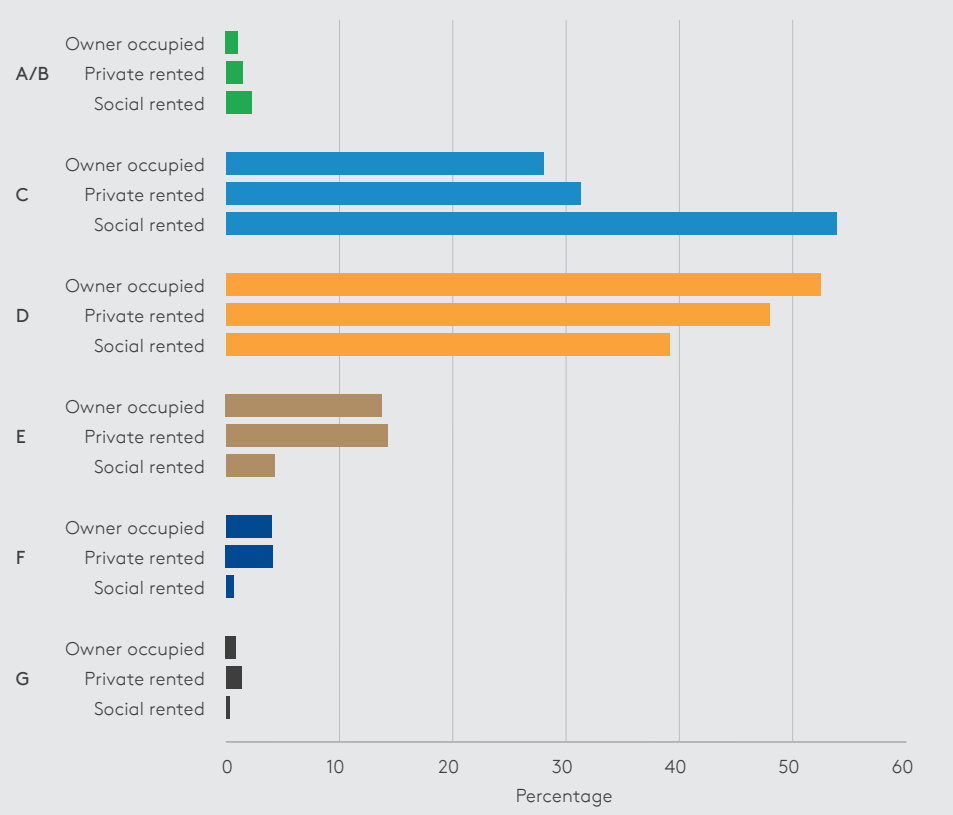

Figure 1: Percentage of homes in EPC bands, by tenure. Source: English Housing Survey (2020).[15]

Current Market Context

Current Government Support Mechanisms

The Energy Company Obligation (ECO) is a government energy efficiency scheme aimed at reducing carbon emissions from housing and tackling fuel poverty. ECO has been the main driver of domestic energy efficiency installations across this timeframe. However, the deployment rates for the scheme peaked in 2014 and have been declining ever since (figure 2). As noted by the BEIS Select Committee, insulation installation rates are at their lowest level in 10 years, and 'the rate of loft and wall insulation measures going into houses under Government schemes is 95 per cent lower than what was delivered in 2012'.[7] ECO3, which began in 2018, has been predominantly focused on incentivising fuel poor households.

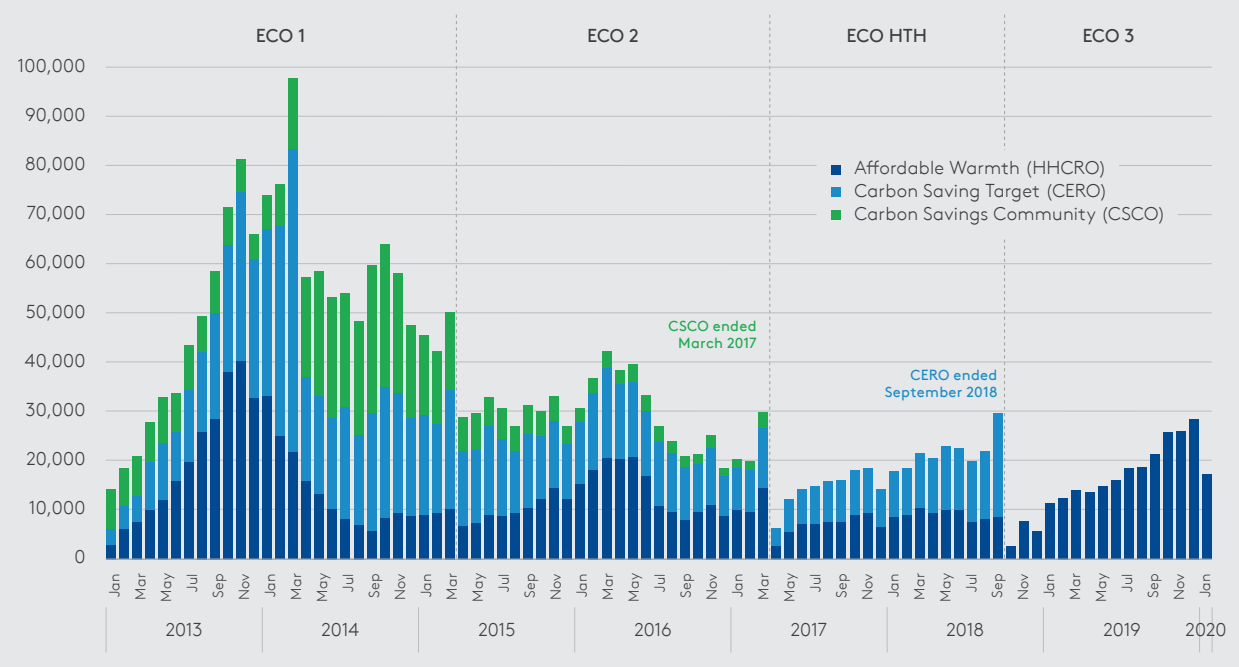

Figure 2: ECO deployment rates over time, showing a peak in 2014 and a fall in numbers ever since. Source: BEIS, (2020).[16]

Current Market Context

As shown in figure 3, England is some way behind the level of uptake needed and falls far behind the devolved nations. Interestingly, the levels of investment into energy efficiency were lower in England in 2017 than in any of the devolved nations (average annual per capita investment £35 in Scotland, £23 in Northern Ireland, £17 in Wales and £8 in England). It is clear that more needs to be done, particularly in England, to address these installation rates if we are to meet the net-zero by 2050 target.

