



UK FINANCE

NET ZERO HOMES:

TIME FOR A RESET

NOVEMBER 2022



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NET ZERO HOMES: TIME FOR A RESET

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FOREWORD

The need to 'go-green' is unequivocal. Climate change is upon us and the challenges that we face in the 21st century are literally existential. We are no longer 'at a crossroads', no longer just able to consider our options. Now is the time for action. For mortgage lenders, this means not just greening their balance sheets but helping green the housing stock by enabling an inclusive transition. A transition that allows the person who has just purchased their ex-council property to play an active part in this change in the same way as someone who has more economic firepower. In a high-inflation environment where living standards and spare cash are being squeezed this inclusivity is even more important.

The scale of the challenge in greening housing and the associated opportunity is enormous, so there is a clear need for prioritisation and focus. As an industry, we welcome the government's Heat and Buildings Strategy and are actively working across government departments to support implementation. We are also working closely with the financial service industry's regulators to address what lenders can do now and in future to tackle this challenge.

This combined approach between government, regulators and industry matters. Success will lead to a housing stock that can migrate to Net Zero and not leave behind populations unable to make the transition. There are risks and the costs are enormous. We estimate it will cost UK homes approaching £300 billion to reach the required Energy Performance Certificate (EPC) ratings alone. If the funding and physical implementation of this change are not thought through, we risk creating cohorts of 'stranded assets', increasing lending costs to compensate for this diluted loan security and excluding customers from ready access to the property market as a new cohort of 'climate prisoners' emerges. We already know that the predominance of lower EPC ratings is across poorer regions in the UK and we need to act thoughtfully to ensure that we do not make this worse.

As the number one public policy priority facing future generations, we need to get it right. Lenders have a role in supporting their customers. However, the responsibility of leading, coordinating, and managing change sits with the government. Delays to policy delivery have a knock-on effect for us all. This report sets out a series of recommendations which broadly works within the key targets and measurement system laid down in the government's Net Zero Strategy. These recommendations seek to fire up the Net Zero Homes agenda in a systematic way which does not disadvantage more vulnerable consumers, blight properties and bake in unnecessary costs. This report has been prepared and written to reflect the position across the United Kingdom, including in the devolved nations. Where devolved administrations have developed specific policies and/or timelines, these have been highlighted.

We can do this and if we work together, we will.



David Postings
Chief Executive
UK Finance

1. SUMMARY AND RECOMMENDATIONS

The UK has a good record on reducing carbon emissions, relative to its major international competitors. However, the **UK's homes remain among the least energy efficient in Europe**, with heating of the UK's 28 million homes (predicted to increase to 31 million by 2037) representing 14 per cent of the UK's total carbon emissions. The UK's housing stock presents a range of challenges, as no one technology option will be appropriate for all homes. The government's central and devolved strategies setting out policies and proposals to meet the UK's 2050 Net Zero target set the ambition, but currently lack detail on funding, timelines, capacity, and capability to deliver.

Domestic heating is yet to reach its 'Tesla' moment where renewable sources are aspirational, but moreover reliable and reasonable value for money. **85 per cent of the public believe that climate change is an important issue**, with 84 per cent believing that everyone will have to adopt energy efficiency measures. **However, only 35 per cent have adopted or are planning to adopt energy efficiency measures** anytime soon.

The role of the banking and finance sector

The **banking and finance sector is playing, and will continue to play, a key part** in facilitating this transition. Since as early as 2006, mortgage lenders have offered a range of products aimed at incentivising homeowners to improve the energy efficiency of their homes **and the wider banking and finance sector can play a role in financing the industries and firms that enable the transition**, such as the multitude of SMEs that will be required to retrofit properties. The Green Finance Institute tracks the range of green mortgage products available but these have, so far had limited take-up due to a lack of consumer awareness, understanding, or reluctance due to costs. The role of the mortgage adviser in educating and informing home buyers, landlords and re-mortgagors should not be underestimated.

Public-private collaboration to address high costs

Upfront installation costs are a barrier for almost half (45 per cent) of the public, with a quarter perceiving the running costs of a low-carbon heating system to be too high for them to afford or not providing enough cost savings to be economic. The government must bridge this value-action gap if decarbonisation ambitions are to be successful. **Financial incentives – grants and subsidies – will encourage consumers** to implement energy efficient measures to retrofit homes. Our recommendation is that an energy efficiency adjusted Stamp Duty Land Tax (SDLT) could be utilised to increase demand for energy efficient properties and encourage homeowners to retrofit their homes although other options include using centrally-funded council tax incentives.

While lenders cannot be solely responsible for resolving these broad societal issues (around 35 per cent of homes in the UK are owner-occupied and mortgage-free which reduces the effectiveness of any policies that focus on lending), they will have a continued role to play. **Cooperation across the public and private sectors is key** to delivering long-term practical and long-term public policy, regulation, and collaboration through consumer education, development of high-quality EPC and environmental housing assessments, an increase in cost-effective retrofitting, meaningful long-term public funding, incentivised improvements, and new build housing built to Net Zero standards.

Overcoming data challenges

Currently, EPCs are the only consistent measure of energy efficiency in domestic properties across the UK. Although public awareness of EPCs is high, there are numerous critics who claim **EPCs focus too heavily on the fuel cost of heating a property and the recommendations included are often overlooked**. That said, there is an urgent need to open the EPC register so that real-time updates can be provided (rather than quarterly) so that lenders can build data into their decisioning processes. Anecdotally there are questions about the consistency of EPCs and their use as a tool for consumers to plan property upgrades. Reform to make them fit for purpose is needed.

Our analysis estimates the total cost of the **upgrading the entire UK housing stock to EPC Band C at approximately £249.5 billion**; with total cost of **improving the UK housing stock's energy efficiency ratio (EER) to its maximum potential EPC rating to be £291.1 billion**.

Avoiding a disorderly transition

Government and lenders must consider transitional risks impacting homeowners and tenants. **Firms are facing challenges, both in terms of practical application and growing regulatory and supervisory oversight.** The challenges facing **homeowners and tenants include lack of access to finance, restricted retrofitting options, lack of awareness and understanding of available options and logistical/fitting challenges.** Without tailored support, low-income households could be locked out from the benefits of the transition enjoyed by other households.

STRATEGIC RESET: WHAT THIS REPORT SETS OUT

Ultimately, this calls for a strategic reset in the way that all participants, particularly the UK's governments, engage with the challenges of greening of our housing stock. This report is structured in two main parts:

In the first part (chapters 3-8), we set out a **detailed analysis of the problem and attempts to resolve the challenge to date.** This covers a range of issues, including:

- The UK's wider net zero commitments and policy measures to date
- The nature of the UK's housing stock and contributors to poor energy efficiency performance
- The challenges of measurement and of high retrofit costs
- The issues and risks posed to the economy and consumers
- The role the banking and finance sector is playing and can continue to play

In the second part (chapter 9), we set out **three sets of recommendations** – for both governments and lenders – that will enable this transition to happen: **Inspiring Action, Delivering Funding and Redefining Standards.**

REPORT RECOMMENDATIONS

INSPIRE ACTION

- Establish a government-led body to drive collaboration across key stakeholders.
- Create an advisory service to provide homeowners with independent retrofitting advice.
- Provide certainty for firms involved in retrofitting with long-term public policies.

DELIVER FUNDING

- Prioritise public funding to improve energy efficiency in social housing.
- Support vulnerable people with the costs of energy efficiency improvements.
- Use Stamp Duty to incentivise retrofitting measures.
- Provide grants and subsidies to upskill tradespeople.

REDEFINE STANDARDS

- Ensure energy performance methodologies for buildings are fit for purpose.
- Implement minimum energy efficiency requirements for homes.
- Consider mandating hydrogen-ready boilers when a natural gas boiler needs replacing.

These recommendations are intended to offer a comprehensive template for what is needed to achieve the UK's and banks' Net Zero targets in the housing sector.

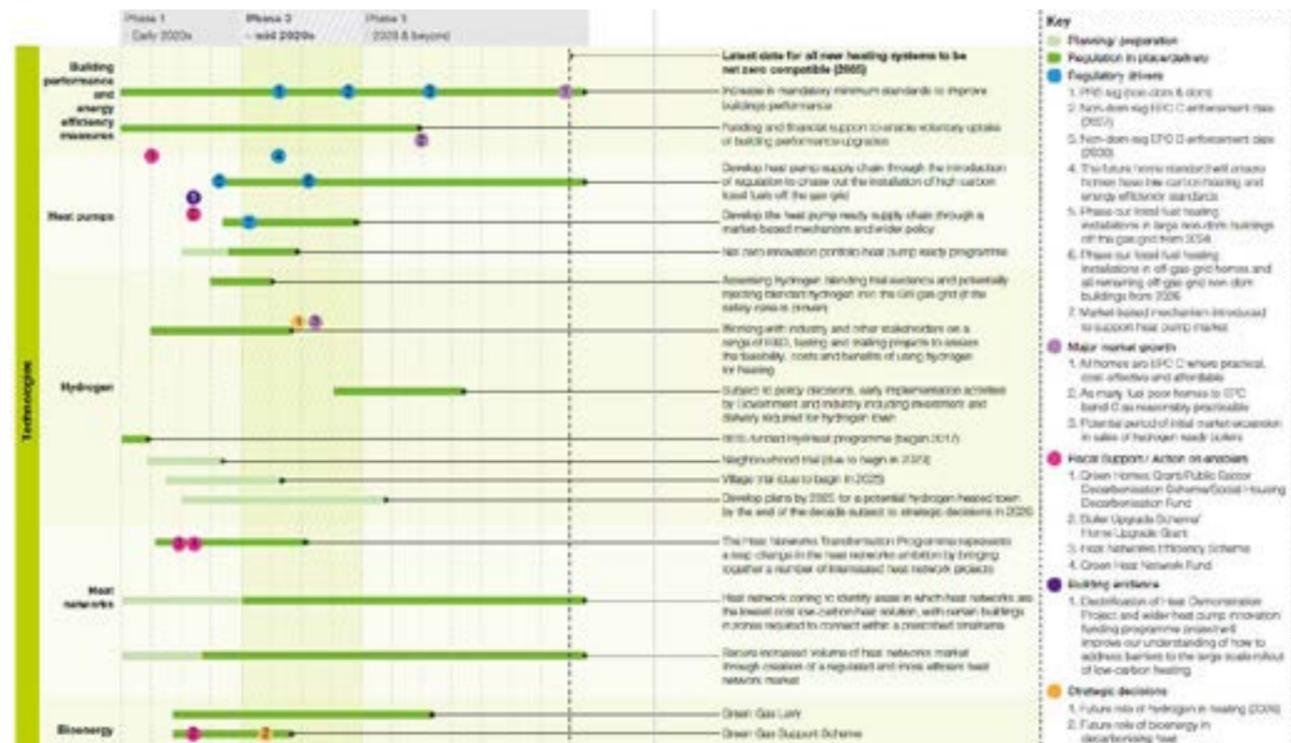
2. REPORT STRUCTURE

In the following chapters (3-8), we examine the problem and some of the solutions that have been deployed to date. These cover:

- **Chapters 3-4:** The UK's wider Net Zero commitments and policy measures deployed: this covers both the UK's broad commitment to Net Zero as well as the specific measures deployed to deliver a greener housing stock.
- **Chapter 5:** The nature of the UK's housing stock and contributors to poor energy efficiency performance: dealing with the highly variegated nature of the UK housing stock and material contributors to energy efficiency performance.
- **Chapter 6:** The challenges of measurement and of high retrofit costs: covering both the challenges with existing measurements such as Energy Performance Certification; and the need to address major societal barriers such as the absence of a skilled workforce of sufficient size to achieve our objectives.
- **Chapter 7:** The issues and risks posed to the economy and consumers arising from a poor transition to a greener housing stock.
- **Chapter 8:** The role that the banking sector is playing and can continue to play, as well as the limits to this role.

3. CONTEXT

Policy approach outlined by the Heat and Buildings Strategy



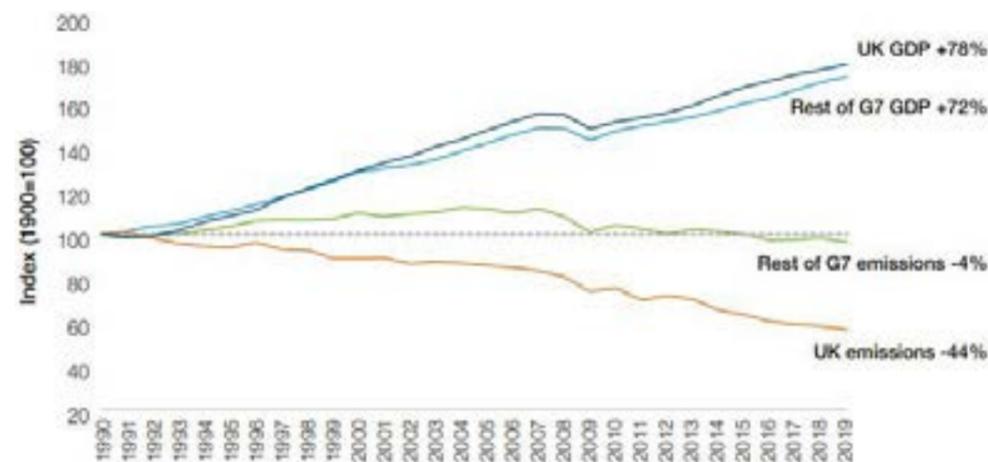
Source: Heat & Buildings Strategy

The UK has a good record on reducing carbon emissions, relative to its major international competitors (see table overleaf). However, more needs to be done. The government has set ambitious Net Zero targets, with the Climate Change Act (2019) committing the UK to Net Zero emissions by 2050. In October 2021, the UK government published the Strategy for Net Zero, outlining areas of focus for the decarbonisation of the UK's economy. Given that energy usage in homes represents approximately 14 per cent of the UK's total emissions¹, it is unsurprising that the Heat and Buildings sector has been identified as an area of focus in the UK's transition to Net Zero. Additionally, in October 2021 both the Heat and Buildings Strategy (England) and Heat in Buildings Strategy (Scotland) were released. These outline a series of measures to facilitate the transition to high-efficiency low-carbon homes, including the introduction of schemes to improve the uptake of energy efficiency measures and reduce the cost of low-carbon heating systems. Northern Ireland and Wales are yet to release equivalent strategies; however, it is expected that they will release strategies for the built environment in due course. As energy efficiency is largely a 'devolved matter' and the approach taken to decarbonise the housing sector varies between England, Wales, Scotland, and Northern Ireland, there is additional complication for UK-wide businesses, including lenders.

Heat and buildings will be instrumental in achieving Net Zero in the housing sector but action in this area does not come without risk. For lenders, these risks manifest as stranded assets which would have capital costs (and potentially affect profit-and-loss) – to be the subject of a further report in the autumn – and secured lending quality impacted by blighted security.

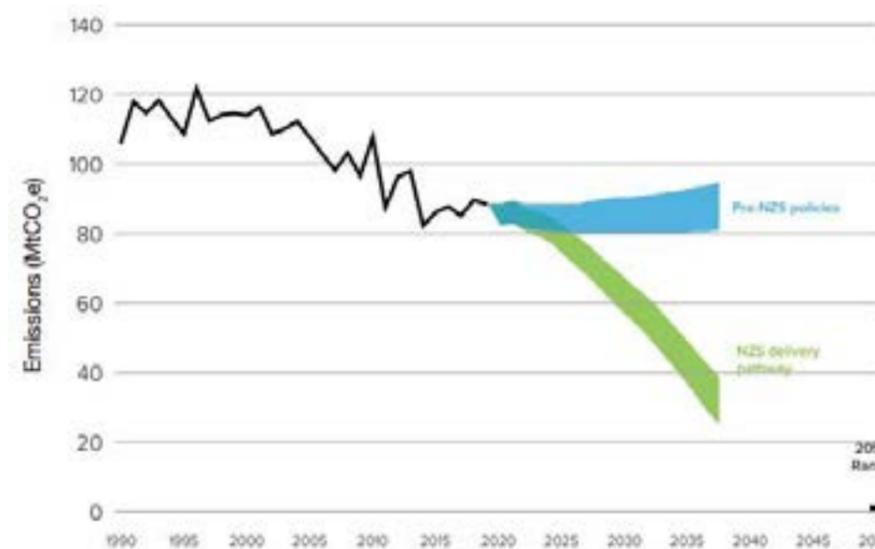
¹ <https://www.theccc.org.uk/2019/02/21/uk-homes-unfit-for-the-challenges-of-climate-change-ccc-says/>

UK vs Rest of G7 GDP and GHG emissions



Source: Net Zero Strategy: Build Back Greener

Indicative heat and buildings emissions pathway to 2037



Source: Net Zero Strategy: Build Back Greener

For borrowers, their risk is the sunk costs of investment in technology that soon becomes obsolete, or energy ratings that disadvantage them in the mortgage market, creating a new class of property prisoner. Homeowners may be obliged to sell their property at deeply discounted prices to compensate for a lack of "greening".

