Department for
Business, Energy
& Industrial Strategy

A market-based mechanism for low-carbon heat

Consultation

Closing date: 12 January 2022

October 2021

Any enquiries regarding this publication should be sent to us at:
heatmarketmechanism@beis.gov.uk

Introduction

The UK was the first major economy in the world to set a legally binding target to achieve net zero greenhouse gas emissions by 2050. The UK has also already shown that environmental action can go hand-in-hand with economic success, having grown our economy by more than three-quarters while cutting emissions by over 40% since 1990. The sixth carbon budget is another indication of this government's dedication to Britain's green industrial revolution, positioning the UK as a global leader in the green technologies of the future.[1]

To achieve our net zero target, we need to transition to low-carbon ways of heating our homes, businesses and public buildings across the board. Currently, heat in buildings is responsible for 23% of the UK's greenhouse gas emissions.[2]

This is a critical decade for action on the decarbonisation of heat and upgrading the energy efficiency of our homes and other buildings. Published alongside this consultation, the government's Heat and Buildings Strategy sets out the policy action we are taking now to accelerate this transformation and our plans to go further.

While there are several strategic pathways to full decarbonisation of heat by 2050 and a range of low-carbon technologies and systems have an important role to play, including a potentially leading role for hydrogen, one thing is clear: the electrification of heating through the deployment of highly efficient electric heat pumps must form a major part of how we heat our buildings in all future scenarios.

As the Heat and Buildings Strategy sets out, this means we need to grow the market for heat pumps to approximately 600,000 installations per year by 2028. This level of heat pump deployment, including in new-build properties, is strategically important for any of the potential routes to net zero, and it is essential for ensuring an electrification-led route remains viable, which would require further growth to much higher numbers of annual heat pump installations by the early 2030s. This scale of market growth over the 2020s is also expected to directly support around 40,000 low-carbon jobs by 2030. The government is keen that the proposals set out here, and the broader strategic and policy approach we are taking, support investment and high-quality futureproofed jobs throughout the UK supply chain – in the development, manufacture, sales, installation, and maintenance of heat pumps and in wider associated industries such as smart home energy management.

The government has taken a range of steps to support consumers and building-owners to make the transition to low-carbon heat. The domestic Renewable Heat Incentive (RHI), for instance has supported more than 60,000 heat pump installations. The new £450m Boiler Upgrade Scheme, announced in the Heat and Buildings Strategy, will also be focused primarily on supporting heat pump installations from 2022 with consumer grants towards upfront costs.

However, further action, using a balance of policy approaches, is needed to accelerate this transition. The government has therefore announced that under the forthcoming Future Homes Standard new buildings will be required to be future-proofed with low-carbon heating and

[1] We have set a series of targets to reduce greenhouse gas emissions through legally-binding 'carbon budgets'. The sixth carbon budget covers the period 2033-2037.
[2] BEIS (2021), 'Final UK greenhouse gas emissions national statistics: 1990 to 2019' (https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2019) and BEIS (2021) 'Energy Consumption in the UK' (https://www.gov.uk/government/statistics/energy-consumption-in-the-uk).

world-leading levels of energy efficiency, while alongside the Heat and Buildings Strategy we are consulting on proposals to phase out the installation of fossil fuel heating systems off the gas grid.

This consultation sets out plans to establish a platform for an industry-led transformation of the heating appliance market, through the introduction of a market-based mechanism for low-carbon heat. Working alongside measures such as those above, this mechanism will create a market incentive to grow the number of heat pumps installed in existing premises each year, providing industry with a clear, long-term policy framework for investment and innovation throughout the supply chain. This intervention will also help to correct for a number of market failures that otherwise lead to under-investment in strategic low-carbon technologies such as heat pumps, relative to established fossil fuel technologies, since their relative prices are not reflective of their respective full costs and benefits to society.

Under our lead proposal, this mechanism would work by establishing an obligation on those companies selling fossil fuel heating appliances (gas and oil boilers) to achieve a growing number of heat pump, and potentially other low-carbon appliance, installations in parallel, in line with the trajectory towards 600,000 heat pumps per year by 2028.

We believe that through providing market-wide certainty and incentives, we can provide the conditions for investment in the UK heat pump supply chain and help businesses to take the lead in finding innovative market opportunities to make the switch to a heat pump an increasingly attractive, mainstream choice for growing numbers of UK consumers.

As the Heat and Buildings Strategy sets out, there remain important choices as to how the costs of the transition to low-carbon heating are met across society, but the government is committed to ensuring affordability through addressing market distortions, providing near-term financial support, and creating the conditions for industry to rapidly drive down costs. We will work with industry on the ambitions of leading businesses for 25-50% reductions in the installed costs of heat pumps by 2025 and approaching parity with boilers by the end of the decade.

In this light, government is also taking a range of steps to support the development of a vibrant market for green finance over the coming years. We will also continue to consider the case and options for targeted financial support for low-carbon heating technologies such as heat pumps in future, beyond the period of current and planned support schemes.

At the heart of the government’s approach in reviewing and developing the overall policy framework will be ensuring that the costs of decarbonising the energy system are fair and affordable for all energy users. Low-income and fuel-poor households must not be disproportionately affected and there must be support where it is needed to make sure that all consumers are able to make the transition.

We would welcome views from a wide range of stakeholders on the proposals set out here. We anticipate consulting further in due course on more detailed policy design proposals, informed by responses to this first consultation. Developing the market for heat pumps in the UK at the pace needed requires a major transformation, but it is one that will bring both substantial opportunities for businesses and substantial benefits for consumers. We look forward to hearing in responses how we can design this policy to work best for consumers, best for business, and best for our journey to net zero.

Contents

General information

Why we are consulting

To set out policy proposals and invite stakeholder views on the introduction of a market-based mechanism to support the development of the market in low-carbon heating appliances, principally electric heat pumps.

Consultation details

Issued: 19 October 2021

Respond by: 12 January 2022

Enquiries to: Heat Market Mechanism Team

Email: heatmarketmechanism@beis.gov.uk

Consultation reference: A market-based mechanism for low-carbon heat

Audiences:

The consultation will be of particular interest to stakeholders in the heating and wider energy industry, representative groups, and those with wider interest in the UK's net zero ambition.

Territorial extent:

The United Kingdom

How to respond

We encourage respondents to make use of the online e-Consultation platform, Citizen Space, to respond to this consultation wherever possible. This is the department's preferred method of receiving responses. However, responses submitted in writing, or by email will be accepted. If responding by email, please use the email template found on the GOV.UK consultation page.

Respond online at: https://beisgovuk.citizenspace.com/heat/a-market-based-mechanism-for-low-carbon-heat

or

Email to: heatmarketmechanism@beis.gov.uk

A response form is available on the GOV.UK consultation page: https://www.gov.uk/government/consultations/market-based-mechanism-for-low-carbon-heat

When responding, please state whether you are responding as an individual or representing the views of an organisation.

Your response will be most useful if it is framed in direct response to the questions posed, though further comments and evidence are also welcome.

