

The Future of **Energy**

Reducing emissions from buildings

April 2019



► Reducing emissions from buildings

Executive summary

To achieve the aim of reducing emissions from domestic and non-domestic buildings, major progress will need to be made in two key areas.

We discuss these below: in Part A we focus on the need for greater efficiency and quality of buildings, while Part B looks at reducing carbon emissions produced when heating and cooling our homes and businesses.

Approximately 90% of households and 70% of non-domestic properties rely on carbon-based fuels for heating²⁸, with natural gas being the most common fuel source. Providing heating and hot water accounts for around 30% of the UK's total greenhouse gas emissions²⁹, and we need to achieve steep reductions in carbon-based heating to meet the UK's emissions targets.

Although there are several promising replacement technologies, such as electric heat-pumps and hydrogen-based systems, it is likely that alternative solutions will cost more in the short term than carbon-based sources used today. Therefore, a key component in decarbonising heat lies in the energy efficiency of buildings. For new heating technologies to be attractive and affordable on a large scale, our buildings must make the best use of the energy they consume.

Energy efficiency can also play a leading role in ensuring that some of today's overall demand for electricity can be redeployed in future to support the uptake of electric heating and transport. This will reduce the need to build additional generation and network capacity.

Each area is a major task in itself, so we have dedicated separate sections to set out the regulations, incentives and funding needed to drive the uptake of energy efficiency measures and low carbon heat respectively.

“Energy efficiency can also play a leading role in ensuring that some of today’s overall demand for electricity can be redeployed in future to support the uptake of electric heating and transport.”

²⁸https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/244735/4_estimates_of_heat_use_in_the_uk_2012.pdf

²⁹<https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-2017>

► Part A



Improving energy efficiency in domestic and non-domestic buildings





Key points:

- **There are significant economic, environmental, comfort and health benefits to be gained from making energy efficiency improvements. Funding levels for energy efficiency are not sufficient to meet the goals set out in the Clean Growth Strategy, England's Fuel Poverty Strategy or the 2050 emissions targets.**
- **Strong regulations are needed to drive action, such as minimum property standards, along with incentives to support a private market for energy efficiency and public funding for fuel poor households.**

Below, we consider:

- The impact of the current policy framework on energy efficiency,
- The challenges to stimulating a wider market for energy efficiency and customer adoption,
- How to encourage customer demand in energy efficiency to deliver action.

The consumer benefits from energy efficiency are clear. There is an immediate improvement to comfort levels, energy costs reduce in the short term and, over the longer-term, households and businesses are insulated from future energy price shocks. There are also demonstrated health benefits to customers living in warmer, drier houses that also result in reduced pressure on the health system and increased productivity through fewer sick days from work or education.

Over the past three decades, numerous pieces of research have pointed to the importance of energy efficiency and the action needed to drive progress. The market for energy efficiency outside of supplier obligations has, however, remained limited. Further action is needed to drive progress across all sectors. Without it, it is unlikely Great Britain (GB) will be able to meet its targets in alleviating fuel poverty and reducing carbon emissions.

Action is needed across four areas:

- a strong government commitment to building a sustainable market for energy efficiency, through ambitious timebound regulations on both domestic and non-domestic buildings, as well as new builds.
- a sustainable private market for energy efficiency, that drives demand for energy efficiency across households and businesses and encourages regulatory compliance ahead of time. This needs to include a robust quality and standards framework to engender trust and confidence, as well as incentives, better information to make uptake easier and more attractive.
- support for innovation to develop new energy efficiency measures and installation methods, to drive improvements over and above more established methods.
- Government-funded support for those in fuel poverty and less able to pay for energy efficiency improvements, through a national energy efficiency scheme.

Emerging thinking and potential solutions



No.	Opportunity	Forward direction	Potential solution
1	There is an opportunity to increase the demand for energy efficiency products.	The Government to stimulate the market by introducing strong regulations on domestic and non-domestic properties to improve the energy efficiency ratings of their buildings	To sell or rent a domestic or non-domestic property after 2030 (or by 2035 at the latest), it should be required to meet an EPC Band C or higher. This is subject to reasonable exceptions, such as listed buildings and practical limitations.
2	Strengthened minimum standards would support energy efficiency in the non-domestic sector.	Encourage action through incentives and regulation to improve energy efficiency in the non-domestic sector.	The Government should: <ul style="list-style-type: none"> strengthen and extend mandatory public reporting require that all businesses act on their Energy Savings Opportunity Scheme (ESOS) report, where reasonable and practicable, and where there is a payback period of less than 18 months. limit policy cost exemptions where an ESOS report identifies cost-effective energy efficiency savings.
3	Public trust and confidence in the quality of energy efficiency measures is crucial to increase uptake.	A strengthened accreditation and certification framework, supported by high-quality monitoring and effective compliance enforcement, needs to be in place as soon as practically possible for all energy efficiency installations. This has to be balanced with cost implications on installations.	The Each Home Counts recommendations should be implemented in full. Similar recommendations could be considered for non-domestic buildings.
4	Greater incentives would encourage building owners to invest in energy efficiency, and support a pathway to comply with strengthened minimum standards.	A market should be stimulated throughout the 2020s, ahead of banning the sale or rental of any property below EPC Band C.	Greater use should be made of the tax system (for example, VAT and stamp duty in the domestic sector and through business rates) to help drive improvements in energy efficiency, and to support the delivery of the proposed ban in the sale or rental of buildings below EPC Band C.
5	Better information would set out a clear path for building owners to improve their efficiency.	Improved information on opportunities for efficiency improvements will support compliance with minimum efficiency standards.	Green building passports should be introduced by 2020 to provide commercial building owners with useful information to improve energy efficiency over time. The Government should also explore approaches such as Design for Performance for larger buildings.

No.	Opportunity	Forward direction	Potential solution
6	Improved access to capital would make it easier to fund energy efficiency improvements.	New ways for households and businesses to access capital for energy efficiency improvements.	The Government should work with the finance industry to support the development of new financial products and services, such as Green Mortgages.
7	There are opportunities in new technologies and installation measures to see greater energy efficiency gains.	Support for innovation in energy efficiency to foster new technologies to help meet targets.	A well-functioning private market for energy efficiency should encourage innovative measures. However, the Government needs to ensure it provides adequate support, financial or otherwise, for research and development of new technologies and innovative approaches.
8	Households on low incomes and that are vulnerable to fuel poverty need support to improve their energy efficiency.	Direct subsidies should not be needed in the able-to-pay market, but they will still be needed for vulnerable and fuel poor households.	The Government should develop a centrally funded national energy efficiency scheme to support households in or at risk of fuel poverty. The scheme should make use of best practice to develop solutions tailored to different areas, customers, measure types and funding arrangements.
9	Designing energy efficiency into new builds means buildings will not need further retrofitting in the future.	The Government should review the regulations for energy efficiency standards of new-build properties.	Government should ensure that new buildings are not being constructed with carbon-intensive materials, or to a standard that they would require retrofitting to meet long-term carbon emission and fuel-poverty targets.



Opportunities and challenges

Key points:



- **Energy efficiency is a key component of GB meeting both its carbon and fuel poverty targets.**
- **Consumers benefit from energy efficiency through more comfortable and healthy homes.**
- **There are significant economic benefits in improving energy efficiency.**
- **Driving demand for energy efficiency faces challenges, from low customer interest and financial barriers, to quality improvements and the need for new technologies.**

The opportunity of energy efficiency in GB

Benefits of energy efficiency

All sectors of the British economy will contribute to meeting our 2050 emissions reductions targets. The need for domestic and non-domestic customers to embrace energy efficiency is critical to the UK's decarbonisation efforts. Energy efficiency also delivers clear consumer and societal benefits³⁰. It brings an immediate improvement to comfort levels, energy costs reduce in the short-term, and over the longer-term households and businesses are, in every sense, insulated from future energy price shocks. There are also demonstrable health benefits to living in warmer, drier houses, which in turn ripple outwards in the form of reducing demand on health services, and higher productivity.³¹

For businesses and industry, which account for 25% of the UK's carbon emissions, it is estimated that a 20% improvement in energy productivity by 2030 could deliver up to £6 billion in cost savings and reduce carbon emissions by 22MtCO_{2e} in the fifth carbon budget (2028-2032)³². Improving efficiency in the industrial sector is also critical for the longer-term 2050 carbon saving ambitions³³. This will, however, require improvements to the energy efficiency of industrial processes, as well as buildings.

The potential benefits to the economy are also significant. In their October 2014 report 'Building the Future: The Economic and Fiscal impacts of making homes energy efficient', Verco and Cambridge Econometrics estimated that upgrading all homes to at least EPC band C by 2035 could result in a £3.20 increase in GDP for every £1 invested by the Government.³⁴ For businesses, the International Energy Agency has found that productivity and operational benefits flowing from energy efficiency can be up to 2.5 times the value of the energy saved.³⁵

In addition, energy efficiency can be seen as an infrastructure improvement. Improved energy efficiency in buildings frees up energy for other uses, just as increased investment in generation and network capacity would³⁶. Research indicates that a 25% reduction in domestic energy use could be achieved through existing low-cost measures alone, and would save the equivalent amount of energy to that produced by six nuclear power stations the size of Hinkley Point C – and deliver average bill savings of £270 per year.³⁷ This energy could instead help to meet the substantial need for electricity to support decarbonisation in other areas, such as transport and heating.

³⁰Committee on Climate Change (2017), 2017 Report to Parliament – Meeting Carbon Budgets: Closing the policy gap, <https://www.theccc.org.uk/publication/2017-report-to-parliament-meeting-carbon-budgets-closing-the-policy-gap/>

³¹International Energy Agency (2015), Capturing the Multiple Benefits of Energy Efficiency, <https://webstore.iea.org/capturing-the-multiple-benefits-of-energy-efficiency>

³²BEIS (2017), The Clean Growth Strategy: Leading the way to a low carbon future, <https://www.gov.uk/government/publications/clean-growth-strategy>

³³Reducing greenhouse gas emissions by 80% compared to 1990 levels by 2050

³⁴Verco, Cambridge Economics (2014), Building the Future: The economic and fiscal impacts of making homes energy efficient, <https://www.sustainableenergyassociation.com/resources/684/>

³⁵IEA (2014) Capturing the Multiple Benefits of Energy Efficiency: A Guide to Quantifying the Value Added, <http://www.oecd.org/publications/multiple-benefits-of-energy-efficiency-9789264220720-en.htm>

³⁶Frontier Economics (2015), Energy Efficiency: An infrastructure priority, <http://www.frontier-economics.com/uk/en/news-and-articles/articles/article-i4966-energy-efficiency-an-infrastructure-priority/>

³⁷UK Energy Research Centre, Centre on Innovation and Energy Demand (2017), Unlocking Britain's First Fuel: The potential for energy savings in UK housing, <http://www.ukerc.ac.uk/publications/unlocking-britains-first-fuel-energy-savings-in-uk-housing.html>