While greening of the UK's power generation infrastructure will go some way to reducing emissions across industries and sectors, it will not be sufficient in the buildings sector where heavy reliance on direct gas and oil combustion cannot easily be replaced by electricity. In its June 2022 progress report to Parliament, the UK Climate Change Committee noted that many indicators of success are on track within the greening of the electricity supply, while improvements to energy efficiency in buildings remain "well below the necessary level".²

In October 2017, The Clean Growth Strategy set the aim in the UK upgrading as many homes as possible to EPC Band C by 2035, including all rented and fuel-poor homes by 2030, and phasing out the installation of high-carbon fossil fuel heating in homes off the gas grid by 2030. In November 2020, the government released its Ten Point Plan for a

² Climate Change Committee, *Progress in reducing emissions: 2022 report to Parliament*, June 2022

Green Industrial Revolution (including 'Point 7: Greener Buildings') which was closely followed by the Energy White Paper, published in December 2020. In these, the government set out its ambition to drive better building performance through building regulations and move away from fossil fuels, including:

- an ambition to install 600,000 heat pumps per year by 2028
- energy efficiency funding, including the Public Sector Decarbonisation Scheme and Social Housing Decarbonisation Fund
- strengthened energy efficiency requirements for private sector landlords.

In January 2021 the UK government consulted on proposals to introduce and enforce minimum energy performance standards for rented properties in England and Wales, with new tenancies needing to meet EPC Band C by 2025, and existing tenancies by 2028. Additionally, the UK government has consulted on proposals to require mortgage lenders in England and Wales to disclose energy performance across their property portfolios by 2023 and on introducing voluntary targets to improve their portfolios to an average of EPC Band C by 2030.

In October 2021, the government released its Net Zero Strategy: Build Back Greener, which set out policies and proposals for decarbonising all sectors of the economy to meet the UK's Net Zero target by 2050. The Heat and Buildings Strategy, also released in October 2021, forms a central part of the Net Zero Strategy, and focuses on how the government will ensure that heating systems in homes and workplaces are low-carbon. The Heat and Buildings Strategy allocated £3.9 billion to the following key commitments:

- £800 million into the Social Housing Decarbonisation Fund
- £950 million into the Home Upgrade Grant
- £1.4 billion into the Public Sector Decarbonisation Scheme
- £450 million into the new Boiler Upgrade Scheme
- £338 million into the Heat Network Transformation Programme

However, these strategies have received criticism. In July 2022, the High Court ruled that the Net Zero Strategy does not meet the government's obligations under the Climate Change Act to produce detailed climate policies that demonstrate how the UK's legally binding carbon budgets will be met. The Court has ordered the government, by 31 March 2023, to update the Net Zero Strategy, and include the details of the emissions reductions that its policies will achieve and how any measured shortfall will credibly be made up, so the legislated targets are reached. In addition, the ruling made it clear that the Net Zero Strategy should not only provide information about the total contribution to emission reductions, but also on an individual policy level.³

These key commitments have been further refined into a series of key government policies, including:

- An ambition that by 2035, no new gas boilers will be sold.
- A new £450 million three-year Boiler Upgrade Scheme that will see households offered grants of up to £5,000 for low-carbon heating systems so they cost the same as a gas boiler now.
- A new £60 million Heat Pump Ready programme that will provide funding for pioneering heat pump technologies and will support the government's target of 600,000 installations a year by 2028.
- Delivering cheaper electricity by rebalancing policy costs from electricity bills to gas bills this decade.
- Further funding for the Social Housing Decarbonisation Scheme and Home Upgrade Grants, investing £1.75 billion. Additional funding of £1.425 billion for public sector decarbonisation, with the aim of reducing emissions from public sector buildings by 75 per cent by 2037.
- Launching a Hydrogen Village trial to inform a decision on the role of hydrogen in the heating system by 2026.

³ <https://friendsoftheearth.uk/climate/briefing-net-zero-strategy-judgment>

HEAT AND BUILDINGS STRATEGY KEY COMMITMENTS

Levelling-up by supporting 175,000 green skilled jobs by 2030 and 240,000 by 2035 – resulting in £6 billion additional GVA by 2030 and with a focus on the areas that need investment most.

Making the transition to low-carbon buildings affordable and achievable for all by: aiming to phase out the installation of new and replacement natural gas boilers by 2035 in line with the natural replacement cycle, and once costs of low-carbon alternatives have come down, including any hydrogen-ready boilers in areas not converting to hydrogen, to ensure that all heating systems used in 2050 are compatible with Net Zero.

Making heat pumps as cheap to buy and run as a gas boiler by growing the heat pump market to support 600,000 installations per year by 2028 and expanding UK manufacturing – with the ambition of working with industry to reduce costs by at least 25-50 per cent by 2025 and to parity with gas boilers by 2030 at the latest.

Supporting households in making this transition with a new £450 million Boiler Upgrade Scheme providing £5,000 capital grants and a new market-based incentive for heating system manufacturers, while investing £60 million in heat pump innovation – overcoming the key barriers to domestic deployment.

Consulting on phasing out the dirtiest and most expensive fossil fuels first – new oil, coal, and liquefied petroleum gas heating – and replacing with low-carbon alternatives in non-domestic buildings from 2024 and homes from 2026, following natural appliance replacement cycles

Committing to action on addressing distortions in fuel prices to ensure that low-carbon technologies are no more expensive to run than fossil fuel boilers.

Helping households and businesses reduce their energy bills while making buildings healthier and more comfortable benefiting from warmer, comfier, more valuable buildings through: upgrading fuel poor homes to EPC Band C by 2030 where reasonably practicable and providing additional funding to the Home Upgrade Grant and the Social Housing Decarbonisation Fund – investing £1.75 billion.

Consulting on phasing in higher minimum performance standards to ensure all homes meet EPC Band C by 2035, where cost-effective, practical, and affordable.

- Setting long-term regulatory standards to upgrade privately rented homes to EPC C by 2028 and considering setting a long-term regulatory standard for social housing, subject to consultation.
- Reducing the energy consumption in commercial and industrial buildings in England and Wales by 2030, using measures including regulations and a performance-based measurement scheme.
- Investing a further £1.425 billion in the Public Sector Decarbonisation Scheme, with the aim of reducing direct emissions from public sector buildings by 75 per cent by 2037.
- Setting a minimum energy efficiency standard of EPC Band B by 2030 for privately rented commercial buildings in England and Wales.
- Establishing large-scale trials of hydrogen for heating to take decisions in 2026 on the role of hydrogen in decarbonising heating and consult on the case for enabling or requiring hydrogen-ready boilers and broader heating system efficiencies.
- Continuing to grow and decarbonise the UK Heat Network market through the £338 million Heat Network Transformation Programme of which at least £270 million will go towards the Green Heat Network Fund, introducing sector regulation and new heat network zones by 2025.
- Launching a new world-class policy framework for energy-related products to ensure products use less energy, reducing emissions and household bills.

4. SCALING THE PROBLEM

Although government strategies have set ambitious targets for the decarbonisation of the housing sector, it is not yet clear how these will be achieved. The Heat and Buildings Strategy and Heat in Buildings Strategy lack detail of how the ambitions will be funded, whether the associated industries have the capability to achieve the targets, and whether the timetables set are feasible.

At its heart, the UK must become more economical with domestic energy use, more efficient through insulation and making buildings airtight, and transition to sustainable energy consumption, both locally and nationally, by moving away from carbon-sourced energy. Currently, public sentiment towards Net Zero is positive, but there is confusion around how it might be achieved.

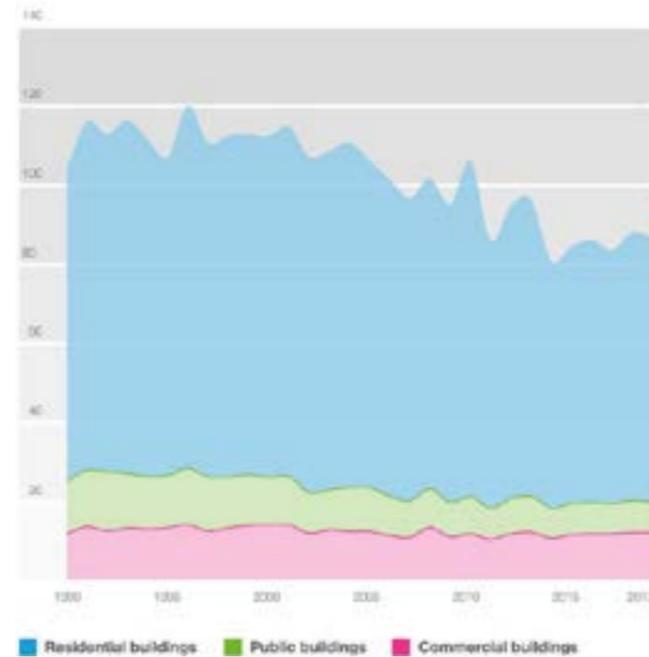
Local renewable energy sources (e.g. heat source pumps) have yet to reduce in price to at least near equivalent of traditional heating methods and do not realise economic benefits sufficiently to facilitate a rational economic choice to switch. Domestic heating has yet to reach its ‘Tesla’ moment where renewable sources are considered aspirational, but moreover reliable and reasonable value for money. Consumers are therefore uncertain about which technology to invest in, and when, and suppliers are unable to scale given the lack of clear demand. Simple messages to conserve energy have been lost and the ‘fabric first’ call to insulate and draught-proof properties as a first step has not landed.

As witnessed during the ongoing Russia/ Ukraine conflict, consumers require energy security to smooth troughs in supply. Energy continuity is a live issue for some renewables (e.g. wind, solar) and batteries for energy storage do not provide a pragmatic solution.

Lenders have a significant role to play in the transition (see section 7) but they require clarity on government proposals for greening UK housing and a roadmap for how government intends to reach Net Zero once current EPC ambitions have been reached.

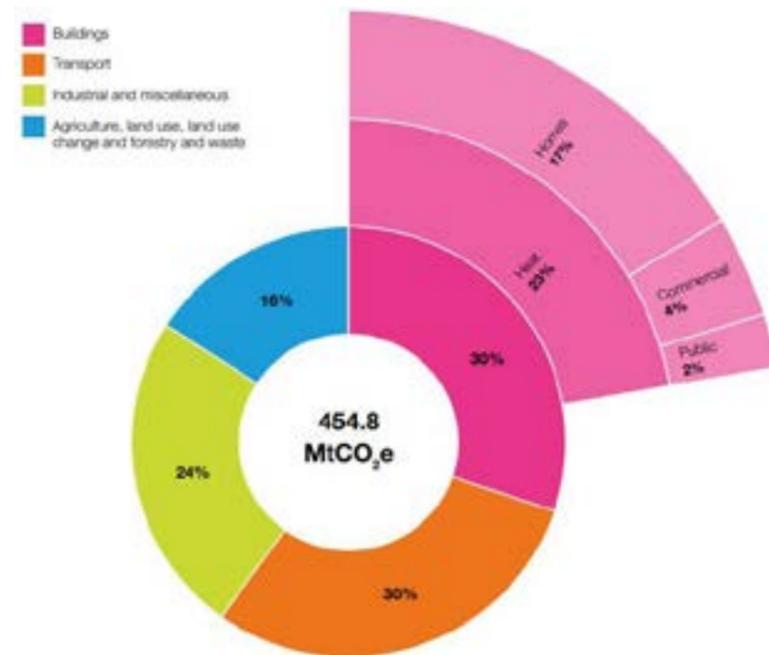
An improvement in the energy efficiency of homes will have cost implications for both landlords in the rental sector and homeowners. These must be considered fully by government, regulators, and lenders to avoid any unintended consequences.

Direct emissions from heat in buildings (1990-2019)



Source: Heat and Buildings Strategy

UK emissions in 2019



Source: Heat and Buildings Strategy

Lenders cannot be solely responsible for resolving these broad societal issues or for ensuring that homeowners make changes to their properties, not least because a significant portion of properties in the UK do not have mortgages. Other stakeholders including national, devolved, and local government, and other private sectors have responsibility for achieving this. Lenders want to see:

- **Practical and long-term public policy, regulation and collaboration** that delivers a just transition to greener UK properties and ensures no-one, whether landlord or owner-occupier, is left behind, unable to green their property to the required standard and facing negative consequences.
- **Collaboration on a large-scale consumer education and communication campaign** involving all stakeholders – public and private – in the housing market driven forward by the government.
- **Collaboration in the development of high-quality EPC and environmental housing assessments.** A revised assessment criteria should reflect both the energy efficiency and carbon footprint of a property. In addition, assessments should be updated on a more frequent basis (i.e. to reflect the impact of property improvements) with this data published to allow more accurate decisions to be made.
- **A large-scale increase in the amount of appropriate, good quality and cost-effective retrofitting** and energy system installation available to consumers.
- **Meaningful, comprehensive, and long-term public funding** and support for property owners who are unable to access other funding sources.
- The use of **government measures which incentivise improvements** for all property owners, including but not limited to tax incentives.
- New build housing built to Net Zero standards to draw a line in the sand without any reduction in build quality.

BANKS' NET ZERO TARGETS WILL NOT BE ACHIEVED WITHOUT GOVERNMENT SUPPORT

Many banking and finance firms, including some of the UK's largest mortgage lenders, have made pledges to align their financing portfolios with Net Zero as part of initiatives such as the Net Zero Banking Alliance (NZBA), part of the Glasgow Financial Alliance for Net Zero (GFANZ).

For firms with large mortgage portfolios, the delivery of these pledges relies on the improvement of the overall energy performance of those portfolios, which in turn requires clear communication of expectations to homeowners and the wider economy.

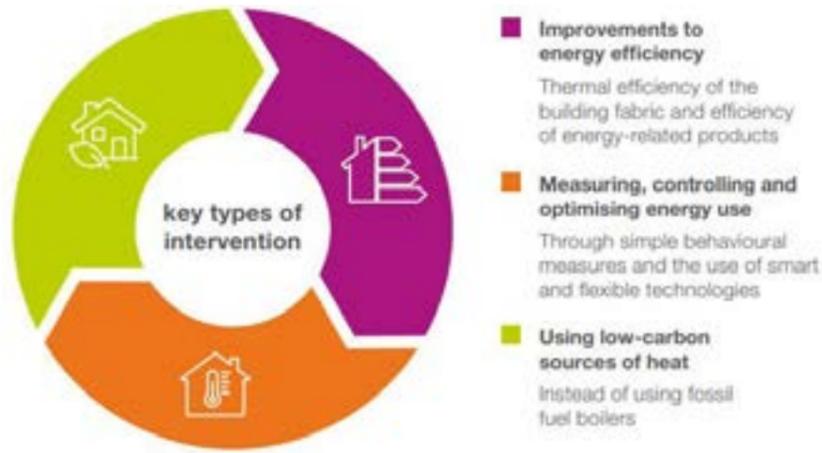
Banks' Net Zero targets will not be achieved without concerted government and public authority action to support the whole-of-economy transition.

5. MANAGING USAGE

Key interventions

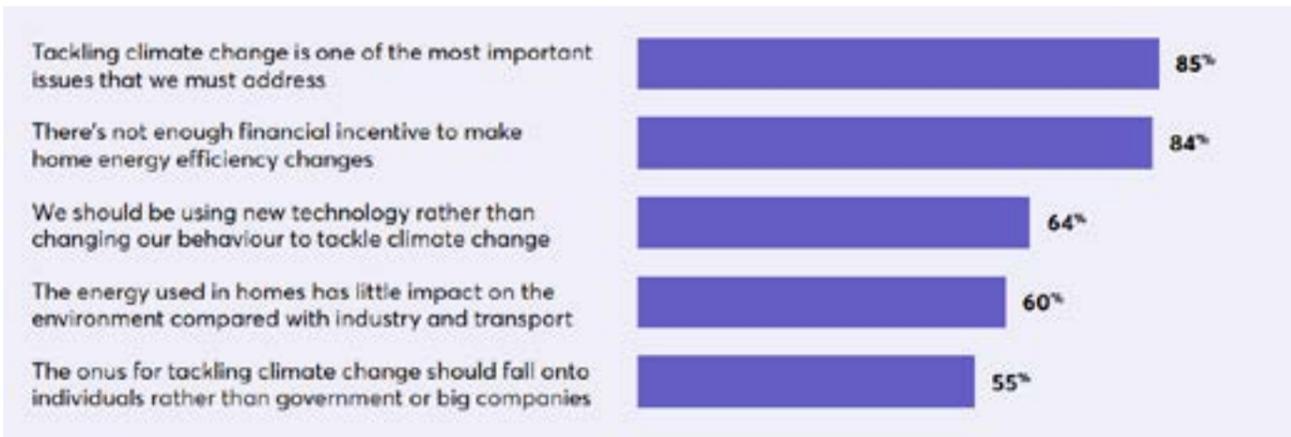
For the UK government to achieve its Net Zero ambitions, nearly every home in the UK will have to adopt energy efficiency measures.

