The voice of the energy industry

Heat Policy Team
Department for Business, Energy and Industrial Strategy
1 Victoria Street
London
SW1H 0ET

Sent via email to: heatpolicy@beis.gov.uk

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Energy UK Response: Clean Growth – Transforming Heat

Energy UK welcomes the opportunity to respond to this publication, which is a very useful review of existing evidence on the decarbonisation of heat and contains commitments that will be important in decarbonising the UK's supply of heat.

Energy UK is the trade association for the GB energy industry with a membership of over 100 suppliers, generators, and stakeholders with a business interest in the production and supply of electricity and gas for domestic and business consumers. Our membership encompasses the truly diverse nature of the UK's energy industry – from established FTSE 100 companies right through to new, growing suppliers and generators, which now make up over half of our membership.

Our members turn renewable energy sources as well as nuclear, gas and coal into electricity for over 27 million homes and every business in Britain. Over 730,000 people in every corner of the country rely on the sector for their jobs, with many of our members providing lifelong employment as well as quality apprenticeships and training for those starting their careers. Annually, the energy industry invests over £11bn, delivers £88bn in economic activity through its supply chain and interaction with other sectors, and pays £6bn in tax to HMT.

The actions outlined in the document are welcome, key points that we would draw attention to are as follows:

- In the short term, action is needed to provide certainty on what is to follow the closure of the Renewable Heat Incentive. This should address off gas grid and new build homes, heat networks and reducing emissions in the public sector, while seeking to ensure that heat is fully integrated into the Smart Systems and Flexibility Plan.
- In the longer term, a two-pronged approach to stimulating demand for low-carbon solutions should be taken forward, including gradually removing carbon emitting systems alongside a review of taxation, subsidy and incentives to be applied progressively across all sectors.

If BEIS would like to discuss any of the details of Energy UK's response below, please do not hesitate to get in touch. We would welcome the opportunity to work with BEIS to take forward the proposals outlined in the 'clean growth – transforming heat' document and the areas explored in our response below.

Joseph Cosier
Policy Executive
Energy UK
Joseph.Cosier@energy-uk.org.uk
26 Finsbury Square (1st Floor)
London
EC2A 1DS

Executive Summary

Action in the short term

We welcome many of the commitments on longer term options however we do not believe the actions outlined in this document for the near term and on energy efficiency go far enough. Long term uncertainties and unanswered questions must not prevent progress in the short term where opportunities exist.

- There needs to be greater certainty and transparency about what, if anything, is to follow the Renewable Heat Incentive (RHI). Over £23bn is expected to be spent over the total lifetime of the RHI, for this spending to have maximum impact it is vital that appropriate follow-on actions are put in place. Energy UK would welcome the opportunity to work with Government in developing effective next steps after the closure of the scheme to avoid a cliff edge effect.
- Segmentation of the UK's housing stock has an important role to play in rolling out low carbon heating solutions and implementing least regret actions. Key segments which can and should be addressed now include:
    - *Off gas grid homes and businesses*: Government and regulators should implement incremental improvements to standards that effectively ban the most carbon intensive technologies whilst supporting consumers in making the switch to low carbon heating.
    - *New build standards*: as highlighted in the Committee on Climate Change's (CCC) recent publication on the UK housing stock, new build standards need to be strengthened to avoid locking in emissions and increasing the number of homes that will need to be retrofitted at a later date. Standards for new build homes that are consistent with our 2050 decarbonisation targets need to be introduced as a priority.
    - *Rolling out heat networks*: while developing a regulatory framework for heat networks will likely be a medium-term rather than a short-term action, there are areas to progress now that will support their growth. Barriers surrounding planning policy, building regulations and business rates are hindering the development of a self-sustaining market for heat networks and should be addressed.
    - *The public sector:* in line with the ambition laid out in the Clean Growth Strategy efforts need to be ramped up to decarbonise public sector buildings. In many instances investment will have a positive net present value, therefore delivering efficiencies.
- There needs to a greater focus, both in the short term and looking further ahead, on ensuring that heat can be integrated into a framework for a smart flexible energy system as part of the Government's Smart System and Flexibility Plan, thus starting to value heat as a flexibility resource.
- The commitment to publish consultations on off gas grid heating, part L of Building Regulations and on market frameworks for heat networks are welcome and represent an important opportunity to address short term issues on decarbonising heat, as described in the bullets above. We would however caution against publishing these pieces of work too close to each other, as this could reduce the quality of stakeholder input.

Longer term action

Energy UK proposes a two-pronged approach to stimulating demand for low-carbon solutions in the longer term. Firstly, that the Government set 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-focussed solutions. Secondly, initiate a review of taxation, subsidy and incentives to be applied progressively across all sectors to signal the change required and to generate revenue to support the development and roll out of local solutions.

