



House of Commons  
Science and Technology  
Committee

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**Clean Growth:  
Technologies for  
meeting the UK's  
emissions reduction  
targets: Government  
and Ofgem Responses  
to the Committee's  
Twentieth Report of  
Session 2017–19**

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**First Special Report of Session 2019**

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## Science and Technology Committee

The Science and Technology Committee is appointed by the House of Commons to examine the expenditure, administration and policy of the Government Office for Science and associated public bodies.

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### Committee staff

The current staff of the Committee are: Dr Harry Beeson (Committee Specialist), Dr Christopher Brown (Committee Specialist), Dr James Chandler (Committee Specialist), Sonia Draper (Senior Committee Assistant), Danielle Nash (Clerk), Julie Storey (Committee Assistant), Ellen Watson (Second Clerk), and Joe Williams (Media Officer).

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# First Special Report

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On 22 August 2019 the Committee published its Twentieth Report of Session 2017–19, *Clean Growth: Technologies for meeting the UK’s emissions reduction targets* [HC 1454]. The response from the Government was received on 25 October 2019. The Committee also received a response from Ofgem on 22 October. The responses are appended below.

## Appendix 1: Government Response

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### Summary

#### *Minister of State for Business, Energy and Clean Growth Foreword*

I am very grateful to the Science and Technology Committee for their report on policies needed to deploy the technologies to meet the UK’s emissions reduction targets. Their report comes at a critical time, when concern about the environment is at an all-time high and the need for action ever clearer.

The Government is committed to tackling climate change, and proud of the UK’s progress to date in doing so. Not only is this the right thing to do – clean growth will be the growth story of the 21st century, and the Government is determined to seize it.

But, as the Committee rightly highlights, targets alone are not enough and must be backed up by ambitious policy to meet them. Since the Government set a legally binding target for net zero on 27 June we have already been raising our ambition – whether through publication of our Green Finance Strategy, announcement of new funding for clean steel and electric vehicles infrastructure and supply chains, and seeing the latest auctions for renewable power deliver record breaking results yet again. Over the coming year, we will also be laying out our plans across different sectors – for example through a heat policy roadmap in 2020.

Our action in the UK is only part of the story, and we are working to drive action globally as well as at home. It has been confirmed that the UK will host COP26 in Glasgow in partnership with Italy. At this landmark UN summit, we will call on all other countries to rise to the challenge, building on the leadership we demonstrated at the UN General Assembly in New York through our commitment to double the UK’s International Climate Finance to at least £11.6 billion between 2021/22 to 2025/26.

Delivering net zero will be a huge challenge – but also offers huge opportunities to innovate and grow the economy, create new clean technologies and jobs, and deliver cleaner air and warmer homes. Delivering these benefits must be a joint endeavour, crossing political boundaries, and encompassing all parts of society, in order to set an example for the world to follow.

## Introduction

The Government welcomes the Science and Technology Committee's inquiry and report on the technologies that will be required to meet the UK's legally binding emissions reductions targets. A response to each of the recommendations is provided below.

We take pride in our achievements in rapid decarbonisation to date. Between 1990 and 2017, the UK reduced its emissions by over 40 per cent while growing the economy by more than two thirds – the best performance in the G7 on a per person basis. Last year over half of our electricity came from low carbon sources, the majority from renewables. However, this is tempered with recognition of the scale of the task in front of us. This will continue to be a top priority for the Government moving forward. We agree with the Committee's emphasis on the need for accelerated policy action, both to meet our existing carbon budgets and to put us on track to deliver net zero emissions by 2050.

We believe that the foundations in the Clean Growth Strategy and Industrial Strategy provide the right basis for action towards net zero, a view shared by the Committee on Climate Change; and we are clear that we must continue to develop firm policy, ambitious implementation plans and a co-ordinated approach across all sectors highlighted by the Committee. Now is the time to rise to the challenge we have set ourselves.