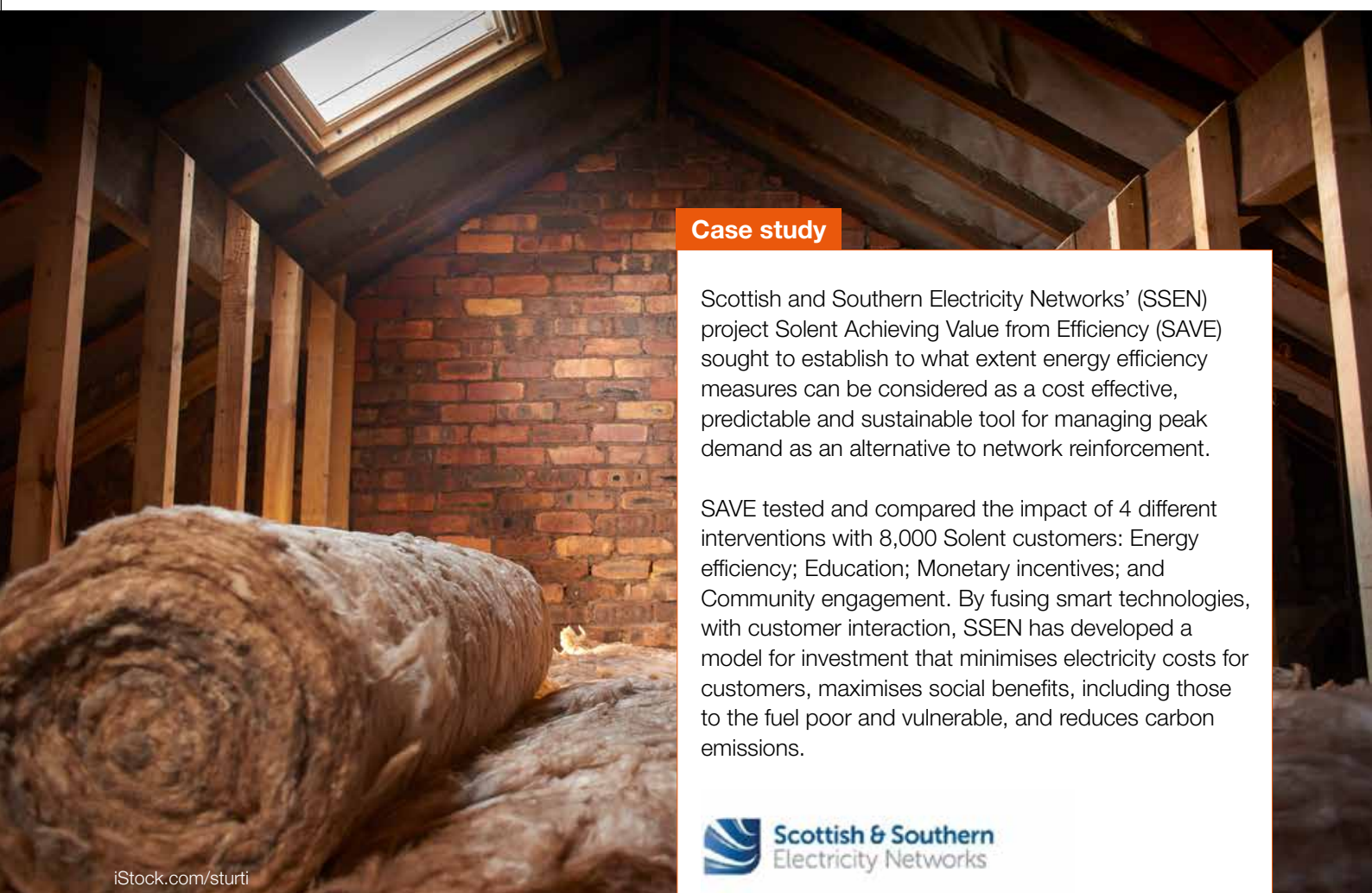
Progress to date

The positive action to date, supported by government policy, has delivered remarkable gains.

Since 2000, domestic energy consumption in the UK has fallen by 14%, despite a 15% increase in households, greater electrification, economic growth and a 12% increase in the population. By 2015, domestic energy bills were on average £490 lower than they would otherwise have been, due to energy efficiency improvements since 2004.

Progress in energy efficiency has been remarkable

In 2016, 83% of homes had double-glazed windows throughout, compared to 9.5% in 1983. In 1976, just 3.9% of homes had cavity wall insulation, compared to 69% in 2016. Also, in 1976, 87% of households had a hot water tank and 76% of these were insulated. In 2012, half of all homes had combination or condensing boilers, and 99% of remaining hot water tanks were insulated. The majority of homes now have loft insulation installed, and 68% of households have insulation of 125mm or more.



Case study

Scottish and Southern Electricity Networks' (SSEN) project Solent Achieving Value from Efficiency (SAVE) sought to establish to what extent energy efficiency measures can be considered as a cost effective, predictable and sustainable tool for managing peak demand as an alternative to network reinforcement.

SAVE tested and compared the impact of 4 different interventions with 8,000 Solent customers: Energy efficiency; Education; Monetary incentives; and Community engagement. By fusing smart technologies, with customer interaction, SSEN has developed a model for investment that minimises electricity costs for customers, maximises social benefits, including those to the fuel poor and vulnerable, and reduces carbon emissions.



iStock.com/sturti

³⁸BEIS (2018), Energy Consumption in the UK, <https://www.gov.uk/government/collections/energy-consumption-in-the-uk>

³⁹UK Energy Research Centre, Centre on Innovation and Energy Demand (2017), Unlocking Britain's First Fuel: The potential for energy savings in UK housing, <http://www.ukerc.ac.uk/publications/unlocking-britains-first-fuel-energy-savings-in-uk-housing.html>

However, the drivers for this reduction are many and complex. As noted in the UK Fact File 2013, “commentators have suggested that [reductions are] largely down to the increase in energy costs”.⁴⁰ Much of the progress to date has been focused on the ‘low hanging fruit’ - improved product standards and domestic improvements that are inexpensive and relatively straightforward to deliver.

But looking ahead to the 2050 carbon targets, there is still significant change needed to eliminate our dependence on carbon. For the first time since the introduction of the Climate Change Act in 2008, the UK is not on course to meet the fourth and fifth legally binding carbon budgets⁴¹. In 2017, direct emissions from buildings comprised 19% (83Mt) of total emissions in the UK, with the majority of this (64Mt) being from residential buildings.⁴² The Committee on Climate Change has indicated that a 3% reduction in emissions per year is needed to meet the 2050 target.

A recent International Panel on Climate Change (IPCC) report also stated the urgency required to address climate change targets, if global warming was to be kept to a maximum of 1.5°C.

It is clear that further improving the energy efficiency of GB’s building stock, both domestic and non-domestic, will be required to deliver the massive reductions in carbon emissions.

Headline indicators Including abatement from biomethane	2017 indicator (to be on track for 2030)	2017 outturn (actual) Temperature adjusted emissions, to show underlying trend
Reduce direct CO2 from buildings by 32% by 2030, from 1990 levels	-17%	-11%
24% reduction in direct CO2 from homes by 2030, from 1990 levels	-13%	-9%
58% reduction in direct CO2 from non-residential buildings by 2030, from 1990 levels	-27%	-16%

On-track and actual reductions, domestic and non-domestic sectors. Source: Committee on Climate Change 2018 Progress Report to Parliament

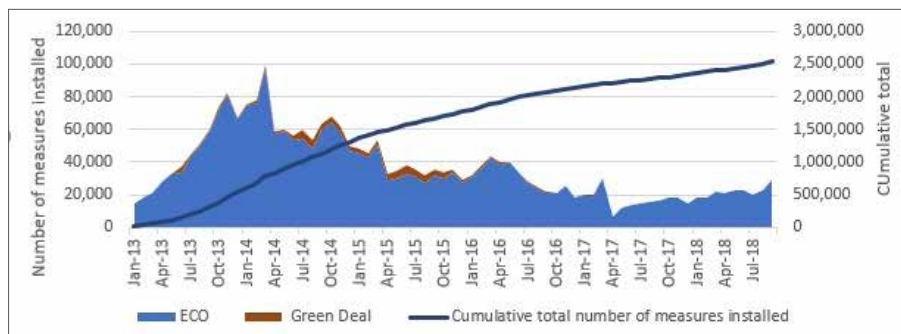
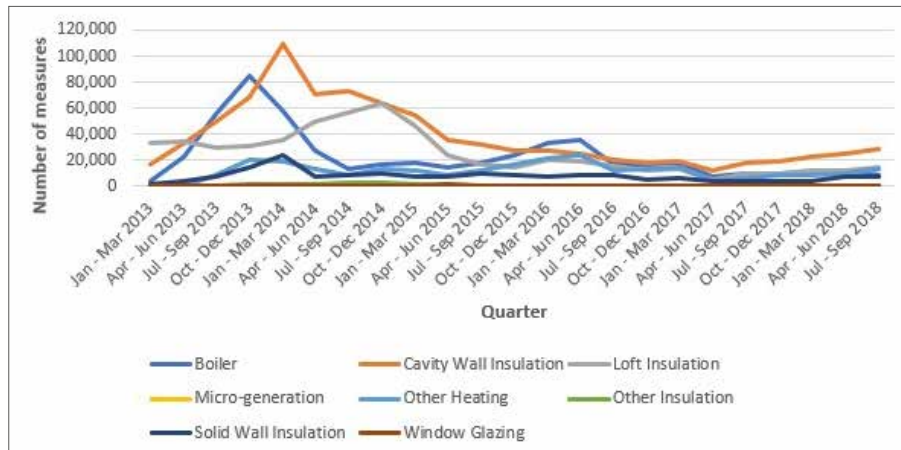
Compounding this issue, in recent years the levels of installation activity in the sector has declined significantly. For example, the number of measures installed under the Energy Companies Obligation (ECO) has reduced substantially since 2013 across all measure types, along with the total number of measures installed under ECO and the Green Deal.

“...In 2017, direct emissions from buildings comprised 19% (83Mt) of total emissions in the UK, with the majority of this (64Mt) being from residential buildings.”

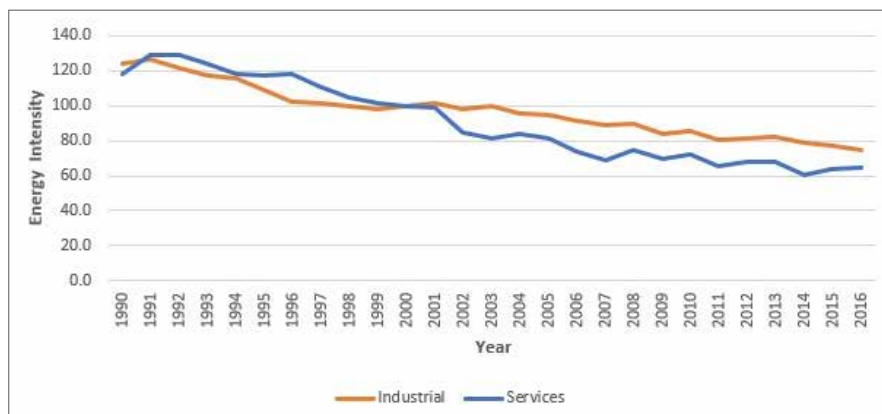
⁴⁰Department of Energy and Climate Change (2013), United Kingdom housing energy fact file, <https://www.gov.uk/government/statistics/united-kingdom-housing-energy-fact-file-2013>

⁴¹Committee on Climate Change (2018), How the UK is progressing, <https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/how-the-uk-is-progressing/>

⁴²CCC 2018 update <https://www.theccc.org.uk/publication/reducing-uk-emissions-2018-progress-report-to-parliament/>



Although direct energy efficiency data is not available for non-domestic buildings, energy intensity indicators suggest that reductions in energy use in the services sector (the commercial, agriculture and public administration sectors) and industrial sectors, as a proportion of output, have also slowed or stalled in recent years.