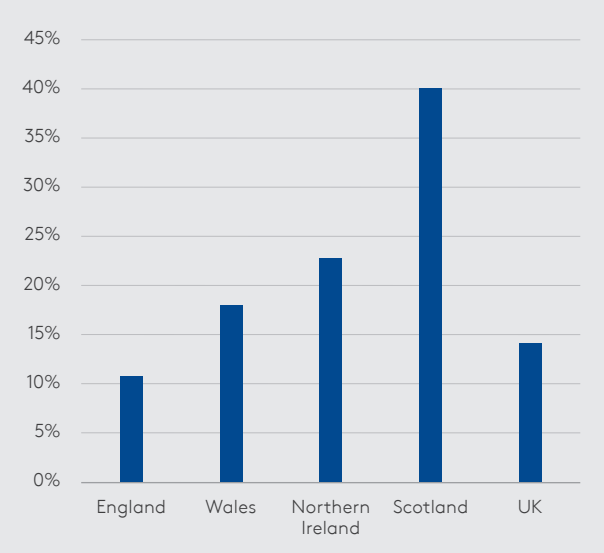

Figure 3: Rate of homes supported with energy efficiency retrofits in 2017/18, by UK nation, as a percentage of the average annual rate needed to 2035. Source: BEIS Select Committee and sources within Energy efficiency: building towards net zero (2019).

The BEIS Select Committee have recommended that ECO is adjusted to involve 'three tiers of funding consisting of ECO, centrally funded local authority schemes, and a further national funding safety net, to provide a comprehensive strategy for energy efficiency'. They also recommend that for the able to pay sector specifically, the Government should publish its energy efficiency action plan which has now been expected for a number of months, and that the possibility of linking Stamp Duty Land tax to energy efficiency, as discussed below, should be revisited.

Barriers to Uptake

Encouraging behavioural changes

Currently, uptake of measures suggests that homeowners are reluctant to invest in energy efficiency. This 'energy efficiency gap' has been explored by economists and ways that uptake can be encouraged have been identified. This includes 'nudge' incentives that prompt households to change their behaviours and consider installing energy efficiency measures. Nudge behaviour utilises small interventions which have a disproportionately large influence on consumer behaviour to steer stakeholders toward more desirable behaviours. For example, Kingspan Insulation considers that a clear statement comparing the energy use of one consumer to 'the average' in similar circumstances would be a motivation to some homeowners.[17]

Moreover, motivation to implement energy efficiency measures could also be generated from 'social norms'. Social norms have been shown to have some role in motivating pro-environmental behaviours such as household recycling. Motivation for behaviour change splits into three factors: economic, social and environmental (see table 1).[18]

Motivation Theme	Motivation Factor
Economic	Cost of energy bills Potential savings Available incentives Cost of works Household income Value added to property
Social	Comfort Role of home Social norms Sense of responsibility Locus of control Loss aversion Expectations
Environmental	Carbon footprint Environmental impact Resilience against climate change

Table 1: Motivation theme and factor for behaviour change regarding energy efficiency improvements.[19]

Existing motivation models and concepts in the psychological world give some examples of potential reasons to change behaviours but to date these have not yet been specifically applied to energy efficiency retrofits. Although, it is thought that individuals are likely to undertake energy efficiency works for three principal reasons:

1 energy bill saving;

2 increased comfort within homes; and

3 reduced environmental impact.

However, Kingspan Insulation believes that firstly an awareness and education piece is needed, as consumers will only be motivated to adopt energy efficiency measures when they have knowledge of home improvements that are available to them. This should be combined with information on the benefits and costs, as well as wider environmental and social advantages that adopting these measures would incur.

Property repairs and maintenance

It is crucial that when considering property repairs and maintenance, a holistic approach is taken to encompass not only emergency repairs but also good structural quality and energy efficiency improvements. Although this is likely to increase the costs of the renovation, it will also result in improved performance and reduced risk of unintended consequences. In addition, making sure that the property is in good general condition with no structural damage or problems such as damp prior to energy efficiency retrofits is vital as this ensures the measure can operate most effectively.

It's important to note that households do not always completely understand the maintenance requirements of energy efficiency measures or how to best operate low-carbon heating systems such as heat pumps. Therefore, there is a need for education of households upon installation of the measures, and a record of what is installed in the form of a building passport may be useful.

Motivation to Act in Existing Able to Pay homes

Over a number of years, various policy mechanisms and financial levers that can be pulled to encourage action in the able to pay market have been suggested. The Green Finance Institute state that *"ready availability of private finance for the 'able-to-pay' market is critically important but will not on its own drive sufficient demand for insulation and low carbon heating systems. Actions and activities – better information, access to capital, standards to ensure that works deliver the energy savings predicted, as well as incentives and regulation for both borrowers and lenders to act – are also needed."* [20]

Below is a summary of the different methods, which Kingspan Insulation feel should be considered and acted on by Government to help the sector make changes essential to meeting net-zero and creating a futureproof housing stock.