Confidentiality and data protection

Information you provide in response to this consultation, including personal information, may be disclosed in accordance with UK legislation (the Freedom of Information Act 2000, the Data Protection Act 2018 and the Environmental Information Regulations 2004).

If you want the information that you provide to be treated as confidential please tell us, but be aware that we cannot guarantee confidentiality in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not be regarded by us as a confidentiality request.

We will process your personal data in accordance with all applicable data protection laws. See our privacy policy.

We will summarise all responses and publish this summary on GOV.UK. The summary will include a list of names or organisations that responded, but not people's personal names, addresses or other contact details.

Quality assurance

This consultation has been carried out in accordance with the government's consultation principles.

If you have any complaints about the way this consultation has been conducted, please email: beis.bru@beis.gov.uk.

Background to the proposals

The Heat and Buildings Strategy recognises that there are several potential strategic pathways that the UK could take to decarbonising heat by 2050. Two main options involve widespread electrification of heating using heat pumps, on the one hand, and a potential programme to convert parts or the whole of the current natural gas network to one supplying hydrogen, on the other. However, given the diversity of heat demand in the UK, no one solution can provide the best option for everyone: a mix of technologies and customer options will be needed to decarbonise heat at scale. Low-carbon heat networks, for instance, have an important role to play in all scenarios.

Whatever the ultimate pathway to net zero, however, it is clear that heat pumps will need to play a substantial role in all cases. Heat pumps are powered by electricity rather than burning fossil fuels, so do not produce emissions at the point of use. As the UK electricity generation mix produces increasingly lower greenhouse gas emissions each year, so do electric heating systems. Heat pumps are also highly efficient, producing several units of heat for every unit of energy consumed, meaning their deployment at scale leads to lower total energy demand.

While the number of consumers installing a heat pump each year has been growing in recent years, UK heat pump sales remain very limited by comparison with sales of fossil fuel burning appliances. Approximately 1.7 million gas boilers[3] are installed in the UK each year, as against only around 35,000 heat pumps.[4] Heat pumps are a mature technology, however, that are an established mainstream consumer choice in other markets such as Sweden and Norway and increasingly so in France and Italy.

As the Heat and Buildings Strategy sets out, we need heat pumps to become an equally mainstream consumer solution in the UK over the coming years. For this reason, the Prime Minister's recent Ten-Point Plan for a Green Industrial Revolution set out an aim to grow the market to 600,000 heat pump installations per year by 2028 in order to reduce greenhouse gas emissions from heat and put us on a trajectory to reaching our 2050 net zero targets. This scale of heat pump deployment is needed to make an electrification-led pathway to net zero a viable option at least cost, which would require substantial further growth in installations by the early 2030s, but is also a strategically important level of deployment even in a hydrogen-led transition.

To enable this level of deployment, the market and supply chains need to develop substantially in order to provide a wide range of attractive choices for consumers, with compelling and simple consumer journeys, supported by a wide base of skilled advisors and installers. We expect this to support up to 90,000 futureproofed low-carbon jobs by 2035. This clear trajectory for the UK heat pump market, and growing demand across Europe around the world, also represents an exciting opportunity for the UK engineering, manufacturing and assembly industries to develop to serve as large a share as possible of domestic and export demand.

There are a number of policies already in place to support the growth of the heat pump market, including the Renewable Heat Incentive (RHI). The RHI has been in place since 2011 and is a government financial incentive scheme to support the uptake of renewable heating technologies. Since the start of the RHI, it has supported the deployment of more than 60,000

[3] Energy & Utilities Alliance (2019), EUA Economic Report
[4] Building Services Research and Information Association (BSRIA) (2021), *Heat Pump Market Analysis 2020*

heat pumps.[5] The domestic RHI has funding confirmed for new deployment of renewable heat technologies up until 31 March 2022. The government's new £450m Boiler Upgrade Scheme announced in the Heat and Buildings Strategy will provide further support to heat pump installations from 2022, with household grants of up to £6,000, depending on technology. In addition, the Green Homes Grant voucher scheme supported domestic customers to install energy efficiency and low-carbon heating measures, including heat pumps, helping to reduce energy bills and greenhouse gas emissions, and the Green Homes Grant Local Authority Delivery and Home Upgrade Grant schemes continue to support heat pump installations.

We are also undertaking a programme of work to build an enabling environment for growing the UK heat pump market and driving wider deployment. This includes working with industry on training, skills and standards for installers and others in the supply chain; reviewing installation standards to ensure consumers benefit from the protections they need and the quality of work they expect; working with Ofgem, network operators and others to ensure the electricity system is ready to meet the increased demand for electricity from heat pumps at lowest cost for consumers; funding innovations and developing policies to support development of the market in green finance for home retrofits; and stepping up public engagement to help build understanding of the need for a transition to low-carbon heating and confidence in the technologies and options for doing so, and ensure consumers have access to high-quality trusted advice when they come to make the switch.

The electricity system plays a vital role in enabling the deployment of low-carbon heating technologies, particularly in the case of heat pumps. By using smart technologies, buildings can optimise consumption of electricity from renewable sources, reduce how much low-carbon generation and network capacity is needed to power them, and reduce the need for connection upgrades. Smart and flexible heat pumps, alongside heat and energy storage, shift their electricity consumption to times when demand for electricity is low or low-carbon generation (such as wind power) is high, thereby benefitting the grid. This can help both to reduce carbon emissions, by reducing the amount of network and generation capacity needed and, by favouring off-peak usage, reduce costs to consumers. BEIS and Ofgem have set out their vision, analysis and work programme for delivering a smart and flexible energy system in the Smart Systems and Flexibility Plan and Energy Digitalisation Strategy. We are currently undertaking research and analysis to develop policies to support and incentivise smart systems, including the smart deployment of heat pumps.

However, we need to go further in supporting the transition to low-carbon heating.

As part of this, the government has announced plans to introduce a Future Homes Standard to ensure that new-build homes are futureproofed with low-carbon heating and high levels of energy efficiency, avoiding the need for later retrofitting.

Alongside the Heat and Buildings Strategy, the government has also published consultations on a package of new policy measures, including consultations on regulations to phase out the installation of high-carbon fossil fuel heating in existing homes and existing businesses and public buildings off the gas grid, both with a 'heat pump first' approach to replacement.

Complementing those areas where regulations are most appropriate and in order to help prepare the market and supply chains for their introduction, this consultation sets out plans to establish a platform for an industry-led transformation of the heating market, through the introduction of a market-based mechanism for low-carbon heat.

[5] BEIS (2015), *Renewable Heat Incentive statistics,* https://www.gov.uk/government/collections/renewable-heat-incentive-statistics

The proposals

Aims

The policy proposals set out here aim to underpin a transformative development of the UK heat pump market towards 600,000 installations per year by 2028,[6] and to work alongside other policies to deliver substantial reductions in greenhouse gas emissions from heating.