For new build homes, the Government committed in 2008 to a policy of zero-carbon homes, which would have gradually phased in stricter energy efficiency standards for new build homes by 2016. But this policy was cancelled in 2015. Recent research has estimated that yearly energy bills are £200 higher for owners of new build homes than they would have been if the policy was kept in place. The cumulative additional spend on energy in new build homes since 2015 is estimated at £120 million and is expected to rise to over £2 billion by 2020.⁴⁴

⁴³Industrial energy intensity is measured in consumption per unit output. Services energy intensity is measured in energy consumption per £1 million of Gross Value Added (2013 prices).

⁴⁴Energy and Climate Intelligence Unit (2019), Zero Carbon Homes: How owners of new homes are paying over the odds for energy, <https://eci.u.net/press-releases/2019/leaky-new-build-houses-put-200-on-energy-bills>

It is clear that significant action is needed to fill the policy gap for energy efficiency across the domestic and non-domestic sectors. A recent report by Frontier Economics on behalf of the Energy Efficiency Infrastructure Group (EEIG), examined the UK's aspiration for as many homes as possible to attain EPC band C by 2035 (where practical, reasonable and affordable). It found that to achieve this, a £4.5 billion per annum investment gap needs to be filled, from a combination of increased private and public funding.⁴⁵

In the non-domestic sector, the Government's Clean Growth Strategy targets to improve the energy efficiency of commercial and industrial buildings are laudable. However, the UK does not currently have a plan, or the policy instruments, to deliver the 20% increase in energy productivity by 2030.

Challenges

Further opportunities to improve energy efficiency through both the domestic and non-domestic space clearly exist. But we consider there are a number of challenges impeding progress.

Low customer interest in energy efficiency

Households and businesses are generally aware of energy efficiency. For example, BEIS research suggests that most households are aware of Energy Performance Certificates (EPCs)⁴⁶. The EPC was introduced in 2008 to help raise awareness of the energy efficiency of homes among homeowners and renters. Only a small proportion aren't aware of common energy efficiency measures such as cavity wall insulation, double glazing, solid wall insulation and underfloor insulation. But while awareness may be generally high, taking action is not. There is also evidence that awareness is less widespread about the regulatory instruments relating to energy efficiency.

In November 2018, the BEIS Public Attitudes Tracker showed that customers are generally unaware of the EPC rating of their property. Only 6% knew their exact rating, while 41% knew what an EPC was, but not their own score. Of those who could recall seeing an EPC, only 43% had made an improvement to their home.⁴⁷

The fact remains that households and businesses continue to place little value on energy efficiency. For households, there is a significant opportunity cost to installing unseen measures such as insulation, and it delivers limited impact on subsequent property values.

For businesses, energy efficiency is often not a top priority, especially at senior levels. Broadly speaking, and particularly in consumer facing-environments, core activities will take precedence especially when investment is required. The Government's 2012 Energy Efficiency Strategy noted that this was particularly prevalent where energy made up a small proportion of a business's total costs.⁴⁸ Also, many small to medium enterprises (SMEs) will simply not have the time to consider their energy usage and potential investments.

The installation of energy efficiency measures may also create a level of disruption for households and businesses. Some domestic measures, such as solid wall insulation, are particularly intrusive, and they can be even more challenging for businesses. Businesses may have to compromise or even shut down operations while retrofitting work is underway, presenting them with a bill over and above the cost of the measure itself. Inertia is, therefore, an issue for both households and businesses despite the best efforts of initiatives in recent years.

⁴⁶58% of respondents were aware of Energy Performance Certificates in the November BEIS Public Attitudes Tracker.

⁴⁷BEIS (2018) Public Attitudes Tracker: Wave 27, <https://www.gov.uk/government/collections/public-attitudes-tracking-survey#beis-public-attitudes-tracker-surveys>

⁴⁸Department of Energy and Climate Change (2012) – The Energy Efficiency Strategy: The Energy Efficiency Opportunities in the UK https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/65603/6928-the--energy-efficiency-strategy-statistical-strat.pdf

Public perceptions

In the able-to-pay sector, supplier obligations have hindered the market for energy efficiency measures. On the supply side they have caused the installation supply chain to rely heavily on subsidies through obligations, rather than developing more attractive products and finding ways to positively sell them to consumers. On the demand side, supplier obligations and other subsidised schemes have led consumers - regardless of income - to expect energy efficiency solutions for free, undermining their perceived value. Supplier obligations have, therefore, not had the desired effect of creating a functioning market for energy efficiency. Rather, they have created a dependency, leading to boom and bust cycles for supply chains.

To some extent, the wider debate around the retail energy market also confuses customers about the importance of energy efficiency. The primary message they're receiving is that their energy costs are out of their control, and the result of a malfunctioning market. The current political debate suggests that reducing energy costs is a political decision, absolving individuals of accountability in how they use energy and the efficiency of their homes. In turn, this does little to encourage the uptake of efficiency measures.

More needs to be done to make energy efficiency more attractive to the public. We believe that many consumers could be persuaded, with effective engagement, to pay for cost-effective energy efficiency measures.

Access to capital and large upfront costs

The Green Deal was right to recognise that the cost and availability of capital is a key barrier. It is a tough sell to ask consumers to invest in measures with a large upfront cost and, therefore, a long payback period. And tougher still if they see themselves moving house and not benefiting from the measures themselves. In addition, householders may not see a clear increase in the value of their property.

Although energy efficiency can be cheap, the success of cost-effective supplier obligations since 1994 means the remaining scope for energy efficiency in the domestic market is at the higher-cost end, with annual savings that are relatively modest.

Similarly, businesses of all sizes find that a lack of access to capital is a significant barrier. Even when capital is available, the proposition must also be attractive to make them want to invest it. In larger companies this will probably need board approval, with a clear demonstration of competitive benefits and payback periods.

“We believe that many consumers could be persuaded, with effective engagement, to pay for cost-effective energy efficiency measures.”

Misaligned incentives between landlords and tenants

Over 20 per cent of households live in private rented dwellings, and most businesses do not own their own premises, with multiple firms often sharing space. In both cases, this can mean the incentives to undertake energy efficiency retrofitting are misaligned, as the costs are borne by landlords, while the primary benefits in terms of lower energy bills are realised by tenants.

There are regulatory requirements on landlords to improve the energy efficiency of domestic and commercial buildings. However, these regulations:

- **provide significant leeway for exemption**, a view backed up by 56% of respondents to a recent survey⁴⁹
- **have insufficient enforcement and compliance**. The Committee on Climate Change (CCC) highlighted in their summer update a recent Environmental Industries Commission report suggesting that landlords are not making EPCs available in the first place and fines are not being issued for non-compliance⁵⁰
- **large industrial buildings are excluded**, covered instead by the EU Emissions Trading Scheme, and/or Climate Change Agreements.

Innovation

Compared to heat and transport, there is less R&D activity into new energy efficiency technologies for buildings. Although some recent initiatives are welcome, such as including innovation and demonstration measures in ECO3 and the BEIS Thermal Efficiency Fund, a gap remains unfilled, for deployable technologies at scale to push energy efficiency beyond what can be achieved with established measures.

The ability of households and businesses to install measures differs according to regional variations in the housing stock. The type of construction will have a direct impact on which measures are appropriate and desirable, and the associated cost. The BEIS public attitudes tracker reports that a significant proportion (25-36%) of householders that have not taken measures believe that traditional cavity, loft, underfloor or solid-wall insulation are not appropriate for their home.⁵¹

Buildings that aren't suited to the established measures are also likely to be more expensive to treat. For listed buildings and those in conservation areas there may also be legal barriers and societal concerns. Treating these properties is likely to require new measure types, or more cost-effective installation methods for existing measures.

In the non-domestic sector, it is likely that more bespoke and technically complex improvements will be needed to drive energy efficiency, due to the segmented nature of businesses in terms of size, type of premises and processes.



“Compared to heat and transport, there is less R&D activity into new energy efficiency technologies for buildings.”

⁴⁹EEVS insight and Bloomberg New Energy Finance (2017), Energy Efficiency Trends Report Vol. 21, <http://www.eevs.co.uk/pastreports.html>

⁵⁰(Q3 2017) Committee on Climate Change, Reducing UK emissions, 2018 Progress Report to Parliament, June 2018, <https://www.theccc.org.uk/publication/reducing-uk-emissions-2018-progress-report-to-parliament/>

Quality concerns

There is low public trust in energy efficiency. Policy failures seen to date have been exacerbated by a lack of industry-wide quality assurance. Customers need to be assured that any investment they make will result in high-quality installations and a positive customer journey.

According to the results of Ofgem's technical monitoring, 6.9% of the almost 1.5 million measures installed during ECO1 between January 2013 and March 2015 were inspected. They report that 9.9% of these measures did not meet the necessary installation standards and required additional work.⁵²

The issues around quality and standards led the Government to appoint Dr Peter Bonfield to undertake a thorough review of the retrofit industry in 2016. The final recommendations of his Each Home Counts review highlighted that broad reform was required:

"The myriad of schemes, brands, certification bodies and organisations operating across the energy efficiency and renewable energy sector give a confusing, even bewildering picture for the consumer. Who can the consumer trust?"⁵³

The quality of installations becomes even more important as the types of measures become more complex. A report by the Government's Chief Construction Adviser in 2015 estimated that around 3.5 million homes in the UK were suitable for solid wall insulation⁵⁴. This is generally a more technical measure than traditional insulation, requiring different skill sets and expertise. At the same time, proposed new standards for domestic retrofit works are moving towards whole-house approaches that involve multiple measures per installation.

The Hackitt Review of Building Regulations and Fire Safety that followed the Grenfell Tower tragedy also shone a light on quality failures in the regulatory system.

Developing solutions to increase uptake in energy efficiency measures

We continue to support the Government's targets to improve the energy efficiency ratings of households. But we're concerned that the correct policy and investment frameworks are not currently in place to meet them.

We believe a sustainable market for energy efficiency should be built on:

- strong regulatory requirements, as a foundation to improve energy efficiency and to drive demand
- incentives to encourage households and businesses to become more energy efficient
- an end to direct subsidies in the able-to-pay market, but retaining them for vulnerable and fuel poor households. However, this should be funded through general taxation
- new builds should be future-proofed by setting high energy efficiency requirements.

⁵²Ofgem (2015), Energy Companies Obligation Technical Monitoring Report, https://www.ofgem.gov.uk/sites/default/files/docs/eco1_tm_report_final_0.pdf

⁵³Peter Bonfield (2016), Each Home Counts: An independent review of consumer advice, protection, standards and enforcement for energy efficiency and renewable energy, <https://www.gov.uk/government/publications/each-home-counts-review-of-consumer-advice-protection-standards-and-enforcement-for-energy-efficiency-and-renewable-energy>

⁵⁴Peter Hansford (2015), Solid Wall Insulation: Unlocking Demand and Driving Up Standards, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/476977/BIS-15-562-solid-wall-insulation-report.pdf

Regulations that are fit for purpose

Key points:



- **A sustainable private market for energy efficiency measures has not emerged.**
- **We believe a requirement should be placed on all buildings, where reasonable, practical and cost-effective, to attain EPC band C by 2030, and by 2035 at the latest.**
- **More ambitious regulations, together with greater enforcement of existing regulations, would send a powerful signal.**
- **The appropriate supporting framework will need to be in place to provide a clear path to compliance.**

A regulatory signal to invest in energy efficiency

Outside of government funding and schemes, it falls to individual households and businesses, if they can afford it, to invest in energy efficiency improvements. The Government has tried to take steps to stimulate a market for measures outside of supplier obligations, for example with the Minimum Energy Efficiency Standards (MEES) for the private rented sector (PRS).