Recognising the Value of Energy Efficiency to Drive Demand

In a competitive housing market, sellers will often be incentivised to make changes to their home that increase its value. The Green Finance Coalition is calling for research and development of practical solutions, based on the relationship between energy performance and property valuation, that unlock investment towards net-zero homes.[21]

Whilst there appears to be some correlation between good energy efficiency levels and higher property prices, it is likely that this is somewhat linked to location, property size and general condition. It has been shown that homes rated A or B can expect 5% increases in property prices and C +1.8% compared to a dwelling rated D. For dwellings rated E and F there are -0.7% and -0.9% respectively discounts on property price compared to band D. This effect is felt most in terraced dwellings where Fuerst et al (2015)[22] show that terraced home rated B 'has sold for approximately 4.5% more per square metre than a terraced dwelling EPC rated D. The comparable figure for a flat is 1.6%'.

Previous studies have indicated that increasing energy efficiency scores by 1% produces a 0.1% to 0.45% increase in predicted property price, whereas a 1% fall in energy rating produced a 0.2% fall in price.[23,24] However, more needs to be done to increase demand for properties with better performance ratings so that homeowners are incentivised to raise the energy efficiency in their homes and install low-carbon heating as currently higher levels of energy efficiency are associated with more modern kitchens and bathrooms which obviously impact the property price also.

Therefore, when consumers begin to look for energy efficiency in properties and low-carbon homes become the norm, there will be an increased pressure for sellers to improve their properties by installing energy efficiency and low-carbon heating before putting them on the market. However, it is a challenge to ensure that potential buyers or tenants do see the tangible benefits of energy efficient homes and currently the energy performance of the home and the energy bill savings this can result in is not reflected in its property price. The below financial mechanisms aim to change this and make energy efficiency and carbon emissions more relevant to owner-occupiers.

Building Passports

The concept of a Building Passport is supported by a range of organisations including the Green Finance Coalition[25] and the sustainable Energy Association[26] to increase the rate and depth or retrofits and providing households with information on what measures are possible and a long term renovation plan.

A Building Renovation Passport is defined by Buildings Performance Institute Europe (BPIE) as:

"A document - in electronic or paper format - outlining a long-term (up to 15 or 20 years) step-by-step renovation roadmap for a specific building, resulting from an on-site energy audit fulfilling specific quality criteria and indicators established during the design phase and in dialogue with building owners." [27]

The expected benefits of the introduction of a Building Passport include reduced energy bills, comfort improvement and carbon emissions reductions, explained in a user-friendly way that encourages homeowners to take an interest in their property's energy performance. They can also be used in EPC assessments and by assessors to generate a more accurate, more reliable rdSAP score for the building and improve the relevance of the EPC to the homeowner.

Improving the wealth and depth of data available to assessors by retaining previous assessments or data collected when carrying out calculations would see errors decreased and significantly increase reliability. Reducing the amount of data that needs to be collected at each EPC revision and ensuring that previous measurements are considered as part of an EPC renewal is key to improving the reliability. A large volume of data is collected during the property specification and as such, during subsequent EPC assessments future assessors should have access to all of this prior information to improve understanding of the property and how it has changed over time. A new assessment shouldn't start from a baseline of no information about the building. Instead, the assessment/building passport should track all changes, updates or revisions and retain past ratings.

Furthermore, introducing a more dynamic passport, possibly digitally via an easy to use app, would mean that homeowners are able to update the information about the house as they carry out works regardless of the scale of the change. Over time, Kingspan Insulation advocate that EPCs should be amended to become or should be used alongside live Building Passports. They should be updated whenever renovations affecting the energy performance are undertaken, for example new or replacement heating systems or controls, new windows or doors, any changes in the ventilation system or to the building fabric.

Having a 10 year lifespan and only being required when selling or renting a property means that EPCs are often out of date and do not take into consideration changes made by occupants during this period. Introducing live or dynamic passports that enable all smaller changes to be recorded would be helpful to overcome this barrier.

Motivation to Act in Existing Able to Pay homes

In addition to the introduction of dynamic EPCs, it might also be appropriate to require a 7 year mandatory review on top of this, in order to better reflect changes made to the building that haven't been subject to building regulations, as well as industry innovations and system wide developments such as decarbonisation of the electricity grid which will affect the buildings' emissions levels.

Currently consumer awareness of EPCs is poor; the English Housing Survey (2018) indicates that 28% of people did not see an EPC when moving into their new home and 76% of people that had seen one were not influenced by it.[28] More accessible, interactive and up-to-date data in a Buildings Passport could motivate homeowners to engage more with their EPC and make improvements in the home.

Introducing new information sources such as smart meter data will help to ensure that EPCs are up to date and reflective of actual property performance. Currently, EPCs are static and use assumed demand profiles which is often not accurate to the real performance of the home. To make EPCs more accurate, more dynamic data points from technologies such as smart meters should be used to ensure that the ratings reflect the property and household composition.

In the longer term, the Building Passports could be used to help create a long-term renovation plan for the property which shows the renovation roadmap for the property to meet the 2050 net-zero target and the midpoint EPC band C target. This should be holistic and outline the measures that need to be installed and the recommended order to installation to avoid unintended consequences. For example, a household may opt to change their heating system and later install wall insulation reducing demand however, it may be prudent to instead address the thermal efficiency first thus enabling a smaller heating system to be installed. The roadmap should provide this guidance to ensure that households take the most cost-effective route to meeting net-zero carbon emissions.

BPIE suggest that 'by supporting staged renovations, adapted to the preferences of individual building owners, Building Passports give homeowners the opportunity to have an overview of the full range of renovation options and to easily identify each renovation step from beginning to the end. As a result, staged renovation strategies facilitate the owner's decision to invest in a deeper renovation process, in particular if specific elements that need to be taken into account for later renovations are also highlighted.'[22] The passports could be used to inform longer term decision making and engage homeowners by:

- centrally holding data to enable information to be kept up to date, accessed and updated when improvements (or changes) are made to a property;
- providing maintenance and replacement information to ensure that systems are operated efficiently;
- introducing an online tool, which would allow homeowners to access their information and potentially vary inputs for a more personalised set of recommendations. This would allow a more tailored cost saving based on the property's energy usage, the way it is occupied and the likely length of time the household will remain in the property;
- highlighting available support and sources of reliable information and guidance materials;
- ensuring that the need to future-proof homes is considered; and
- enabling information to be passed between property owners.