At present, the UK heating market is dominated by mature, fossil fuel technologies – most notably, natural gas boilers – which have no long-term role in a low-carbon future.[7] The proposals here therefore aim to provide a clear long-term policy trajectory and certainty on market size and establish the conditions for market actors to invest with confidence in transforming the heating market towards low-carbon alternatives of strategic importance.

This approach also keeps the choice to switch to low-carbon heating voluntary for those consumers where there remain a broader range of potential strategic options for the transition to low-carbon heating, such as those connected to the gas grid.

In taking this policy approach, our aim is to harness the power of the market to experiment with ways to grow the appeal and uptake of heat pumps that work for consumers, work for business, and keep costs low. As industry looks to develop the market and build consumer demand, we would expect to see growth and evolution throughout the UK heat pump supply chain, including in the range of products and services on offer, business models, and the numbers and approaches of skilled installers and other intermediaries.

These proposals are aimed at addressing market failures that act as a barrier to the emergence of low-carbon technologies such as heat pumps on a competitive basis with established alternatives. The full societal costs of heating based on fossil fuel combustion and of low-carbon heating – with respect to health and climate change – are not reflected in their market price, leading to under-investment in technologies such as heat pumps. Low-carbon heating also does not benefit from economies of scale and mature supply chains to the same degree as conventional technologies, which further contributes to heat pumps' inability to compete on price. The proposals set out here therefore aim to address the cumulative effects of this, improving the incentives for investment in developing the UK heat pump supply chain, supporting growth of the market to realise economies of scale, and supporting the competitiveness of a key technology for net zero.

[6] This ambition of approximately 600,000 installations per year by 2028 includes hydronic heat pump installations in new-build properties. The market-based mechanism proposed here would be focused on domestic-scale hydronic heat pump installations in existing properties, as set out in the 'Proposed scope' section below.
[7] In principle, natural gas boilers could be manufactured in future so as to be more readily convertible to run on hydrogen.

A market-based mechanism for low-carbon heat

Introduction

We propose to introduce a new market-based mechanism from 2024, which will create a market incentive to grow the numbers of low-carbon heating appliances installed each year. This mechanism will work alongside a range of subsidy-based and regulatory policy approaches, targeted where most appropriate, to establish an overall policy framework capable of supporting a transformation of the market.

Under the lead option that we are most likely to pursue, this mechanism would create an obligation on the manufacturers of fossil fuel heating appliances (gas and oil boilers) to achieve the sale of a certain level of heat pumps proportional to their fossil fuel boiler sales in a given period.

This proportion could then in principle be stepped up over time, in line with the ambitious but achievable scale of growth in low-carbon heating that is needed. Such increments would be planned and publicised in advance to provide sufficient lead-in times to support businesses to prepare.

As the 'Obligation design' section below sets out, there are a range of models that a mechanism such as this could take, and we expect to consult on more detailed design proposals in due course. We intend that whatever model is ultimately adopted will incorporate a means for flexible market-based responses to meeting the obligation, such as credit-trading, so that obligated parties have options beyond and alongside the sale of their own heat pumps.

Market-based mechanisms such as these have been successful in supporting market transformations and achieving social and environmental objectives in a range of sectors in the UK and elsewhere, including growing the market for low-emissions vehicles, reducing landfill waste, supporting renewable electricity generation, and reducing the carbon intensity of fuels.

Lead proposal: an obligation in the heating appliance market

We are proposing to introduce an obligation on the manufacturers of gas and oil boilers sold on the UK market to achieve the sale of a certain number of heat pumps proportional to their boiler sales in a given period.

In response, we would expect obligated parties to take a range of steps, both directly and in partnership with other market actors, to find and build consumer demand for heat pumps. In this way, we expect the policy to help create the conditions for rapid innovation across the market, for example in consumer marketing, in consumer journeys, in products and product bundles, or in service-based or finance packages. We anticipate that this will help bring about a transformative development of the consumer proposition with respect to heat pumps, leading to an expansion of compelling, attractive offers, and products and services suited to a range of different consumers and properties.

Through encouraging innovation and development of the consumer experience of switching to a heat pump, and the options available for doing so, the policy – in tandem with regulatory and subsidy-based demand-side measures – should therefore help both to encourage growing numbers of consumers to voluntarily make the switch as well as provide an improved experience for consumers guided to install a heat pump under rising minimum standards.

Costs, finance and financial support

The upfront cost of installing a heat pump for the first time (including one-off measures) is at present often significantly higher than replacing a gas or oil boiler. However, we expect to see significant reductions in the installed cost of heat pumps over the coming years and will work with industry on the ambitions of leading businesses for at least 25-50% reductions by 2025 and approaching cost parity with boilers by the end of the decade.

Economies of scale throughout the supply chain, for example with efficiencies on installations as volumes grow and new approaches are explored, will play a major part in this.

The market-based and market-wide nature of the policy should also help to keep overall costs as low as possible, with obligated parties competing to develop a vibrant heat pump market in the most efficient ways possible, with significant benefits for consumers as a result.

We also see an important role for consumer and private finance to play in helping to spread the costs of energy efficiency upgrades and low-carbon heating installations over time for home- and building-owners. The government is therefore taking a range of steps to support the development of a vibrant market for green finance of this nature. Our Green Home Finance Innovation Fund, for instance, is providing £1.8m support to three projects to develop and pilot innovative green mortgage and additional borrowing products, and we are considering options for how the growth of the green finance market can best be supported going forward.[8] We have also recently consulted on proposals for how mortgage lenders can help homeowners to improve the energy performance of their homes.[9] We believe that the introduction of the market mechanism proposed here will further help to support the development of a market in green finance, providing market actors with the incentive to explore, for instance, partnering with financial institutions to offer attractive financing propositions to consumers for heat pump installations and wider home retrofits.

As the Heat and Buildings Strategy sets out, it is important to ensure that the way that the costs of heat decarbonisation, including heat pump deployment, are met across society is fair. The government will therefore continue both to support cost reductions to be realised this decade as economies of scale are reached and to provide financial support where it may be needed to enable or incentivise certain consumers to make the switch to a heat pump, including to help ensure that complying with regulations is affordable.

As part of this, we are investing both in key research and development efforts through our £60m Heat Pump Ready programme and in a range of schemes directly supporting the installation of heat pumps, including the new £450m Boiler Upgrade Scheme and the Home Upgrade Grant focussed on the worst-performing off-grid homes. We will continue to consider the case and options for future support to heat pump deployment beyond these and other planned schemes.

The choice of a manufacturer obligation

We are proposing to introduce this obligation in the heating appliance market, as opposed to elsewhere in the energy market, as we believe this approach most directly aligns with the expected evolution of the sector: since it is clear that heat pumps will be a major part of the UK

[8] BEIS (2020), *Green Home Finance Innovation Fund competition – successful bids* https://www.gov.uk/government/publications/green-home-finance-innovation-fund-competition-successful-bids

[9] BEIS (2020), *Improving home energy performance through lenders* https://www.gov.uk/government/consultations/improving-home-energy-performance-through-lenders

heating mix under any strategic scenario, many companies in the sector are already planning and beginning to grow the low-carbon side of their businesses in order to compete in that fast-growing market and so retain or grow overall market share. This market-wide policy provides the incentive and confidence to pursue and expand those plans.