Although this is welcome, standards and regulations to date have had very limited success in creating a functioning market. Even with the recently announced changes to the MEES for the PRS, which will introduce a monetary cap on energy efficiency improvements, only around half of PRS dwellings are expected⁵⁵ to move from EPC bands F and G to band E by 2020. This falls short of the first milestone set out in England's Fuel Poverty Strategy.

It is estimated that of the £4.5 billion funding gap in investment in energy efficiency, identified by Frontier economics on behalf of the Energy Efficiency Infrastructure Group (EEIG), around £3.5 billion per annum could realistically be funded by customers in the able-to-pay market.

With this in mind, the Government should improve and extend the existing MEES framework to all buildings, subject to reasonable exemptions.

A clear regulatory requirement for minimum energy efficiency standards for all buildings, domestic and non-domestic, would send a clear signal to the market about the need to improve efficiency, and provide certainty and comfort for households and businesses to invest in improvements. We consider that Government should legislate to require that to sell or rent a property (domestic or non-domestic) from 2030 (or by 2035 at the latest), it should meet EPC band C standard at a minimum. Such a long-term commitment would be a strong signal to drive the change needed. Due to the higher turnover of business premises, there may be even greater opportunities to move faster in the non-domestic sector.

“A clear regulatory requirement for minimum energy efficiency standards for all buildings, domestic and non-domestic, would send a clear signal to the market about the need to improve efficiency...”

In 2014, a report commissioned by the Energy Bill Revolution found that the cost of upgrading all housing in the UK to EPC band C by 2035 would be £126 billion. However, it was estimated that 85% of homes could be upgraded for less than £10,000, and £4,400 on average.

Of course, there will be cases where implementing these more stringent requirements aren't technically feasible or desirable – or where the sums simply don't add up and improvements are uneconomic. Any new regulation should, therefore, use exemptions where cost or practicality prevent compliance.

Additionally, concessions could be put in place where a building owner may be unable or unwilling to carry out efficiency improvements themselves. For example, where a building does not meet the standard, a proportion of the sale proceeds could be ring-fenced for the new owners to perform the necessary upgrades.

The following section explores some of the other ways the tax system could be geared to incentivise energy efficiency and support compliance with any new standards. We consider it crucial that new incentives go hand in hand with greater regulatory requirements.

Lastly, the success of any minimum standard, inherently relies on having the proper enforcement and supporting frameworks in place. It is important that new standards are backed and supported by a strong compliance and enforcement regime.

No.	Opportunity	Forward direction	Potential solution
1	There is an opportunity to increase the demand for energy efficiency products.	The Government to stimulate the market by introducing strong regulations on domestic and non-domestic properties to improve the energy efficiency ratings of their buildings	To sell or rent a domestic or non-domestic property after 2030 (or by 2035 at the latest), it should be required to meet an EPC Band C or higher. This is subject to reasonable exceptions, such as listed buildings and practical limitations.

Strengthening existing non-domestic policies

We also look to the Government to take steps to rectify the policy deficits in the existing tools it has at its disposal.

For example, we know that for large organisations, corporate social responsibility is increasingly front of mind when making budgetary decisions. The Government could therefore make wider use of reputational benchmarking in the commercial sector by strengthening and extending mandatory public reporting of operational energy ratings via Display Energy Certificates (DEC) or equivalent (such as NABERS).

The Government has also already committed to reviewing The Energy Savings Opportunity Scheme (ESOS). The limited research available on ESOS since it was introduced in 2014 suggests a low take-up of energy efficiency measures - even when they're very cost effective. We, therefore, recommend as a minimum step that any business should be required to act on their ESOS report if it identifies efficiency measures that have a payback period of less than 18 months.

Government should also be mindful of the policy exemptions for energy intensive industries (EII), where the biggest savings can be made. We believe that no policy cost exemptions should be awarded to EIs if their ESOS report indicates cost-effective savings could be delivered through investment in energy efficiency and/or optimisation.

No.	Opportunity	Forward direction	Potential solution
2	Strengthened minimum standards would support energy efficiency in the non-domestic sector.	Encourage action through incentives and regulation to improve energy efficiency in the non-domestic sector.	<p>The Government should:</p> <ul style="list-style-type: none"> strengthen and extend mandatory public reporting require that all businesses act on their Energy Savings Opportunity Scheme (ESOS) report, where reasonable and practicable, and where there is a payback period of less than 18 months. limit policy cost exemptions where an ESOS report identifies cost-effective energy efficiency savings.



iStock.com/suiwuya

Building a market for energy efficiency



Key points:

- **A sustainable private market for energy efficiency is needed to encourage demand for energy efficiency measures.**
- **Consumers need to have confidence in the quality of products and installations.**
- **Incentives, underpinned by strong regulations set out above, would provide households and businesses with a clear direction to invest in energy efficiency.**

By providing a clear signal to households and businesses that any property for sale or rent must attain a minimum EPC Band C, the Government is recognising energy efficiency as a priority and an area that demands action. But this will require supporting policies to be effective in stimulating investment. Any approach must also recognise that customers on low incomes and vulnerable to fuel poverty will still require support. We discuss this further below.

Quality and trust

Trust is a key component of any industry. With energy efficiency, households and businesses need to be confident it is worthwhile investing in measures and services, and that they will be delivered as promised. This requires the Government to put in place controls as soon as possible that ensure that the energy efficiency industry delivers high-quality installations every time.

We therefore support the Government introducing in full the measures proposed in the final Each Home Counts report, and extending its recommendations to the non-domestic market. It is also important that the recommendations are implemented in a way that assures quality and consumer protection, while being proportionate to the costs this will impose on installation of measures.

A further dividend of higher quality standards across the industry might be that finance is unlocked as lenders gain greater confidence in the measures, the installers and the operators of those measures. Equally, customers themselves will gain confidence that they are getting value for money, which itself should drive more interest in the market.

Underpinning this confidence should be a strengthened accreditation and certification framework, supported by high-quality monitoring and effective compliance enforcement. This framework needs to be robust, independent and active. Unless the framework acts and offers recourse against installers who fail to meet quality standards, it will not engender consumer trust.

No.	Opportunity	Forward direction	Potential solution
3	Public trust and confidence in the quality of energy efficiency measures is crucial to increase uptake.	A strengthened accreditation and certification framework, supported by high-quality monitoring and effective compliance enforcement, needs to be in place as soon as practically possible for all energy efficiency installations. This has to be balanced with cost implications on installations.	The Each Home Counts recommendations should be implemented in full. Similar recommendations could be considered for non-domestic buildings.

“Trust is a key component of any industry. With energy efficiency, households and businesses need to be confident it is worthwhile investing in measures and services...”



iStock.com/FlairImages

New incentives

To help kick-start a sustainable market for cost-effective energy efficiency measures and to encourage action, the Government should introduce targeted incentives to drive demand.

Energy UK and others have previously identified a number of possible government initiatives to activate the able-to-pay energy efficiency market⁵⁷. Among the options, adjusting the stamp duty of a property according to its EPC is particularly worth considering. It should be a key initiative in any future policy framework and could be introduced ahead of the proposed sale/rental restrictions from 2030. This could be revenue-neutral for HM Treasury but would provide an incentive and value for customers to take action.

The combination of incentives and regulations should also help drive a clearer link between energy efficiency investment and increased property value, via higher EPC ratings. If property owners can see a clear value of a higher EPC value, through higher prices or a reduction in stamp duty, it would be a motivating factor in improving the overall efficiency of their homes.

Like in the domestic retrofit market, the Government could also explore how it can use the tax system further to help drive improvements and support minimum standards and/or reputational regulation - particularly in relation to SMEs and landlords, noting that the Climate Change Levy already exists for larger organisations. It could, for example, further incentivise businesses to act by setting business rates relative to a property's EPC.⁵⁸

No.	Opportunity	Forward direction	Potential solution
4	Greater incentives would encourage building owners to invest in energy efficiency, and support a pathway to comply with strengthened minimum standards.	A market should be stimulated throughout the 2020s, ahead of banning the sale or rental of any property below EPC Band C.	Greater use should be made of the tax system (for example, VAT and stamp duty in the domestic sector and through business rates) to help drive improvements in energy efficiency, and to support the delivery of the proposed ban in the sale or rental of buildings below EPC Band C.

⁵⁷Energy UK, “Kick-starting a sustainable energy efficiency market”, October 2015

⁵⁸EU State Aid rules forbid but Brexit may give Britain the opportunity to diverge (EIC, Improving non-domestic energy efficiency after Brexit, 2018)



Robust information remedies to support minimum standards

To ensure regulations and incentives have the desired long-term effects we also need to consider the way buildings are subsequently used and operated post-retrofit. This area hasn't received enough policy focus in the past and needs to be addressed, especially in the non-domestic sector, if we are to maximise the value of energy-efficient investments.

The stated rating of a building is often not fully achieved because of a lack of understanding about its design and how to realise its potential. This can happen the commissioning of a building, or after it has changed hands between owners or tenants.

We support the introduction of Green Building Passports for commercial properties by 2020, as recommended by the Green Finance Taskforce⁵⁹. A digital passport would set out a customised retrofit roadmap for a building based on fabric and operational data, initially using EPCs and additional data over time. The passports would support businesses to plan investments, and to track and evidence the minimum standard of their buildings.

We also support the Committee on Climate Change's suggestion that, for larger buildings, the Government should explore approaches such as Design for Performance (Better Buildings Partnership). This makes a distinction between 'base building' energy, which is the responsibility of the owner, and the additional energy demands of the occupying organisation⁶⁰.

No.	Opportunity	Forward direction	Potential solution
5	Better information would set out a clear path for building owners to improve their efficiency.	Improved information on opportunities for efficiency improvements will support compliance with minimum efficiency standards.	Green building passports should be introduced by 2020 to provide commercial building owners with useful information to improve energy efficiency over time. The Government should also explore approaches such as Design for Performance for larger buildings.



⁵⁹Green Finance Taskforce (2018), Accelerating Green Finance, <https://www.gov.uk/government/publications/accelerating-green-finance-green-finance-taskforce-report>

⁶⁰Committee on Climate Change (2018), Reducing UK emissions - 2018 Progress Report to Parliament, <https://www.theccc.org.uk/publication/reducing-uk-emissions-2018-progress-report-to-parliament/>

New financial mechanisms

In 2013, the Government launched the Green Deal, a ‘pay as you save’ loan to help households fund energy efficiency improvements. However, it overestimated demand and misjudged the barriers to take-up. Ultimately, just 13,954 Green Deal plans were issued (as of November 2018⁶¹). For the consumer market, the Green Deal offering was complex and unintuitive. Its guaranteed interest rate for 20+ years was perceived as poor value at a time of historically low rates. The scheme, particularly in Scotland, was also plagued with accusations of mis-selling.

Nonetheless, for some households and businesses, even with the appropriate incentives, access to capital will remain a genuine barrier that in theory ‘pay as you save’ schemes like the Green Deal could help address. To ensure that households and businesses can actually, practically and efficiently comply with any new requirements, government should consider how it can help households and businesses access required capital.

Under the right circumstances, with the right design, ‘pay as you save’ mechanisms could still provide customers with access to the funding they need while minimising the disincentive of large upfront costs. The Government should look to work with the finance sector to develop green loans and mortgages, with the specific aim of helping small businesses and the domestic private rented sector.

With this in mind, we welcome the Governments intention to establish an SME energy efficiency scheme. A state-funded national programme could help many SMEs to overcome capital concerns. However, any scheme should be funded in a progressive manner (i.e. not via energy bills). It should also draw lessons from past domestic energy efficiency supplier obligations, and not unintentionally restrict the growth of a genuine market.