Researchers have identified a value-action gap in respect of decarbonising the housing sector, in which consumers care about the environment and want to improve the energy efficiency of their home, but something is preventing them from doing so.



Source: Heat and Buildings Strategy

Attitudes to climate change and energy efficiency



Source: Nesta

A study of consumer attitudes towards energy efficiency and green heating identified that **85 per cent of the public believe that climate change is one of the most important issues** that needs addressing, with 84 per cent believing that everyone will have to adopt energy efficiency measures sooner or later. However, only **35 per cent of people said that they have adopted or are planning to adopt energy efficiency measures** soon. The government must bridge this value-action gap if decarbonisation ambitions are to be successful.

The UK's housing stock must undergo an overhaul to achieve the government's Net Zero ambitions. Decarbonising the UK's 28 million households is a monumental challenge. Variations in the UK's housing stock on both a national and regional level present additional challenges when decarbonising the housing sector. For instance, Northern Ireland has a distinctly different fuel mix from the rest of the UK and therefore will require different measures to decarbonise heating. By considering these variations, the UK government has an opportunity to integrate energy efficiency policies with the Levelling Up agenda, tackling the inequality of the UK's energy bills.

Given that substantial replacement of existing homes with new builds is not an option, the UK will have to adapt existing homes to improve energy efficiency and reduce carbon emissions. The energy efficiency of each home is determined by its individual characteristics and therefore the heterogeneity of the UK's housing stock presents a range of challenges to the decarbonisation of heat. It is evident that a 'one size fits all' approach to decarbonisation is not appropriate. Instead, the UK government must develop bespoke solutions and advice to accommodate the varying

decarbonisation needs of UK homes, therefore enabling the UK to achieve its Net Zero ambitions.

The key characteristics that impact home energy efficiency and the applicability of energy efficiency measures include property age (the most significant factor), type (flats and maisonettes are the most energy efficient property type while detached and semi-detached properties are the least efficient), tenure (social rented properties are the most energy efficient property type, and owner-occupied dwellings the least) and the heating system (the majority (85 per cent) of homes in the UK are connected to the gas grid, using a gas fired central heating system).

Percentage of homes with different sources of heat in England, 2019



Source: Heat and Buildings Strategy

Successful decarbonisation of the UK housing stock will require improvement of the energy efficiency of homes to reduce energy demand as well as adoption of low-carbon heating sources. Therefore, retrofitting existing properties will be an essential step in enabling the government to achieve its Net Zero ambitions. Retrofitting is the introduction of materials, products, and technologies into an existing building to improve energy efficiency and reduce energy consumption. Improving the efficiency of a home has many benefits; it reduces its emissions, makes it cheaper to run and can increase the value of the property. The table below highlights the installation time, payback period and lifespan of some of the key retrofitting options to improving the energy efficiency of properties.

Comparison of retrofitting measures

Energy Efficiency ⁴			
	Installation time	Payback	Lifetime
Loft insulation	2 days	2 years	90 years
Cavity wall insulation	1 day	5 years	90 years
Suspended floor insulation	5 days	5 years	90 years
Double glazing	2 days	100 years	25 years
Draft proofing	1 day	9 months	n/a

Source: Savills, and Energy Saving Trust - The Green Age

⁴ Notes: Numbers are estimates, based on the average UK house – the cost and efficiency would depend on the type of property, location, and size of the house
Savills, Energy saving trust, The green age – 5 energy saving measures biggest payback Decarbonising heat in the building

6. MEASURING AND COSTING HOUSING EFFICIENCY

Measuring energy efficiency

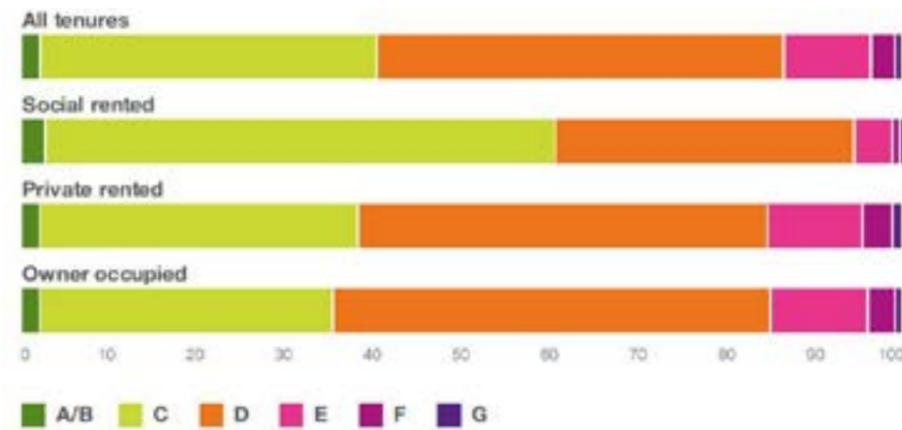
The energy efficiency of homes is benchmarked using Energy Performance Certificates (EPCs), with properties graded from A (the most energy efficient) to G (the least energy efficient). Underpinning the ratings bands are Standard Assessment Procedure (SAP) points, where a dwelling is scored between 0 SAP points (least efficient) to 100 SAP points (most efficient).

EPCs include two metrics which assess energy performance in terms of how costly it will be to heat and light the property, Energy Efficiency Rating (EER), and what the property's carbon emissions are likely to be (Environmental Impact Rating, EIR).

Additionally, EPCs include recommendations to improve energy efficiency and quantify the potential energy improvement benefits of each option. EPCs are issued by approved domestic energy assessors and are valid for ten years from the date of issue.

EPCs play a key role in promoting energy performance improvements in domestic properties, with public policies often using EPCs to set minimum energy efficiency standards.

Energy efficiency by tenure type



Source: Heat and Buildings Strategy

Energy efficiency regulations and targets

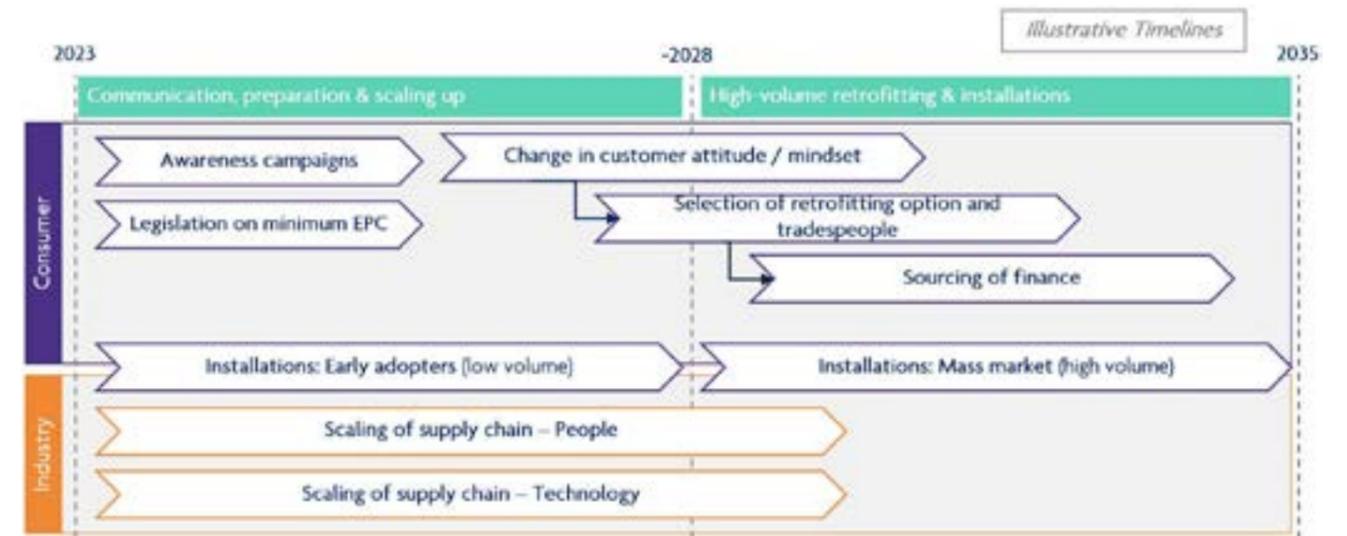
There are a number of incoming and proposed regulations which use EPC ratings as a basis for improving the energy efficiency of domestic properties (see Appendix D). In addition, financial institutions in England and Wales may also be subject to domestic energy efficiency requirements as Minimum Energy Efficiency Standards (MEES) have been proposed which would mean that mortgage lenders in England and Wales must ensure that the average energy performance level of their domestic portfolios is at least EPC Band C by 31 December 2030. While the EPC rating targets vary between nations and property types, the UK government set an overarching ambition for as many homes as possible to be EPC band C by 2035 in the Net Zero Strategy.

Our analysis estimates that 16.7 million properties in the UK have an EPC rating of below C, which is a common target EPC rating in regulations. Therefore, bringing all properties to EPC Band C by 2035 will require retrofitting measures to be applied to 1,285,000 homes per year, equating to more than 3,500 retrofits per day. This is a significant challenge, particularly when considering that only 200,000 homes received energy efficiency installations in 2021, just 15 per cent of annual installations required.

To achieve these targets, there must be a concerted effort to engage the public and scale supply chains to implement the number of retrofitting measures required. There is little time to achieve this. As illustrated in the chart below.

The Office for National Statistics estimates that there were 28.1 million households in the UK in 2021. Using the EER as the headline metric of EPCs, our analysis demonstrates that the most common EPC rating is Band D (38.2 per cent), followed by Band C (29.1 per cent). The number of properties achieving the highest rating (Band A) is negligible (0.2 per cent). In total, more than half (59.5 per cent) of properties received an EER rating below B and C, with this number climbing to 65.2 per cent under the EIR metric.

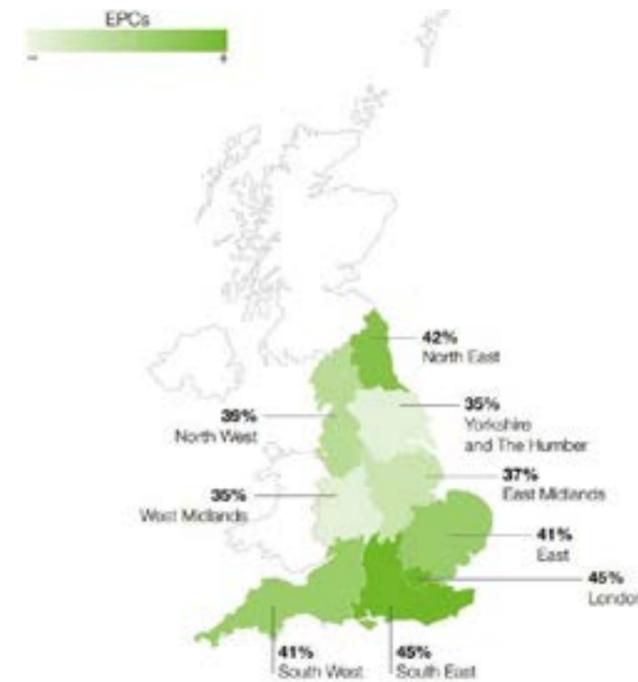
Illustrative timelines



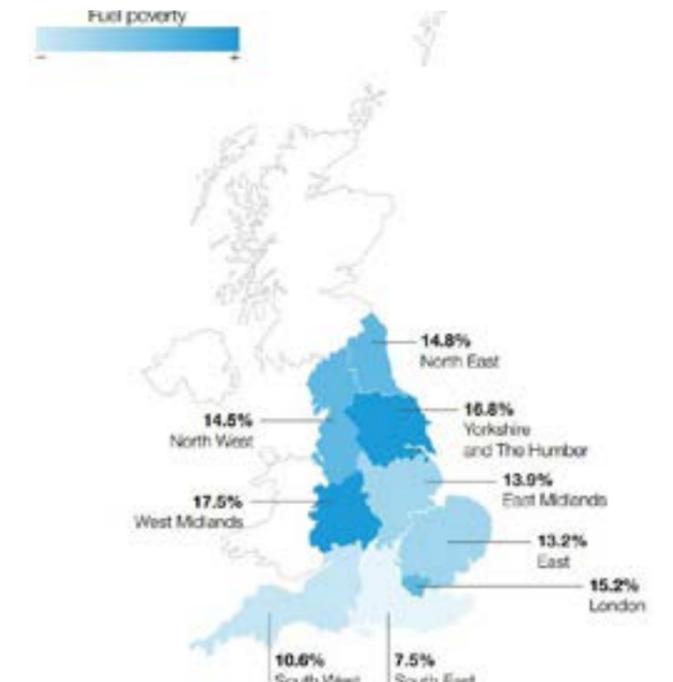
Source: Made by KPMG/UK Finance

Many government policies set ambitions for dwellings to achieve an EPC rating of Band C. Using the headline EER metric, our analysis estimates that 16.7 million dwellings currently have an EPC rating of D-G. To uplift the entire UK housing stock to EPC Band C, this analysis estimates that an increase of 24.6 million EPC bands would be required (the equivalent to an increase of 247.5 million SAP points). Moreover, the special distribution of EPC ratings is uneven and concentrated in areas of fuel poverty.

Proportion of homes rated EPC C and above by region



Proportion of fuel poor households by region

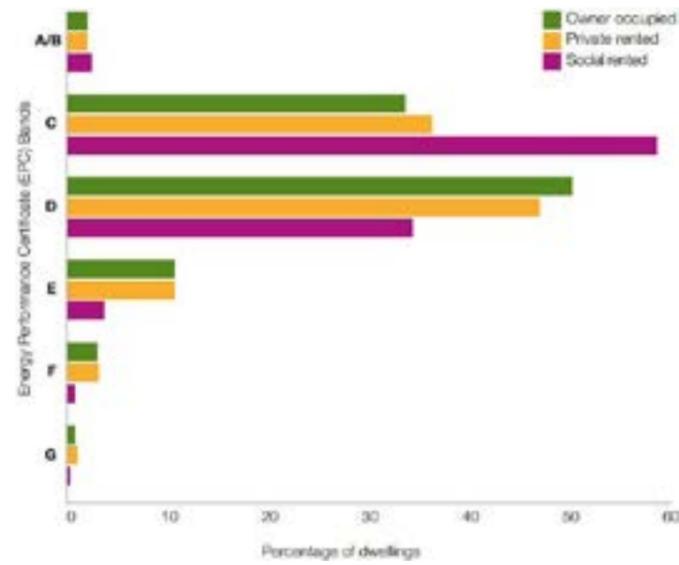


Source: Heat and Buildings Strategy

To estimate the cost of bringing the entire UK housing stock to EPC C, Savills (2020) analysis was used which estimated the cost of upgrading EPC bands. It is noteworthy that these estimated costs significantly exceed the value of grants provided by the UK government under existing retrofitting policies. The table below demonstrates the output of Savills' 2020 cost analysis, which estimates the average retrofitting cost to move from a domestic property's current EPC rating to its potential EPC rating. Overall, our analysis estimates the total cost of the upgrading the entire UK housing stock to EPC Band C at approximately £249.5 billion.

The UK government's ambitions to decarbonise the housing sector are further complicated by limitations to the potential energy efficiency of existing properties. EPC certificates provide a 'potential' EPC rating which indicates how energy efficient the dwelling would become if the recommendations were to be implemented.

