

What policy changes are needed to deliver energy efficient homes across the UK?

The Government should set a clear policy for the transition of the built environment to net-zero by 2050, including a national retrofit programme to upgrade the UK housing stock to net zero levels for heating.

All new build properties should be designed, constructed, and operated to net zero insulation and heating standards. In addition, policy should:

- be consistent, long-term, clear, funded and with a commitment for cross-party unity at UK Government and Devolved Administration levels. This will increase confidence in industry and stimulate an increase in local (and export) production, reduce costs through economies of scale, boost jobs and skills, together with the local and national economies, and provide greater energy security and resilience.
- describe the desired outcome and how it should be measured, and allow for unexpected innovation, which will inevitably arise through technological developments.
- provide a joined-up approach linked with targets and realistic, consistent delivery plans at local and national levels.
- provide consumer financial incentives to invest in energy efficiency measures, such as 'heat as a service'.
- allow for the wider use of modern methods of construction that eliminate rework and snagging.
- ensure guaranteed low carbon performance standards with reduced costs for the user backed by insurance products.

The housing strategy should support the integration of individual buildings into the energy grid through local micro-grids and peer-to-peer energy trading.

An overarching principle of any scaling up in the supply chain needs to be down scalable so that a homeowner can take advantage of the solution that suits them best in eliminating carbon from their heating.

These measures are needed now, backed by support for upskilling and reskilling development measures in industry and education establishments so that a take-up in demand can be met by an adequate supply of skilled operators.

The [Institution of Engineering and Technology's](#) published [Decarbonising the Built Environment: a guide for decision makers](#) in April 2023. Our overarching recommendation is to:

Develop new relationships and understanding between the built environment groups involved in creating, using, and disposing of buildings. If they were to improve their leadership role, trade and professional organisations could play a key part in fostering a fresh decarbonisation approach to structures. Government, innovation funders and the education base should support them.

What are the key factors contributing to the under-delivery of the UK's government-backed retrofit schemes?

- Government long-term commitment, as per Q1.
- Familiarity with traditional forms of heating combined with a general concern about the cost, disruption and energy efficiency benefits of Net Zero measures.
- The lack of an integrated systems approach in the construction industry when compared with other industries such as energy or motor vehicles.
- The UK has the core technologies for full decarbonisation, but it needs collaborative knowledge transfer, more designers, engineers and installers with upgraded, multi-disciplinary green skills and a knowledge of how technologies go together in a holistic approach.
- There needs to be a focus on upskilling and retraining for the green economy within local business in partnership with universities and colleges to reflect local requirements and meet salary expectations. 80% of the current 1.3 million workforce will still be active in at the end of this decade.
- The lack of a supportive regulatory environment for energy efficiency improvements for simple consumer protection.
- Planning laws should have a default position in favour of net zero developments.
- Eliminate 'value engineering' that compromises the design intention, the ambitions of clients and homeowners.
- Schemes that are limited in volume, timescale, size, funding or with inflexible criteria reduce the motivation of industry to invest long-term in technological developments and production.
- Local government / industry needs longer-term procurement processes to stimulate innovation and shared risk-taking, rather than current competitive, start-stop processes that are unnecessarily time and finance consuming.
- There isn't a simple, streamlined, trustworthy and reliable one-stop-shop approach to give consumers the necessary awareness, confidence, and pathway to find qualified installers and understand the benefits of energy efficiency improvements, with mandated and enforced industry standards so as to eliminate rogue traders.
- Policy is not helped by the perception that the cost accrues to the individual, but the benefits to society.
- Limited awareness by local authorities over how to operate schemes to best effect.

Which standards and assessment frameworks are needed to deliver a reliable, skilled workforce capable of transitioning UK homes to modern heating solutions?

Legislation

Building regulations are minimum standards for design, construction, and alterations to virtually every UK building: Building Act 1984 (England and Wales), the Building Regulations (Northern Ireland) 2012, the Building (Scotland) Act 2003.

The Building Safety Act 2022 creates a clear, framework for the design, construction, and management of safer, high-quality homes though it doesn't focus on Net-Zero requirements.

Standards

The ISO 19650 standard, published by BSi is an international standard for managing information over the whole life cycle of a built asset using building information modelling (BIM) i.e. the design construction and management of a building.

The IET co-publishes a standard with the BSi, BS7671, also known as the Wiring Regulations, which covers electrical installation.

Best Practice

Best practice is encouraged and measured by BREEAM, LEED, NABERS UK and Passivhaus, all of which provide both a strategic approach to and certification of projects for newbuilds.

Soft Landings is a framework to ensure that the development of a building continues through the handover phase and assures good performance.

The measurement of carbon and energy efficiency should be a requirement in the design of new build properties so as to avoid unnecessary future retrofit with scarce resources.