Case study

Centrica Business Solutions has partnered with the largest healthcare provider in South West London, St George’s University Hospital, to create a new energy strategy as part of a 15-year Energy Performance Contract. The contract involves installing two Combined Heat and Power (CHP) Units and four boilers.

Alongside this, Centrica Business Solutions have introduced various schemes across the site, which include: improved lighting, a building management system, chiller replacement and split unit air conditioning optimisation. The improvements will result in reduction in energy costs of £1m a year and 6,000 tons of carbon saved a year, which is equivalent to 3,000 cars being taken off the roads.



No.	Opportunity	Forward direction	Potential solution
6	Improved access to capital would make it easier to fund energy efficiency improvements.	New ways for households and businesses to access capital for energy efficiency improvements.	The Government should work with the finance industry to support the development of new financial products and services, such as Green Mortgages.

⁶¹BEIS (2018), Households Energy Efficiency National Statistics, headline release December 2018, <https://www.gov.uk/government/statistics/household-energy-efficiency-national-statistics-headline-release-december-2018>

Supporting innovation

Key points:



- **New technologies and methods are likely to be needed to improve the cost-effectiveness of energy efficiency measures.**
- **The Government should ensure support to develop new technologies and innovative approaches, providing a route-to-market in the able-to-pay space.**

As we explored above, current technologies do not adequately provide cost-effective solutions for all properties.

A functioning private market for energy efficiency should encourage the development of new technologies and innovations to meet demand. However, the Government needs to ensure there is adequate support, financial or otherwise, for R&D.

However, in doing so it is important to avoid direct subsidies that only prompt short-term demand and do not sustain the market past the life of that subsidy. We need to heed the lessons from initiatives such as the Green Deal Home Improvement Fund (GDHIF), where short-term financial measures, or changes to support measures, have only stimulated short-term demand. Where the supply chain does not see a long-term demand, it is unlikely to invest in its own growth.

No.	Opportunity	Forward direction	Potential solution
7	There are opportunities in new technologies and installation measures to see greater energy efficiency gains.	Support for innovation in energy efficiency to foster new technologies to help meet targets.	A well-functioning private market for energy efficiency should encourage innovative measures. However, the Government needs to ensure it provides adequate support, financial or otherwise, for research and development of new technologies and innovative approaches.

Support for those most in need

Key points:



- **People on low incomes and vulnerable to fuel poverty will require support to improve their energy efficiency.**
- **The current model of support through supplier obligations is regressive, and should be replaced with a centrally funded scheme supported by general taxation.**

Without some form of subsidy, the upfront costs of installing energy efficiency measures will prevent some, in particular customers in or at risk of fuel poverty, from ever engaging in the market.

Additionally, ambitious action to reduce domestic carbon emissions from uses such as heating can be directly at odds with reducing fuel poverty. As noted in the 2012 Fuel Poverty Review, moves to make users of carbon-intensive heating sources pay the full cost of their emissions will risk disproportionately impacting vulnerable households who are least able to pay additional costs.⁶²

⁶¹ John Hills (2012), Getting the Measure of Fuel Poverty: Final Report of the Fuel Poverty Review, <https://www.gov.uk/government/publications/final-report-of-the-fuel-poverty-review>

Subsidies, such as those targeted at the fuel poor households under ECO3, are necessary to support customers in vulnerable circumstances living in inefficient homes. We therefore support the Government’s commitment to providing support for domestic energy efficiency improvements through to 2028, and at least at the same rate of allocated funding as under ECO3.

However, we do question whether this support is sufficient, and whether it is best delivered via energy company obligations or alternative mechanisms. Subsidies such as ECO3 are levied from the bills of all customers, regardless of their ability to pay, exacerbating the situation of people who are in, or at risk of, fuel poverty. Furthermore, the supplier obligation model, along with including targets based on bill savings and the number of measures delivered, is designed to encourage a ‘least-cost’ model of delivery. As the long-term eradication of fuel poverty will require upgrades to some of the UK’s lowest-quality housing, it is questionable whether delivering such complex, costly and risky construction projects through supplier obligations is the best way to address energy efficiency in fuel poor households.

The fairest and most progressive method of funding an energy efficiency programme to address fuel poverty is through general taxation. The Government should develop a centrally-funded national energy efficiency scheme to improve the quality of GB homes for those in or at risk of fuel poverty. The EEIG estimated that the total cost of such a scheme would be around £1.7 billion per year (including the funding currently allocated for ECO3).

ECO has worked best when it’s paired with other funding, such as the Home Energy Efficiency Programme (HEEP) in Scotland and the NEST and Arbed programmes in Wales. This has allowed ECO and public funding to be combined to deliver measures where cost would otherwise be a barrier. Initiatives in Scotland have also made good use of area-based schemes, partnering ECO obligated suppliers, local authorities and social housing providers to deliver measures that are most effective at scale, such as solid wall insulation, and using local experience to more effectively identify vulnerable households. The design of any future energy efficiency scheme should make use of these learnings.

In addition, there may be opportunities to use additional sources of funding from other stakeholders that benefit from the positive effects of energy efficiency. Given the benefits to the health of individuals, there may be opportunities to partner with the health sector to deliver household energy efficiency measures.

Given the government’s new powers under the Digital Economy Act 2017, any new scheme should also look to make use of government data to streamline the process of identifying households that need support. The Department of Work and Pensions’ data-match with suppliers to target the delivery of Warm Home Discount Core Group rebates provides a clear example of best practice in this area.

No.	Opportunity	Forward direction	Potential solution
8	Households on low incomes and that are vulnerable to fuel poverty need support to improve their energy efficiency.	Direct subsidies should not be needed in the able-to-pay market, but they will still be needed for vulnerable and fuel poor households.	<p>The Government should develop a centrally funded national energy efficiency scheme to support households in or at risk of fuel poverty.</p> <p>The scheme should make use of best practice to develop solutions tailored to different areas, customers, measure types and funding arrangements.</p>

The new build sector

Key points:



- **Constructing new builds to high energy efficiency standards will avoid having to carry out further retrofitting in the future.**

Whether for domestic or commercial occupants, it makes no economic sense to be building today, only to retrofit tomorrow to meet the Government's own carbon targets. But the fact is, there is evidence that new builds being constructed today are not meeting a level of efficiency needed to meet the 2050 carbon targets⁶³. As noted above, there are also gaps between buildings' expected level of efficiency and their actual operational performance.⁶⁴

To this end, we welcome the Government's recent commitment to introduce a Future Homes Standard by 2025, so that new build homes are future-proofed with low carbon heating and world-leading levels of energy efficiency. The government should ensure that this new standard guarantees that the building industry is constructing homes and premises that are sustainable and affordable to heat for both current and future generations.

No.	Opportunity	Forward direction	Potential solution
9	Designing energy efficiency into new builds means buildings will not need further retrofitting in the future.	The Government should review the regulations for energy efficiency standards of new-build properties.	Government should ensure that new buildings are not being constructed with carbon-intensive materials, or to a standard that they would require retrofitting to meet long-term carbon emission and fuel-poverty targets.

⁶³Energy Savings Trust (2017), The Clean Growth Plan: A "2050-ready" new-build homes policy, <http://www.energysavingtrust.org.uk/clean-growth-plan-2050-ready-new-build-homes-policy>

⁶⁴UK Green Building Council (2016), Delivering Building Performance, <https://www.ukgbc.org/ukgbc-work/delivering-building-performance/>



▶ Part B

How we can sustainably transition to a low carbon heating system



Key points:



- **Action is needed immediately to meet the UK's carbon targets.**
- **The Government has an important role to play in setting the speed and direction of travel.**
- **Government should consult on a heat strategy for publication by the end of 2020.**

► **Fact: without urgent progress to decarbonise heat, the UK will not meet its carbon targets.**

National Grid's Future Energy Scenarios⁶⁵ and the Committee on Climate Change (CCC) 2018 Update Report⁶⁶ both indicate the need to decarbonise the UK's heat to meet its legally binding requirements. We cannot continue to burn natural gas, oil and coal as we do today if we are to meet our climate change commitments.

The processes used for heating and hot water contribute almost a quarter of UK carbon emissions. They are also recognised as a leading cause of poor air quality within the home^{67,68}. To date, there have been a variety of incentives aimed at increasing uptake of low carbon solutions with limited success. To drive change, a timeline for tight carbon emissions regulation is required now.

Central government has a key role to play in reducing the country's carbon emissions from heating and, increasingly, cooling, but the industry and local actors will be responsible for implementing low carbon solutions. Decarbonising heating and cooling will require a seismic change to a number of supply chains, business models, investment and industrial processes. Nor will it be cheap, requiring committed choices from households and investors.

Where government can be most effective is in setting out ambition and frameworks, and then allowing private markets and local actors to deliver solutions that best fit customers' needs. But Energy UK believes it is imperative that this Government sets out a long-term strategy by 2020 on how this change will be delivered and coordinated. This would cover:

- **Regulation:** The Government and regulators to implement incremental improvements to standards that effectively ban the most carbon-intensive technologies. This to culminate in a ban on the sale of carbon-emitting boilers by 2040.
- **Communication:** Industry to launch a communications campaign in collaboration with the Government to engage customers on the need to change, and the range of solutions open to them.
- **Trials:** Specific large-scale trials of a range of technologies and a local approach to deploying low carbon heat to be rolled out from 2020.
- **Fiscal signals:** The Government to review options and introduce mechanisms from 2025 to signal required behaviour change, and to raise ring-fenced revenue to support low carbon deployment.
- **National framework for local solutions:** The Government to release funds to local actors based on bids that best meet its objectives and deliver decarbonisation at lowest cost.
- **Energy efficiency:** This strategy should be coupled with a strong market for energy efficiency to support decarbonisation at lowest cost.

⁶⁵<http://fes.nationalgrid.com/media/1363/fes-interactive-version-final.pdf>

⁶⁶<https://www.theccc.org.uk/wp-content/uploads/2018/06/CCC-2018-Progress-Report-to-Parliament.pdf>

⁶⁷WHO - <http://www.who.int/airpollution/household/pollutants/combustion/en/>

⁶⁸https://www.parliament.uk/documents/post/postpn366_indoor_air_quality.pdf

Emerging thinking and potential solutions



No.	Opportunity	Forward direction	Potential solution
1	Developing fiscal incentives and regulatory standards could simultaneously drive forward the decarbonisation of heat and support customers in the transition.	Establishing appropriate regulatory standards and fiscal incentives by 2020 to support the phasing out of high-carbon heating systems.	Implement incremental standards which encourage and require reductions in heating emissions, effectively banning the sale of technologies that exceed a carbon emissions limit decided by the Government. Ensure appropriate price signals through taxation, incentives and subsidy to further encourage and support customers in transition, and fund broader heat decarbonisation.
2	Increasing awareness of the effect of current heating on emissions and air quality, and the need to adapt to smooth the transition.	A consumer engagement programme is required to inform of upcoming changes to heating policy, the reasons why, and the options and viable solutions.	Energy UK to engage with a range of stakeholders to inform and progress the public debate on the transition to low carbon heating.
3	Establishing a national strategy for decarbonising heat would give confidence to customers, investors and market actors, incorporating: decisive near-term action; development of long-term options; and energy efficiency and optimisation.	Develop a comprehensive heat strategy by the end of 2020 that includes large scale trials and deployment of CCUS and local decarbonisation plans; incremental improvements in building standards; and the use of fiscal incentives and regulation.	Set out a broad strategy for decarbonisation of heat to 2050, including an initial target of at least a 20% reduction in heating and hot water emissions from buildings by 2030.
4	Local approaches to decarbonisation could deliver national reductions at lower cost to consumers.	Local areas to bring forward low carbon heat solutions that are funded by private partners and central Government.	Funding should be allocated to local areas competitively in order to enable large-scale deployment of low carbon heat solutions.
5	Driving innovation in the UK by testing a range of options for decarbonising heat together and at scale.	Deliver large-scale trials to demonstrate opportunities and costs of a range of technologies.	Large-scale trials should be funded and initiated by the end of 2020 to enable application of learnings to deliver a full tendering process for local decarbonisation plans in 2025.
6	Delivery of low carbon heat offers faster decarbonisation and improved air quality, while opening up opportunities for UK industry.	The power system will need to be adapted to manage any additional low carbon electricity and gas load on the system, and may have higher flexibility requirement.	Provided the appropriate frameworks are in place, the energy industry will deliver the power and gas required to support all heating being decarbonised by 2050.