Percentage of dwellings in England with EPC rating A-G, 2019



Source: Heat and Buildings Strategy

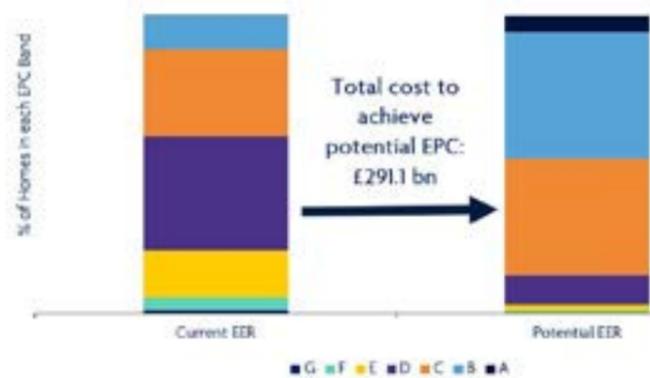
Current rating	Potential rating						
	A	B	C	D	E	F	G
A	£7,110						
B	£32,919	£4,263					
C	£20,437	£12,302	£4,937				
D	£32,915	£18,588	£12,746	£6,244			
E	£40,451	£23,542	£17,156	£11,357	£5,752		
F	£44,933	£29,237	£22,873	£18,823	£13,070	£6,303	
G	£47,363	£31,879	£26,791	£23,866	£20,077	£19,745	£15,461

Source: Savills UK

Most properties are assessed to have a potential rating of EPC Band B (EER 42.5 per cent, EIR 35.5 per cent) or EPC Band C (EER 38.9 per cent, EIR 35.6 per cent). However, our analysis estimates that 3.1 million properties have a potential EPC rating that is capped at Band D or below, which presents a significant challenge when decarbonising the UK's housing stock.

Overall, our analysis estimated the total cost of improving the UK housing stock's energy efficiency to its potential EPC Rating (EER) to be £291.1 billion.

Percentage of UK Homes in Each EPC Band



Source: UK Government and Scottish Government EPC data

7. ISSUES AND RISKS

The regulatory landscape of climate change and sustainability is a complex space. Though stakeholder approaches are coalescing in some areas, regulation and policy continue to evolve rapidly. Firms are facing challenges, both in terms of practical application and growing regulatory and supervisory oversight.

Accurately capturing the impact of climate change on bank balance sheets poses a major challenge and necessitates innovation in forward-looking modelling, scenario analysis and data granularity. Climate-related risks are inherently more complex and long-term than most traditional business risks. There is a growing consensus among policymakers and supervisors that climate change poses real financial risks. Recent work by the Financial Stability Board (FSB) has focused on how climate risks might impact, or be amplified by, the financial system. This will be the main driver for any adjustments to the prudential framework.

Climate change affects the financial system through two main climate risk drivers. Physical risk, which refers to the financial impact of changes in climate (e.g. cyclones, droughts, heat waves or floods), and transition risk, which refers to financial institutions' financial loss from adjusting to a lower-carbon and sustainable economy.

When making changes to support the transition to Net Zero, government and lenders need to consider transitional risks created as a consequence of the policies that impact homeowners and tenants.

The scale of the changes needed to UK homes over the next 30 years will give rise to considerable transition risks. Such risks will manifest at different points in the transition and their impact will vary depending on the stakeholders involved. These will need to be carefully considered and managed during policy design, to minimise the impact on key portions of the population and key stakeholders within the housing sector.

Challenge	Description
 Upfront cost of retrofitting	The upfront costs of retrofitting are too high for many people to pay without financial support (and sometimes unachievable even with grants), resulting in these cohorts disproportionately paying more in the long run due to higher energy bills. This will not support the government in its aims to reduce fuel poverty and on its levelling up agenda.
 Devaluation of property value	As public awareness of energy efficiency increases (e.g. driven by minimum EPC standards), instances may arise in which properties are devalued if homeowners are unable to afford to retrofit the house.
 Property prisoners	The government has stated that it wants every house to have at least an EPC rating of C by 2030 which may result in banks refusing to remortgage or provide equity release mortgages to less energy efficient homes. This risks leaving those who cannot afford to retrofit struggling to find a lender offering a competitive mortgage and unable to switch to a more competitive rate.
 Exposure to penalties	Any penalties aimed at driving energy efficiency (e.g. increased Stamp Duty (SDLT) on less energy efficient homes) may cause financial hardship for those who are already facing fuel poverty or lack of access to financing to increase the energy efficiency of their homes.
 Ineffective retrofitting installation	The technology required to retrofit houses will differ across the housing stock. If consumers are poorly advised they may not receive the appropriate retrofits, potentially leading to costly retrofits without the desired effect or consumers needing additional changes in the future.

In addition, sections of the population face additional challenges in the decarbonisation of the housing sector, particularly when considering the practicalities of retrofitting homes. The transition risks facing these populations must be explicitly considered when designing policies, to avoid unintended consequences. The key challenges facing these populations include:

- **Lack of access to financing** - Some homeowners lack access to financing (e.g. savings, loans, or grants) to afford and implement retrofitting options, particularly those on low or fixed incomes (e.g. pensioners).
- **Selecting retrofitting options** - The UK's heterogenous housing stock means that a range of retrofitting options will be required to decarbonise the sector.
- **Lack of awareness and understanding** - Homeowners may lack understanding of the retrofitting and financing options available to retrofit their property.
- **Logistical challenges** – Retrofitting can be very disruptive, particularly for those who cannot leave their homes during installation.
- **Privately rented housing** – Residents with rental agreements may have little or no influence in the retrofitting decisions made for their property.

Regulatory change

Globally, regulators and supervisors have started to consider whether current legislation and regulation can adequately cover conduct and prudential climate risk. The Basel Committee for Banking Supervision (BCBS) published its final 18 principles for the effective management and supervision of climate-related financial risks, covering:

1. Corporate governance
2. Internal controls
3. Capital and liquidity adequacy
4. Risk assessment: credit, market, liquidity, operational
5. Risk management and reporting
6. Scenario analysis

The European Banking Authority (EBA) published a discussion paper on the role of environmental risk in the prudential framework, assessing how Pillar 1 can be adapted to accommodate such risks. The EBA examines its own fund requirements for credit, market, non-financial and liquidity risks, addressing challenges around data availability, forward-looking characteristics and add-on treatment constraints. The final report is expected to be delivered in 2023, and further analysis on Pillar 2 and 3 is currently being evaluated.

Barriers to decarbonisation

Unsurprisingly, cost is the main barrier for the implementation of home energy efficiency measures. The quarterly BEIS Public Attitudes Tracker⁵ looked at public attitudes to heat and energy in the home, this showed that the upfront cost of installation is a barrier for almost half (45 per cent) of the public, with a quarter of people (25 per cent) perceiving the running costs of a low-carbon heating system to be too high. In this regard, mortgage advisers can play a critical part in educating and informing home buyers, landlords and re-mortgagers of the financial benefits in upgrading their property to become more energy efficient/carbon neutral. Additionally, by taking these steps, not only could a lower interest rate/cashback be available from the mortgage provider, but the costs associated with the energy efficiency upgrades and retrofitting could be added on to the mortgage. In order to do this, mortgage advisers would need to have the necessary training, coupled with supporting online consumer facing documentation or websites and links to government accredited retrofitting advisers that could be shared with mortgage applicants.

The effort required to research energy efficient measures has also been identified as a significant barrier to consumers, with 32 per cent of consumers strongly agreeing that there is not enough clear evidence about which measures would be appropriate for their home. Furthermore, there are high levels of scepticism among consumers when obtaining advice about energy efficiency measures. Less than half of the public (46 per cent) trust advice provided by tradespeople, with energy suppliers (18 per cent), landlords (eight per cent) and housing associations (eight per cent) identified as having particularly low levels of consumer trust.

Other barriers identified included: hassle factors of installation (39 per cent), a preference to wait to see how the technology develops in time (34 per cent), a perception that energy efficiency measures might not be appropriate for their home, not knowing enough about the heating systems available (28 per cent), being happy with their existing heating system (22 per cent) and concerns that it might be unpleasant to live with, for example being unsightly or noisy (14 per cent).

⁵<https://www.gov.uk/government/statistics/beis-public-attitudes-tracker-spring-2022>

Fuel poverty

The affordability of energy is often framed in terms of fuel poverty. In the UK approximately 6.5 million households are suffering from fuel poverty⁶, in which a high proportion of household income is spent on keeping the home at a reasonable temperature. Fuel poverty has been associated with numerous health problems and it is estimated that the annual cost to the NHS is £1.2 billion.⁷

The government has included further details regarding its vulnerability principle in Sustainable Warmth: protecting vulnerable households in England, following the results of its consultation on proposals to update the 2015 Fuel Poverty Strategy. Under the vulnerability principle, the needs of low-income households most at risk from the impact of living in a cold home are considered under one (or more) of the following categories:

- 65 or older;
- younger than school age;
- living with a long-term health condition which makes them more likely to spend most of their time at home, such as mobility conditions which further reduce ability to stay warm; and/or,
- living with a long-term health condition which puts them at higher risk of experiencing cold-related illness (for example, a health condition which affects their breathing, heart or mental health).

There are national variations in the rates of fuel poverty across the UK, with 13 per cent of households in England classed as fuel poor, 25 per cent in Scotland, 12 per cent in Wales and 18 per cent in Northern Ireland⁸. Furthermore, there are sub-national variations in fuel poverty rates, for example there are significantly higher rates of fuel poverty in the Midlands and the North of England, which together make up 55 per cent of all homes in fuel poverty in England⁹. Certain sections of the population face additional challenges in the decarbonisation of the housing sector, particularly when considering the practicalities of retrofitting homes. The transition risks facing these populations must be explicitly considered when designing policies, to avoid unintended consequences.

Just transition

Poorly designed environmental policies carry their own risks in terms of exacerbating poverty and worsening financial burdens on those with low incomes, locking in further inequality. Without tailored support, low-income households could be locked out from the benefits of the transition enjoyed by other households. For example, low-income households are unlikely to be able to afford the upfront cost of installing energy efficiency improvements in their home. As a result, these homes remain energy inefficient and have higher energy bills, further driving these households into fuel poverty.

Decarbonisation policies should be designed to ensure a 'just and fair' transition, so that the environmental, financial and wellbeing benefits of the transition are accrued by those who need them the most.

⁶<https://www.nea.org.uk/who-we-are/about-nea/>

⁷[Balancing_the_energy_equation.pdf \(green-alliance.org.uk\)](https://www.green-alliance.org.uk/Balancing_the_energy_equation.pdf)

⁸<https://commonslibrary.parliament.uk/research-briefings/cbp-8730/>

⁹<https://eciu.net/analysis/reports/2022/levelling-up-or-letting-down>

Levelling up

In February 2022, the Department for Levelling Up, Housing and Communities (DLUHC) released a White Paper which defined 'levelling up' and set out the allocation of a £4.8 billion budget to tackle inequalities and ensure opportunities and prosperity are spread equally across the country. However, the White Paper failed to provide a clear and long-term plan for decarbonising housing and protecting fuel-poor households from soaring gas prices.

Policies that improve the energy efficiency of homes provide the UK government with an opportunity to address the cost-of-living crisis, achieve Net Zero and level up the UK. Therefore, the lack of alignment between the UK government's levelling up and Net Zero agendas presents a critical gap that should be immediately addressed.

Policy ineffectiveness

To successfully decarbonise domestic heating, the UK government must provide a clear and coherent range of policy options which provide certainty in the transition to Net Zero.

One of the core problems to date has been the lack of coherence between schemes. This means consumers are confused about what they are entitled to or find it un navigable and suppliers cannot commit to schemes. The Green Homes Grant scheme for example (see Appendix F) was introduced and pulled too quickly to have an impact. An outsourced and independent body would provide consistency. From a political perspective, a new incoming administration gives us a little more flexibility (within reason) to reassess what has gone before.

8. FUNDING THE TRANSITION

Financial institutions can play a vital but supporting role through their trusted relationship with consumers and the provision of finance. Lenders have offered a range of products aimed at incentivising homeowners to improve the energy efficiency of their homes, but these have so far had limited take-up. Large lenders (such as Barclays) entered the market in 2018 while smaller lenders (for example Ecology Building Society) have been offering financing for energy efficiency renovations and self-builds since as early as 2006.

Today, most large lenders offer some form of green mortgage or additional financing with new products appearing regularly over the last couple of years. Existing products typically offer a discount to the headline interest rate or cashback for improvements in EPC rating or for the purchase of an energy efficient home (e.g. EPC A or B). The applicability of each product varies by lender with some targeting new builds or buy to let and others existing owner-occupied homes. In addition to this, the qualifying criteria can vary with some being linked to EPC improvement and others limited to only certain types of purchase.

Green mortgages provide one way for lenders to influence the behaviour of consumers, but this action alone will not solve the complex problem of decarbonising UK homes. As of April 2022, green mortgage rates could often be inferior to standard products which, along with other friction points, could dissuade consumers from taking out a green mortgage.

New innovative financing solutions should be developed to enable the decarbonisation of heat in the housing sector, for example, the development of property-linked finance for heat pumps, in which the financing will be attached to a home rather than the homeowner. The Green Home Finance Accelerator (NZIP-GHFA) programme, due to be launched in autumn 2022, aims to drive innovation in the green lending market and support the establishment of a diverse range of green finance products which incentivise domestic energy performance improvements for both owner-occupiers and private landlords. The NZIP-GHFA programme will provide up to £10 million grant funding to support UK retail lenders to design, develop and pilot a range of finance propositions which encourage domestic energy and low-carbon heating retrofits.

However, the funding of new decarbonisation technology introduces additional conduct and legal risks to underwriting considerations for lenders. This will be a prominent consideration for banks following recent solar panel performance issues, which have led to significant redress programmes by lenders under the Section 75 of the Consumer Credit Act (1974). As a result, it is extremely important to note that banks are likely to be more conservative in how they price and sell products for newer technologies, which may stifle the adoption of decarbonisation technology.

For financial institutions to effectively support the government's ambition for Net Zero homes, there must be a clear policy direction and lead-in time to create certainty for lenders when designing products aimed at incentivising homeowners to improve the energy efficiency of their homes.

Government action

The following amounts were allocated to the domestic sector as part of the Heat and Building Strategy's allocation of £3.9 billion to decarbonise the UK's building stock:

- £800 million into the Social Housing Decarbonisation Fund
- £950 million into the Home Upgrade Grant
- £450 million into the new Boiler Upgrade Scheme
- £338 million into the Heat Network Transformation Programme

Government policies and actions need the support of a wide range of stakeholders including financial institutions. There are a number of actions lenders can take to further the Net Zero transition with respect to homes. Banks have an unrivalled relationship with the general populace through everyday banking services. Most UK adults have a bank account and in England alone, there are over 7.2 million owner-occupied homes with a mortgage¹⁰.

KEY ACTIONS FOR FINANCIAL INSTITUTIONS

Funding the balance sheet

There are many actions lenders can take to further the Net Zero transition. A green version of the Term Funding Scheme with Incentives for SMEs (TFSME) to help stimulate supply and demand would enable firms to pass on lower funding costs to support cheaper retrofit Funds Available for Distribution (FAD) (volumes potentially linked to BEIS portfolio improvement targets) and simultaneously allow the Bank of England (BoE) to green its balance sheet (i.e. drawdowns supported by higher quality EPC collateral).

Securitisation

The market for ESG-linked securities is currently relatively small but it has been growing, albeit with products linked to social benefit playing a greater role than environmental products. With ESG becoming more important across financial services, there would be investor appetite for more environmental-linked products if good quality ones were created.

There are some key requirements to be met for this market to grow. It is not enough for securities to simply be labelled as 'environmental' and such greenwashing would be unattractive to investors. Environmental securities would need to drive greener behaviours in consumers rather than just group energy efficient assets together.

To achieve this, robust and tangible incentives would be needed for investors (e.g. in the form of lower risk weightings or better haircuts at marginal refinancing facilities). These would be passed on to the final borrowers, potentially creating a virtuous circle. It is possible these loans could be government-backed through some form of wrapper or guarantee to enable them to be provided at low or zero cost to consumers.

There would need to be a transparent system in place which meant consumer loans fund verifiable and effective energy efficiency or environmental improvement works. Investors would need to be able to readily establish that proceeds have been used correctly and met obligations. Put simply, investors need to know that homeowners have used loans to carry out work that has the positive environmental impact intended.

Underpinning this is a requirement for stronger and more consistent data for investors so that they can determine if securities meet their requirements. This could be a challenge as ESG securities already have additional information and disclosure requirements and further requirements could be burdensome.

¹⁰ English Housing Survey: headline report (publishing.service.gov.uk)

Finally, this market would need to see consumer demand increased as a precursor to expansion – it cannot happen without more homeowners seeking finance to carry out energy efficiency installations or retrofits. Nonetheless, the possibility exists that a virtuous circle of investors lending via securities at low cost to fund green improvements and the returns increasing further investment could be created.