Retrofit

The PAS 2035 guidance for domestic retrofit and PAS 2038 guidance for non-domestic buildings offer an end-to-end framework for the application of energy, insulation, and other retrofit measures to existing UK buildings. This provides a best practice implementation standard to reduce carbon to zero carbon levels.

Since 80% of the buildings standing today will still be in use in 2050 retrofitting existing buildings to these standards is essential for a net-zero transition.

Planning

The planning system plays a major part in shaping our built environment and has the potential to be a blocker or an enabler. National and local government deliver strategic and tactical roles across multiple policy areas, such as housing, highways, regeneration, environmental management, infrastructure, and managing land-use. They provide a decision-making structure within which acceptable development can take place. A full review of how the planning system can support the NetZero agenda by default is required as a matter of urgency.

Other institutions

All the institutions below drive best practice in their own areas of expertise. They need to be encouraged and supported by regulation to collaborate more on the development and application of cross-sector delivery and skills:

British Association of Landscape Industries Fenestration Self-Assessment Scheme	National House Building Council
Federation of Master Builders	NICOIEC
Gas Safe Register	Royal Institute of British Architects
Home Builders Federation	Royal Town Planning Institute
Institute of Civil Engineers	The Arboricultural Association
LABC	The Planning Portal
Landscape Institute	Town and Country Planning Association
National Federation of Demolition Contractors	

How might the Government support innovation in delivering local solutions?

Consistent, long-term, cross-party policy is needed that takes account of local needs, but is not dictated by minority views that hinder green developments. The onshore wind situation is a clear example where industry confidence for investment in value for money schemes has been severely damaged.

There’s a shortage of funding for development costs pre-Final Investment Decision, including feasibility and screening activities since private finance is less willing to fund without a tangible outcome. This is a potential barrier to low carbon development and an area where

Government support can enhance innovation by reducing industry financial risks.

What role should customer choice play in the future planning of energy networks for home heating?

Consumer awareness and involvement in decision-making are key factors in increasing the take-up of energy efficient options. This is essential given the current lack of public knowledge about reliable and quality home heating options, as discussed under Q2. Given high energy bills customers are increasingly demanding more control over their energy consumption and sustainable heating options.

A significant problem in raising consumer confidence is the dissemination of conflicting information that often lacks credibility and may be communicated for political / commercial gain. The provision of impartial, streamlined responsive details that inform consumer choice is a clear way of enhancing buy-in.

We believe that:

- consumers will seek the 'instant response' of current systems. A gas boiler responds rapidly to heat a radiator to the required temperature, and at a higher temperature than a heat pump.
- improved performance and smart controls are needed to increase attractiveness.
- cost and the payback period for benefits are clear factors for consumers.

Does the current state of consumer protections for low-carbon home technologies represent a barrier to uptake of these products?

Consumers are protected in terms of the product safety and liability legislation. However, the lack of clarity and consistency in the regulations governing products and the companies installing them diminishes consumer confidence and act as a barrier to uptake.

A lack of a one stop shop, and a regulatory framework makes it difficult for consumers to understand and have confidence in the standards / performance and their rights, how to find a qualified installer and how to get redress for issues where necessary.

Independent organisations that provide warranties and insurance for new build homes, have been proven to provide insufficient support to new-build new homeowners when homes are not performing as promised or poor construction practices are identified.

The provision of the role of Retrofit Coordinator is a recent, positive development under PAS2030/ 2035. This should provide better protection and confidence in net-zero construction for home and building owners in future. However, the Government has a role in ensuring greater public awareness about this.

How will the public be able to afford the switch to decarbonised heating?

Switching to decarbonised heating is costly.

Government needs to make it easier for people to access finance at reasonable rates and yet avoid repeating the failings of past models such as the Boiler Upgrade Scheme and the Green Homes Grant which didn't gain traction with the public due to a lack of financial incentives and a lack of public awareness.

In essence, servitisation moves from a product selling business model to an approach around selling services. It is used to instil consumer confidence by avoiding large upfront costs, whilst offering convenience, long-term control and a guaranteed level of service.

It's a concept that has been proven to work in various industries. For some years jet engine manufacturing has offered a service package whereby airlines pay by the hour according to the amount of time an engine is in flight. Netflix and Spotify deliver media as a service. Octopus Energy has launched a salary sacrifice scheme for employers to support their employees in driving electric vehicles. Audi have arranged for their customers to have access to a smart Energy tariff from Octopus Energy. There are many more examples.

Recently the Energy Systems Catapult conducted consumer trials of 'heat-as-a-service'. The concept was based on the way mobile phone contracts work. Consumers pay for a certain base level of comfort for a fixed fee, with additional 'bolt on' services available if required. The model was attractive to consumers because they could understand what they were buying - a certain guaranteed level of comfort as opposed to kilowatt hours. Comfort is the overriding benefit that consumers want when purchasing space and water heating.