Opportunities and the scale of the challenge

Key points:



- Opportunities are apparent in innovation, investment, exportation, emission reduction and air quality improvements from an ambitious heat decarbonisation plan
- Decarbonisation will cost the UK billions of pounds and continued delays to policy decisions may increase the impact on consumers by increasing the cost per year
- Progress to date has not been significant, even though the UK's heat expertise is advanced.

Progress to date

UK heat policy is inching forwards when it should be striding ahead. The Government's Clean Growth Strategy allocated a low amount of funding to decarbonising heat (£227 million of confirmed funding, compared to the £3.5 billion allocated to transport), indicating the lack of certainty in decarbonising heat. The energy industry has progressed a range of supply chains and technologies across the UK, as set out in a 2018 Energy UK paper⁶⁹.

The most critical elements when examining the need to decarbonise heat are the impacts of existing heating installations on carbon emissions and air quality. The need to decarbonise the way we heat and cool our buildings – with the average domestic gas boiler emitting over two tonnes of carbon dioxide per annum⁷⁰ – is driving many of the ongoing changes.

But a more tangible element is air quality, with poor air directly contributing to around 40,000 premature deaths per year in the UK⁷¹. Just as air quality concerns have driven measures to clean up transport, the impact of heat on air quality should accelerate action in the coming years - but this is not the case today.

To date, the UK's focus has centred on estimates of the cost for heat decarbonisation to 2050 targets including estimates of £80bn⁷², £318bn⁷³ and £450bn⁷⁴ depending on a range of different factors. Only recently has the focus of both government and industry shifted to introduce significant near-term actions. The CCC estimates that a 20% reduction in heating and hot water carbon emissions from buildings is required by 2030 to meet 2050 targets⁷⁵. As yet, the UK has no framework for achieving this.

⁶⁹Energy UK – 'Kick-Starting the Decarbonisation of Heat'

⁷⁰Energy UK calculation, based on: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018>

⁷¹Every Breath We Take, Royal College of Physicians, <https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution>

⁷²CCC / Imperial - <https://www.theccc.org.uk/publication/analysis-of-alternative-uk-heat-decarbonisation-pathways/>

⁷³ENA / KPMG - <http://www.energynetworks.org/assets/files/gas/futures/KPMG%20Future%20of%20Gas%20Main%20report%20plus%20appendices%20FINAL.pdf>

⁷⁴National Infrastructure Commission - <https://www.nic.org.uk/publications/cost-analysis-of-future-heat-infrastructure/>

⁷⁵CCC, Next Steps for Heat Policy - <https://www.theccc.org.uk/publication/next-steps-for-uk-heat-policy/>

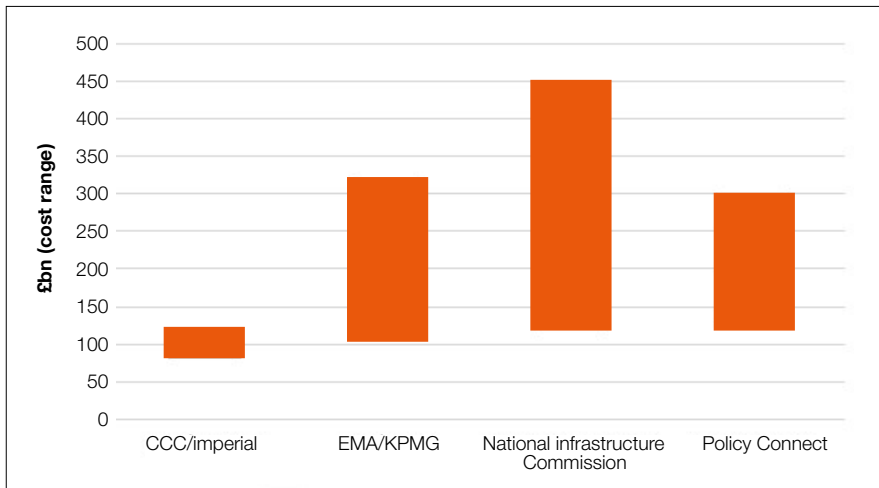


Chart of existing cost estimates of decarbonising heat

Source: Energy UK analysis⁷⁶

The Government's approach is currently based on three strands: decisive near-term action; energy efficiency and optimisation; and development of long-term options. Near-term action has been ineffective to date, with existing initiatives and standards resulting in low progress overall.

The Government's publication of Clean Growth: Transforming Heat shows the intention to increase the amount of focus given to near-term action and requires the support of industry to deliver it. This includes the decision to target emission reductions in off gas grid and new build properties during the 2020s, bolstered by comprehensive regulatory frameworks.

To date, the Government has awarded over £1.4 billion in Renewable Heating Incentive (RHI) payments with an expected total of £23 billion to be spent by 2041; greatly reduced from the initial targeted spending of £47 billion. The RHI has failed to address the upfront costs of installations, and the number of trained installers is dropping due to falling installation numbers.

Targeting off gas grid properties, seen by many as the 'low-hanging fruit', will enable the Government to bolster supply chains for low carbon technologies by creating a market for them. Manufacturers of a range of incumbent technologies, including oil and LPG boilers, and low carbon alternatives including heat pumps and hybrid solutions, have told Energy UK they are confident they can adapt to deliver decarbonisation. These companies require additional guidance from the Government on the targeted levels of decarbonisation, in order to set in motion appropriate supply chain modifications.

⁷⁶Energy UK analysis based on:

CCC / Imperial: <https://www.theccc.org.uk/publication/analysis-of-alternative-uk-heat-decarbonisation-pathways/>

ENA / KPMG: <http://www.energynetworks.org/assets/files/gas/futures/KPMG%20Future%20of%20Gas%20Main%20report%20plus%20appendices%20FINAL.pdf>

National Infrastructure Commission: <https://www.nic.org.uk/wp-content/uploads/Element-Energy-and-E4techCost-analysis-of-future-heat-infrastructure-Final.pdf>

Policy Connect:

https://www.policyconnect.org.uk/sites/site_pc/files/report/1001/fieldreportdownload/futuregaspt1nextstepsforthegasgridwebcompressed.pdf

⁷⁷Clean Growth: Transforming Heat - BEIS

⁷⁸National Audit Office (NAO) -

<https://www.nao.org.uk/wp-content/uploads/2018/02/Low-carbon-heating-of-homes-and-businesses-and-the-Renewable-Heat-Incentive.pdf>

The challenge

By 2050, heating and cooling sources must be decarbonised. This includes, for example, replacing the systems of over 20 million gas-heated homes with low carbon options including 'greening' the gas supply (e.g. shifting to low carbon gases); electrification using highly-efficient heat pumps; and hybrid heat solutions where the bulk of heat demand is met by electricity, but peak demand by low carbon gas .

Solving the UK's dependence on natural gas will require significant action. Gas is a flexible and energy-rich fuel source which has, and will continue to have, an important role in power generation and heating. Arup modelling, supported by Energy UK, suggests that 70% of properties will remain connected to the gas grid by 2035 .

Adopting greater levels of low carbon heat installations will see an increase in the amount of electricity used to heat our homes and buildings. We do not expect this to become a concern in the 2020s provided the UK focuses on energy efficiency measures, but the potential requirements will still need to be considered.

Case study

The growth of renewable energy in the power sector has already rendered electric heating less carbon intensive than gas central heating. By shifting consumption to when energy is cheaper and greener, additional value can be generated for customers and businesses through grid balancing, making electric heating even cheaper.

Kaluza (an Ovo company) offers a smart electric heat platform that connects electric heating systems with storage to the Kaluza distributed energy management platform. These storage heaters can then be aggregated to form a virtual battery, enabling participation in grid balancing. Smart electric heating technology can be applied to storage heaters, hot water heaters and new heat products that include storage.



As the UK moves into the 2030s, it is important that effective market frameworks are established to encourage continued investment in gas and electricity networks and generation assets that reflect the changing needs of the system. This is explored further in [Report section 2](#) (Funding future electricity generation and system services) and [Report section 5](#) (Transporting energy to and from customers through transmission and distribution networks).

The increase in heat demand for electricity has the potential to become problematic as the impacts of climate change become more pronounced, and as the estimated 20% of buildings already experiencing overheating in summer continues to grow . The potentially significant increase in demand for cooling by 2030 will need to be considered in any national frameworks for energy efficiency and the decarbonisation of heat.

The large-scale storage capacity offered by gas will still be needed to meet winter peak demand for heat and generation, as well as to meet heavy industry demand year-round, throughout the 2020s and beyond. It is important that investment, regulation and incentives reflect the changing requirements for meeting demand from heat and cooling. This requires central leadership, best delivered via a national strategy and framework.

Domestic properties

Rolling out low carbon solutions to domestic properties will not be simple. Barriers to consumer uptake include upfront cost, unfamiliarity with the range of options, disruption in the home and to public infrastructure (such as digging up roads), and the complexity of modifying rented properties. Many of these barriers can be removed relatively swiftly through coordinated industry and government action, but domestic heating is not expected to be a fast-moving market given the consumers' sunk-cost of boilers.

Energy efficiency markets can give us important lessons about the need for efficient and attractive markets for low carbon heat. Consumer engagement has been low to date, with few customers currently concerned about the emissions of their boiler.

The range of technologies currently available for low carbon heating all require significant disruption to buildings, and some impact to public spaces such as roads and pavements. Engaging customers on why these disruptions are unavoidable, and ensuring that they are minimised, will be important to the efficient implementation of domestic decarbonisation.

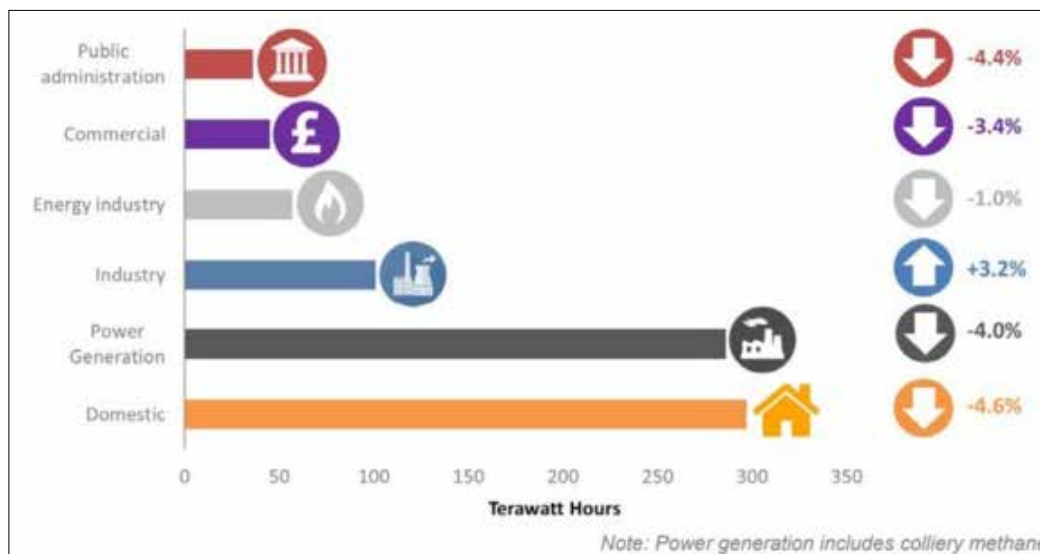


iStock.com/adventtr

Industrial and commercial users

Many industrial processes require a consistent source of heat. Gas is the only current option with the right level of controllability, raising a potential barrier to decarbonising the UK industry's provision of heat. The use of gas for industrial processes, and its continued role in space heating, led to industry being the only UK sector in which gas demand rose in 2017 over 2016.