Fostering an innovative culture

Sustainability has become a high priority for financial institutions in recent years but there remains a risk that finance professionals are not given space to innovate. Financial institutions should ensure that they are fostering an innovative culture and giving their finance professionals the time and space required to develop products to help drive decarbonisation and generate new income streams.

Engaging with non-mortgage customers

Around 35 per cent of homes in the UK are mortgage-free which reduces the effectiveness of any policies that utilise mortgage lending arrangements. However, lenders are in the unique position of having a relationship with a very large number of mortgage-free homeowners due to them having current accounts, savings accounts, or personal loans. These are trusted relationships which give lenders the ability to provide important information on the Net Zero transition to customers who may otherwise not engage with the transition.

It is therefore important that there is an agreed set of clear, consistent messages that can be used across all channels to actively engage with all customers. This will enable lenders to inform and educate them on both the benefits and practicalities of embracing Net Zero home improvements.

Utilise local and trusted presence

The decarbonisation of heat in the housing sector will require place-based solutions, due to the heterogeneous nature of the UK's housing stock. Many lenders have a strong local presence and therefore can engage with communities alongside local authorities in a way that central government cannot. Lenders should leverage this and aim to be a source of trusted information and advice for customers in their communities. This offers a dual benefit of increasing visibility and reputation in local communities through building relationships and enhancing the quality of information consumers are getting in relation to greening their homes.

Portfolio disclosures

The government is considering improving home energy performance through lenders but is yet to publish a response to the consultation, which ended in 2021. There are clear risks associated with setting mandatory targets for lenders to achieve a minimum average EPC rating across a portfolio, in particular the risk that such targets would result in lenders targeting properties that are already energy efficient, instead of encouraging improvements to energy inefficient homes.

As lenders set ambitious climate targets, for example through GFANZ, there will be an increasing need for robust transition plans and disclosures to track and measure progress. These plans should be disclosed publicly and include effective methods for greening lending portfolios that do not undermine the wider societal Net Zero goals.

Data gathering

Data is a key enabler in the transition but there are currently gaps in the data held by mortgage lenders about the energy efficiency of loans on their book. Lenders should be looking to put in place processes that capture this data at origination and enable updates to be made throughout the life of the loan (e.g. if retrofitting works result in an improved EPC rating).

Credit risk process and covenants

As new innovative financing arrangements are designed and offered to individuals and SMEs, lenders must ensure that credit risk processes are fit for purpose (e.g. by embedding sustainability factors into processes). Similarly, as more lending to SMEs in this sector takes place, lenders may need to carefully consider how contracting arrangements and resulting covenants are best designed to both protect the lenders' interests but not restrict the use of funds by SMEs for the purpose of growing their businesses.

Broker relationships

Brokers play a vital role in the mortgage process with the majority of new originations taking place each year through a broker rather than direct to lenders. It is therefore essential for this relationship to play a key part in communicating with customers and engaging and educating them about retrofitting options and the available funding, both private and public. The Mortgage Climate Action Group is currently looking at the role brokers can play in greening homes and lenders should proactively engage with this group to ensure that the shared goals of both industries are furthered.

Supporting the growth of SMEs

It is not just private individuals that need to be considered in this transition; SMEs represent most UK businesses and therefore will be a critical part of the retrofitting supply chain. Lenders would need access to low-cost capital that could be ringfenced for SME retrofitting, this could be offered through the UK Investment Bank or British Business Bank, similar to Covid-19 support schemes. Lenders have strong relationships with these SMEs through business banking or other financing arrangements and are therefore well-positioned to offer support to SMEs in the industry.

Commercial finance

Commercial financing for SMEs will be vital for enabling them to scale their operations to support growing demand for retrofitting services. This could be provided by lenders through:

- **Cash flow funding** – invoice financing for example to release funds to improve cash flows (e.g. purchase of heat pumps ahead of installation, before payment from homeowners).
- **Asset-backed lending** – secured loans to fund growth capital investments, (e.g. heat-pump manufacturers to invest in machinery).

Career development loans

Other types of business loans could be appropriate for certain SMEs in the supply chain who require significant investments in people. This could be provided to SMEs to help them scale:

- **Career development loans** to sole traders such as heat pump training or retrofit coordination.
- **Lending to SMEs** to finance workforce upskilling which will ultimately support the transition of skills towards low-carbon technologies.

Leasing of retrofitting options

The capital costs of low-carbon technologies can be prohibitively high and leasing could become a preferred option for many SMEs and individuals. There is scope for lenders to facilitate this through:

- **Loans for SMEs** to bulk purchase or produce low-carbon solutions that are then leased to customers.
- **Loans to individual customers** to finance purchase of equipment using the SME as the intermediary body. Note given that heat-pumps will be homeowners' primary heating source, it would be difficult to repossess heat-pumps for delinquent loans.

Investments

Lenders have significant levels of capital to deploy and expertise in a wide range of industries making them ideally placed to support SMEs on their growth journey. This could be through:

- **Direct investment** – investing in low-carbon technology companies that are working to provide solutions to this issue.
- **Accelerator programmes** – offering specialist business advice and accelerator programmes that offer support such as mentorships and a network (similar to the Barclays growth accelerator programme).

SUPPORT REQUIRED BY LENDERS

As a provider of funding and services to UK homeowners, lenders bear some responsibility in facilitating the decarbonisation of the homes in their portfolios.

Actions taken by lenders in support of decarbonising homes is not without risk, be it credit risk or the risk that actions forced upon them have unintended consequences on customers. In addition, a key risk for lenders is that they are used to enforce government policy and then face the backlash of any unintended consequences.

Lenders require support from government in a number of areas, including:

- **Mitigation of credit risk** – support may be needed to underwrite some of the risk on green lending or investments either directly through government or via a development bank.
- **Underwriting high risk debt** – lenders will need to offer loans to many householders across the UK to achieve the government's Net Zero ambitions. This will include some sub-prime lending which will have a higher risk of default. To avoid offering rates that could be deemed predatory or excluding vulnerable populations, governments need to support banks by underwriting high risk debt.
- **Clarity on policies** – a lack of clarity in the future direction of policies makes it difficult to set a strategy that will help achieve Net Zero homes. Lenders, and indeed all stakeholders, need firm commitments from the government that sets out key milestones in the road to Net Zero and the policies that will get them there.

SOLAR PANELS

A number of consumers have purchased solar panels to reduce their carbon footprint and save money, but are now concerned that they have lost out.

Many of these people are looking to reduce their bills, and are often retired or approaching retirement. Typically they have agreed to have panels installed, taking out a loan to pay for them on the basis that the panels would 'pay for themselves', and even make some money.

Unfortunately for some, once their loan repayments are taken into account the solar panels are actually costing them money. And in some cases, people are being left in financial difficulty. Consumers who have bought solar panels on credit are able to ask the credit provider to refund the costs of the solar panels under Section 56 and 75 of the Consumer Credit Act (1974).

When the Financial Ombudsman Service looks into these complaints, they often find evidence of pressure sales techniques, and misleading sales literature or representations by the salesperson.

9. ACHIEVING NET ZERO HOMES: POLICY RECOMMENDATIONS

The context and issues presented in the preceding pages call for a strategic reset in the way that all actors, particularly the UK’s governments, engage with the greening of our housing stock, and collaborate and align for Net Zero. With hugely ambitious targets and deadlines looming, there is a real risk that we will not succeed otherwise. We set out three sets of recommendations that will enable this: Inspiring Action, Delivering Funding and Redefining Standards.

1. Inspiring Action

Establish a government-led delivery body

Decarbonising the UK’s 28.1 million homes will require a monumental retrofitting effort involving a range of stakeholders including, but not limited to: homeowners, lenders, manufacturers, and retrofitters. While each of these stakeholders have their own expertise, the transition of the UK’s housing sector will not be a success unless stakeholders are able to share their knowledge and collaborate effectively. Therefore, an industry-wide approach to decarbonisation is needed, in which the skills and expertise of each of the stakeholders are utilised effectively to ensure a successful transition.

Furthermore, there are likely to be overlaps between government policies addressing the decarbonisation of heat in the housing sector and other Net Zero strategies. For example, policies to decarbonise the transport sector may require homeowners to adapt their homes to accommodate electric vehicle charging points, while housing sector policies may require energy efficiency improvements to be made. Consumers may become confused by the various requirements to adapt their homes, which may result in disengagement with government initiatives. The UK’s governments should ensure that the various Net Zero policies complement each other and consider the wider asks of homeowners, a role that should be fulfilled by a delivery body.

Finally, the decarbonisation of homes requires a system-wide approach which not only considers housing but also transport, electricity, and gas networks. The recently announced Future System Operator (FSO) will be tasked with taking a whole-system approach within the energy system to drive towards Net Zero while maintaining energy security and minimising costs to consumers.

Variations in the UK’s housing stock (e.g. property age, type, tenure, and heating system) on both a national and regional level present challenges when decarbonising the housing sector, as a ‘one-size-fits-all’ approach cannot be applied across the UK. Local authorities are well placed to tailor decarbonisation approaches to the housing stock and demographics for their area. However, thus far, the role of local authorities has not been clearly defined in the decarbonisation of the housing sector. The need for local authority involvement was recently recognised by Ofgem, which set out the need for energy network companies to work closely with local authorities to develop local area energy plans which are tailored to the specific needs of each area.

Ofgem recently commissioned the development of a methodology for Local Area Energy Plans (LAEPs). These plans identify the most cost-effective means of decarbonising heat (and transport) in a local area by marrying local knowledge with whole system modelling to create a comprehensive, data-driven, cost-effective plan for decarbonisation that can guide future projects and support applications for funding¹¹.

Recommendations

Establish a government-led delivery body to drive collaboration and knowledge sharing between key stakeholders. The delivery body should leverage the skills and expertise of the key stakeholders to develop a system-wide approach to directing efforts to the highest-priority homes. These high-priority homes should include not only the properties which are the most appropriate for retrofitting measures (i.e. off-gas-grid homes, given their exposure to commodity price fluctuations), but also the vulnerable populations which stand to benefit the most from improved energy efficiency measures, thus ensuring an equitable transition.

¹¹ <https://es.catapult.org.uk/brochure/local-area-energy-planning-brochure/>

The establishment of this body must reflect the urgency of the challenge faced. The government-led delivery body should be operational by 2024, with interim targets set to ensure that this target is met. Interim targets should be utilised to ensure the timely allocation of funding, selection of leadership (including key stakeholders) and agreement of terms of reference. In 2020, the CBI released a report outlining the need for a national delivery body and the key principles that would make such a body effective in driving action towards Net Zero which should provide a good framework for how the delivery body should be set up¹².

The delivery body should be tasked with collaborating with stakeholders such as the Future Systems Operator (FSO) and should also work closely across central, devolved, and local governments to ensure coherence.

To support decarbonisation efforts at a local level, the government-led delivery body should support the use of the Local Area Energy Planning (LAEP) methodology to generate local level plans for the decarbonisation of heat in homes. From 2024, following the pilots across three local areas, LAEP should be rolled out across the country, with the government-led delivery body providing support to local authorities in the generation of these plans. From 2027, the UK’s governments should mandate the use of LAEP as a pre-requisite for obtaining central government funding. This should replace the requirement for councils to bid for retrofitting funding for their local areas.

Role of government	Managing the collaboration required across stakeholders and industries requires a central body, which the government is best placed to lead. Therefore, the delivery body should be UK government-led.
Role of financial services	Lenders should engage in this process as key stakeholders of the government-led delivery body. Lenders are well positioned to share knowledge and expertise with the delivery body to ensure its success and, importantly, to ensure that the body is taking account of lenders needs in this transition. This could be in the form of lenders being represented on a delivery body board and participating in roundtables as the body is established and aims set.

Establish a retrofit advisory service

The energy efficiency of each home is determined by its individual characteristics which, in turn, influence which retrofitting options are the most appropriate. Each property requires a bespoke selection of retrofitting options. This has resulted in confusion among homeowners about which retrofitting options are appropriate for their property.

The range of financial assistance options for retrofitting varies between households, depending on each household’s financial situation. The cost of retrofitting is the biggest barrier to consumers engaging in improving the energy efficiency of their homes. Although the government has established a range of financial incentives to reduce this barrier, consumers are often unaware of the financing options available and therefore do not take advantage of them. In addition, issues associated with previous financial incentive schemes (such as the Green Homes Grant) have reduced the public’s confidence in financial incentives for retrofitting.

Stakeholders have voiced concern about retrofitting being conducted by so called ‘cowboy builders’, who may advise the implementation of redundant measures in homes. Cowboy builders present a threat to homeowners, who risk wasting money and damage to their property. This can reduce the confidence of consumers when implementing retrofitting measures. Providing resources to educate homeowners on retrofitting will increase consumer confidence

¹² [heat-policy-commission-final-report.pdf \(cbi.org.uk\)](#)

when selecting retrofitting options, reducing the risk of damage to property and wasted consumer investment.

Recommendations

A government-backed Retrofit Advisory Service must be developed to provide homeowners with a central hub to access independent retrofitting information and advice. The development of this service should be conducted by the government-led delivery body.

The Retrofit Advisory Service should include the establishment of an online platform (by the end of 2023) to provide retrofitting advice, both in respect of the most appropriate retrofitting options available for each house type and the financing options available (both public and private) for each household. By 2024, the Retrofit Advisory Service should develop a ‘gold standard’ supplier list to ease the research burden and provide further confidence in the retrofitter selection process.

Finally, the Retrofit Advisory Service should engage with key industry members to formalise a Building Renovation Passport (BRP) framework, which should detail a step-by-step roadmap for a long-term approach to retrofitting a property, as proposed by the GFI’s Coalition for the Energy Efficiency of Buildings. Industry should take the lead in then implementing the BRP framework. BRPs will provide consumers and lenders with confidence that the retrofitting measures applied are appropriate for the property. This BRP framework should be implemented from 2025.

Role of government	The government-led delivery body should develop the Retrofit Advisory Service to provide consumers with a central hub to access independent retrofitting information and advice.
	The Retrofit Advisory Service should consult with key stakeholders (including the government) to formalise a Building Renovation Passport (BRP) framework.
Role of financial services	Lenders should encourage their customers to use the Retrofit Advisory Service to identify the public financing available to them.
	Lenders should direct homeowners seeking private finance for retrofitting to obtain a Building Renovation Passport to identify the most appropriate retrofitting options for their property.
	Lenders should create financial products that integrate with the Retrofit Advisory Service and provide homeowners with private financing that complements government support.

Supply chain confidence

SMEs in all sectors find it challenging to make progress on sustainability because they lack the resources, knowledge, and expertise of larger companies. Most smaller businesses are at an early stage in their transition to Net Zero. According to the British Business Bank, nearly 60 per cent of firms report reasonable awareness of key Net Zero concepts, but around half (53 per cent) are not yet ready to prioritise decarbonisation. On actions to improve knowledge and capability there is limited progress. For example, more than half (56 per cent) of smaller businesses say they have taken no actions to change this.

Focusing on the housing and construction sectors specifically, SMEs play a vital role in the supply of services and products within the housing and construction supply chain. The government, through the Future Homes and Building Standard, is bringing in various requirements for new homes to reduce carbon emissions – including Part L (Fuel and power), Part F (Ventilation), Part O (overheating) and Part S (Electric Vehicle Charging). This requires SMEs in the supply chain to be familiar with the regulations and have the knowledge, expertise, and resources to identify the best solutions for their customers.

The current skills shortage is already presenting a barrier to the sector. The Committee on Climate Change (CCC) estimates that an additional 200,000 workers will be required to meet the UK’s 2050 target¹³. However, in its Q2 2022 survey, the Federation of Master Builders (FMB) reported that 61 per cent of members had delayed jobs due to a shortage of skilled tradespeople in that quarter; with 42 per cent finding it difficult to hire bricklayers and carpenters and joiners, and 81 per cent of builders increasing prices for work¹⁴. Actions taken to scale-up the retrofitting supply chain will have to increase the construction industry’s capacity, including training of both new and existing tradespeople to close the labour gap.

Unfortunately, the UK is likely to experience an increase in the number of rogue tradespeople offering retrofitting services. As a result, consumers may lack confidence in finding trusted suppliers to perform work. In addition, this presents challenges for lenders, who are reluctant to recommend retrofitting services in case they are revealed to be rogue tradespeople, which could result in the lenders being held liable for any negative consequences of installation.