- Energy UK supports the commitment to publish a heat policy roadmap. This should include:
    1. **Regulation**: Government and regulators to implement incremental improvements to standards that effectively ban the most carbon intensive technologies.
    2. **Communication:** Industry to launch a communications campaign to engage customers on the need to change and the range of solutions.

3. **Trials**: Large scale trials of a range of technologies to be rolled out from 2020 to boost investor confidence.
4. **Fiscal options and price signals**: Government to review fiscal options and introduce mechanisms from 2025 to signal required behaviour change and raise revenue to be ringfenced to support low carbon deployment.
5. **National framework for local solutions**: Government to release funds to local actors based on bids that best meet government's objectives and deliver decarbonisation at lowest cost.
6. **Energy efficiency**: This strategy should be coupled with a strong market for energy efficiency to support decarbonisation at lowest cost

Consultation questions

4. Characteristics of low carbon options

a) Does this overview of the strategically important issues, as identified in the course of our review of the evidence, highlight the key issues? Are there important issues missing?

We broadly agree with the overview of key issues, however would highlight the importance of taking forward energy efficiency improvements as part of the transition to low carbon heat. There is little mention of the importance of demand reduction as part of the discussion on the economic costs and benefits, the consumer experience or the energy system impacts despite the significant potential benefits of an ambitious energy efficiency programme.

It should also be noted that heat has a role to play in the development of a framework for a smart flexible energy system as defined by BEIS and Ofgem. Increasing levels of electrification and the deployment of multi-source heat networks mean that a larger number of heat assets will be able to provide value to the system by shifting their demand at times of strain. Trials across the UK, including the FREEDOM project and Smart Electric Heating Retrofits project, have begun to demonstrate the value of heat as a flexibility resource.

The developing evidence shows that not only can heat become an asset to the UK energy system, but that by implementing business models and market structures which recognise the value of flexibility, and make them accessible to small as well as large participants, it may be possible to offset the capital costs to consumers of decarbonising heat. Progress has already been made in developing 'heat as a service' style customer offerings, bolstered by the introduction of assignment of rights. New business models and offerings such as these will be important to overcome the high upfront cost of low carbon heat systems and must be actively encouraged.

b) Are there any important pieces of evidence that require further consideration?

We would highlight the work being undertaken by National Grid to examine the potential role of the existing national transmission system in facilitating a hydrogen solution. We would point to our member's response for more detail on this.

As explored in response to question 5.b) below, any long-term policy framework will need to be flexible enough to allow for new research to be integrated into the heat decarbonisation process. We would highlight for instance, recent evidence[1] suggesting that peak demand from electric heat demand is lower than some other studies have previously indicated while also flagging the impact of the electrification of passenger transport. Uncertainties in how processes such as these are going to map out highlight the importance of maintaining flexibility

c) **Do you agree with the set of strategic inferences we have drawn out?**

[1] https://www.sciencedirect.com/science/article/pii/S0301421518307249

Emissions reduction potential

Energy UK broadly agrees with the strategic inferences drawn out with regards to emissions reduction potential: both electric heating (including both heat pumps and hybrid heat pumps) and hydrogen have the potential to deliver on decarbonisation objectives. Although not viable as a stand-alone solution to decarbonise the UK's heat supply we agree that bioenergy could offer a valuable contribution to decarbonisation efforts.

As discussed in the document, the CCC is this year scheduled to deliver advice on a net zero target. Heat will no doubt be an important part of that however we would highlight the challenges inherent to decarbonising heat. While there is a significant emissions reduction potential across hydrogen, hybrid heat pumps and heat pump, it may not be possible to fully decarbonise heat through these routes. Instead, as with some other hard to decarbonise sectors, residual emissions may need to be offset with progress made in easier to decarbonise sectors. As additional modelling is undertaken to understand energy system impacts and emissions reductions potential, a more complete picture will become available.

Economic costs and benefits

A number of in-depth reports[2,3,4,5,6] have explored the potential costs of heat decarbonisation through a variety of pathways, primarily focussing on a single primary technology. It is still unclear the true costs or benefits of any technology, as commercialisation of trials and economies of scale will play a crucial role in better understanding optimal integration of solutions and the benefits, costs and associated disruption.

Reductions in cost are, to a degree, dependent on the development of markets for low carbon heat. As UK supply chains develop, costs should come down. Economies of scale would be important to achieve cost reductions and are predicated on high volume manufacturing, which in turn requires equipment manufacturers having confidence that there will be sufficient demand. Regardless of the amount of reduction realised thanks to the development of supply chains, there is a need for business models to develop for the method of payment.

Energy UK would again note that heat should be better integrated into the Smart Systems and Flexibility Plan to enable additional sources of revenue to recover some of the installation costs of heat technologies and highlight the important contributions heat decarbonisation can make to the objectives of the industrial strategy and clean growth. As flagged elsewhere in this response there is considerable potential for new customer offerings to overcome upfront cost barriers. A greater emphasis is needed on encouraging innovation in this area, including placing a value on the flexibility that heating can provide.