Highlighting Costs During Property Transactions

In order to highlight how energy efficient properties can help save the consumer money and be more affordable to run, Kingspan Insulation believes that mortgage providers should not be able to promote monthly mortgage repayments without also highlighting the costs to run the building. This will help to educate homeowners on the financial benefits of energy efficiency and help make the link between the property's value and its energy performance. This will also enable green finance products such as green mortgages, discussed in more detail below, to be introduced to the consumer when they are conscious of the link to the costs to run.

It has been shown that over 60% of those buying a house don't know about the energy performance of their new home.[29] A requirement could be introduced making it necessary for every EPC (or as discussed above, Building Passport) survey to include the cost of improving the house to the next band when the home is bought to encourage the homeowner to act on the advice. This would also encourage the homeowner to look at the longer-term costs of not acting (i.e. increased energy bills) and allow them to consider what renovations they might want to carry out in the future.

Furthermore, a homeowner could be obliged to show whether they have increased the EPC band of a home during occupation upon selling the house and if not, the cost of raising it to the next band could be ringfenced in escrow for the new buyer to make improvements and raise the EPC band. It is important that trigger points such as point of sale are targeted by interventions that will encourage action to be taken and securing money from the previous owner for this is one way to incentivise retrofit works to be carried out.

Motivation to Act in Existing Able to Pay homes

Stamp Duty

The use of Stamp Duty Land Tax flexed around a home's energy performance as an incentive for energy efficiency has been suggested by numerous bodies e.g. Policy Exchange, Frontier Economics, the Sustainable Energy Association, UK GBC, etc. Variable Stamp Duty rates would work by buyers receiving a discount on Stamp Duty if a property is above a given energy efficiency standard (for example EPC band C, in line with Government targets), or pay a higher rate if its performance is below this level. When selling a property, there are likely to be changes made by the old owner to try and ensure a quick and easy sell - energy efficiency could be improved as part of this to try and reduce the amount of Stamp Duty paid by the new owner, making it more attractive to potential buyers. UK GBC suggest that a key element of this lever would be ensuring that a rebate for any household that undertakes energy efficiency work within twelve months of purchasing a property is secured. This intervention also pulls on the human psychological lure to take action to prevent losing money through paying additional tax, known as loss aversion.[30]

UK GBC analysis suggests that variable Stamp Duty could create an additional 135,195 - 270,402 home retrofits per year, equating to annual carbon emission savings of between 208,538 - 417,088 tCO_2. They suggest that this scheme could also contribute £404 million - £807 million to GDP a year with a near zero annual direct cost to Government.[31] Alternatively, it could be used to generate additional funding (approx. £742 million) for the Government, as modelled by the SEA in figure 4, if the point around which Stamp Duty is flexed is above the mid-point of EPC band C. This policy, if introduced, is expected to impact 1.2 million households across the UK each year.[32]

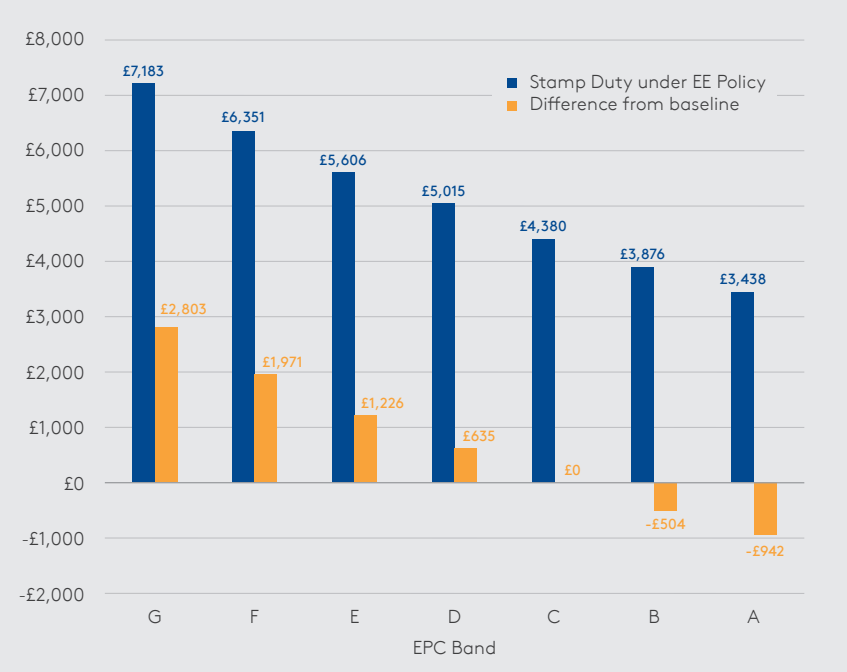

Figure 4: Variable Stamp Duty flexed around an EPC band C and adjusted by 1% per unit change in SAP. Source: Sustainable Energy Association, Energy Efficiency Policy Pathway.[33]

Motivation to Act in Existing Able to Pay homes

Green Mortgages

Green mortgages offer consumers discounted rates of interest when they upgrade the energy performance of their home. Often, interest rates are tiered according to the level of energy efficiency improvement achieved in the borrower's property. There is evidence that those who invest in the energy efficiency of their homes have a lesser risk of defaulting on their mortgages[34] providing an incentive for banks to provide green finance packages to these homeowners.