Recommendation

To provide SMEs with the confidence to invest in scaling their operations, the UK’s governments should design long-term policies that provide SMEs with a clear signal of the direction of the market. These policies should be clearly communicated, with the conditions and timelines of policies made explicitly clear from the outset. The Retrofit Advisory Service should be utilised to provide SMEs with clear information about such policies.

Scaling up the supply chain will only be beneficial if there is a rapid increase in the number of skilled workers available to perform retrofitting. Therefore, action taken to raise industry capacity for the greening of the housing stock must work in tandem with wider initiatives to grow the capacity of the construction industry. This should include local skills building as part of the government’s levelling up policies, and the work of the Construction Industry Training Board (CITB).

To improve consumer confidence when selecting tradespeople, a ‘gold standard supplier’ list should be created and made readily available through the Retrofit Advisory Service. This could involve the expansion of existing accreditation schemes (such as TrustMark or MCS) to provide confidence and protection for consumers. By extension, the extensive use of Publicly Available Specifications (PAS Standards) would provide government assurance that retrofitting options are safe and effective.

Role of government	The government should ensure that long-term policies are clearly communicated to the market, in particular the conditions and timeframes, to provide SMEs with the confidence to invest in scaling their operations.
	The government should offer grants and subsidies to train new and upskill existing tradespeople to achieve the qualifications required to be deemed a ‘gold standard supplier’. This will increase consumer confidence when selecting retrofitting SMEs.
Role of financial services	Lenders benefit from policy certainty as this would allow for longer-term planning and therefore should engage with the government, through the delivery body, to make clear the benefits of providing longer-term certainty.
	As providers of private finance to SMEs, lenders are well placed to advise and educate SMEs on how to scale-up their operations to meet future customer demand.
	By encouraging homeowners to use tradespeople from the ‘gold standard supplier’ list, lenders will reduce the risk that the private financing that they are advancing being used on rogue tradespeople

¹³ <https://www.theccc.org.uk/publication/sixth-carbon-budget/>

¹⁴ <https://www.fmb.org.uk/resource/state-of-trade-survey-q2-2022.html>

2. Delivering funding

Prioritise social housing

Social housing comprises approximately 16 per cent of the UK's housing stock¹⁵. Although social housing tends to be more energy efficient than owner-occupied homes, they will still require a large retrofitting effort to meet the government's Net Zero ambitions.

Given that social housing is more affordable than housing on the open market, it contains a higher proportion of vulnerable populations than other housing types. As a result, residents in social housing stand to gain the most from energy efficiency improvements to their property, as implementing these measures will bring down the cost of energy bills. Therefore, social housing should be a priority in UK government initiatives to decarbonise homes.

In addition, given that social housing is owned by councils and housing associations (as opposed to numerous landlords), initiatives can more easily be rolled out across many houses. As a result, the economies of scale generated by these projects will reduce the cost of retrofitting for other housing types, in turn encouraging further retrofitting within the housing sector. It has been estimated that government-funded retrofitting of 5,000 social houses each year from 2025 to 2030 would result in the capital cost of retrofitting falling by 50 per cent by 2030, due to resulting economies of scale. Furthermore, it is expected that this reduction in cost would be enough to incentivise a third of UK homes to decarbonise with the support of private sector funding¹⁶.

Recommendations

Public funding should be prioritised for initiatives which improve energy efficiency and implement low-carbon heating systems within social housing. For example, funding should be used to expand the Social Housing Decarbonisation Fund, given its success so far.

Social housing retrofitting initiatives should initially focus on housing types which stand to benefit the most from energy efficiency improvements, including properties which are the most appropriate for heat pump installation (e.g. off-the-gas-grid homes with poor insulation). In addition, retrofitting efforts should be focused on social housing in areas with high rates of fuel poverty, in turn reducing energy bills for residents.

Role of government	<p>The government should ensure that social housing is prioritised in the allocation of public funding for retrofitting. This should include an expansion of the £800 million funding committed in the Heat and Buildings Strategy.</p> <p>LAEPs provide an opportunity for the government to apply a structured approach to ensuring that social housing is prioritised in the allocation of retrofit funding by local authorities</p>
Role of financial services	<p>Lenders should engage with their social housing customers (e.g. housing associations) and provide support in applying for central funding or play an active role in directing them to available support.</p> <p>Lenders should consider whether they can provide additional finance to complement central funding.</p> <p>Lenders should review covenants on loan agreements with social housing providers to ensure they protect the lender while supporting the capital expenditure on energy efficiency measures.</p>

Provide additional government grants

The scale and cost of changes needed to UK homes means that grants are unavoidable. Rising inflation and energy bills are putting pressures on vulnerable portions of the population that simply cannot afford to make the necessary upgrades. This does not mean that progress can halt, but it does require a robust response from government to provide funding to those that need it most.

¹⁵ <https://fullfact.org/economy/whats-happening-rented-social-housing-england/>
¹⁶ [RetrofitRevolution.pdf \(volans.com\)](https://retrofitrevolution.pdf/volans.com)

As cost is the greatest barrier for decarbonisation efforts, it is unsurprising that financial incentives have been identified as the most effective way to encourage consumers to implement energy efficient measures, with a grant covering the total cost identified as the most effective motivator for decarbonisation efforts¹⁷.

The most vulnerable populations, who would otherwise be unable to afford the installation of energy efficiency measures and low-carbon heating, should be prioritised in the allocation of financial assistance (e.g. grants and subsidies). In turn, these vulnerable populations will benefit from improved energy efficiency of their properties, resulting in lower energy bills. This will help to ensure an equitable transition of the housing sector to Net Zero.

The nature of grants must also reflect the financial needs of these vulnerable populations. For example, these populations are unlikely to have the upfront capital required to cover the costs of energy efficiency improvements. Therefore, financial assistance should be provided in advance of the commencement of work, removing the requirement of households to have readily available disposable income. Financial assistance must also be expanded to cover the hidden costs of installation (e.g. rewiring and redecorating) as even these smaller-scale costs can be unaffordable.

To achieve the scale of retrofitting required, the process of obtaining financial assistance must be simple and hassle-free, enabling households to access finance quickly and easily. Previous policies have been criticised for having onerous admin requirements, which have deterred people from accessing the finance available. For example, the Green Homes Grant received criticism due to delays in the issuance of vouchers and for excessive administration expenses due to the overly complex nature of the scheme.

To combat the current energy price increases, existing schemes that have been shown to be effective should be rapidly extended. The fourth iteration of the ECO scheme has yet to begin and prioritising the legislation to bring this into force in time for improvements to be made ahead of winter 2022 could help alleviate pressure on low-income households and contribute to emission reductions.

Recommendations

Retrofitting should be fairly financed. Vulnerable populations should receive grants that cover the full upfront cost (including hidden costs) of energy efficiency improvements and low-carbon heating systems. Financial assistance should not only be offered to vulnerable populations, with a means-based approach taken to financing assistance for the rest of the population. Households with a greater ability to pay for retrofitting should receive a smaller upfront grant with the option to supplement this with an interest-free or low-interest rate loan to cover the remaining cost. This could be done through environmental-linked securitisations. The grants should be front-loaded with a clearly communicated tapering of support to incentivise action.

The process of obtaining grants should be simplified, to encourage their uptake. The payment of grants should be received directly by tradespeople, therefore reducing the administration burden for consumers. In addition, the application process for grants should be streamlined to encourage consumers to engage with such schemes.

Legislation for the fourth ECO scheme should be prioritised ahead of winter 2022 with a commitment to further annual funding that matches customer contributions and work with lenders to develop financing options to spread the cost.

It is essential that whichever government grants are implemented, the timescales and conditions of such grants are clearly communicated to consumers. This long-term signalling will provide certainty to consumers allowing them to plan home improvements.

¹⁷ <https://fullfact.org/economy/whats-happening-rented-social-housing-england/>

Role of government	The government should provide targeted grants and subsidies that cover the full upfront cost (including hidden costs) of retrofitting for certain vulnerable populations. For those with a greater ability to pay, a mean-based approach should be taken.
	The government should consider if it could better support environmental-linked securities through a wrapper or guarantee to reduce the risk for lenders and provide low-cost loans for consumers.
	The process of obtaining grant funding should be simplified with timescales and conditions of grants clearly communicated to customers.
Role of financial services	Lenders should offer specific products (e.g. retrofitting loans) to complement means-based government grants, so that homeowners are able to afford the upfront cost of retrofitting options.
	Lenders should work together to build the frameworks for environmental-linked securitisations and engage with government to ensure that the risks are appropriately managed and allow access to cheap funding for consumers.
	Lenders should also work with government and suppliers to ensure that the process for the customer is frictionless for example with respect to the application for finance, release of funds, and any required assurance over works done.

Update Stamp Duty Land Tax (SDLT)

Fiscal levers can be utilised in energy efficiency policies as both incentives (e.g. using grants) and penalties (e.g. for non-compliance). For the use of fiscal levers to be effective, careful consideration must be given to ensure that they target the correct populations and strike a balance between encouragement and penalty.

Fiscal levers must explicitly consider vulnerable populations in their design, to ensure that the approach taken enables an equitable transition. For example, the use of financial penalties should not disproportionately impact the poorest in society, who are unable to pay for energy efficiency upgrades or heating system replacements. Instead, these vulnerable populations should be supported by financial incentives, such as grants and subsidies.

Policies introduced to facilitate the transition of the housing sector to Net Zero should take advantage of existing trigger points in the home buying process, therefore encouraging capital investments into energy efficiency and low-carbon heating systems at these points. SDLT occurs at the point of sale of a property and is suffered by the buyer. Therefore, an energy efficiency adjusted SDLT could be utilised to increase demand for energy efficient properties, encouraging homeowners to retrofit their homes.

Recommendations

SDLT should be utilised as a fiscal lever to encourage the implementation of energy efficiency measures and low-carbon heat sources. SDLT should be amended to incorporate the property’s energy demand and carbon emissions, in such a way that is revenue neutral for the government. The SDLT amendments should be made in line with proposals by the Energy Efficiency Infrastructure Group (EEIG)¹⁸, which suggests that SDLT rebates should become available if energy efficiency improvements are completed within two years of the property purchase. Implementation of the SDLT amendment should be made after 2025, when actions aimed at scaling the retrofitting supply chain begin to have a positive impact and ensures that demand for retrofitting services can be met.

¹⁸ ENERGY SAVING STAMP DUTY INCENTIVE (theeeig.co.uk)

Role of government	The government should amend the conditions of Stamp Duty Land Tax to incorporate the property’s energy demand and carbon emissions, in such a way that is revenue neutral for the government. The SDLT amendments should be made in line with proposals by the Energy Efficiency Infrastructure Group (EEIG).
Role of financial services	N/A

Financing the supply chain

As demand for retrofitting increases (due to a combination of policy action and consumer awareness), supply chains will have to scale-up to keep pace. Scaling the supply chain will require SMEs to make significant capital investment in their operations (e.g. new machinery, capabilities). However, such investment by SMEs has been limited thus far due to uncertainty surrounding the direction of government policy and previous negative experiences on engaging with green technologies.

Green technology installers will also face additional financial pressures from the need to hold an inventory of expensive assets such as heat pumps. They will require new working capital arrangements with their banks that take into account holding a stock of these assets.

The cost of retrofitting has been identified as the main barrier to UK homeowners improving the energy efficiency of their homes¹⁹. While retrofitting is currently an expensive process, the scaling up of the retrofit supply chain will reduce the cost of measures due to economies of scale. It is estimated that the cost of retrofitting could be reduced by 50 per cent due to economies of scale, which is enough to make retrofits commercially viable for the wider market²⁰. The reduced cost of these measures will make retrofitting more attractive to the public, therefore further driving an improvement in the energy efficiency of homes.

Recommendations

Grants and subsidies should be offered to upskill new and existing tradespeople to achieve the qualifications required to be deemed a ‘gold standard supplier’. We estimate that it would cost approximately £60-110 million to train the CCC’s predicted 200,000 additional workers²¹.

The financing available to SMEs in the supply chain should be increased via initiatives which mobilise both private and public funding sources. This could include the use of credit guarantees for lenders (to reduce the risk of lending to supply chain companies) and the mobilisation of finance from the UK Infrastructure Bank (to provide low-interest loans to supply chain companies). The government should also expand the Green Homes Finance Accelerator competition, to encourage the development of innovative green finance products.

Role of government	The Retrofit Advisory Service should educate SMEs on the private financing options available to scale-up their operations.
	The government should also consider providing ring-fenced funding at a low cost to SMEs, for example through UKIB or BBB.
Role of financial services	Lenders should engage with their SME customers and provide advice and support to help them plan for expansion of their businesses to meet future demand.
	Lenders should offer private financing products to support SMEs scale-up their operations. Options could include cash flow support (e.g. working capital loans), loans for training programmes, and leasing arrangements.

¹⁹ <https://www.gov.uk/government/statistics/beis-public-attitudes-tracker-winter-2021>

²⁰ https://volans.com/wp-content/uploads/2021/04/Retrofitting-report_v5.pdf

²¹ <https://www.theccc.org.uk/publication/sixth-carbon-budget/>

3. Redefining standards

Amend the EPC standard & certification process

Energy Performance Certificates (EPCs) are a well-established and useful tool for consumers and for other stakeholders in the industry such as lenders who are looking to benchmark their mortgage portfolio, or for governments looking to set minimum efficiency requirements.

However, the current headline EPC metric is not fit for purpose. It fails to take account of emerging heating technologies which risks undermining any policies that use it as a basis for setting improvement targets or minimum standards. In 2020, the government commissioned a scoping project to identify how the EPC methodology (SAP/RdSAP) could be enhanced to support Net Zero commitments. The scoping project identified 25 key recommendations and a project group is now working to implement the recommendations in the lead up to 2025, when the updated SAP/RdSAP 11 methodology will come into force.

In addition, there are issues with the EPC database that must be addressed. Though significant progress has been made on assessing the EPC rating of UK housing stock since the introduction of EPC ratings in 2007, many UK homes still do not have an EPC rating. Furthermore, updates to home energy efficiency do not always translate to an updated EPC rating and therefore EPC ratings are often an outdated representation of energy efficiency. Finally, there is a significant time-lag in the EPC database, with register data published every four to six months²². This time-lag limits the usefulness of the EPC database for making decisions, for example when lenders utilise the data to assess the EPC performance of their portfolios.

Recommendations

Ensure that the forthcoming SAP/RdSAP 11 methodology reflects the key recommendations made in the government's scoping report. The key areas which should be addressed by SAP 11 are:

- ensuring one of the main functions is to support the Net Zero strategy
- introducing absolute energy use targets rather than relative ones
- the use of long-term carbon factors
- support for the decarbonisation of heat and electricity through better modelling of low-carbon technologies (heat pumps, solar PV, heat networks)
- the creation of new metrics that can be used to track progress to Net Zero

Crucially, the SAP/RdSAP 11 methodology should be applied across all nations to ensure consistency of data recorded for the energy efficiency of properties across the UK. This will require adoption of the methodology by all devolved administrations.

To ensure that more accurate EPC data is available, any energy efficiency improvements (due to the retrofitting) should be reflected in the EPC rating of a property at the date of installation. This would improve the accuracy of data included within the EPC database, therefore improving the usefulness of data to stakeholders. In addition, stakeholders should be granted access to a live database of EPC ratings through an API, to enable them to make decisions with up-to-date EPC data. Furthermore, a methodology should be developed to calculate a proxy EPC rating for properties lacking an EPC rating. This would reduce the prevalence of data gaps, therefore enabling the government, banks and other stakeholders to more accurately assess the energy efficiency of homes at a UK, regional and individual level.

²² <https://epc.opendatacommunities.org/docs/guidance>

Role of government	Ensure that the incoming SAP/RdSAP methodology reflects the key recommendations made in the scoping report. Improve consistency of EPCs across the UK by implementing the methodology across all devolved administrations.
	Integrate real-time updates to EPCs into a database accessible to stakeholders through an API.
Role of financial services	Develop a methodology to calculate a proxy rating for properties which do not have an EPC rating or have an outdated EPC rating.
	Lenders should engage with the working group that is developing the SAP 11 guidance to ensure that lender needs are fed into the process (e.g. enabling real time updates)

Implement minimum energy efficiency requirements

A long-term ambition needs interim targets in order to measure progress. Educating and engaging consumers is an important step along the Net Zero journey, and this will undoubtedly, when coupled with financial support, change behaviours. However, this alone is unlikely to result in the level and speed of action needed and therefore there needs to be clear requirements imposed that dictate the direction of travel. The government should utilise legislation to further drive the decarbonisation of heat in the housing sector.