Customer experience

We broadly agree with the conclusions on the customer experience and recognise the differences in the level of disruption from the installation process, the heating experience and use between electric and hydrogen options. As noted in the document, once a heat pump is installed and fully operational consumers tend to be satisfied with the service level. As hydrogen boilers are expected to operate in a similar way to natural gas boilers, which consumers tend to be satisfied with, it is also reasonable to expect similar levels of user satisfaction. The primary differences for the consumer therefore seem to

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[2] - https://www.theccc.org.uk/wp-content/uploads/2018/06/Imperial-College-2018-Analysis-of-Alternative-UK-Heat-Decarbonisation-Pathways-Executive-Summary.pdf

[3] https://www.nic.org.uk/wp-content/uploads/Element-Energy-and-E4techCost-analysis-of-future-heat-infrastructure-Final.pdf

[4] https://www.nea.org.uk/wp-content/uploads/2017/09/Heat-Decarbonisation-Report-2017.pdf

[5] http://www.energynetworks.org/assets/files/gas/futures/KPMG%20Future%20of%20Gas%20Main%20report%20plus%20appendices%20FINAL.pdf

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

lie in the cost and disruption of installation and the ongoing running costs. It is also noteworthy that the installation of hybrid heat pumps is less disruptive than other heat pumps.

Further, it is important to note the difference between hydrogen-ready appliances and having to replace appliances as part of a coordinated switchover, the former resulting in considerably less disruption and giving consumers more flexibility over the timing of their conversion. As discussed in response to 5.b) we would point to evidence from the social sciences to understand user preferences and motivations for different heating technologies.

Energy systems impacts

The adoption of greater levels of low carbon heat installations will see an increase in the amount of electricity used to heat our homes and buildings. Energy UK does not expect this to become a concern in the 2020s as long as the UK focusses on energy efficiency measures, but the potential requirements of this will need to be considered.

The increase in heat demand for electricity has the potential to become more problematic if market reforms do not occur in parallel as the impacts of climate change become more pronounced and the estimated 20 per cent of buildings already experiencing overheating in summer grows. There is potential for a significant increase in demand for cooling by 2030, which will require consideration as part of 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 and heavy industry demand 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.

It is important to emphasise that decisions on decarbonising heat cannot be taken in isolation of wider developments across the energy sector and other sectors. For instance, hydrogen could have an important role to play in decarbonising heavy goods vehicles, which would have implications for using hydrogen for heat. It is also important to flag that the electrification of transport, which is rapidly gaining pace and reaching a tipping point, will heavily impact electrification decarbonisation pathways. Further, as noted above, there may be a need to offset residual emissions from heat and cooling with progress in other sectors. It is therefore vital that decarbonising heat is considered alongside, and aligned with, the wider UK decarbonisation process.

Industrial heating

Heating makes up approximately one third of the UK's non-domestic energy use[7] and industrial purchase of gas in 2017 totalled over £1.8bn[8]. 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.

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

Of the range of options for decarbonising heat, some options will be better suited to specific applications than others. For example, process heating requirements are more likely to require some form of gas heating, as this provides a consistent source with the capability to produce much higher temperatures than many other solutions. In other applications, there are a range of technologies available which could be applied to decarbonise the provision of space and water heating for off gas grid properties.

Non-domestic buildings continue to represent significant potential in terms of ability to transition away from high carbon fossil fuel heating. There are various options available to make this possible, and it is

[7] CCC, Next Steps for Heat Policy - https://www.theccc.org.uk/publication/next-steps-for-uk-heat-policy/

[8] BEIS, Sales of Electricity and Gas by Sector (DUKES 1.7) - https://www.gov.uk/government/statistics/dukes-annual-tables

most likely to be done through a combination of technologies including electrification, heating networks, biogas, hydrogen and energy conservation. However, we believe it would be inappropriate to target specific technologies. Instead, we would ask that a broad policy framework be put in place to limit the use of high carbon technologies and incentivise the use of low carbon technologies.

5. Discussion of Evidence Base: Achieving Change

a) Does this overview of the strategically important issues, as identified in the course of our review of the evidence, highlight the key issues? Are there important issues missing?

Consumer engagement

As recognised in the consultation paper, consumers are generally satisfied with natural gas central heating, which is both effective and efficient. There must, therefore, be an external push to drive customers away from carbon-emitting technologies. To be most effective, this would also be complemented by a consumer pull, supported by appropriate incentives and compelling customer propositions.

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

Energy efficiency markets can be used to learn important lessons about the need for efficient and attractive markets for low carbon heat. Consumer engagement on low carbon heat and energy efficiency has been low to date, with few consumers currently concerned about the emissions of their boiler or aware of alternative, renewable options.