Research by E.ON shows that green mortgages may be popular because they generate cost-saving on energy bills, resonating with many consumers whereas secondary benefits like value growth and home comfort simply reinforce this. Their research shows that the primary barrier to uptake is not wanting/inability to afford taking out an additional loan followed by a secondary barrier of the hassle associated with home renovations.[35]

The Green Finance Strategy and launch of the Green Finance Institute showed the Government is committed to rolling out green finance to decarbonise buildings and homes across the UK, by removing the capex barrier. Whilst this commitment is welcomed, so far investment from the public and private sector has been relatively limited – for example the £5 million Green Home Finance Innovation Fund was described as 'woefully inadequate to stimulate demand for energy efficiency within the able to pay sector' by the BEIS Select Committee and there have been calls to dramatically increase the funding allocated to this area.[36]

There are a limited number of green mortgage options available. Currently Barclay's offer a green mortgage product in the UK but only for new build homes. The Republic of Ireland's Bank, as part of the bank's Sustainable Finance Fund introduced a 'green interest rate discount' for borrowers buying or building energy efficient properties in the summer of 2019. This comprised of a 0.2% discount off any fixed interest rate mortgages offered by the bank for a building that has a Building Energy Rating (BER, similar to an EPC) of A.[37]

Kingspan Insulation therefore agrees with the recommendations as set out by the BEIS Select Committee and support the roll out of green mortgages to help more effectively make the link between property prices, energy efficiency, energy bill savings and carbon emission savings for consumers. Green mortgages do this by helping consumers understand that more energy efficient homes have lower fuel bills and therefore more can afford higher monthly repayments on their mortgages, or alternatively have more disposable income to spend elsewhere.

Variable Council Tax

Council Tax rates could be varied according to the energy efficiency of a property incurring discounts for highly energy efficient properties and increased rates for those with poor energy performance. Industry bodies have suggested that this could be completely revenue neutral for the Government, or generate revenue in the same way as the Stamp Duty scheme,[38] and encourage widespread action from homeowners to the scale of an additional 517,739 - 1,480,935 retrofits per year, with annual carbon savings of between 812,192 - 2,231,594 tCO_2. UK GBC estimate that a variable Council Tax scheme could also contribute £1.5 billion - £4.4 billion to GDP annually.[39]

It is thought that variable Council Tax could be an extremely strong driver for action, as it has a wide ranging collection base, high collection rate, it is levied and paid consistently and because it is a charge on the property itself. This mechanism would help to strengthen the link between the property value and its energy efficiency performance. It is also unpopular with the public, so has good potential to cause behavioural changes and is aligned with the human innate desire to adhere to the social norm, whilst being loss averse. With a clear link generated between energy efficient properties and lower Council Tax, it is thought that this scheme could have large positive impacts in driving consumer demand for homes that have a good energy performance.

Financial Support to Enable Uptake

The rates of installation of insulation have dropped 95% since 2012 (see figure 5) and the average annual rate at which homes undertake significant energy performance improvements in the UK needs to increase by a factor of seven.[40] The lack of consumer action even given the long-term energy bill savings of installing energy efficiency suggests that homeowners are unwilling to pay measures outright and could benefit from financial support to install these measures. One of the major barriers to energy efficiency retrofits is the access to upfront funding for measures. Below we provide an overview of a range of financial support mechanisms that could increase uptake and address this barrier.

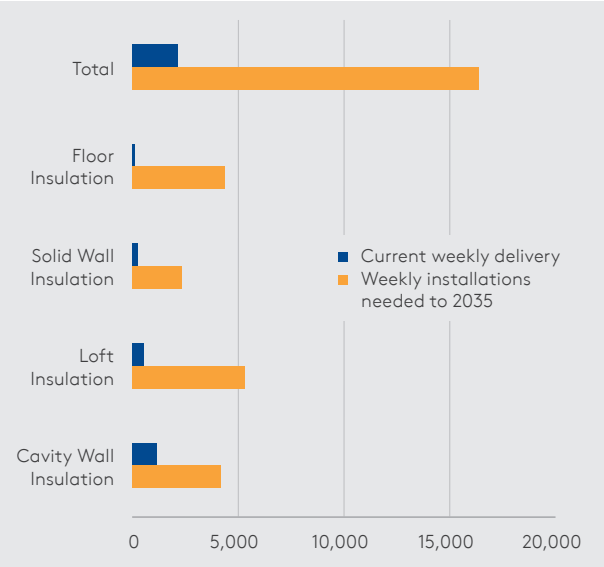

Figure 5: delivery rates of energy efficiency measures currently, and those needed to 2035. Source: BEIS Select Committee.[7]

Council Tax Rebates

Council Tax rebates, differing from variable Council Tax discussed above, could also be offered to incentivise homeowners to improve the energy performance of their home. Rebates work by giving a discount on Council Tax after the consumer has installed energy efficiency measures, meaning that some of the cost is recuperated and increasing the attractiveness of undergoing retrofit works. Seen as more of a 'carrot' than a 'stick' like the variable Council Tax scheme, rebates have previously been offered in the UK under a British Gas led scheme, but the success and uptake was limited.

This British Gas scheme offered £50 to £100, focussed mainly on cavity wall insulation installed by a designated third party.[41] The Energy Saving Trust has suggested that this scheme had a good conversion rate of those receiving information about the program and ultimately choosing to take part at 60%[42] however the actual uptake had limited levels of uptake as it was short lived and depended on local authorities taking the lead to implement and promote the rebate scheme.

Grants

Grants in the form of a 'cash-back' scheme such as the grants for social housing energy efficiency improvements in Scotland (worth £3.5 million) or boiler scrappage schemes (as recommended by the Heat Pump Association[43]) could help to drive demand and support uptake of energy efficiency measures.