Long-term regulatory clarity will benefit all stakeholders, allowing them to plan and act ahead of time. Domestic Minimum Energy Efficiency Standard (MEES) regulations exist for the private-rented sector but not for the 65 per cent of UK homes that are owner-occupied. Ensuring that all homes in the UK are covered by minimum requirements will be a clear signal of intent that will drive action.

However, any such requirements would need to be carefully formulated and aligned with wider policy goals to avoid unintended consequences. For example, there is a risk that domestic MEES may create property prisoners, in which homeowners are either unable to sell or have access to a wide choice of mortgage on their property as they do not have the upfront capital required to implement energy efficiency improvements. The government must mitigate this risk by considering whether any proposed MEES explicitly consider the needs of all vulnerable populations.

Recommendations

Introduce domestic MEES for owner-occupied housing, in which a minimum energy efficiency rating (based on updated iterations of SAP/RdSAP) is required for the sale or remortgage of a property. A phased implementation of such MEES should be used, starting in 2030 and ending in 2050, to provide owner-occupiers with sufficient time to implement energy efficiency improvements. In addition, the MEES should include exemptions to reduce the risk of vulnerable populations becoming property prisoners, as included within the Heat in Building's proposed domestic MEES for owner-occupied properties.

Combine the requirement for a minimum EPC rating with funding and policies to ensure supply chains can cope with demand and that there are no negative impacts on vulnerable populations while providing a nudge for those who have the means to retrofit but are reluctant to do so. Vulnerable populations should be identified, defined and granted exemptions to these requirements.

Role of government	Introduce domestic MEES for owner-occupied housing, in which a minimum energy efficiency rating (based on updated iterations of SAP/RdSAP) is required for the sale or remortgage of a property. A phased implementation of such MEES should be used, starting in 2030 and ending in 2050, to provide owner-occupiers with sufficient time to implement energy efficiency improvements.
Role of financial services	Lenders should disclose, as part of their wider climate disclosures, improvements in the EPC ratings of their portfolios. While many lenders already do this, setting targets for improvements and disclosing against these will reinforce the message within the industry that this is a clear focus area. Through engaging with government and other stakeholders, lenders can ensure that the metrics used for assessing emissions in homes is fit for purpose and then disclose against this.

Consider mandating hydrogen ready boilers

Approximately 85 per cent of UK homes are connected to the gas grid²³ with an estimated 1.7 million new gas boilers installed each year²⁴. The Heat and Buildings Strategy sets out the government’s plans to phase out installation of fossil gas boilers in new builds from 2025 and existing homes from 2035. The low-carbon heating systems used to replace existing gas boilers will vary depending on individual property characteristics, with a mosaic of different solutions required.

The government is currently considering the use of hydrogen as a low-carbon heating source, with a strategic decision due on the role of hydrogen in heating by 2026, following the conclusion of several ongoing trials. Currently, the price of a hydrogen-ready boiler exceeds that of a natural gas boiler. While this increased cost acts as a deterrent, large boiler manufacturers have indicated that the price of a hydrogen-ready boiler could be comparable to that of a natural gas boiler by 2025. If this price-parity can be achieved, then this could enable a rapid uptake of hydrogen-ready boilers in preparation for the decision on the use of hydrogen as a heating source in 2026, at no detriment to the homeowner.

Recommendations

In preparation for the strategic decision on the role of hydrogen in heating (expected in 2026), the government should consider mandating the installation of hydrogen-ready boilers at the point of natural gas boiler replacement from 2025²⁵ (by which time the industry would have met its commitment to achieve price parity on hydrogen-ready vs. natural gas boilers).

In addition, the government should amend the VAT Act (1994) so that hydrogen (currently taxed at 20 per cent) is taxed at either the same rate as natural gas (five per cent), or lower.

Role of government	Consider mandating hydrogen-ready boilers for the installation of all new boilers by 2025 (in line with industry commitment to achieve price parity on hydrogen-ready vs. gas boilers). The government should amend the VAT standard of 1994 so that Hydrogen (currently taxed at 20 per cent) should be taxed at the same rate as natural gas (five per cent).
Role of financial services	N/A

²³ Annex-2-Heat-in-UK-Buildings-Today-Committee-on-Climate-Change-October-2016.pdf (theccc.org.uk)
²⁴ UK heating plan still means 120 gas boilers installed for every low-carbon system - Energy Post
²⁵ Big Four make price promise on domestic hydrogen boilers (theengineer.co.uk)

Ensuring a just transition

The above policy options have been designed to address the range of transition risks, and vulnerable populations previously highlighted in this report. Amendments to the SDLT, grants and subsidies may adversely impact the transition risks and vulnerable populations. For example, SDLTs based on EPCs may create property prisoners, penalise homeowners who are unable to perform retrofitting and pressure homeowners into performing retrofits that are not suitable for their home. Additionally, grants and subsidies need to be appropriately designed to encourage suitable retrofitting for homes.

Risks and challenges of recommendations

	Stakeholders Engaged	Transitional risks					Challenges facing vulnerable populations				
		Cost	Property Devaluation	Property Prisoners	Penalties	Installation	Finance access	Appropriate retrofitting	Awareness	Logistics	Private rentals
Government-led delivery body	Local & Central Government, Manufacturers, Installers, Landlords & Homeowners	-	-	-	-	✓	✓	✓	-	-	-
Retrofit advisory Service	Local & Central Government, Installers, Manufacturers, Landlords & Homeowners	✓	✓	✓	-	✓	✓	✓	✓	✓	
Supply Chain Confidence	Local & Central Government, Installers, Technology firms, Manufacturers	-	✓	-	-	✓	-	✓	-	-	
Prioritise Social Housing	Central Government, Landlords	✓	✓	-	-	✓	✓	✓	-	-	
Government Grants	Central Government, Landlords & Homeowners	✓	✓	✓	✓	?	✓	?	✓	-	
Stamp Duty Land Tax	Central Government, Landlords & Homeowners	-	-	?	?	-	-	?	✓	-	
Supply Chain Planning	Local & Central Government, Installers, Technology firms, Manufacturers	✓	-	-	-	✓	-	-	-	-	
EPC Standard & Certification	Central government, Landlords & Homeowners	-	-	-	-	✓	-	✓	✓	-	
Minimum Energy Efficiency	Central Government & Homeowner	-	?	?	?	-	-	-	✓	-	
Hydrogen Ready Boilers	Central government, Landlords & Homeowners	-	-	-	-	-	-	✓	-	-	

Key:
 ✓ Reduce risk / Improve outcomes ? Potential risk - Limited impact or improvement

Source: UK Finance/KPMG

ANNEXES

A. CLEAN/GREEN DOMESTIC ENERGY GENERATION

Low-carbon heating sources: while gas boilers are the most common heating technology in the UK, the need to replace these boilers is essential to reach Net Zero homes. The table below provides a benchmark for the new low-carbon heating options compared to the current gas and oil boiler systems. The analysis shows that the lifetime costs of most low-carbon heating systems are likely to be more expensive than the current fossil fuel options.

Low-carbon heating sources

Type	Technology	System efficiency	Cost p/kw	Capital cost	Installation cost	Installation time	Payback	Lifetime
Existing high-carbon heating sources	Oil boiler (NI)	87%	4.9p	£2,000	£600	1-3 days	n/a	15 years
	Gas boiler	92%	4.5p	£2,000	£400	1-2 days	n/a	15 years
Low-carbon heating sources	Heat pump	250%	20p	£7,724*	£10,000	2-4 days	11 years	20 years
	Hydrogen ready boiler	80%	n/a	£2,500	£400	1-2 days	n/a	15 years
	Infrared heating	100%	11p	£1,500	£300	1 day	3.6 years	30 years
	Solar thermal	80%	8.5p	£2,000	£2,500	1-2 days	10 years	25 years

Source: BEIS

Heat pumps (air/ground source). Heat pumps play a pivotal role in the government's decarbonisation strategy, with ambitions to increase the installation of heat pumps from one per cent of households to 27 per cent of households by 2030.

Heat pumps are one of the most efficient ways to heat houses and their water systems. They work by extracting heat from the air, ground, or nearby water source, before concentrating the heat and transferring it indoors.

Although heat pumps are very efficient, the success of their roll out across households has been limited by their relatively high upfront costs and specific features required for installation. A recent study by the Energy and Utilities Alliance found that heat pumps are unsuitable for 37-54 per cent of UK homes, however 14-18 per cent of UK homes could be made suitable following improvements to the home's efficiency.

The government's ambitions to install 600,000 heat pumps a year by 2028 is ambitious given that in 2019 the UK only installed 35,000 heat pumps. Therefore, meeting this target will require a significant scaling-up of the number of suppliers and trained installers. The sixth carbon budget stated that the number of installers in 2020 will need to increase thirty-fold to meet the government's ambitions.

Hydrogen-ready boilers. Hydrogen-ready boilers are gas-fired heating boilers which can burn either natural gas or pure (100 per cent) hydrogen. When used with sustainable hydrogen, they also have the potential to reduce green house gas emissions.

Hydrogen-ready boilers are a relatively low-cost alternative to heat pumps as their capital costs are similar to that of regular gas boilers. Furthermore, they do not require any additional space for installation.

However, hydrogen boilers will require the current gas network to move from natural gas to hydrogen. A strategic decision on the role of hydrogen in residential heating is set to be taken by 2026. Until a decision has been made, it is difficult to assess the future implementation of hydrogen boilers.

Solar thermal. Solar heating systems use panels or tubes, called solar collectors, to gather solar energy which is converted into heat for hot water and is transferred around the home.

Although the upfront costs of solar thermal heating systems are high, once installed there are no running costs (outside maintenance). However, solar thermal however does not offer space heating and is only suitable for installation alongside a heating system that includes a hot water cylinder and would not be appropriate for houses with combi boilers.

Infrared heating. Infrared heating panels, also referred to as radiant heating panels, or far infrared panels, are electric heating emitters that use the radiant heat spectrum to target heat in specific areas. They can be used as a whole house solution or as complementary heaters that work alongside an existing heating system.

As infrared heating panels use radiant heat (and therefore are specifically designed to heat objects, rather than the air), they are a good solution for poorly-insulated houses. As they run on electricity, they will be decarbonised with an increase in renewable electricity sources.

With standard infrared heating panels costing between £120 - £180 per panel and requiring only one day of installation work, they are a low-cost low-friction alternative to other retrofitting options.

Fabric First. A successful approach to deploying low-carbon heating fabric first prioritises measures to improve the energy efficiency of the building before making any changes to the heating system. It spreads out the capital costs, improves the efficiency of the heating systems when installed and can immediately reduce heating bills for the homeowners.

Alternative technology options: In addition to the technology options already mentioned, there are several alternative technology options including:

- Community solar projects: this is a solar power installation that accepts capital from and provides output credit and tax benefits to multiple customers. Participants typically invest in or subscribe to a certain kW capacity or kWh of remote, electrical production.
- District heating: this is a system for distributing heat generated from renewable sources in a centralised location through pipes for residential and commercial heating. The networks work well in urban areas where houses are closely connected. This technology requires changes to be made to be multiple houses in unison and therefore is not considered in this report.
- Smart technology: The United Nations Environment Programme estimates that 30-80 per cent of energy bills could be reduced by using existing management technology, including smart meters and thermometers. These technologies are proven, low cost and can be installed quickly with an immediate effect on energy bills.

The diversity amongst UK housing stock means that there will not be one single technology that can decarbonise all houses. There must be a mosaic of solutions tailored to the requirements of each household. Any financing solutions, whether grants or loans, must be flexible and consider the most appropriate technology options for each home.

B. TYPES OF INSULATION

Loft insulation. The Energy Savings Trust estimates that a quarter of heat is lost through the roof in an uninsulated home. Therefore, insulating a loft, attic or flat roof is an effective way to reduce heat loss. In most cases, insulating a loft is easy and involves layering rolls of mineral wool insulation between the beams that make up the floor of the loft.

Cavity wall insulation. It is estimated approximately a third of heat lost in an uninsulated home escapes through the walls²⁶. Two-thirds of properties in the UK are estimated to have cavity walls, many of which can be insulated by injecting insulation material from the outside (usually mineral wool or polystyrene beads)²⁷.

Suspended floor insulation. Insulating a suspended timber floor can both eliminate floor draughts and reduce heat loss through the fabric of the floor. It is possible to install floor insulation without the assistance of a professional, therefore making it one of the least disruptive retrofitting options.

Window glazing. Energy-efficient glazing covers both double and triple glazing. It reduces draughts and cold spots thus reducing heat loss. This is usually fitted by a professional and the costs vary by materials and style. The biggest friction for consumers is the appearance of the windows, especially for period properties.

Draught-proofing. Draught-proofing is one of the cheapest and most effective ways to save energy in any type of building. The most common areas of a home to find draughts include windows, doors, chimneys, floorboards and loft hatches. Draught proofing does not need to be completed by a professional.

It should be noted that poorly completed insulation in all these options can cause issues with damp and mould. Ensuring that the work is done by a skilled installer is key to avoiding future property damage and potential health risks for residents.

²⁶ <https://energysavingtrust.org.uk/advice/cavity-wall-insulation/>

²⁷ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/970064/Detailed_Release_-_HEE_stats_18_Mar_2021_FINAL.pdf

C. FACTORS AFFECTING ENERGY EFFICIENCY IN A HOME

Property age. The age of a property is the most significant factor associated with energy efficiency, due to changes in building techniques and regulations coupled with wear and tear. This is demonstrated by the fact that almost all homes in England and Wales built since 2012 have a high energy efficiency rating, compared to only 12 per cent and eight per cent of homes built before 1900 in England and Wales respectively.

One of the most significant changes in building techniques which impacts energy efficiency is the type of wall. Homes built from the 1920s onwards tend to be built with cavity walls, with these walls likely to be insulated in properties built after 1990. Conversely, properties built pre-1920 predominantly have solid walls, which rapidly lose heat. The type of wall also affects the insulation options available to a property.

Property type. Flats and maisonettes are the most energy efficient property type while detached and semi-detached properties are the least efficient. This difference in energy efficiency is driven by external wall exposure, which is greater in houses than flats.

However, there are challenges associated with improving the energy efficiency of a flat, namely that improving insulation often requires the buy-in of all other residents within the property. In addition, some insulation options are not appropriate for flats, for example, a top floor flat formed from a roof conversion limits the roof insulation options available. Flats are also subject to space restraints which may prevent the installation of low-carbon heating options (e.g. heat pumps).

Property tenure. Households are typically divided into one of three tenures: owner-occupiers, social renters, and private renters, with each facing their own decarbonisation challenges. Approximately 65 per cent of housing in the UK is owner-occupied, 16 per cent socially rented and 19 per cent privately rented. On average, social rented properties are the most energy efficient property type, and owner-occupied dwellings the least.

Although owner-occupiers are often referred to as the ‘able to pay’ sector, they comprise the highest proportion of fuel poverty households (51 per cent) and homes that fail to meet ‘decent standard’ (61 per cent) across the UK. Of owner-occupiers, approximately 56 per cent own their properties outright, while 44 per cent are owned with a mortgage or loan.

Energy efficiency improvements in the private rented sector have been constrained by split incentives, where landlords suffer the cost of energy efficiency improvements while tenants benefit from the lower costs of heating. As a result, landlords are often reluctant to implement energy efficiency measures.

The social rented sector is more energy efficient than the private rented sector, both due to the age profile of properties and a higher proportion of flats. Given that social tenants are reliant on social landlords to implement changes with a limited budget, there is little that they can do to improve the energy efficiency of their homes.

Heating system. The majority (85 per cent) of homes in the UK are connected to the gas grid. These homes predominantly use a gas fired central heating system. The remaining 15 per cent use either oil or liquid petroleum gas (LPG) as their main heating fuel, or an electric heating system. These properties make up a greater proportion of heating emissions (23 per cent) due to the higher carbon intensity of oil and LPG.

Due to a significantly higher proportion of off-gas-grid properties, homes in rural areas are more likely to use oil or LPG heating systems. Additionally, Northern Ireland has a distinctly different heating profile than the rest of the UK, with approximately 68 per cent of properties using an oil-based heating system.