The low level of consumer awareness around low carbon heating options is well illustrated in BEIS's Public Attitude Tracker[9], the most recent version of which finds that less than a third of respondents knew anything about renewable heating systems, with only six per cent stating that they know a lot. Perhaps more worryingly, awareness of renewable heating systems appears to have gradually dropped since 2013.

The range of technologies currently available for low carbon heating all require significant disruption in buildings, with many requiring additional disruption to public spaces like roads and pavements due to network reinforcement or modifications. Engaging consumers on why these unavoidable disruptions are happening and ensuring wherever possible that the disruption is minimised will be important to the efficiency of these domestic decarbonisation.

A key element for consumer engagement on heat decarbonisation will be positive messaging. Government communications and messaging should be optimistic and engaging, seeking to build public buy-in for the transition to low carbon heat. Government should also examine the role of a broader educational piece and explore what form a campaign could take if necessary. It is also important to look to industry, who are actively advertising low carbon heating technologies and will be able to offer feedback. Whilst it is true that the decarbonisation of heat is at an earlier stage than, for instance, the decarbonisation of transport, building a positive narrative will assist with deployment and consumer acceptance further down the line.

Government should continue to engage with consumer groups, notably Citizens Advice, in work on heat networks and low carbon heat and should ensure wide engagement in the development of consumer protections across these groups as well as across industry. Engaging with the wider consumer base on technical options for low carbon heat is a vital part of developing understanding, support and uptake for

9 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/776657/BEIS_Public_Attitudes_Tracker_-_Wave_28_-_key_findings.pdf

low carbon heat. The RHI has, to date, been unsuccessful in this wider engagement and a greater effort should be made in a coordinated effort to educate consumers.

We believe that in the first instance, developing a full picture of how different consumer groups are most likely to be affected and understanding the range of alternatives available to these groups, along with their circumstances, will be important. From this it will then be easier to identify the most effective routes for engagement.

Energy UK is already working with partner organisations, such as the Energy Saving Trust, to examine in greater detail where opportunities to engage may exist and where we may add value. We will continue to engage with BEIS and industry colleagues throughout 2019 to map out options and take forward opportunities, where appropriate.

Markets, coordination and planning /Local leadership and action

Government and industry are in agreement that any long-term policy framework will need to be flexible enough to enable local divergence whilst recognising the importance of central leadership. It is likely that different regions or types of building stock may hold 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 2017[10]. Consideration needs to be given to the type, ownership and geographical location of properties to understand what combination of solutions can best deliver for those consumers. This is not a decision that can be taken from Whitehall.

Please refer to our response to questions on 5.c) and 6.b) for further views on setting up appropriate market frameworks and price signals on heat decarbonisation. We would also highlight the need for segmenting the UK housing stock as explored in response to question 6.a)

b) Are there any important pieces of evidence that require further consideration?

When considering costs and benefits and the consumer experience, we would point to evidence from the behavioural sciences which concludes, for instance, that consumers tend to heavily discount future costs and benefits[11], preferring higher ongoing running costs to higher upfront costs. As argued in Energy UK's 'Kickstarting the Decarbonisation of Heat'[12] report, the high upfront cost of renewable heating systems is an important barrier to uptake and until assignment of rights was introduced was something the RHI failed to effectively tackle. There is also evidence suggesting a powerful bias towards the status quo[13]. There is extensive research[14,15,16] exploring the habits, preferences, motivations and heuristics that impact decision making, in particular in the energy and climate field. These insights should not be overlooked in the policy making process.

There is a tendency in many policy areas, including the energy sector, to focus on the technical and economic aspects of effecting change, often to the detriment of the user experience. The challenge of decarbonising heating is such that neglecting the end user and basing policy on erroneous assumptions of customer behaviour will lead to suboptimal outcomes. While it is clear that increased awareness of low carbon heating options and a strong customer proposition will be important parts of improving uptake, they will not be sufficient on their own. As outlined in response to question 6.b), Energy UK believes that a strong mix of policy levers, reflecting consumers diverse motivations and drivers of behaviour, will be necessary to deliver change at the required scale. We welcome the commitment to undertake research on consumer attitudes, motivations and preferences on heating, this will be a key

[10] https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Chapter-5-People-and-the-built-environment.pdf

[11] https://www.repository.cam.ac.uk/handle/1810/257212
[12] https://www.energy-uk.org.uk/publication.html?task=file.download&id=6609
[13] https://www.sciencedirect.com/science/article/pii/S1364032114007990
[14] https://www.repository.cam.ac.uk/handle/1810/242028
[15] https://www.repository.cam.ac.uk/handle/1810/257049
[16] http://www.behaviouralinsights.co.uk/wp-content/uploads/2015/07/behaviour-change-and-energy-use.pdf

foundation on which to base customer engagement and ensure that a consumer-centric approach to decarbonising heat is taken.

c) Do you agree with the set of strategic inferences we have drawn out?