## UK Greenhouse Gas Emissions

**1. The UK has achieved world-leading emissions reductions for over two decades. However, this has not been exclusively the result of Government policies. The Government has decided to carry forward the equivalent of 88 million tonnes of carbon dioxide from the second carbon budget to the third, as permitted by the Climate Change Act 2008, pending advice from the Committee on Climate Change on technical changes to how the UK calculates and reports its emissions. *The Government must not use outperformance of the second carbon budget to weaken its targets for subsequent carbon budgets. As soon as possible after the Committee on Climate Change's advice on technical changes to the UK's emissions baseline, the Government should unambiguously declare its commitment to follow that advice.*** (Paragraph 12)

The UK has a world-leading record in tackling climate change. We are rightly proud of our performance against our carbon budgets, having outperformed our targets for both the first and second carbon budgets (2008–2017), and having decarbonised our economy more quickly than any G20 country since 2000.

We remain firmly committed to tackling the threat of climate change and to meeting our future carbon budgets through the ambitious plans and policies set out in the Clean Growth Strategy. The decision to carry forward part of our overachievement from the second carbon budget is a technical one which does not impact the Government's commitment to taking strong domestic action to reduce greenhouse gas emissions and tackle climate change.

**2. Progress against the UK's emissions reductions targets must not be achieved by 'offshoring' UK industry and displacing the UK's territorial emissions to be counted instead in its consumption emissions. The Government should do more to meet its commitment to increase the prominence of consumption emissions statistics in**

**its publications. *The Government should include consumption emissions alongside territorial emissions in all future publications on UK emissions. It should consider the impact of all policies on consumption emissions as well as territorial emissions, and ensure that progress is not achieved by ‘offshoring’ emissions to other countries to the detriment of the global environment. We do not accept that territorial emissions should be the sole basis for international negotiations. The United Kingdom’s decarbonisation targets should also include consumption emissions.*** (Paragraph 16)

Progress towards our domestic and international targets is based on emissions reported in the UK Greenhouse Gas Inventory (GHGI), which measures territorial emissions. The GHGI is consistent with the agreed approach for reporting emissions under the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC and the Paris Agreement take a consistent approach of reporting emissions from production, rather than consumption. Therefore, UK official emissions statistics, published annually, are based on the GHGI and do not include emissions from the manufacture of imported goods, which should be reported by the manufacturing countries through their UNFCCC GHGI.

Estimated UK consumption emissions, published by Defra, are experimental rather than official statistics. However, they are considered in setting UK policy, and are monitored as part of the Government’s Resources and Waste Strategy.

The Government agrees with the Committee that global action on climate change is of the utmost importance, and the UK continues to be at the forefront of international action on climate change, including through our influential role in securing the Paris Agreement and the recent doubling of our International Climate Finance (ICF) to at least £11.6 billion over the next five years. Through ICF, we are helping developing countries to mitigate and adapt to climate change across sectors, including industrial emissions.

**3. We commend the Government for adopting a net zero emissions target, in line with the 2015 Paris Agreement. It is vital now that this ambition is backed up with policies to ensure that the UK meets its targets. *The Government must develop and act on policies to ensure that the UK is on track to meet a 2050 net zero emissions target. It must seek to achieve this through, wherever possible, domestic emissions reductions. However, it should also work to develop robust international frameworks for carbon units trading, to ensure that effective and efficient methods for reducing global emissions are supported where available.*** (Paragraph 19)

The UK is the first major economy to legislate for a net zero target, continuing our proud tradition of climate leadership. We fully intend to meet our net zero target through cutting our domestic greenhouse gas emissions, building on the world-leading progress we have made to date in cutting our emissions while growing the economy. The Committee on Climate Change, in their advice of 2 May 2019, were clear that “If the speculative options to reduce UK emissions do not develop sufficiently, or if there is a shortfall in delivery of the other elements of the scenarios, then international carbon units (i.e. ‘credits’ or ‘offsets’) could provide contingency”. In light of that advice, we are maintaining the limited tools we already have under the Climate Change Act 2008 to ensure we can deliver our emissions reduction targets at lowest cost, including the option of using international credits. We are also currently engaged in the United Nations Framework Convention on Climate Change

(UNFCCC) negotiations on international market-based cooperation, under Article 6 of the Paris Agreement, to provide a robust framework within which international carbon markets can continue to develop in the coming years.