Servitisation has its challenges - it needs new business models, organisational structures that will manage delivery risk, guarantee service levels, and fundamentally it needs to be assured by an overarching robust regulatory and financial framework, overseen by Ofgem or a similar body, to instil confidence and protect consumers from mis-selling schemes. These are not insurmountable and may act as a catalyst for demand, which in turn will incentivise industry investment in skills, production, and supply chains.

We recommend that Government focuses effort on developing the 'heat as a service' concept, establishing a forum that includes energy companies, corporate and consumer finance companies, homeowners, and the social housing sector with a view to developing and implementing servitisation simply, at scale and at attractive consumer subscription rates.

How will decarbonisation plans be drawn up in each area?

The UK lacks a clear and consistent process for delivering credible, coordinated planning at local, regional and national levels. In the UK, 300 councils and 8 combined authorities / city regions have announced a climate emergency. These represents 90% of the population.

The challenge is about implementing sustainability plans. Authorities are challenged by restrictive planning rules and other regulatory processes, which remain key barriers to deploying low-carbon infrastructure home improvements such as heat pumps. The default approach should be for planning decisions to permit Net-Zero developments.

We recommend a revised planning regime that adopts the values espoused by the World Green Building Council:

- Prevent – use good planning and design to avoid or minimise construction.
- Reduce and optimise – minimise the use of virgin materials, prioritise low carbon options, and choose low carbon construction techniques which minimise waste.
- Plan for the future – extend the life of the building by designing in flexibility.
- Design for recycling.
- Offset – as a last resort offset residual embodied carbon emissions.

New planning rules should:

- Provide clearer guidance on assessing carbon impacts, measuring environmental outcomes and evidence requirements for climate considerations in the definition of 'sustainability'.
- Develop new business models that are appropriately regulated by Government.
- Support the deployment of low-carbon heat, ensuring that strategic decisions align with the wider energy security and energy priority needs of other sectors

- across the UK.
- Assess whole-life carbon and material use of all construction projects – embodied and operational.
- Take account of energy infrastructure requirements that are expected to grow exponentially in the years leading up to 2050.

Do the current EPC frameworks help consumers make informed decisions on transition?

The EPC framework is intended to help consumers understand the energy efficiency of properties and make informed decisions about improving energy efficiency. The Standard Assessment Procedure (SAP) is the calculation methodology behind it.

However, the current EPC framework needs radical reform as it currently provides misleading information to homeowners. The information presented does not accurately reflect a building's performance. For example, two properties with the same EPC rating may have very different energy bills after adjusting for the lifestyle of occupants. Ratings can be difficult to interpret for a homeowner, and the information about potential savings is often not very clear.

If the EPC framework is to continue the following minimum adjustments should be made:

- The SAP model needs to be made more comprehensive by building in factors such as property age, the heating system in use (including new technologies) and the levels of insulation.
- It needs to be easier for consumers to understand e.g., by simplifying ratings and providing clear and concise information about potential savings.
- It should be more accessible for consumers, making it easier to find and access ratings. We suggest an online capability to view and do some simple 'what if' modelling on certain improvements e.g., what if I replace windows, or upgrade ceiling insulation, or install a heat pump etc.

Do standards need to differ for different types of housing?

Standards are used throughout building construction.

However, the application of standards differs according to type. Local and national planning regimes will prescribe appropriate variations to the application of building standards based on building archetypes for deep retrofit or new builds. For example, although badly insulated windows or doors will lower a building's performance, it may not be permitted to replace wooden sash windows with PVC double glazing in the UK.

Standards may need to differ to ensure properties are comfortable and energy efficient. Older homes are often less energy efficient than newer ones because they may not have been built to the same standards or updated with energy efficiency measures. Homes in colder regions may require more energy for heating than homes in warmer areas.

What is the role of different levels of government in developing, funding and implementing schemes?

The roles of UK national and local government in developing, funding and implementing schemes vary depending on the specific scheme.

National government sets long-term policy and strategy including targets, providing a level of funding for priorities. This must be cross party, 'for the good of the country' and continue beyond the next election.

Local government should be provided with a stable, hopefully also long-term platform on which to implement schemes, at a tactical level, working with businesses, academia and communities to tailor schemes to local needs. Within funding / regulatory limits local government may have the flexibility to adapt delivery to ensure successful outcomes.

About the IET

The Institution of Engineering and Technology (IET) is one of the world's largest engineering institutions with over 158,000 members in 150 countries. Our aim is to inspire, inform and influence the global engineering communities to engineer a better world. We are a diverse home across engineering and technology; and share knowledge to tackle global challenges like climate change. The IET provides independent, impartial, evidence-based expert advice across multiple sectors including Energy, the Built Environment, Innovation and Skills, Digital and Transport. With our roots in electrical engineering, we have been championing engineering solutions and the people who deliver them for over 150 years.

The Institution of Engineering and Technology
Futures Place
Kings Way
Stevenage
SG1 2UA