Grant schemes have been successful in other sectors, for example UK GBC evidence that a variety of countries including the UK, US and those in the EU have previously encouraged consumers to purchase new, fuel efficient cars with discounts and rebates.[44]

In 2010, a boiler scrappage scheme was introduced in the UK to households to install new, A-rated boilers. Households were able to claim £400 in vouchers to help cover up-front cost of the boiler. Often, installers matched the value of the voucher to give a combined discount of up to £800. In total a significant 125,000 vouchers were given out and there was a high rate of use – 95% of vouchers were cashed in by consumers, showing the successes that this sort of scheme could have in the energy efficiency industry.[45]

The high upfront cost barrier of some energy efficiency measures such as SWI is often cited as the most significant barrier to uptake.[46] Therefore Kingspan Insulation welcomed the Conservative Party Manifesto pledge for £9.2bn of investment in energy efficiency of which a proportion was allocated to a new Homes Upgrades Grant scheme. The Manifesto sets out annual funding budgets with £150m allocated to 2020/21. However, the scheme is yet to be introduced meaning that deploying the funding this financial year is likely to be challenging. The Home Upgrades Grant should be introduced as soon as possible to provide the much needed boost to the able to pay sector and provide a strong driver for action. The grant should be targeted towards hard to treat properties receiving holistic energy efficiency upgrades, providing upfront funding to support these higher cost projects. As discussed later in the report, delivering programmes at a local level aimed at supporting hard to treat homes will deliver cost efficiencies and will also realise local economic benefits including job creation.

For particularly expensive retrofit measures such as SWI, grants may be a good option to increase uptake as they will provide some of the upfront funding needed to encourage and enable action. So far, SWI grants are limited to the ECO programme where there are specific targets for the number of SWI properties the energy supplier must treat in a year. This means that currently only fuel poor or vulnerable households can access the grant funding and we recommend that this is adjusted so that the able to pay market can also benefit, creating opportunities for carbon emissions savings and making progress towards EPC targets in hard to treat properties. Targeting the Home Upgrades Grant towards harder to treat properties will ensure that these leaky homes are not left behind. Households will benefit from lower energy bills and will be able to undertake works they may not have otherwise been able to afford

Financial Support to Enable Uptake

However, grants and cash-back schemes can lead to a cycle of boom-and-bust, as seen in the Feed-in-Tariff scheme which saw high uptake in solar PV (over 800,000 installations between 2010 and 2019[47]) yet when the scheme closed, installations of solar technologies fell dramatically. Whilst helpful for increasing initial uptake, securing a long term market through grants and cash-back schemes is difficult as the market is dependent on Government-led subsidies rather than constant consumer demand. As such there is a need for a combination of both finance provision, consumer incentives and regulation to drive sustained demand.

Reduced VAT for Energy Efficiency

Value Added Tax (VAT) is applied to almost all goods and services, with reduced rates (normally 5%) being available to things that are considered to be essential or of social benefit. Kingspan Insulation believes that energy efficiency goods, which can reduce the incidence and impacts of fuel poverty, significantly reduce carbon emissions and make homes warmer and more affordable to live in should be considered in both the essential and socially beneficial category.

The standard rate of VAT is currently 20% and so once added, its effect on the final price of goods and services paid by households is significant. Dropping the rate from 20% to 5% could would help to lower the cost to the homeowner of taking action. As noted by UK GBC, 5% VAT already applies to construction and retrofit in commercial to residential conversion work and renovations to residential properties which have been empty for more than two years.[48]

Until October 2019, a reduced VAT rate was also applied to 'energy saving materials', which included insulation. However, this was removed as part of an EU Directive meaning that the discounted rate is now only permissible in certain conditions; where the consumer is over 60 and in receipt of certain benefits or living in a 'relevant housing association', or the cost of the materials is more than 60% of the overall cost of the retrofit (including installation labour).

A solid wall insulation project on a detached property will cost in the region of £7,800 – £9,750 depending on the size of the property and the insulation material will cost between £2,200 - £2,500. This suggests that the insulation material will constitute around 30% of the total install cost. Taking the fabric first approach, we are pleased to see that this proposal is unlikely to significantly impact the cost of installing insulation measures in homes. However, Kingspan Insulation believes that the eligibility conditions should be removed, and the reduced VAT rate extended to include all energy efficiency retrofits and low-carbon heating measures to reduce the cost for homeowners to decarbonise their buildings in line with net-zero.

The UK GBC state that reducing VAT could have major effects. 'The effect of reducing VAT on the labour element of all domestic repair and maintenance from 20 per cent to 5 per cent could stimulate an additional £1.45 billion of spending on energy efficiency measures by 2020, saving up to 393,600 tonnes of CO_2 over the period to 2020. They reported that this would result from over 163,000 extra homes installing double glazing, insulation and energy efficient boilers over the period.' [49]

Loans

Low Interest 'Green' Loans

Numerous countries have introduced loan schemes to help overcome the upfront cost barrier. For example, Germany's development bank offers low interest loans (0.75%) and subsidies of up to €30,000 towards energy renovation and low carbon heat, linking the level of subsidy to energy performance standards. 276,000 retrofits were supported in 2016, costing €1.7 billion although €1.6 billion was recuperated in VAT alone meaning the scheme almost paid for itself. In addition to financial sector spending, property owners invested €8.4 billion, and there was €6.6 billion net turnover upstream in the supply chain.[50] Closer to home in Scotland, interest-free loans of up to £15,000 are available for energy efficiency measures under the Home Energy Scotland Loan Scheme, a £30 million fund in 2017/18.

It is important that a loan scheme has attractive interest rates to entice consumers into taking out a loan. Interest rates proved pivotal to the success of the previous Green Deal loan scheme, which had between 7.9% to 10.3% APR and relatively low levels of uptake.[51] Research has showed that only 7% of homeowners were interested in taking up the Green Deal offer if the interest rate was greater than 6% and as such this will be a crucial part of any loan scheme.[52]

In the US, third party finance schemes such as the Property Assessed Clean Energy (PACE) program had more success with interest rates of 6% - 8% APR. Charging less interest than the UK Green Deal, uptake of PACE was significant at over 200,000 energy efficiency and renewable energy improvements (worth $4.2 billion) from its launch in 2008 to 2019.[53]

The Bank of Ireland introduced a Green Home Improvement Loan, available at 6.5% variable APR from €2,000 to €65,000, in 2019. This helps overcome the cost barrier to installing energy efficiency because the capex is now available, and repayment terms of 1 to 7 years mean that this loan is relatively short-term. This 'green loan' compares to alternative home improvement loans for aspects such as a new kitchen or bathroom with higher rates of interest (from 7.5% APR).