Taking this approach, with the low-carbon heating obligation linked to fossil fuel appliance sales, also helps to focus the incentives of the policy most directly on the heating appliance market and supply chain and on the point of appliance purchase.

We believe that a market-based policy such as this has an important role to play as part of the overall policy framework. Such a mechanism will put the market at the heart of driving the transition and incentivise firms to invest and innovate to improve the consumer proposition of heat pumps and build consumer demand. Operating alongside spending-led and regulatory demand-side policies at both UK Government and Devolved Administration levels, this will create a system of aligned incentives for manufacturers, installers and consumers and help to correct the market failures that would otherwise continue to lead to under-investment in and the under-competitiveness of heat pumps, and ensure that the development of the market for this key strategic technology for net zero keeps pace with the ambitious trajectory we need.

In response to the policy, and as part of the broader evolution of the market, we would anticipate a range of routes-to-consumer to continue and new ones to emerge, many of which may involve manufacturers working in partnership with other intermediaries across the market – whether heating installers, energy suppliers, or others – in order to reach different types of consumers with low-carbon products and services that work best for them.

In this way, the proposal does not rest on an assumption that manufacturers would need to substantially expand direct-to-consumer sales for heat pumps, although we are aware that manufacturers may opt to do so. In the current UK heating market, the large majority of boilers are sold via intermediaries, primarily on the recommendation of heating installers with a substantial minority sold through others such as energy suppliers and heating insurance schemes.

Question 1. Do you have views on the proposal to apply this mechanism to the heating appliance market, basing the obligation on the sale of fossil fuel boilers and applying it to appliance manufacturers?

Question 2. Do you have comments on how the market would be likely to evolve once this obligation was in place? For instance, do you envisage that it would be most likely to lead to growth in certain business models or consumer propositions?

Question 3. Do you have views on how competitive pressure can be maintained to support cost reductions and efficiencies in the heat pump market over time, as have been seen in other sectors? Are there further steps that you feel it would be justified to take within the design of this market-based mechanism to support this?

Question 4. Do you have views on how future financial support to the heat pump market, such as financial support for certain heat pump consumers, might work most effectively alongside this market-based mechanism, and how reliance on such support can be reduced over time?

Alternative proposal: an obligation in the energy supply market

A potential alternative to our lead option would be for the obligation to achieve a certain number of low-carbon heat installations to be applied to energy suppliers, rather than to appliance manufacturers. Supplier obligations have achieved significant impact both in the UK and elsewhere, for instance to support building energy efficiency upgrades.

Under this model, the incentive would be placed on licensed gas and electricity suppliers to take steps to support consumer uptake of heat pumps, for instance through promoting products and services to their existing consumer base and new consumers, potentially developing new business models and consumer packages, and in some cases making use of established delivery models or supply chains developed for existing schemes such as the Energy Company Obligation (ECO).

We would expect to see some pass-through of costs associated with such activity to consumer energy tariffs. However, as above, we will be continuing to review the wider policy framework to ensure a fair allocation of how costs associated with building decarbonisation are met among all consumer groups and between different energy users, homeowners and taxpayers. The financial support we are providing to heat pump installations, plus the rapid reductions in heat pump costs we expect to see as the market scales up in the coming years, should help to keep the direct costs to energy suppliers of such an obligation to a minimum.

For those energy suppliers with ambitions to develop or expand business activities in supporting consumers to transition to low-carbon heat, a policy such as this could provide a platform of confidence against which to invest in pursuing these plans. However, it would be important that market-based means of meeting the obligation are available, as set out in the 'Obligation design' section below, so that firms would have a range of options to suit different business strategies, whatever the final design choice on the obligated party.

We are keen to receive views through this consultation on the principle of a supplier obligation such as the one proposed here and how such a policy could be designed to work best to meet the aims set out in this document.

While we have not yet fully ruled out pursuing such an approach, and are therefore keen for views in response to this consultation, it is not the lead proposal that we expect to pursue, since we believe it aligns less well with the potential evolution of the energy retail market towards greater flexibility and diversity of suppliers and business models.[10] In contrast, our lead proposal does have strong alignment with the direction of the heating appliance market.

> **Question 5. Do you have views on this alternative 'supplier obligation' proposal? If the government were to pursue this approach, what design considerations would help to make it work best for the energy retail market and for consumers?**

Territorial Extent

The government's intention is that the proposed obligation should apply throughout the UK. We believe it is important and preferable that different rules do not apply to sales of heating

[10] BEIS/Ofgem (2019), *Flexible and responsive energy retail markets*, https://www.gov.uk/government/consultations/flexible-and-responsive-energy-retail-markets

appliances in one part of the UK market from another. This will help to ensure that the policy is effective, keep the complexity of compliance for companies to a minimum, and ensure fair, low-cost outcomes for consumers. For instance, if large numbers of fossil fuel boilers began to be sold from one part of the UK where their sale did not generate a low-carbon heat obligation to consumers in another part of the UK where it would have done, the policy would not achieve its impacts on reducing greenhouse gas emissions from heating.

Given these considerations, we will work closely with the Scottish and Welsh Governments and Northern Ireland Executive on options for applying the policy UK-wide to complement heat and energy efficiency policies in the devolved nations, in line with the respective devolution settlements.

Proposed scope of technologies and installations

The aim of this policy is to support a transformation in the market for domestic-scale heating appliances and to create market conditions which support heat pumps to quickly become a mainstream choice for consumers replacing the heating system of existing properties. 'Domestic-scale' heating appliances are those with the capacity to heat the vast majority of UK homes, which are also used in certain smaller non-domestic properties. Such appliances represent over 95% of all UK heating appliance sales each year.

In summary, we propose that:

- the sale of fossil fuel boilers (those fired by natural gas, oil, or liquefied petroleum gas (LPG)) up to 70kWth to UK consumers, in the lead policy proposal, would generate a low-carbon heating obligation;
- the obligation would require the obligated parties to achieve the installation of a certain number of heat pumps up to 45kWth to existing UK properties.

Heat pump appliances in scope

The focus of the policy is on supporting development of the market in electrically-driven heat pumps which can provide both space heating and hot water and can be retrofitted to the over 85% of UK domestic properties which have hydronic (water-based) central heating systems. As a result, we are not minded to include 'air-to-air' heat pumps in scope; meeting the obligation would require the installation of an 'air-to-water', 'ground-to-water' or 'water-to-water' heat pump.

Low-temperature heat pumps can deliver high levels of energy efficiency, emissions reductions and thermal comfort, can be deployed at scale across the majority of UK homes, and generally have lower running costs than many other low-carbon heating systems, including high-temperature heat pumps. It is therefore the development of the market in low-temperature heat pumps that we are primarily aiming to incentivise through this policy. We are considering how best to treat high-temperature heat pumps under the obligation, subject to the policy's final core design, including the options of excluding their sale from qualifying towards meeting the obligation or of building in differentiated incentives for low-temperature vs high-temperature heat pumps (see 'Potential for differentiated incentives' section below).