Heating currently accounts for around one-third of the UK's non-domestic energy use and this has contributed to the costs of industrial gas in 2017, which totalled over £1.8 billion. Ensuring that the cost of energy is not a barrier to industrial investment in the UK is part of both the Government's Industrial Strategy and its Clean Growth Strategy, and will be vital to maintaining a strong economy.



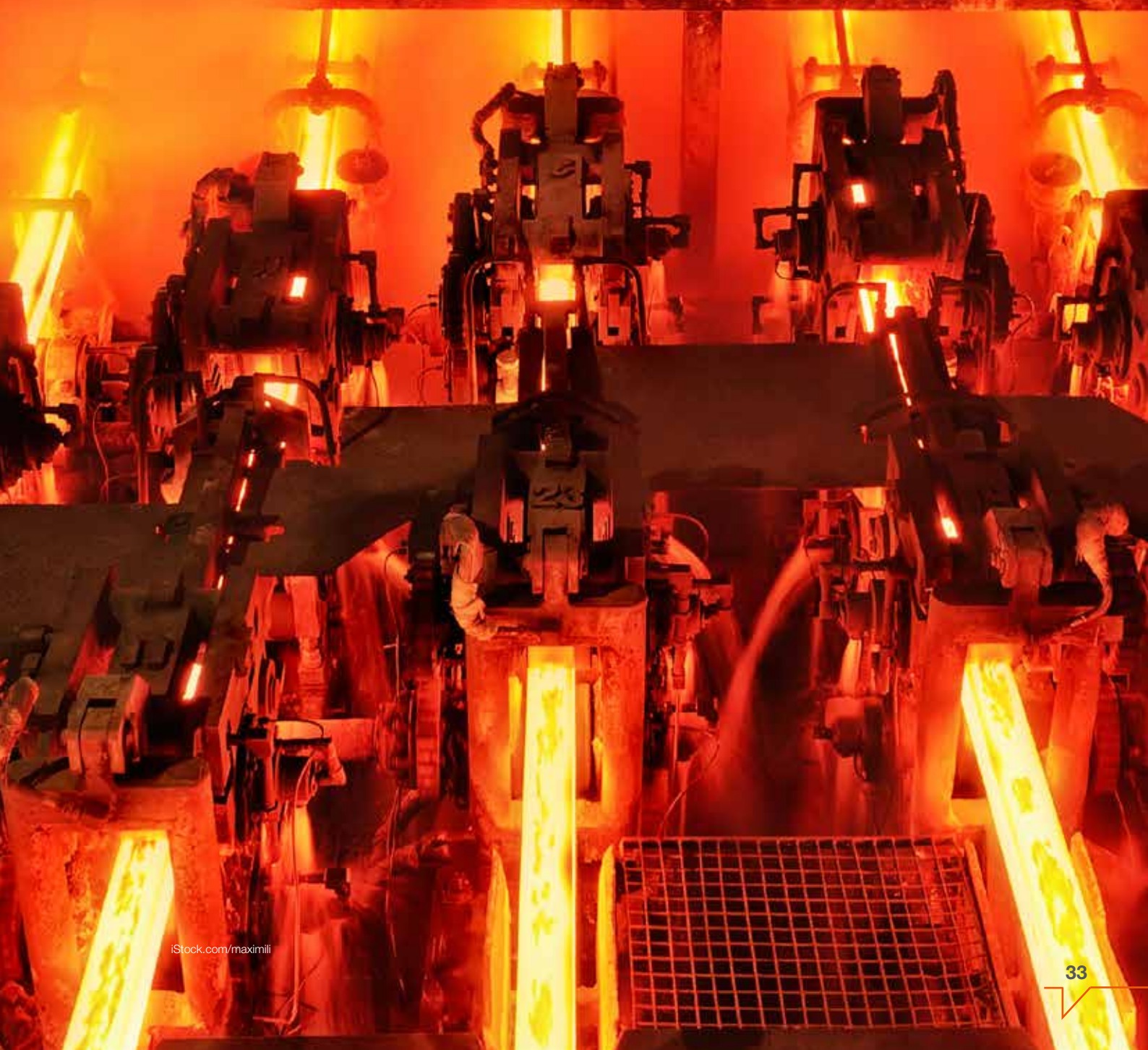
Increasing gas demand from industry in 2017

Source: Digest of UK Energy Statistics, 2017

“The use of gas for industrial processes, and its continued role in space heating, led to ‘industry’ being the only UK sector in which gas demand rose in 2017 over 2016.”



“Ensuring that the cost of energy is not a barrier to industrial investment in the UK is part of both the Government’s Industrial Strategy and its Clean Growth Strategy.”



A strategy for decarbonising heat

Key points:



Government leadership is needed for the efficient and effective decarbonisation of heat at the lowest cost to customers.

- Local delivery will play a central role in deploying solutions at scale.
- Centralised funding is required to enable local implementation of decarbonisation.

A government strategy

Based on the issues above, a UK strategy for decarbonising heat should address:

- the slow uptake of heat technologies at a residential level
- coordinated activity between markets and policymakers to ensure viability and delivery across both heat and power
- developing industrial heat solutions in the near-term to enable a smooth transition without disrupting economic competitiveness and growth
- adoption of low carbon heat solutions alongside action on energy efficiency.

Existing regulatory and incentive frameworks will not deliver the scale or speed of change required. The Government, with industry, must kick-start more significant change. By 2020, the Government should set out a national framework for decarbonising heat. This should establish an overarching, investible framework that gives advance notice to domestic and business customers that by 2050 or sooner we will not rely upon the same technologies that heat our homes and buildings today.

The following provides an overview of what should form the core of a national framework⁸⁴.

Balancing regulation and fiscal incentives

Energy UK proposes a two-pronged approach to stimulating demand for low carbon solutions. Firstly, the Government sets out a long-term plan to remove carbon emitting technologies from the marketplace. This will generate demand and provide a push for industry to develop customer-focused solutions. Secondly, it should progressively apply reviewed taxation, subsidy and incentives across all sectors, both to signal the change required and to generate revenue to support the development and rollout of local solutions.

Carbon intensity regulation

Although most current heating solutions are efficient, effective and low-cost, they don't meet the UK's commitments to decarbonise. But customers are unlikely to move away from them without a significant intervention. There must, therefore, be an external push to drive customers away from carbon-emitting technology if targets are to be met.

While there may be an opportunity to lower the cost differential between low- and high-carbon solutions, this is unlikely to be met by government financing and should instead leverage private funds. The Government should establish a timeline, with significant foresight, that progressively restricts carbon emissions from heating solutions - effectively banning the sale of technologies that exceed a carbon emissions limit. In doing so, customers and industry will adapt and act accordingly.

⁸⁴This document provides an outline of a proposed strategy, for implementation and any near-term actions. Energy UK would be pleased to share further thoughts with government and other stakeholders.

Restricting allowable carbon emissions from heating and, in the longer term, cooling, should first be applied to the industrial and commercial sectors (I&C). They create a higher demand than other sectors and have greater potential for innovation and investment. This will need to be accompanied by innovation funding and appropriate fiscal signals to encourage action.

By incentivising industry to make significant progress in decarbonising throughout the next decade, the UK will lower costs and barriers to a successful rollout across the rest of the economy. Focusing on I&C will also provide opportunity, through the existing and future UK Industrial Strategy, to ensure that the UK remains a competitive option for manufacturing and industry.

Current support mechanisms through the Clean Growth Competition and the Industrial Energy Transformation Fund have the potential to enable a broader move towards low carbon. These will need to be reinforced with incremental standards and emission limits that will drive industry to adapt.

Fiscal incentives

Difficult decisions will need to be taken about how the costs of carbon are factored into customers' decision-making and how finance is to be generated to fund the transition. The Government should build on the success of carbon pricing in the power sector and look at ways to apply the same principles to the heat sector.

There is a range of options for introducing fiscal incentives, each requiring a gradual implementation that is well signposted and integrated with wider decarbonisation efforts. Currently, gas in heating does not pay any form of carbon tax, therefore, unsurprisingly, customers are unaware of their heating's emissions.

Establishing a carbon intensity signal - a carbon tax equivalent to that in the power sector - ⁸⁵ could start to flag up the true cost of heating emissions without being overly burdensome on customers. It is expected that, by 2030, carbon pricing policy for domestic users will be easier to set, but only if the 2020s pave the way with increased carbon signals across I&C users, effectively increasing the market share of low carbon options.

Any use of carbon pricing will need advanced warning to signal the need for investment from industry, and ensure customers have time and options available to minimise the cost. This would also need the aid of adequate market support mechanisms to ensure the delivery of viable and easily available alternatives.

Almost 70% of customers see saving money on heating bills as important when thinking about replacing a heating system. They also tend to focus more on the initial cost of equipment than the total lifetime bill, which includes energy fuel costs⁸⁶. As a result, many choose higher-carbon technology options that may be more expensive overall, in order to reduce the initial cost hit. The Government should consider how it can redirect support to ease the high up-front costs of low carbon solutions.



Almost **70%** of customers see saving money on heating bills as important when thinking about replacing a heating system.

⁸⁶ Element energy, Achieving deployment of renewable heat, April 2011, p23

The industry is clear that vulnerable and fuel poor consumers should be protected from any rise in energy bills caused by carbon pricing, through a mixture of support programmes and energy efficiency measures. As we set out below, educational resources on decarbonisation options should also be made available to all customers, including industrial users, and plans should be aligned with local authorities.

Increasing standards and incentives on heating emissions will focus customers on the long-term viability of their decisions. Incentives and subsidy still have core roles to play in supporting customers who transition in the 2020s. We examine this in more detail in Energy UK's Kick-Starting the Decarbonisation of Heat, which explores establishing a Low Carbon Heat Incentive to 2030.

No.	Opportunity	Forward direction	Potential solution
1	Developing fiscal incentives and regulatory standards could simultaneously drive forward the decarbonisation of heat and support customers in the transition.	Establishing appropriate regulatory standards and fiscal incentives by 2020 to support the phasing out of high-carbon heating systems.	Implement incremental standards which encourage and require reductions in heating emissions, effectively banning the sale of technologies that exceed a carbon emissions limit decided by the Government. Ensure appropriate price signals through taxation, incentives and subsidy to further encourage and support customers in transition, and fund broader heat decarbonisation.

Communication

Ensuring a smooth consumer transition to low carbon requires more than just establishing price signals, particularly in the domestic setting. By also providing a clear timeline for limiting carbon emissions, the industry can communicate the impending changes to customers and offer them solutions. The industry is committed to take the lead and work alongside the Government to develop messaging through appropriate channels

The Energy Saving Trust has a continuing role to play in listing trusted installers for a range of technologies available today, as do suppliers and installers themselves. One in four people put most trust in the advice of tradespeople, such as builders, plumbers and gas technicians. It follows that the trade has a role to play in engaging customers to reduce their heating's carbon impact. Energy UK will work alongside members and their supply chains to find appropriate and effective ways to raise awareness of solutions.