Financial Support to Enable Uptake

Equity Loans

Equity loans that allow homeowners to borrow against the value of their property for energy efficiency measures are recommended by both the Sustainable Energy Association[54] and the Green Finance Institute.[55] They are currently being piloted in Scotland, where the loan (up to £40,000 can be borrowed at a maximum of 50% of the property's market value[56]) is repaid upon sale of the property meaning there are no ongoing repayment. It is also helpful that the loan is repaid on selling, as this avoids the unintended consequences of other loan schemes such as the Green Deal. At least 55% of the costs of the work must be for energy efficiency works, however the equity loan can be used for the following measures which must be recommended in the building's EPC or in a Home Energy Scotland energy report:

- a new boiler;
- insulation;
- double glazing;
- renewable technologies; and
- repairs which reduce heat loss through the building's fabric or damp and moisture.

The amount paid back under the HEEPS equity loan scheme is the lesser amount of either the loan amount if it had been a commercial loan at 2.5% APR for the duration of the agreement, or the Scottish Government's agreed equity share of the property's sale price.[32] This safeguard ensures that an increased property value over a short period of time will not mean that the homeowner has to pay back more unfairly.

Help to Renovate

Help to Renovate loans enable homeowners to borrow with favourable terms to invest in the energy performance of their home.[57] Help to renovate mechanisms could be particularly important for solid wall properties, which can be more expensive and much harder to treat yet are often the worst performing so are crucial to tackle. If policy levers are not put in place, it is likely that these properties will be 'left behind'. To address these properties as well as the wider able to pay market, help to renovate loans could also be introduced; this could take the form of a government supported savings scheme whereby major interventions might be saved towards similarly to 'help to buy'. Perhaps focused on worst performing properties, this scheme could require an improvement plan developed at the outset and then allow for saving via an ISA type approach, or something similar to the Home Energy Scotland loan. Ultimately it is thought that this type of savings scheme could encourage action in the able to pay market, particularly if the consumer feels they are getting Government support an additional benefit from this help to renovate loan scheme.

Mandating Action to Meet Targets

Minimum Standards at Point of Sale for All Tenures

There are minimum energy efficiency standards in place for the private rented sector and in social housing the Decent Homes Standard and Fuel Poverty target apply however the same level of regulation is not seen in the owner-occupier market. This means that in most cases, only homeowners that are 'green' (environmentally minded) or realise the long-term energy bill savings of energy efficiency retrofits are motivated to take early action; therefore a small number of households. It has been suggested that minimum standards, like those in other sectors, are needed to push homeowners that are not inclined to take early action to change their behaviours and install energy efficiency measures.

To this end, mandating that homes need to be at a certain standard to be sold is one way to regulate the energy performance of able to pay properties. This is currently being considered by the Scottish Government, as well as triggering of the standard when the home is undergoing a 'major renovation'.[58] These trigger points are suggested because at this point, there is already likely to be significant hassle, disruption and cost to the homeowner so adding a little more to improve the energy performance is more acceptable.

The Building Regulations for existing domestic properties are due to be reviewed this year and it is hoped that their review will include some further regulation on the energy performance of the home during retrofit. Inclusion of strong and stable energy efficiency standards would certainly help to drive action, both in the short and long term as people renovate their homes.

For this policy lever, it is very important that sufficient warning of these standards is conveyed to homeowners so they are aware of the standards coming down the line and can plan and budget for upcoming changes. Kingspan Insulation have previously produced evidence from across Europe that setting out a long-term trajectory not only for the immediate changes in Building Regulations but for future iterations too can help to encourage homeowners to adhere to future higher standards before that are strictly necessary. This helps to not only save cost in the long run, but also save on carbon emissions from the outset. Therefore, we advocate that a minimum energy efficiency standard at the point of sale and perhaps in the future during a major renovation should be introduced by the UK Government as soon as possible.

Tackling Hard to Treat Properties

It is estimated that only 6% of owner-occupied properties with solid walls are insulated which is significantly lower than the social rented sector and means that a large proportion of homes are leaking energy, carbon and are colder and more expensive to live in than they should be. Targeting this group and encouraging private owners to improve the energy efficiency of solid walled properties therefore offers a significant opportunity to improve the UK housing stock and reduce energy wastage. To this end, solid walled properties should be a focus for the Government, industry and homeowners themselves as improving the worst performing, most expensive to improve properties is important to tackle in order to ensure that they are not left behind.

Current market frameworks and government policies are not set up to encourage this; in the ECO impact assessment, the Government assumes that the co-funding required for solid wall insulation is 75% of the cost.[59] Estimates of insulation costs suggest that this means households can be asked to contribute around £10,000 towards such measures,[60] which is obviously a significant amount of money and most homeowners are unlikely to be able to afford this without years of savings. The policy levers and mechanisms discussed below could help to solve some of the issues with funding for difficult or expensive to treat homes, such as solid walled properties, all helping on the pathway to net-zero.

Street by Street Approaches

The CCC also highlight that area based programmes can enable more holistic solutions to be implemented and 'whole-street' approaches to be taken which can reduce costs for hard to treat properties, for example in Scotland the Local Heat and Energy Efficiency strategies.[61] Numerous barriers to uptake such as perceived hassle or disruption and finding a trusted installer are shared between houses, which could be better overcome if multiple properties come together and undergo works at the same time to reduce disruption. Similarly, the upfront cost barrier is common and can be reduced by taking a street by street approach, as economies of scale on the likes of scaffolding etc. are proven to reduce expenditure and only getting the installer out to a location once can help save money.