Local leadership and action

To deliver local solutions, the Government should build on the local growth agenda supported by BEIS and its Industrial Strategy and ring-fence revenue raised through carbon-based incentives and taxation. This funding should be allocated competitively to regions in order to enable large-scale deployment of solutions to effectively deliver decarbonisation.

These bids should draw upon the knowledge and expertise of local actors including local authorities, local enterprise partnerships, businesses, social enterprises and delivery partners such as energy firms and network operators. This will identify opportunities to reduce carbon emissions across business, industrial and domestic consumers, as well as the potential for energy efficiency, locally-sourced fuels such as low carbon gas, and developed supply chains. This approach would also release private finance if supported by government policy and funding.

Central government funding would unlock the most cost-effective route to decarbonisation for the country, with a secondary objective of supporting industrial strategy objectives. Energy UK is deliberately vague when suggesting the kind of regional bodies that should coordinate, but such a grouping should coordinate with councils, private businesses and social foundations.

Overarching central government leadership will ensure that learnings on the social and financial impact 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 UK consumers.

Local authorities and communities are in many cases uniquely capable of developing plans relevant to local needs in a way which central government is unlikely to be able to do. Government should support this process by establishing broad frameworks for local authorities to follow and providing information on options, in terms of technologies and sources of funding.

Local approaches enable consideration of local needs and circumstances but need national coordination to ensure best practice is shared and collaboration across borders is enabled. Local planning may be limited in terms of its ability to affect the gas network, as there is an extent to which decarbonising the gas network will need to be led by UK Government. Government should coordinate with ongoing work examining this area of decarbonisation, including projects in Tees Valley, Keele University and across Leeds and Bradford. These efforts need steer and support from government to ensure duplication is avoided and collaborations are enabled.

Government should support the work of the Scottish Government in creating Local Heat & Energy Efficiency Strategies and should implement a similar plan across the UK. Scottish Government's commitment to decarbonisation deserves recognition and support from UK Government, given that it reflects an appropriate level of ambition in meeting the UK's climate change targets.

6. Developing a policy framework

a) Do you agree that we have identified the most important issues to be addressed as we develop our thinking? Do you consider that there are important omissions?

Energy UK supports the stated approach of: Decisive Near-Term Action; Energy Efficiency and Optimisation, and; Development of Long-Term Options. However, it is clear that near-term action has been ineffective to date, with existing initiatives and standards resulting in low levels of overall progress. 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 be delivered upon. In particular actions is needed to target emissions reductions in off gas grid, new build properties, remove barriers to the development of heat networks and cut emissions in public sector building. This should be bolstered by comprehensive regulatory frameworks.

Decisive near-term action

As stated above, near term action has been ineffective to date. There remain a number of low hanging fruit in which action has yet to be taken and we are concerned that the RHI will be closing in March 2019 with no other support announced. Ahead of the publication of heat policy roadmap, action is needed to provide short term stability once the RHI is closed to new applications.

To date, government has awarded over £1.4bn in RHI payments with an expected total of £23bn to be spent by 2041, greatly reduced from the initial targeted spending of £47bn[17]. The RHI has, to date, failed to address the upfront costs of installations and the number of trained installers is dropping because of falling installation numbers. With no announcements on measures to support low carbon heat following the closure of the RHI in March 2021 we are incredibly concerned that installation numbers will drop drastically and the progress made will be lost. It is very likely that unless action is taken swiftly, low carbon heat installations will fall off a cliff edge.

In the near term it will be important to segment the UK housing stock to better understand where least regret options exist and map out where action should be taken.

Short term action should be centred around taking forward ambitious plans for off gas grid and new build decarbonisation, reducing barriers to the development of heat networks and cutting emissions in public sector buildings. Tackling these areas will help develop sustainable markets and supply chains for energy efficiency and alterative heating installations. This holds the added benefit of replacing some of the most carbon intensive installations in the UK.

- *Off gas grid homes and businesses*: Government and regulators should implement incremental improvements to standards that effectively ban the most carbon intensive technologies whilst supporting consumers in making the switch to low carbon heating.
- Targeting off gas grid properties, seen by many to be 'low-hanging fruit', will enable government to bolster supply chains for low carbon technologies by creating a market for these technologies. Manufacturers of a range of incumbent technologies, including Oil and LPG boilers, and low carbon alternatives, including heat pumps and hybrid solutions, have expressed to Energy UK confidence their own ability to adapt to deliver decarbonisation. These companies require additional guidance from government on the targeted levels of decarbonisation in order to set in motion appropriate supply chain modifications.
- *New build standards*. As highlighted by the CCC, most recently in its publication on whether the UK housing stock is fit for the future[18], new build standards need to be strengthened to avoid locking in emissions and increasing the number of homes that will need to be retrofitted at a later date. We agree with the CCC's recommendation that new homes need to be "[…] low carbon, ultra energy efficient and climate resilient, with sustainable transport options". Reviewing Part L of the Building Regulations is a key opportunity to do so and must not be missed.
- *Reducing barriers to the development of heat networks*. Heat networks currently face disproportionately high business rate compared to equivalent utilities: currently heat networks are valued for business rates purposes using a method that uses land and construction costs, with the pipework being so costly, this results in a high rate bills. A further barrier lies in a lack of access and wayleave rights: heat networks need to be granted greater access, maintenance and development rights, similar to other utilities. These rights allow utilities to respond quickly to maintenance issues and to reach any infrastructure on private land. Access rights can also help to ensure that retrofit networks or expansions take the most efficient route. Furthermore, the ability to quickly access pipes for repair and maintenance is important from a customer perspective. Addressing these barriers will be essential to creating a self-sustaining heat network market.
- *The public sector.* In line with the ambition laid out in the Clean Growth Strategy efforts need to be ramped up to decarbonise public sector buildings. In many instances investment will have a positive net present value, therefore delivering efficiency savings.