We are proposing to introduce a heat pump capacity limit in order to ensure that the policy is focused on domestic-scale heating appliances. A 45kW limit would be consistent with the capacity used by the Microgeneration Certification Scheme (MCS) for a single renewable heating product, and is the limit proposed for the Boiler Upgrade Scheme. The majority of the heat pump installations supported under the RHI have a capacity less than or equal to 45kW.

Installations where multiple heat pumps within the appliance capacity limit are installed together to heat one premises, summing to a total installed capacity larger than 70kW (the upper threshold in MCS Standards), would be out of scope.

As set out above, heat pumps and heat pump-based heating systems have an important role to play in supporting the wider energy system and keeping costs low for individuals and in aggregate through smart and flexible operation. We are therefore exploring a range of policy measures that can maximise the flexible potential of heat pumps and mitigate their impact on the electricity system. The market-based mechanism proposed here could have a role to play in this, for instance by incorporating enhanced incentives for 'smart-enabled' heat pumps, or by excluding heat pump installations that are not smart-enabled from contributing towards the obligation altogether. We welcome respondents' views on this.

Question 6. Do you have views on the treatment of 'air-to-air' heat pumps in the market-based mechanism? Please provide evidence to support your response.

Question 7. Do you have views on the treatment of high-temperature heat pumps in the market-based mechanism? Please provide evidence to support your response.

Question 8. Do you agree with the proposal to apply a 45kWth heat pump capacity limit? Yes/No. If no, please provide evidence to support a higher or lower capacity limit.

Question 9. a) Do you have views on the proposal for a 70kWth capacity limit for fossil fuel boilers to generate an obligation under the policy? Yes/No. b) Do you believe that this is an appropriate level to avoid a substantial risk of 'over-sizing' of boilers sold above the policy's limit? Yes/No. Please provide evidence to support your answers and views on how risks may best be mitigated.

Question 10. a) Do you have views on whether the market-based mechanism is an appropriate tool for supporting 'smart' heat pump capability and use, and any limitations of this? Please explain your answer. b) Do you have views on whether this should be through differentiated incentives (see section below), through the exclusion of 'dumb' heat pumps from qualifying scope, or another approach?

Hybrid heat pump systems

Hybrid heat pump systems combine an electric heat pump with a combustion boiler using fossil fuels or low-carbon alternatives. Controls can be used to manage how the different technologies operate together and can be used to optimise on the basis of cost or efficiency.

Whilst there are relatively low levels of deployment within the UK, initial trial and in-situ data suggests these systems can deliver significant greenhouse gas reductions, particularly where the heat pump element is sized to meet the majority of the heat requirements of the building. By switching to make greater use of the boiler when electricity demand is high, hybrid heat

pumps may also help to reduce the peak capacity required in the electricity system, creating additional benefits for network flexibility and resilience. The smart operation of standalone (non-hybrid) heat pumps in combination with energy storage[11] also has the potential to reduce peak electricity requirements significantly; the system value of widespread hybrid heat pump deployment relative to widespread smart and flexible standalone heat pump deployment, and other interventions which can deliver a smart and flexible energy system, requires further investigation.

Hybrid heating systems can also provide a good level of thermal comfort, in a wide range of buildings, limiting the requirement for thermal efficiency improvements and upgrades to heating distribution systems. Hybrids might therefore act as a stepping-stone between a combustion boiler and standalone heat pumps, for consumers more familiar with the former. Additionally, given the considerable overlap in the manufacture and installation of many hybrid systems, the deployment of certain hybrid heat pumps could support the overall development of the heat pump supply chain. Since hybrid systems may also appeal to a different market share than standalone heat pumps, inclusion of hybrid heat pump systems in the policy should also support overall growth in the heat pump market.

However, the market for hybrid systems is developing rapidly and a range of products are available to consumers today. These range from heat pumps installed alongside existing boilers, to compact hybrids consisting of a small heat pump and gas boiler integrated within a single unit. The level of emissions savings for each fossil fuel hybrid installation is proportionate to the level of heat demand met by the heat pump component, however, which can vary across the different types of hybrid systems. Product diversity, therefore, while welcome from an innovation perspective, creates some clear challenges for government in terms of delivering significant near-term carbon savings. Some hybrid systems are also likely to deliver greater benefits than others in terms of supporting overall heat pump supply chain growth.

In practical terms, this may mean that the market-based mechanism will need to differentiate between different types of hybrid systems in order to better support the deployment of those, if any, that more strongly contribute to the policy's objectives of achieving substantial near-term carbon savings and building the heat pump supply chain, particularly in relation to heat pump manufacturing and installer skills.

In addition to the type of product installed, for the heat pump to work efficiently and deliver significant emissions reduction, hybrid systems are reliant on both consumer behaviour and the thermal efficiency of the building. To include hybrids in the market-based mechanism, government will need appropriate safeguards to ensure that:

- There can be a level of certainty of the emissions savings per hybrid installation, versus e.g. a standalone heat pump installation;
- Hybrid installations are compatible with wider energy efficiency objectives – so that their deployment does not lead to lower levels of energy efficiency upgrades, and consumers are made aware that the heat pump component in a hybrid system runs more efficiently in a better-insulated building; and
- Consumer protections in place for heat pump installations can be extended, and if necessary tailored, to hybrids.

[11] *Storage can take several forms, including the heat stored in the fabric of the building, hot water storage, phase change materials (also known as heat batteries) and electric batteries. This storage can be in individual homes, across multiple buildings (e.g. serving a block of flats) or at city scale in large heat networks.*

There are a number of ways this assurance might be gained, either through industry action, the design of the market-based mechanism, or the development of wider policy. For instance, it may be necessary to limit the deployment of hybrids under the obligation either in terms of overall numbers of hybrid installations versus standalone heat pumps; through placing restrictions on the size or type of installation supported; or through limiting installations to a specific sub-set of consumers such as those living in homes currently unsuitable for a standalone heat pump system.

Industry action could include the development alongside government of installation standards governing the minimum energy efficiency or emissions intensity of hybrid systems or the development of specific installer training modules for hybrid installations. Work between industry and consumer protection bodies could also help to ensure that consumer information about hybrid systems presents a comprehensive picture of the potential benefits and risks of installing a hybrid system.

Question 11. Do you agree hybrid heat pump systems should be included in the market-based mechanism? Yes / No. Please explain your answer.

Question 12. Do you agree that the mechanism should differentiate between different types of hybrid system/product to focus incentives on those which are most consistent with the policy's objectives? Yes / No. Please explain your answer.

Question 13. Do you have suggestions on ways in which the government, the heating industry or others could manage the challenges and gain the assurances outlined, in order to include hybrid systems in a market-based mechanism without impacting on the policy's primary objectives to grow the heat pump supply chain and significantly reduce greenhouse gas emissions?