The industry must also gear up for the challenge of changing customer mindsets. Only 17% of homeowners say that they would replace a working boiler, and only 23% of them would put switching to a more environmentally friendly heating system as the most important consideration⁸⁷. Low carbon heating must be an attractive option to get customers on side with the transition.

No.	Opportunity	Forward direction	Potential solution
2	Increasing awareness of the effect of current heating on emissions and air quality, and the need to adapt to smooth the transition.	A consumer engagement programme is required to inform of upcoming changes to heating policy, the reasons why, and the options and viable solutions.	Energy UK to engage with a range of stakeholders to inform and progress the public debate on the transition to low carbon heating.

⁸⁷ BEIS Public Attitudes Tracker Wave 20

Case study

Bristol Energy have been working with the Energy Systems Catapult to become the first energy supplier in the UK to trial selling 'heat as a service'. Households will be offered a 'Heat Plan' tailored to their lifestyle, rather than buying kilowatt hours (kWh) of heat.

Capitalising on digitalisation and emerging smart home technology, the Heat Plan will provide consumers with room-by-room, hour-by-hour control over their heating. This approach is designed to give people greater control over comfort and cost as well as an incentive to use less energy and carbon.



National framework

The UK should establish a framework for decarbonisation of heat based on the three-tiered approach to policy set out by BEIS, incorporating decisive near-term action; development of long-term options; and energy efficiency and optimisation. The first part of this report has considered energy efficiency, whilst the latter is considered in Report [Section 5](#) - Transporting energy to and from customers through transmission and distribution networks, as it should be core to energy policy throughout the 2020s.

“We cannot yet define the 2050 systems for carbon capture, zero-carbon transport, hydrogen or electrification of heat, but the Government must now demonstrate it is serious about their future deployment. Key technologies should be pulled through to bring down costs and support the growth of the low carbon goods and services sector.”

– Committee on Climate Change

Development of long-term options

Energy UK agrees that there is no “silver bullet” to decarbonise the heating infrastructure of the country. Rather, there are going to be regional pockets where a specific mixture of technologies will be more effective. The Government and the industry agree that any long-term policy framework will need to be flexible enough to enable local divergence, while recognising the importance of central leadership.

Rising demand following fiscal incentives and regulation will only be achieved if there are viable options available to customers to decarbonise. The industry will continue to develop innovative solutions and promote take-up, but decisions will need to be taken nationally to enable optimal solutions to be delivered across the country. This includes continuing long-term investment in transmission and distribution networks for gas and electricity, as well as developing support mechanisms for emerging infrastructure including CCUS and heat networks.

“Rising demand following fiscal incentives and regulation will only be achieved if there are viable options available to customers to decarbonise.”

Decisive near-term action

The first element is to push ahead with ambitious plans for off gas grid and new build decarbonisation, and energy efficiency deployment in the 2020s, to develop sustainable markets and supply chains for energy efficiency and alternative heating installations. This delivers the added benefit of replacing some of the most carbon-intensive installations in the UK.

As we set out below, we also look to the Government to set in train actions for the next five years to enable local areas to progress decarbonisation efforts.

No.	Opportunity	Forward direction	Potential solution
3	Establishing a national strategy for decarbonising heat would give confidence to customers, investors and market actors, incorporating: decisive near-term action; development of long-term options; and energy efficiency and optimisation.	Develop a comprehensive heat strategy by the end of 2020 that includes large scale trials and deployment of CCUS and local decarbonisation plans; incremental improvements in building standards; and the use of fiscal incentives and regulation.	Set out a broad strategy for decarbonisation of heat to 2050, including an initial target of at least a 20% reduction in heating and hot water emissions from buildings by 2030.



iStock.com/Milkos

Local solutions

It is likely that different regions, and varying types of building stock have different requirements when deploying low carbon heat solutions. For example, urban areas with a greater density of energy-efficient buildings may need to integrate planning for increased cooling demand as heat demand falls, based on predictions from the UK Climate Change Risk Assessment 2017⁸⁸. It is important to consider the type, ownership and geographical location of properties to understand what combination of solutions can best deliver for those customers. This is not a decision that can be taken from Whitehall.

Although the Government should provide a strategic framework and direction of travel, it should allow local deployment that best suits the needs of regions. This may result in a patchwork of approaches, but it should still deliver the most efficient outcome per area. Any missed strategic overlaps can be minimised through central government coordination.

To deliver this regional approach, the Government needs to build on the local growth agenda supported by BEIS and its Industrial Strategy. Funds should be made available, for instance through the gradual implementation of a carbon tax or other levy, to be allocated competitively to local areas. This approach has been delivered successfully in the past through the Regional Growth Fund and Local Growth Deals and should be broadened to decarbonisation.

In practice, this would be likely to entail a process of bidding for central funds. Local Enterprise Partnerships (LEPs) and other delivery partners including local authorities, energy suppliers, energy networks, private business, and social partners would identify opportunities to decarbonise heating within a government framework and request funds accordingly. This should encompass industrial processes; industrial and domestic energy efficiency; heating and cooling; and supply chain development.

Any allocation of funding from government could unlock the most cost-effective route to decarbonisation, with a secondary objective of supporting other economic initiatives such as the current Government's Industrial Strategy, where appropriate. If a sustainable long-term framework for investment exists, the industry will invest as well, as we have seen with decarbonising electricity generation.

Overarching central government leadership will ensure that learnings on the social and financial impacts of projects are shared nationally. This will enable coordination of resources across regional borders towards common goals, establishing a low carbon energy system that works for all UK customers.

No.	Opportunity	Forward direction	Potential solution
4	Local approaches to decarbonisation could deliver national reductions at lower cost to consumers.	Local areas to bring forward low carbon heat solutions that are funded by private partners and central Government.	Funding should be allocated to local areas competitively in order to enable large-scale deployment of low carbon heat solutions.

“Although the Government should provide a strategic framework and direction of travel, it should allow local deployment that best suits the needs of regions.”

⁸⁸ Summary of the Key Findings from the UK Climate Change Risk Assessment 2017 - <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Chapter-5-People-and-the-built-environment.pdf>

Trials

Implementing standards, raising revenue from a carbon tax and establishing a successful bidding process will all, and rightly, take time to put in place. As a first step, large scale practical trials should advance the UK past the theoretical stages of local planning. These trials need to integrate into wider decarbonisation of power, transport and industry, and draw on the expertise of a range of actors to optimise investment.

Existing proposals for large scale trials and innovation projects could help to improve our understanding of the impact on consumers of integrating a range of options. Wider trials will primarily need to consider all aspects of heat: process heating, space heating, water heating and cooling. These will also need to consider infrastructure requirements, including for carbon capture usage and storage, low carbon clusters and energy network reinforcement.

A number of in-depth reports^{89,90,91,92,93} have explored the potential costs of heat decarbonisation through a variety of pathways, mainly focusing on a single primary technology. The true costs or benefits of any technology are still unclear, as commercialisation of trials and economies of scale will give a crucial insight and better understanding of the best integration of solutions, and the benefits, costs and associated disruption.

Innovation projects such as HyNet and ALIGN CCUS are, in the near-term, focusing efforts on industrial and commercial (I&C) users, given their high-intensity use of high carbon heating. Lessons learned from these projects will help reduce costs and barriers in the decarbonisation of gas networks. Provided the appropriate frameworks are in place, the energy industry will deliver the power and gas required to deliver for industry, as we have already seen in the investment to date in low carbon heating trials and the wider decarbonisation of power supply.

In its Annual Progress Report to Parliament, the CCC highlighted that the cost of decarbonisation in the UK could be reduced by 50% using CCUS, and called for immediate action to keep long-term options open. Given the long-term investment that CCUS infrastructure requires, further delays will only increase costs and reduce options⁹⁴.

Energy UK recognises that to decarbonise heat fully and provide fuel for heavy transportation the UK will require hydrogen or a similar alternative. The Government should therefore award funding to instigate CCUS trials at scale by 2020. This will enable the UK to deliver on the CCC's recommendation that the first CCUS cluster should be operational by 2026.

The Government should enable local areas to state their case for decarbonisation and draw on a wide range of evidence and factors in deciding where to allocate funding. High percentages of fuel poor households⁹⁵ and low energy efficiency standards⁹⁶ mean that trials across the North of England, for example, could affect social change as well as enable decarbonisation. Research by IPPR has highlighted the high potential for trials in the North, with the range of existing assets including hydrogen production and CCUS, boosting the argument for large-scale deployment of solutions in the region⁹⁷.

⁸⁹<https://www.theccc.org.uk/publication/analysis-of-alternative-uk-heat-decarbonisation-pathways/>

⁹⁰<https://www.nic.org.uk/wp-content/uploads/Element-Energy-and-E4techCost-analysis-of-future-heat-infrastructure-Final.pdf>

⁹¹<https://www.nea.org.uk/wp-content/uploads/2017/09/Heat-Decarbonisation-Report-2017.pdf>

⁹²<http://www.energynetworks.org/assets/files/gas/futures/KPMG%20Future%20of%20Gas%20Main%20report%20plus%20appendices%20FINAL.pdf>

⁹³https://www.policyconnect.org.uk/sites/site_pc/files/report/1001/fieldreportdownload/futuregaspt1nextstepsforthegasgridwebcompressed.pdf

⁹⁴<https://www.theccc.org.uk/publication/reducing-uk-emissions-2018-progress-report-to-parliament/>

⁹⁵BEIS, 'Sub-regional Fuel Poverty 2016 data', <https://www.gov.uk/government/statistics/sub-regional-fuel-poverty-data-2018>

⁹⁶Centre for Sustainable Energy (CSE), <http://www.cse.org.uk/downloads/reports-and-publications/mapping-EPC-data-full-feasibility-report.pdf>

⁹⁷IPPR, 'Net Zero North', www.ippr.org/files/2017-12/net-zero-north-report-1712.pdf

Concerns over the ability of the UK energy system to deliver the appropriate amount of low carbon energy to support decarbonised heating are based on a range of issues. However, approaching decarbonisation in a regional strategy allows for clarity of investment opportunities, which are more likely to deliver at the lowest cost to customers. The energy industry has delivered investment and R&D in the decarbonisation of power to date. It can now do the same for heat, if appropriate supporting frameworks are put in place in the 2020s.

No.	Opportunity	Forward direction	Potential solution
5	Driving innovation in the UK by testing a range of options for decarbonising heat together and at scale.	Deliver large-scale trials to demonstrate opportunities and costs of a range of technologies.	Large-scale trials should be funded and initiated by the end of 2020 to enable application of learnings to deliver a full tendering process for local decarbonisation plans in 2025.
6	Delivery of low carbon heat offers faster decarbonisation and improved air quality, while opening up opportunities for UK industry.	The power system will need to be adapted to manage any additional low carbon electricity and gas load on the system, and may have higher flexibility requirement.	Provided the appropriate frameworks are in place, the energy industry will deliver the power and gas required to support all heating being decarbonised by 2050.

“Provided the appropriate frameworks are in place, the energy industry will deliver the power and gas required to support all heating being decarbonised by 2050.”

“Delivery of low carbon heat offers faster decarbonisation and improved air quality, while opening up opportunities for UK industry.”





@energyukcomms
www.energy-uk.org.uk

Energy UK
26 Finsbury Square
London EC2A 1DS