[17] National 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

[18] https://www.theccc.org.uk/publication/uk-housing-fit-for-the-future/

Energy efficiency and optimisation

While Energy UK welcomes the Government's commitment to upgrade as many homes as possible to EPC band C by 2035 we are concerned that not enough is being done to achieve that. As highlighted in the Committee on Fuel Poverty's most recent progress report[19], there is currently a shortfall of over £6.2bn funding gap to meet Government's stated aim of upgrading fuel poor homes to an EPC C by 2030. This means that meeting that same target for all homes is even further out of reach.

Energy UK has consistently asked that government promote energy efficiency measures to a national infrastructure priority and continues to see this as a priority for enabling decarbonisation of the UK's provision of heat. The electricity generation sector has to date had the most significant impact on progress towards national decarbonisation targets and the heating sector now needs to be given the tools to play its part.

For a national programme to be successful, Government needs to provide a clear and certain roadmap with a firm end date as early as is feasible, as well as a range of complementary regulations and standards to be developed as time goes on. For instance, rules across building regulations, private rented sector MEES standards and regulations covering other tenures. It may be sensible for these changes to begin to integrate standards for low carbon heating, but an increased focus on energy efficiency should be progressed without delay as it offers benefits regardless of the heat decarbonisation pathway chosen.

Building regulations will be key to improving the energy efficiency of the building stock and we welcome the commitment to consult and review Part L of Building Regulations for England. Building regulations should be reviewed every three years. Doing so is, and will continue to be, an important part of ensuring that regulations are aligned with heat policy. We would call on Government to commit to reviewing part L of Building Regulations every three years.

Development of longer term actions

In its 2018 Annual Progress Report to Parliament, the CCC highlighted that the cost of decarbonisation in the UK could be reduced by 50 per cent using Carbon, Capture, Usage and Storage (CCUS), and called for immediate action to keep long-term options open. Given the long-term investment that CCUS infrastructure requires, further delays will increase costs and reduce options[20].

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

b) Do you have any comments on the types of actions identified to meet these challenges? Do you have other suggestions?

Energy UK supports the commitment to publish a heat policy roadmap. This should include:

1. **Regulation**: Government and regulators to implement incremental improvements to standards that effectively ban the most carbon intensive technologies.
2. **Communication:** Industry to launch a communications campaign to engage customers on the need to change and the range of solutions.
3. **Trials**: Large scale trials of a range of technologies to be rolled out from 2020 to boost investor confidence.
4. **Fiscal options and price signals**: Government to review fiscal options and introduce mechanisms from 2025 to signal required behaviour change and raise revenue to be ringfenced to support low carbon deployment.
5. **National framework for local solutions**: Government to release funds to local actors based on bids that best meet government's objectives and deliver decarbonisation at lowest cost.

[19] https://www.gov.uk/government/publications/committee-on-fuel-poverty-annual-report-2018

[20] https://www.theccc.org.uk/publication/reducing-uk-emissions-2018-progress-report-to-parliament/

6. **Energy efficiency**: This strategy should be coupled with a strong market for energy efficiency to support decarbonisation at lowest cost

Policies to expand low carbon heating

Energy UK welcomes the commitment to consulting on heating in the off-gas grid, building regulations and a market framework for heat networks, and looks forward to feeding into these important pieces of work.

A number of decisions concerning heat need to be made during this parliament, as they cannot be delayed without causing further uncertainty and endangering the UK's ability to meet its greenhouse gas emissions targets. Please refer to our response to question 6.a) on areas to address as a priority. Energy UK supports the principle laid out by CCC for a framework to be implemented by 2020 in order to meet the requirements set out in the 4th Carbon Budget and welcomes the commitment to laying out a Heat Policy Roadmap in the next 18 months.

The CCC estimates that a 15 per cent reduction in heating and hot water carbon emissions from buildings is required by 2030 to meet 2050 targets[21] but the UK is yet to develop a framework for achieving this. Putting in place a policy roadmap to address this is vital.