Alternative low-carbon heating appliances

While supporting the development of the heat pump market is the primary aim of this policy, in principle a market-based mechanism could be designed to improve the incentives for alternative low-carbon heating technologies too. At present, our intention is to keep the market mechanism focused on developing the heat pump market. However, we will continue to consider the case and options for whether certain alternative technologies could be included under different scheme design models, without coming at the expense of the core objectives in relation to the heat pump market.

Solar thermal

On the principle above that the core aim of the policy is to develop the market for appliances which can provide both space heating and hot water, we are not proposing to allow solar thermal water heating alone to qualify towards meeting the obligation.

Alternative electric heating technologies

The sale or installation of alternative electric heating appliances (e.g. electric boilers, panel heaters (including infrared), storage heaters, etc.) would not qualify towards meeting the obligation due to strategic considerations related to total energy demand across the building stock and impact on the electricity network, in addition to considerations of scheme complexity and the primary objectives in relation to developing the heat pump market

Solid biomass boilers

Although biomass has a wider strategic role to play in overall UK decarbonisation, its use in heating buildings should be limited, as set out by the Committee on Climate Change,[12] to maximise the overall carbon abatement that is possible from sustainable biomass. For this reason, and considerations of scheme complexity and the primary objectives in relation to developing the heat pump market, we are not minded to include biomass appliances in the scope of installations qualifying towards meeting the obligation.

Liquid biofuel boilers

Like solid biomass, liquid biofuels are subject to a finite sustainable supply, and may have multiple potential roles in decarbonising the UK economy. The use of sustainably produced biofuels should therefore be prioritised for the sectors in which they can make the greatest contribution to achieving our net zero targets. This means that for heating, any role for biofuels will likely be limited to use in off gas grid buildings in which a heat pump installation is not reasonable or practical.

Biofuels which may play a role in the decarbonisation of these off-grid buildings include bioLPG and hydrotreated vegetable oil (HVO) biodiesel. These biofuels can be considered 'drop-in' fuels, which are compatible with existing fossil fuel heating systems with little or no modifications.

Given that the focus of this policy is on building the market in low-carbon appliances rather than fuels, we do not propose that the sales of boilers capable of burning either fossil fuels or drop-in biofuel alternatives would be covered by the market-based mechanism.

Question 14. Do you have views on our proposed approach for alternative low-carbon heating appliances under the market-based mechanism?

Installations in non-domestic properties

We propose that heat pump installations in non-domestic properties would be allowable under the policy, provided that the other installation and appliance criteria (such as on maximum appliance capacity) are met. Many non-domestic properties with energy use and floor area similar to domestic properties use the same or similar heating systems and therefore the installer base and supply chains often overlap. Allowing the policy to cover installations in both domestic and these non-domestic properties therefore seems both most appropriate for the market and least complex for the scheme's administration.

The 45kW appliance capacity limit proposed above will help to ensure that the focus of the policy is on these 'domestic-scale' appliances, and not on large 'commercial-scale' heat pumps, generally suitable only for non-domestic properties. However, in addition to appliance capacity limits, we are also considering an upper limit on the floor-size of non-domestic property where heat pump installations would qualify under the obligation, in order to ensure that the policy remains focused on building the mass market in smaller domestic-scale heat pumps and associated supply chains.

[12] CCC (2018). *Biomass in a Low Carbon Economy*, https://www.theccc.org.uk/publication/biomass-in-a-low-carbon-economy/

Question 15. Do you agree with the proposal to distinguish qualifying installations under the obligation by appliance capacity rather than by building use? Yes/no. Please explain your response.

Question 16. Do you believe there is a need to go further to limit the scope of qualifying installations in non-domestic properties under the obligation, for instance through an upper limit on floor-size of properties? Yes/no. Please provide evidence to support your response.

Installations in new-build properties

Heat pump installations in new-build properties will not qualify towards meeting the obligation, since the forthcoming Future Homes Standard and Future Buildings Standard are intended to ensure these properties are fitted with low-carbon heating. Ensuring the market-based mechanism policy is both fair and deliverable requires not having an overlap between these policies. For instance, if the heat pump installation targets for the market-based mechanism did include new-build deployment in scope, deployment in the retrofit market would need to make up for any lower than anticipated deployment in the new-build segment in any given year, creating a significant planning challenge for obligated parties in the market.

Question 17. What challenges may be involved in focusing the obligation on retrofit installations only, excluding those in new-build properties, and how might these be addressed?

In principle, an alternative policy approach would be to focus the obligation not on low-carbon appliance installations (i.e. final sales to end-consumers), but only on initial sales from manufacturers in scope of the obligation, for instance sales to wholesalers. However, such an approach would not allow for a range of measures included among these proposals aimed at managing risks to emissions savings and helping ensure the policy is as fair and as focused on delivering against long-term strategic objectives as possible. For instance, a sales-based approach would not allow for the exclusion of new-build installations, distinguishing between hybrid and non-hybrid installations, or differentiated incentives for certain installation-types (see below). It would also introduce a potential risk that certain appliances counted under the obligation would be sold to final consumers outside the UK.

Question 18. Do you agree with the proposal to focus the policy on appliance installations, in order to enable a range of risk mitigation and impact-enhancing measures? Yes/no. Please provide evidence to support your response.

Potential for differentiated incentives

In order to maximise the impact of the policy on reducing greenhouse gas emissions from heating, we are exploring options for differentiation in the incentives under the obligation for different types of heating system or installation.

There are a variety of ways that such incentives could be built into a policy such as this, depending on the final design and type of core target adopted. (See ‘Obligation design’ section below).

In principle, however, incentive structures within the obligation could be designed, for instance, to:

- reward the installation of low-carbon heating systems that replace fossil fuel heating systems more significantly than those that do not (for instance, those installed in electrically-heated properties);
- reward the installation of low-carbon systems that replace more carbon-intense fossil fuel systems, such as oil boilers, more significantly than others, such as natural gas boilers;
- reward the installation of standalone heat pump systems more significantly than hybrid heat pump systems still retaining a fossil fuel burning appliance;
- reward the installation of low-temperature heat pumps more significantly than high-temperature heat pumps;
- apply a higher obligation to the sale of more carbon-intense fossil fuel appliances, such as oil boilers, than less carbon-intense appliances, such as natural gas boilers; or
- reward the installation of more efficient heat pump systems, including those that make use of smart controls or incorporate technologies such as solar thermal to yield efficiency gains.

Question 19. Do you support the proposal to incentivise the installation of low-carbon heating systems that replace fossil fuel heating systems more strongly than those that do not? Yes/no. If yes, do you have comments on how this could work most effectively?

Question 20. Do you support the proposal to incentivise the installation of low-carbon heating systems that replace more carbon-intense fossil fuel systems more strongly than others? Yes/no. If yes, do you have comments on how this could work most effectively?

Question 21. Do you support the proposal to incentivise the installation of standalone heat pump systems more significantly than hybrid heat pump systems? Yes/no. If yes, do you have comments on how this could work most effectively?