Financial Support to Enable Uptake

For example, in a mid-terrace house, SWI installation is extended to a neighbouring house(s), reducing the man-hours associated with scaffolding installation (including transportation of the materials). i.e. the labour cost associated with scaffolding installation would be reduced by approximately 18%, thus reducing total costs by 1.7-2.3%. Figures 6 and 7 below show this effect. These savings depend on the size of scaffolding per property and might be additionally complimented with:

- Savings on reduced labour cost associated with the installation of SWI – approximately additional 8%
- Savings on material cost – approximately additional 12%

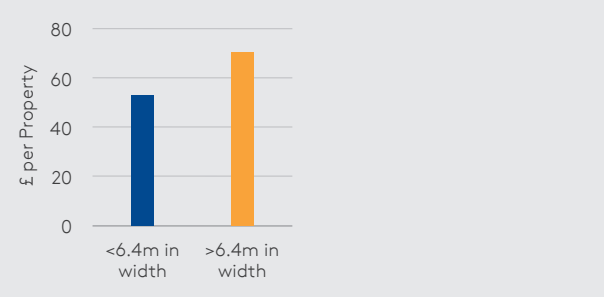

Figure 6: Potential labour cost savings from scaffolding installation in a mid-terrace property with respect to property width. The man-hours required have been calculated according to John S. Page, 1999. The assumed scaffolding height is 3 sections.

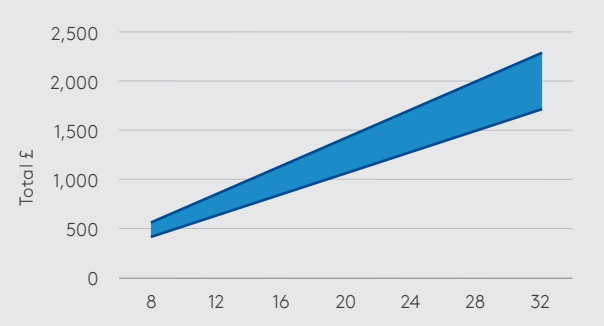

Figure 7 – Potential labour cost savings from scaffolding installation with respect to number of mid-terrace properties. The lines mark savings available for properties less than (min) and more than (max) 6.4m in width. The man-hours required have been calculated according to John S. Page, 1999. The assumed scaffolding height is 3 sections.

Therefore, undergoing multiple improvements at the same time in a 'whole-house' approach and a 'street-by-street' method can help to reduce costs and hassle as multiple measures in multiple homes are all installed at the same time.

Conclusion and Recommendations

The financial mechanisms and enablers discussed within this document give some examples of how the able to pay market might be encouraged to take action on their home's energy performance. However, given the ongoing work in Scotland surrounding minimum standards at the point of sale, and potentially during a major renovation too, it seems likely that in the future necessary regulation will also be introduced to ensure that all homeowners are pushed towards making improvements.

It is important that alongside regulation there is a package of measures, including some of those detailed in this document, that support the homeowner in taking action are implemented and a large part of this will be overcoming the capital expenditure for installing energy efficiency. Therefore, Kingspan Insulation look forward to working with government and industry to help deliver these mechanisms in order to help the owner occupier market move to a net-zero housing stock, which will be essential for both meeting climate change targets and for ensuring that all homes are warm and affordable to live in.

Recommendations

- The Government should consider energy efficiency retrofits of existing homes a priority, in order to meet net-zero and create homes fit for the future. This should be reflected in the upcoming Heat in Buildings Strategy and Energy White Paper, where a clear pathway should be set out for the able to pay market.
- As recommended by numerous industry bodies and the BEIS Select Committee, incentives such as flexing Stamp Duty, Council Tax and introducing loan packages should be introduced in a timely manner to encourage homeowners to make changes to their properties and help overcome the upfront cost barrier.
- For households not incentivised to make changes through the financial mechanisms set out in this paper, a regulation may be needed to drive action across the housing stock. This should be considered by Government as a future means of raising the energy performance and quality of existing homes.

Kingspan: We Are Planet Passionate

Planet Passionate is Kingspan's ambitious 10-year global sustainability programme that aims to impact three big global issues within our operations and via our products:

- climate change;
- circularity; and
- protection of our natural world.

We are planet passionate. This means we recognise the role buildings can play in the fight against climate change and advocate that they should do their bit to help stop global warming. This is because:

- climate change is the single most important issue facing the world today. To protect our planet, we need to prevent a 1.5ºC rise in global temperatures this century;
- to do this carbon emissions need to be cut to net-zero globally by 2050 - but we are currently on course to miss this goal by at least five-fold; and
- the energy, buildings and environmental sector has a key role to play in this challenge. Today, buildings and construction together account for 36% of global final energy use and 39% of energy-related CO_2 emissions when upstream power generation is included.

In order to make positive changes to our carbon emissions, deep and wide-ranging improvements will need to be made to a variety of aspects of the built environment.

1. Manufactured Materials

17% of CO_2 emitted by all the products made for the global economy each year is attributable to building materials.

2. Global Construction

The world's building stock is expected to double by 2060. However, two thirds of this new construction is in countries without mandatory building energy codes. Embodied carbon will be responsible for half of the entire carbon footprint of new construction between now and 2050.

3. Buildings in Use

3.8GtCO_2 in emissions would be saved if all 2020 global building stock adopted high-performance envelope design measures. This would account for approximately 10% of all global CO_2 emissions.

4. End of Life

70-80% of global construction and demolition industry waste is discarded to landfill, accounting for approximately 30% of all global waste to landfill.

To learn more about our 10-year global sustainability programme, please visit:
www.kingspan.com/gb/en-gb/about-us/planet-passionate

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