A comprehensive heat strategy or policy roadmap is essential to provide certainty to industry stakeholders and ensure that investment decisions can be taken in a timely manner. This should establish an overarching, investible framework that gives advance notice to domestic and business customers that any future in 2050 does not rely on the way we heat our homes and buildings today.

Trials for integrated low carbon heat solutions, energy efficiency measures and incremental improvements to the efficiency of gas should be rolled out to develop a comprehensive evidence base and establishing supply chains for Carbon Capture, Utilisation and Storage (CCUS) and a range of technologies. These should be integrated into regional low carbon heat frameworks which play on existing strengths across the UK.

It is essential that government and the energy industry work to give clarity to industry and consumers on the direction of travel. This should be achieved by undertaking a full-scale review of the policy and regulatory framework for heat, focussing specifically on how to improve the customer experience of heat services, utilising appropriate best practice from the UK and other countries[22]. This review should assess how to create an attractive investment climate for heat as a service business models. The recommendations of the Heat Networks Task Force[23] should also be integrated into the framework, as resolving the concerns raised by Citizens Advice[24] and BEIS[25], and currently under investigation by the CMA[26], is a priority for improving consumer and investor confidence. Finally, this review should ensure that best practice is encouraged and carried forward into the UK framework.

To build industry confidence, it will be important to provide clarity on Government's intentions and transparency on when action can be expected. Once timelines for action are announced, it is vital that they are kept to ensure that industry can invest with confidence. The review of Building Regulations is one example, this should take place every three years and is an important opportunity to ensure that regulations are aligned with heat policy. We call on Government to commit to review Building Regulations every three years and keep them closely aligned with work to decarbonise heat.

Promoting innovation in low carbon heating

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[21] https://www.theccc.org.uk/publication/uk-housing-fit-for-the-future/

[22] http://www.ukerc.ac.uk/programmes/technology-and-policy-assessment/best-practice-in-heat-decarbonisation-policy.html

[23] https://www.theade.co.uk/assets/docs/resources/Task%20force%20report_v7_web%20single%20pages.pdf

[24] https://www.citizensadvice.org.uk/Global/CitizensAdvice/Energy/District%20Heat%20Networks%20IR%20Report%202%20(May%202017)%20-%20FINAL.pdf

[25] https://www.gov.uk/government/publications/heat-networks-consumer-survey-consumer-experiences-on-heat-networks-and-other-heating-systems

[26] https://assets.publishing.service.gov.uk/media/5af31b9640f0b622d18b2d3f/Update_paper_heat_networks.pdf

The focus on promoting innovation in low carbon heating is welcome however as argued in response to question 6.d) more support is needed to take forward trials at scale. The commitment to step up innovation work is important and we look forward to seeing detailed proposals and funding commitments in due course, in line with the importance and scale of decarbonising heat.

We would highlight the progress that has already been made in overcoming upfront cost barriers through innovative solutions. The assignment of rights, for example, is playing an important role in bringing forward 'heat as a service' type product offerings, something which needs be actively encouraged and built upon further. Work being undertaken by the Energy Systems Catapult as part of the Smart Systems and Heat programme is further identifying potential new business models and offerings.

Preparing the ground for a new long-term heat policy framework

Energy UK proposes a two-pronged approach to stimulating demand for low-carbon solutions. Firstly, that the Government set 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-focussed solutions. Secondly, initiate a review of taxation, subsidy and incentives to be applied progressively across all sectors to signal the change required and to generate revenue to support the development and roll out of local solutions.

Carbon intensity regulation:

If government establishes a timeline, with significant foresight, that progressively restricts carbon emissions from heating solutions, then customers and industry will act accordingly. Restricting allowable carbon emissions from heating and, in the longer term, cooling should first be applied to the industrial and commercial sectors (I&C), given their higher demand than other sectors and the greater potential for innovation and investment. Incentivising industry to decarbonise their provision of heat throughout the next ten years will lower costs and barriers to successful roll-out across the rest of the economy.

Focussing on I&C will also provide opportunity through the existing and future UK Industrial Strategy in ensuring 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 but will need to be reinforced with emission limits that will drive industry to adapt.

Fiscal Incentives

Difficult decisions will need to be taken about how the costs of carbon are to be incorporated into customer's 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 apply the same principles to the heat sector.

Almost 70 per cent of customers see saving money on heating bills as important when thinking about replacing a heating system. Customers also tend to put more weight on the initial cost of heating equipment than the total life-time bill, which includes energy fuel costs. As a result, many consumers choose higher carbon technology options, that may be more expensive overall, in order to reduce initial expenditure.

Industry is clear that vulnerable and fuel poor consumers should be protected from rises in energy bills imposed by any tax through a mixture of support programmes and energy efficiency measures. As set out below, educational resources on options for decarbonisation should be made available to all customers, including industry, and plans should be aligned with local authorities.