Question 22. Do you support the proposal to attach a higher obligation to the sale of the most carbon-intense heating appliances, such as oil boilers? Yes/no. If yes, do you have comments on how this could work most effectively?

Question 23. Do you have suggestions for other outcomes, beyond those outlined here, for which differentiated incentives within the obligation might be appropriate? Please provide evidence to support your response.

Obligation design and tradability

There are various models for how the core targets and market arrangements of an obligation policy such as this could be designed. Ultimately, any model needs to:

- Give confidence of leading to the development of the heat pump market and emissions reductions targeted.

- Allow for administration and compliance processes that are proportionate, with complexity limited only to what is necessary for meeting policy objectives.
- Have the capacity to accommodate varying incentives for different installation types and the exclusion of others, as described in the preceding sections.
- Allow, in principle, for a secondary market to emerge in qualifying heat pump installations, allowing appliances not sold directly by the obligated party to qualify towards meeting their obligation.

We are exploring the following options among others. We would welcome views in response to this consultation both on these models and on alternative approaches that would be capable of meeting the aims and design principles established here.

In line with the fourth design principle above, each of these models provides obligated parties with market-based options for meeting the obligation. Allowing third-party sales of heat pumps to form part of how a manufacturer meets its obligation – either through 'pooling' or 'credit-trading' arrangements as described in the models below – will ensure that the policy has the flexibility to allow businesses to pursue the strategies that work best for them and allows for the most efficient market responses to prevail, in turn helping to keep overall consumer costs as low as possible. This will also ensure that the growing market remains open and attractive to specialist manufacturers of low-carbon appliances, including any new entrants.

Proportion of sales, with pooling

Under this model, a target would be set for manufacturers of heating appliances setting a minimum proportion of their overall UK heating appliance sales that must be low-carbon heat pump sales.

There would be an option of 'pooling' between firms, whereby a company falling within the scope of the obligation would be able to enter an agreement with one or more other firms to combine their sales to form and meet a joint obligation for the pool. This would be designed so as to allow such pools to involve certain companies not otherwise subject to the obligation, such as specialist heat pump manufacturers, so that a range of market-based responses to the policy in principle could emerge.

Proportion of sales, with tradable heat pump sales certificates

Under this model, a certificate would be generated by every qualifying heat pump sale. Boiler manufacturers would have an obligation to hold a certain number of certificates proportional to their fossil fuel appliance sales in a given period.

Boiler manufacturers could either meet the obligation by selling heat pumps themselves, therefore generating certificates of their own, by accumulating certificates generated by the sales of heat pumps from other manufacturers, or a combination of both.

There are various precedents for similar schemes, including the Producer Responsibility Obligation to support waste recycling, and the Renewables Obligation Certificates scheme which supported growth in renewable electricity generation in the power sector. We are exploring the lessons from these and other schemes.

Minimum average product efficiency or average carbon intensity, with pooling

This model would set a target for the minimum average energy efficiency or maximum average carbon dioxide emissions intensity of all new heating appliances sold by a company (or pool of companies) and installed in the UK over a given period. This mandatory average would be adjusted over time as a means of driving innovation and greater efficiency levels across portfolios.

Since heat pumps have far higher energy efficiency than traditional boilers, selling a greater proportion of heat pumps alongside fossil fuel appliances would help an obligated firm to achieve a minimum 'portfolio average' target. However, in order to guarantee the targeted impact on supporting the development of the heat pump market, it is likely that any version of this model adopted would in practice require further conditions and design features, such as weightings for different products, to be incorporated in order to be effective.

An example of this type of policy approach is the European Union's Vehicle Emissions Standard, which sets average performance standards for vehicles sold by manufacturers (or pools of manufacturers) on the European market.

Efficiency or carbon intensity standards, with credit-trading

Under this type of model, a carbon intensity or product efficiency standard would be established as above. However, it would include 'credits' for higher-efficiency products being generated which are able to be sold by obligated parties whose portfolio average performance exceeds the standard to parties with average performance below the standard, in order to avoid ending an obligation period in deficit. As with the portfolio average models above, certain conditions or weighting mechanisms may need to be included in the design in order to ensure guaranteed impact on the development of the heat pump market specifically.

Existing schemes involving a model such as this include the state of California's Low Carbon Fuel Standard and the European Union's Emission Trading Scheme (EU ETS).

Question 24. Do you have views on the most appropriate central target for the policy? What metric, including but not limited to those here, do you believe would work best to meet the policy aims and design principles? Please provide reasoning to support your response.

Question 25. Do you have views on the most appropriate trading mechanism for the policy? What market arrangements, including but not limited to those here, do you believe would work best to meet the policy aims and design principles? Please provide reasoning to support your response.

Scheme administration, penalties and enforcement

Administrator

We would expect to appoint an administrator to oversee the administration of and compliance with the obligation. At this stage, we are exploring options, including whether Ofgem might be a suitable administrator, given their experience in managing a diverse range of schemes and tackling non-compliance under these.

Further detail on the role of the administrator, and proposals for the approach to reporting, monitoring and enforcement will be set out in due course. In considering options for the administration of the policy, we will seek to keep administrative complexity to a minimum while ensuring that systems are robust to non-compliance and preserving the integrity of the policy.

> **Question 26. Do you have views on options for, or considerations related to, the delivery and administration of the proposals set out in this consultation and/or to the role of an administrator? Please provide reasoning to support your response.**

Penalties

Penalties, including financial penalties, associated with not meeting the obligation will be designed to deter non-compliance.

We intend to consult in due course on further detail related to the basis for determining penalties, which will be informed in part by the choice of delivery model for the obligation. We are also exploring the options for, and will consult on, how any revenues from financial penalties would be used.

We anticipate that the scheme administrator will have responsibility for determining compliance and where necessary calculating and enforcing penalties in cases where the obligation has not been met.

> **Question 27. Do you have suggestions on how monetary and non-monetary penalties may be designed and administered in order to ensure compliance with the obligation?**

Imported products

We propose to apply the obligation to all manufacturers of appliances sold for installation in the UK, regardless of whether they are a UK-registered company. It is important that all fossil fuel boilers sold on the UK market yield a corresponding obligation, without a distinction between those manufactured in the UK and those imported from overseas. This will ensure that the need to transition toward low-carbon heating appliances is appropriately applied across UK market actors, regardless of whether they are based in the UK.

We are exploring delivery and compliance models to facilitate this proposal, for instance to ensure accurate data is available to the scheme administrator on the products sold to UK

consumers in a given period, and welcome views in response to this consultation on how this can best be achieved.

An alternative approach for ensuring the obligation applies to all boiler sales across the market would be to focus the policy only on UK-based companies, but to apply the obligation to UK importers of appliances in addition to UK manufacturers. Under this model, for example, wholesalers which sell a mix of UK-manufactured and imported appliances would also be required to meet the same obligation target for the products they sell (e.g. a proportion of heat pumps among overall heating appliance sales).