D. EPC REQUIREMENTS

Current EPC requirements

	Owner-Occupied	Private Rentals	Social Housing
England & Wales	It is a legal requirement to have a valid EPC for a property when marketing for sale.	All rental properties must have a minimum EPC rating of E or above.	All rental properties in England & Wales are required to have an EPC.
Scotland	Building owners are legally required to provide an EPC on construction, sale or rental of a building to a new tenant.	Landlords must obtain an EPC prior to marketing a rental property for the first time. The EPC must be displayed in the property and the energy performance rating must be included in all advertisements for a vacant property.	All social housing meets, or can be treated as meeting, EPC Band B, or is as energy efficient as practically possible, by the end of December 2032 within the limits of cost, technology and necessary consent. In addition, no social housing below EPC Band D should be re-let from December 2025, subject to temporary specified exemptions.
Northern Ireland	EPCs are required whenever a property is built or marketed for sale. There is no minimum EPC requirement.	EPCs are required whenever a property is built or marketed for rent. There is no minimum EPC requirement.	EPCs are required whenever a property is built or marketed for sale or rent. There is no minimum EPC requirement.

Current EPC requirements

	Owner-Occupied	Private Rentals	Social Housing
England & Wales	No changes proposed.	Minimum Energy Efficiency Standard (MEES): All new tenancies must be at least EPC Band C from 31 December 2025 All existing tenancies must be at least EPC Band C from 31 December 2028 where practical, cost-effective, and affordable	Clean Growth Strategy: Social housing providers must attain the minimum rating of EPC C for rented properties by 2035 (2030 for ‘fuel poor’ households). WHQS (2023): Welsh Social Housing heating systems should achieve EER Band A and carbon emissions should achieve EIR Band C by 2033
Scotland	Heat In Buildings Strategy: Regulations will be required from 2023-25 onwards, requiring all domestic owner-occupied buildings to meet EPC C by 2033, where technically feasible and cost-effective.	Heat In Buildings Strategy: Private rental sector properties should have an EPC rating of C at change of tenancy from 2025. All existing PRS properties will then be required to reach a minimum standard of C by 2028.	The Scottish government proposes to review the social housing standards in 2023 to strengthen the standard.
Northern Ireland	No changes proposed.	Energy Strategy – Path to Net Zero Energy – Action Plan: Proposed establishing minimum energy efficiency standards in the domestic private rented sector, however no specific target suggested.	No changes proposed.

E. KEY FUNDING POLICIES

Policy	Summary
Social Housing Decarbonisation Fund	<p>In October 2021, an £800 million Social Housing Decarbonisation Fund (SHDF) was created, enabling social landlords, including housing associations, to conduct energy efficiency upgrades in tenants' homes. The scheme runs with a fabric-first principle to maximise the suitability of housing for low-carbon heating. Registered providers must improve houses to a minimum of EPC C.</p> <p>SHDF Wave 1 will provide 69 projects across England with a share of £179 million. The successful projects are expected to be complete by the end of March 2023, resulting in the upgrade of approximately 20,000 social properties. In June 2022, the government announced the first tranche of SHDF would include up to £700 million of funding, with the competition window opening in August/September 2022.</p>
Home Upgrade Grant	<p>The Home Upgrade Grant (HUG) will allocate £950 million to 22 local authorities from 2022-25. The initial round will enable 4,300 homes in England to benefit from £67 million funding, with all upgrades delivered within a year. Upgrades will be offered, in the first instance, to low-income households that are off the gas grid and have an EPC Rating of Band D to G. Through the system, households will be able to book in for free wall and roof insulation and replacement heating systems from their local authority.</p>
Boiler Upgrade Scheme	<p>The Boiler Upgrade Scheme (BUS) was launched in May 2022 and will run for three years, backed by £450 million of government funding. The scheme offers capital grants (£5,000 for air source heat pumps and biomass boilers, and £6,000 for ground source heat pumps) to consumers in England and Wales to overcome the high upfront cost of purchasing and installing a low-carbon heating system.</p> <p>However, the grant will still leave a large shortfall when implementing low-carbon heating systems. Therefore, the scheme will be inaccessible to low-income households as it does not do enough to address the upfront cost barrier. Furthermore, the scheme's budget of £150 million per year will only support 30,000 installations each year (in line with the current market size) and therefore falls significantly short of the government's ambition to install 600,000 heat pumps per year by 2028.</p>
Heat Network Transformation Programme	<p>From 2022-25, the Heat Network Transformation Programme seeks to scale-up low-carbon heat network deployment to facilitate low-carbon heat network market growth. The scheme will achieve this through a matrix of support and policy frameworks which includes the Heat Network Delivery Unit, Heat Network Investment Project, Green Heat Networks Fund, and heat zoning.</p>

F. KEY RETRO-FIT POLICIES

Policy	Summary
	<p>The Green Homes Grant (GHG) (launched in 2020) is a £2 billion scheme created to help homeowners in England pay for energy saving improvements including wall insulation, solar panels, and air source heat pumps. The GHG contained two schemes.</p> <p>Voucher scheme</p> <p>The £1.5 billion GHG voucher scheme covered up to two-thirds of the cost of energy efficiency installations (up to £5,000 in all households or £10,000 in low-income households). The scheme was discontinued in March 2021 and only paid out vouchers totalling £35.9 million of the £1.5 billion of funding available.²⁸ The scheme's success was limited for the following key reasons:</p> <ul style="list-style-type: none"> many homeowners and installers had a poor experience of the scheme including delays with the issuance and payment of vouchers installers were reluctant to invest in gaining the accreditation given the short nature of the scheme, resulting in shortage of Trustmark-certified installers to perform work the overly complex design of the scheme meant that £50.5 million (c. 16 per cent of the total spend) was attributable to programme management and administrative expenses²⁹, amounting to more than £1,000 per home upgraded. <p>Local Authority Delivery Scheme (LAD)</p> <p>The £500 million LAD scheme enabled energy inefficient low-income households to apply for up to £10,000 of funding through their local authority. The scheme has two phases (2020-21 and 2021-22) which seek to improve 50,000 homes.</p>
Green Homes Grant	<ul style="list-style-type: none"> many homeowners and installers had a poor experience of the scheme including delays with the issuance and payment of vouchers installers were reluctant to invest in gaining the accreditation given the short nature of the scheme, resulting in shortage of Trustmark-certified installers to perform work the overly complex design of the scheme meant that £50.5 million (c. 16 per cent of the total spend) was attributable to programme management and administrative expenses²⁹, amounting to more than £1,000 per home upgraded.
Energy Company Obligation	<p>The Energy Company Obligation (ECO), first introduced in 2013, is a government energy efficiency scheme in Great Britain that has been amended over time. The ECO3 scheme closed on 31 March 2022 and the latest policy, ECO4, is yet to commence. ECO requires suppliers to promote measures to improve the ability of low-income, fuel poor and vulnerable households to heat their homes (including energy efficiency measures).</p> <p>ECO4 (2022-2026), worth £4 billion, will provide grants to support energy-inefficient households (owner-occupied homes rated EPC D-G and social housing and private rented accommodated rated EPC E-G) on the lowest incomes. Households that do not receive benefits, may still be eligible for ECO4 under the flexible eligibility (LAFlex) program that some councils participate in.</p>
Domestic Renewable Heat Incentive	<p>The Domestic Renewable Heat Incentive (DRHI) was a government financial incentive to promote the use of renewable heat in homes across Great Britain. The scheme was launched in April 2014 with applications ending in March 2022. Participants received payments for seven years based on the amount of heat produced by renewable heating technologies, including air and ground-source heat pumps, biomass boilers and solar thermal panels.</p> <p>The number DRHI accreditations (87,337) fell significantly short of BEIS's ambition of 513,000 accreditations by 2020³⁰. The DRHI scheme received criticism as the seven-year repayment schedule does address the upfront-cost barrier for consumers. As a result, the scheme is not accessible for vulnerable low-income populations.</p>

²⁸ <https://www.nao.org.uk/wp-content/uploads/2021/09/Green-Homes-Grant-Voucher-Scheme.pdf>

²⁹ <https://www.nao.org.uk/wp-content/uploads/2021/09/Green-Homes-Grant-Voucher-Scheme.pdf>

³⁰ <https://www.ofgem.gov.uk/publications/domestic-rhi-annual-report-2020-2021>

Green Home Finance Accelerator	Due to be launched in Autumn 2022, the Green Home Finance Accelerator (NZIP-GHFA) programme aims to drive innovation in the green lending market and support the establishment of a diverse range of green finance products which incentivise domestic energy performance improvements for both owner-occupiers and private landlords. The NZIP-GHFA programme will provide up to £10 million grant funding to support UK retail lenders to design, develop and pilot a range of finance propositions which encourage domestic energy and low-carbon heating retrofits.
Heat Pump Investment Accelerator Competition	In April 2022, the government announced a £30 million Heat Pump Investment Accelerator Competition as part of the British Energy Security Strategy. The competition is due to be launched later in 2022 and will accelerate the production of heat pumps.
VAT Reduction on Energy Saving Materials	In the Spring Statement 2022, the government announced the introduction of a temporary zero rate VAT for energy saving materials in Great Britain from 1 April 2022 until 31 March 2027. A number of complex eligibility conditions were also permanently removed. It is currently envisaged that the five per cent reduced rate will be reintroduced with effect from 1 April 2027. The zero-rate VAT applies to several retrofitting options including draught-proof measures, insulation, solar panels, and heat pumps.
Optimised Retrofit Programme	The Optimised Retrofit Programme (ORP) is a whole house, pragmatic, approach to decarbonising existing homes for 2020 – 2022. ORP enables homes to be assessed in significant detail through a digital Whole Home Survey. A 'Pathways to Zero' digital tool identifies all viable measures and suggests an appropriate sequence for the improvements to be made in a 'home passport' for the property. It is open to registered social landlords and local authorities to retrofit social housing in Wales for 2020-2022 and intends to improve the energy efficiency of more than 1,724 homes ³¹ .

G. DECARBONISATION STRATEGIES IN THE DEVOLVED NATIONS

Wales

Wales has a Net Zero target of 2050, which is set in legislation alongside a series of five-yearly Carbon Budgets. In October 2021, the Welsh government published Net Zero Wales which set out 123 policies and proposals to enable Wales to meet its second carbon budget (2021-25), including several policies in respect of domestic buildings:

- By 2025, 148,000 houses across Wales should have received retrofit measures to reduce heat loss
- By 2025, the proportion of heat that is electrified should increase by three per cent
- By 2025, all new affordable homes in Wales will be built to net zero carbon

In addition, the Welsh Housing Quality Standards (WHQS), due for release in 2023, is expected to take a fabric-first approach to improving the quality of social homes in Wales, including energy efficiency. The WHQS 2023 draft is currently out for consultation and includes a proposal for all social housing to achieve EPC A (or equivalent) by 2033.

Scotland

The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 has committed Scotland to Net Zero emissions by 2045, including an interim target of a 75 per cent reduction in emissions by 2030.

In October 2021, the Scottish government released the Heat in Buildings Strategy, which increased ambitions for the decarbonisation of the housing sector and set the following targets:

- The majority of homes to achieve EPC band C by 2030, with all homes meeting at least this standard by 2033 where feasible and cost-effective.
- All fuel poor households should achieve an energy efficiency rating equivalent to EPC C by 2030 and equivalent to EPC B by 2040.

³¹ <https://www.optimised-retrofit.wales/>

- From 2025, regulations will be introduced requiring all private rented sector properties to reach a minimum standard equivalent to EPC C by 2025 where technically feasible and cost-effective, at change of tenancy, with a backstop of 2028 for all remaining existing properties.
- From 2023-25, regulations will require domestic owner-occupied buildings to meet EPC C by 2033.
- All social housing to meet, or be treated as meeting, EPC B, or be as energy efficient as practically possible, by the end of December 2032.

Northern Ireland

Northern Ireland first passed a Climate Change Bill in 2022, committing to Net Zero gas emissions by 2050. However, this is deemed to be an ambitious target, given that the CCC only recommended an ambition of an 82 per cent reduction by 2050³².

In January 2022, an 'Energy Strategy – Path to Net Zero Energy – Action Plan' was released, which detailed 22 actions to be taken to reduce Northern Ireland's emissions in 2022, including actions relating to the domestic property sector. It is noted that the details of these schemes have not been released yet:

- Launch a domestic energy efficiency scheme
- Establish minimum energy efficiency standards in the domestic private rented sector
- Develop and commence delivery of low-carbon heat demonstrator projects (including for homes).

³² <https://www.theccc.org.uk/publication/letter-northern-irelands-climate-change-bill/>

H. INTERNATIONAL COMPARISONS

In our analysis we have reviewed different successful approaches to retrofitting used across Europe, to understand how they have retrofitted their diverse housing stocks and where similar approaches could be brought to the UK.

Germany

The KfW is the German Development bank, in 2014 the bank committed €47.6 billion for domestic housing and environmental investment. The KfW provides funding to homeowners through a combined grant and loan, giving a funds of up to €120,000 of which up to 50 per cent can be given as a grant and the remainder a loan. Since inception 15 years ago the programme has retrofitted six million homes.

- Energy rating: After understanding the property type and fabric the KfW gives homeowners a baseline for expected energy use of a property.
- Renovation loans: are flexible on what homeowners can use it towards, however the size of the loan and grant proportion relates to how efficient the house will be compared to the baseline rating - a 60 per cent reduction providing the highest loan and grant.
- Funding process: Homeowners apply for loans with their financial provider who provide the loan which is backed by the KfW.
- Technology grants: the KfW offers loans/ grant for individual technologies for a range of technologies including heat pumps, insulation and solar thermal with grants of 35 per cent, 20 per cent and 30 per cent respectively.
- Roadmap: The KfW offers an additional five per cent grant if homeowners create a transition roadmap and complete it within 15 years.
- Government return on investment: It has been estimated that the cost to the government has been offset by the increase in taxes from the six million jobs created and the extra VAT created from investment spending on the programmes.

KfW provides a framework for how the government could collaborate with finance providers to offer combined grants and competitive loans. However, unlike the KfW the UK has a smaller development fund of only £22 billion in total to lend. Additionally, the KfW loans do not support those that cannot afford debt so this programme would need to be used in combination with other means tested programmes.

Case study 1: Energiesprong

The Dutch programme of Energiesprong retrofits existing buildings to Net Zero. The program uses five criteria: 1. Performance guaranteed for 30 years; 2. Implementation possible in less than one week; 3. Affordability through energy savings and reduced maintenance costs; 4. Attractive design with upgraded features; 5. Procuring is based on purchasing housing concepts instead of detailed specifications and drawings.

Key features:

- Stroomversnelling: is a network originating within Energiesprong, facilitating collaboration between all involved stakeholders. The network consists of housing providers, contractors, component suppliers, financiers and other parties. It aims to reduce prices, increase demand & the momentum of growth of the net zero housing market.
- Funding: The programme is funded through energy savings; residents pay the same price as a utility bill which is used to pay off the retrofit. The programme seeks a 30-year payback.
- Technology: shell panels, solar panels, windows and insulation. Retrofits are prefabricated where possible, allowing for fast implementation.
- UK expansion: From 2016, UK Energiesprong was applied to social housing to create initial volume and develop solutions for the UK market. Housing companies finance retrofits by combining energy savings for tenants and repairs and maintenance saving. Tenants pay housing associations an energy service plan to pay back the initial investment costs.

The Energiesprong approach was created to minimise the transition risks for the homeowner, this includes provides a clear and equitable financing system for the homeowner. Energiesprong UK estimate the scheme could be rolled out to 11 million UK homes.

Case study 2: Superbonus

In 2020 the Italian government created the Superbonus scheme in which homeowners were entitled to a grant of up to 110 per cent on the cost of upgrading their home to be energy efficient and earthquake proof. In June 2022 the government froze the scheme as the budget for the scheme had been surpassed. It is estimated that €4 billion of the money was lost to fraud. The programme was also criticised as it is believed most of the beneficiaries were wealthy enough to afford the retrofits and did not require government grants.

Key features:

- Impact: The Italian council of engineers have estimated that the programme led to a 0.7 per cent increase in GDP and created 153,000 jobs.
- Funding system: Homeowners could claim by deducting the costs from tax returns or pass the onus to the contractor to either deduct from taxes or sell the credit to bank, who were refunded by the government.
- Government funding: The Italian treasury estimates the entire program would cost €33 billion, however as of May 2022 the programme had spent €33.7 billion leading to the scheme being frozen.
- Technology: The funding allows a range of technologies and has been criticised for also including natural gas boilers.

The scheme shows that homeowners are willing to retrofit when given enough incentive, however this method would be costly for the government, and the government needs to ensure that programmes are designed to ensure that funds are spent correctly, and that funds are going to those that cannot afford it. It also emphasises the importance of scaling up the supply chain to avoid the cost to retrofits increasing reducing the value and impact of any government funding.

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