Currently, gas in heating does not pay any form of carbon tax. Further, policy costs for schemes that support renewable and low carbon electricity (such as the Renewables Obligation, Contracts for Difference and Feed-in Tariffs) have been recovered on electricity bills whereas support for low carbon heating (such as the RHI, the Heat Networks Investment Project and the Industrial Energy Transformation Fund) is funded through general taxation. This has created a situation in which

customers are unaware of the emissions of their heating solution with. Establishing a carbon intensity signal, a carbon tax equivalent to that in the power sector for example, could start to signal the true cost of heating emissions without being overly burdensome on customers. We would caution however that any carbon intensity signal for domestic user must be linked to the availability of viable, cost effective alternatives to gas boilers to avoid simply adding costs with no reasonable alternative heating option.

There are a range of options for introducing fiscal incentives for decarbonising heat, each of which require a gradual implementation that is well sign-posted and integrated with wider decarbonisation efforts. It is expected that by 2030 carbon pricing policy for domestic will be easier to set, but only if the 2020s see increased carbon signals across I&C users, effectively increasing the market share of low carbon options.

Increasing standards and incentives on heating emissions will mean that customers start to consider the long-term viability of their decisions. Incentives and subsidy still have a core role to play in supporting customers who transition in the 2020s, as set out in Energy UK's publication on Kick-Starting the Decarbonisation of Heat.

c) **Do you have views on which parties are best placed to deliver actions to address the key issues?**

Due to the scale of the challenge, the number of unknowns and uncertainties and the far-reaching consequences of moving to low carbon heating, it is beyond the ability of one single industry actor, or group of industry actors, to lead this transition and action on the part of industry, Government and consumers will be necessary. Central Government has a key role to play in reducing the country's carbon emissions from heating and cooling, but it will be industry and local actors that will be responsible for implementing low carbon solutions. Energy UK members are committed to play their part to deliver a smooth customer experience throughout this transition and will continue to work collaboratively and constructively with industry colleagues, Government and Ofgem. Strategic direction must come from Government in the first instance, through the creation of a comprehensive policy framework which addresses the different barriers to decarbonisation, through an ambitious vision and policy framework for decarbonisation.

d) Do you have any views on priorities for further development and proving of emerging technologies with clear potential to provide strategically important options and benefits in relation to decarbonising heating? Please provide supporting argument for your views.

Energy UK welcomes Government's commitment to promoting innovation in low carbon heating. Bringing new solutions to market through an effective programme of research, development and deployment (RD&D) will be essential to cost effectively decarbonising heat. Efficient innovation in the energy sector is frequently delivered at lowest cost by robust competitive markets. Industry has already trialled a range of technologies in heat and will continue to do so, but market development will be required for the most efficient innovations to be enabled.

Energy UK believes that trials for integrated low carbon heat solutions, energy efficiency measures and incremental improvements to the efficiency of gas should be rolled out to develop a comprehensive evidence base upon which to base decision-making. Initiating and driving forward large-scale trials should be a priority for Government as part of the upcoming Comprehensive Spending Review.

As referenced extensively in the 'Clean Growth – Transforming Heat' document, there are a multitude of uncertainties pertaining to all heat solutions under consideration and deployment at scale is the most effective way of understanding the impacts of rolling them out in practice. We welcome actions 2.1, 4.2 and 4.3 with this regard and call on Government to integrate these actions into a wider programme of trials which also considers the role of energy efficiency and the potential for heating solutions to deliver flexibility to the system.

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. This innovation will need to consider all aspects of heat, primarily: process heating, space heating, water heating and cooling. It will also need

to consider infrastructure requirements, including for carbon capture usage & storage, low carbon clusters and energy network reinforcement. Consideration should also be given to projects that make use of the existing asset base, as these could prove less disruptive and costly.

As highlighted elsewhere in this response, we would also we would also flag the importance of supporting innovative business models, including heat as a service models, to help overcome upfront cost barriers of renewable heating systems.

e) Do you have views on how coordination and prioritisation of relevant initiatives across industry, academia and the public sector could be improved?

Please refer to Energy UK member responses.

f) Do you have views on ways in which the Government, and other actors, could seek to engage stakeholders and stimulate a wider public debate?

As argued in response to question 5.a) increasing awareness of the need to decarbonise heat is essential. We would refer you to Energy UK's response to the 2018 consultation on a future framework for heat in which we outlined key methods to engage consumers and other stakeholders. In summary, this includes:

- High level leadership on energy efficiency, including a comprehensive mix of policy instrument and ambitious high-level targets to indicate the direction of travel and increase awareness of the changes afoot. We would highlight the approach taken by the Scottish Government with this regard.
- Ensuring that local authorities are invited to play a key role in decarbonising heat, by providing clarity on revenue streams across local authority funding, subsidies and incentives for fuel poor or vulnerable customers.

g) Are there practicable ways in which we could facilitate greater transparency in the exchange of views and analysis on relevant issues?

Please refer to Energy UK member responses.