However, we anticipate that there would be a number of challenges with this second approach that would need to be overcome. For instance, it is likely that it would be challenging to ensure compliance among smaller importers and possible that the policy could give rise to a proliferation of small-scale import businesses. This approach would also not be able to account for direct-to-consumer 'distance sales' of boilers from outside the UK if there was no UK company as an intermediary.

Question 28. Do you agree with the proposal to apply the obligation to the manufacturers of all fossil fuel boilers sold on the UK market, including non-UK companies? Yes/no. Please provide reasoning to support your response.

Question 29. Do you have views on how either the proposed or the alternative approach to ensuring the obligation applies fairly across both UK-manufactured and imported products could be delivered most effectively, while keeping administrative complexity proportionate?

Equality Act 2010

Under the Public Sector Equality Duty, government must take steps to understand how policies will affect different groups in society in different ways, with a particular focus on removing or minimising disadvantages suffered by people due to the following protected characteristics: age; gender reassignment; being married or in a civil partnership; being pregnant or on maternity leave; disability; race including colour, nationality, ethnic or national origin; religion or belief; sex; and sexual orientation.

Warm homes and thermal comfort play a crucial role in maintaining our health and wellbeing. Evidence suggests that in homes with a lower level of thermal comfort elderly, pregnant and disabled groups may be particularly affected and at an elevated risk of negative health outcomes.

Question 30. Do you have views on whether, and to what extent, the policy proposals here might disproportionately impact upon certain types of consumer, with a particular focus on those in groups with protected characteristics? Please provide evidence to support your response.

Consultation questions

1. Do you have views on the proposal to apply this mechanism to the heating appliance market, basing the obligation on the sale of fossil fuel boilers and applying it to appliance manufacturers?

2. Do you have comments on how the market would be likely to evolve once this obligation was in place? For instance, do you envisage that it would be most likely to lead to growth in certain business models or consumer propositions?

3. Do you have views on how competitive pressure can be maintained to support cost reductions and efficiencies in the heat pump market over time, as have been seen in other sectors? Are there further steps that you feel would be justified to take within the design of this market-based mechanism to support this?

4. Do you have views on how future financial support to the heat pump market, such as financial support for certain heat pump consumers, might work most effectively alongside this market-based mechanism, and how reliance on such support can be reduced over time?

5. Do you have views on the alternative 'supplier obligation' proposal? If the government were to pursue this approach, what design considerations would help to make it work best for the energy retail market and for consumers?

6. Do you have views on the treatment of 'air-to-air' heat pumps in the market-based mechanism? Please provide evidence to support your response.

7. Do you have views on the treatment of high-temperature heat pumps in the market-based mechanism? Please provide evidence to support your response.

8. Do you agree with the proposal to apply a 45kWth heat pump capacity limit? Yes/No. If no, please provide evidence to support a higher or lower capacity limit.

9. a) Do you have views on the proposal for a 70kWth capacity limit for fossil fuel boilers to generate an obligation under the policy? Yes/No. b) Do you believe that this is an appropriate level to avoid a substantial risk that this could lead to 'over-sizing' of boilers sold above the policy's limit? Yes/No. Please provide evidence to support your answers and views on how risks may best be mitigated.

10. a) Do you have views on whether the market-based mechanism is an appropriate tool for supporting the 'smart' heat pump capability and use, and any limitations of this? Please explain your answer. b) Do you have views on whether this should be through differentiated incentives, through the exclusion of 'dumb' heat pumps from qualifying scope, or another approach?

11. Do you agree that hybrid heat pump systems should be included in the market-based mechanism? Yes / No. Please explain your answer.

12. Do you agree that the mechanism should differentiate between different types of hybrid system/product to focus incentives on those which are most consistent with the policy's objectives? Yes / No. Please explain your answer.

13. Do you have suggestions on ways in which the government, the heating industry or others could manage the challenges and gain the assurances outlined, in order to include hybrid systems in a market-based mechanism without impacting on the policy's primary objectives to grow the heat pump supply chain and significantly reduce greenhouse gas emissions?

14. Do you have views on our proposed approach for alternative low-carbon heating appliances under the market-based mechanism?

15. Do you agree with the proposal to distinguish qualifying installations under the obligation by appliance capacity rather than by building use? Yes/no. Please explain your response.

16. Do you believe there is a need to go further to limit the scope of qualifying installations in non-domestic properties under the obligation, for instance through an upper limit on floor-size of properties? Yes/no. Please provide evidence to support your response.

17. What challenges may be involved in focusing the obligation on retrofit installations only, excluding those in new-build properties, and how might these be addressed?

18. Do you agree with the proposal to focus the policy on appliance installations, in order to enable a range of risk mitigation and impact-enhancing measures? Yes/no. Please provide evidence to support your response.

19. Do you support the proposal to incentivise the installation of low-carbon heating systems that replace fossil fuel heating systems more strongly than those that do not? Yes/no. If yes, do you have comments on how this could work most effectively?

20. Do you support the proposal to incentivise the installation of low-carbon heating systems that replace more carbon-intense fossil fuel systems more strongly than others? Yes/no. If yes, do you have comments on how this could work most effectively?

21. Do you support the proposal to incentivise the installation of standalone heat pump systems more significantly than hybrid heat pump systems? Yes/no. If yes, do you have comments on how this could work most effectively?

22. Do you support the proposal to attach a higher obligation to the sale of the most carbon-intense heating appliances, such as oil boilers? Yes/no. If yes, do you have comments on how this could work most effectively?

23. Do you have suggestions for other outcomes, beyond those outlined here, for which differentiated incentives within the obligation might be appropriate? Please provide evidence to support your response.

24. Do you have views on the most appropriate central target for the policy? What metric, including but not limited to those here, do you believe would work best to meet the policy aims and design principles? Please provide reasoning to support your response.

25. Do you have views on the most appropriate trading mechanism for the policy? What market arrangements, including but not limited to those here, do you believe would work best to meet the policy aims and design principles? Please provide reasoning to support your response.

26. Do you have views on options for, or considerations related to, the delivery and administration of the proposals set out in this consultation and/or to the role of an administrator? Please provide reasoning to support your response.

27. Do you have suggestions on how monetary and non-monetary penalties may be designed and administered in order to ensure compliance with the obligation?

28. Do you agree with the proposal to apply the obligation to the manufacturers of all fossil fuel boilers sold on the UK market, including non-UK companies? Yes/no. Please provide reasoning to support your response.

29. Do you have views on how either the proposed or the alternative approach to ensuring the obligation applies fairly across both UK-manufactured and imported products could be delivered most effectively, while keeping administrative complexity proportionate?

30. Do you have views on whether, and to what extent, the policy proposals here might disproportionately impact upon certain types of consumer, with a particular focus on those in groups with protected characteristics? Please provide evidence to support your response.

This consultation is available from: https://www.gov.uk/government/consultations/market-based-mechanism-for-low-carbon-heat

If you need a version of this document in a more accessible format, please email enquiries@beis.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.