**4. We commend the Government on responding promptly to the Intergovernmental Panel on Climate Change’s 2018 report on 1.5°C global warming, by asking the Committee on Climate Change (CCC) for advice on net zero emissions. However, it is disappointing that the Government excluded existing carbon budgets from the scope of this advice. *The Government should explicitly state, in advance of the CCC’s advice on the sixth carbon budget, its willingness to amend the fourth and fifth carbon budgets in line with the CCC’s cost-effective path to net zero emissions by 2050 if recommended to do so.*** (Paragraph 21)

The UK carbon budgets already set in legislation are among the most stringent in the world, with the fifth carbon budget (2028–32) requiring a 57% cut in greenhouse gas emissions from a 1990 baseline. We are making strong progress towards these targets and will continue to develop and implement ambitious policies and proposals under the Clean Growth Strategy, working with people and organisations across the country to ensure that we are maximising opportunities for emissions reduction and clean growth.

In their report on net zero the CCC stated that they do not recommend changes to the fourth and fifth carbon budgets at this time. They will consider whether the fourth and fifth carbon budgets should be tightened in legislation as part of their advice on the sixth carbon budget. We will consider this advice carefully at that point in time.

**5. Lord Deben, the Chairman of the Committee on Climate Change, gave evidence to our Committee. He did not declare his interest as the Chair of Sancroft International. This company has had amongst its clients Drax, the largest recipient of renewable energy subsidies in the country, and Johnson Matthey, who are about to make a huge investment in electric vehicles. These should have been declared to the Science and Technology Committee.** (Paragraph 23)

## The Clean Growth Strategy

**6. The Government’s own projections suggest that the UK is not currently on track to meet its existing emission targets, although we note that there are several significant policies and ambitions that have not yet been included in these calculations. Nevertheless, the rate of deployment of several key low carbon technologies is significantly lower than what is required to meet the Government’s ambitions, and various stakeholders—including the Committee on Climate Change—have expressed concern at the current and projected rate of progress of the UK’s decarbonisation. In order to meet the fourth and fifth carbon budgets, emissions reductions cannot continue only in sectors that have decarbonised successfully so far, and must be significantly accelerated in sectors such as transport, heating and agriculture that have made little progress. The step-change in decarbonisation required will need policies to support the deployment and roll-out of existing technologies alongside, and co-ordinated with, significant research, development and demonstration of less mature technologies.** (Paragraph 36)

We recognise the need to go further to meet the fourth and fifth carbon budgets – and the Clean Growth Strategy sets out our plan to accelerate decarbonisation across the whole economy, building on the remarkable progress we have made in the power sector. Our independent advisors, the CCC, have said that this is the right framework for action, and we are committed to ambitious action to meet our targets while growing the low carbon economy.

Meeting our targets will require ambitious development and implementation of the policies and proposals in the Clean Growth Strategy across all sectors of the economy, together with the ingenuity of British business and science and support from civil society. We now expect to invest more than £3bn in low carbon energy innovation from 2015 to 2021 to ensure that the UK continues to grasp the economic opportunities of the global shift to a low carbon future. The government recently committed £220m towards a new 20-year UK fusion reactor design programme (known as STEP), which aims to realise UK fusion technology as a global export opportunity for the future. The Government will continue to work with people and organisations across the country to ensure that we are maximising opportunities for emissions reduction and clean growth.

**7. The UK can simultaneously achieve economic growth and global emissions reductions through the export of low carbon technologies to other countries. This potentially offers global emissions reduction at lower cost than the same level of reduction in the UK. However, opportunities for delivering emissions reductions outside of the UK were not included in the 50 key policies and proposals of the Government's Clean Growth Strategy. When it laid legislation strengthening the UK's long-term emissions reduction targets, the Government said that it would review the net zero target within five years, to review the extent to which other countries had followed the UK's lead in setting and acting upon decarbonisation targets. (Paragraph 40)**

**8. *Ahead of its review of international reaction to the UK's net zero target, the Government should actively encourage other countries to take similarly ambitious action. It should develop a strategy by the end of 2020, identifying opportunities for the UK to encourage and support decarbonisation in other countries, and prioritising action that will achieve the greatest global emissions reduction. This should include cross-Government action to support British companies exporting technologies that can deliver emission reductions abroad.* (Paragraph 41)**

Encouraging all countries to increase their climate ambition has long been a UK priority and will be a key part of our upcoming COP26 Presidency. We are asking all countries to submit strengthened Nationally Determined Contributions and new long-term strategies by the end of 2020. This was a key priority for the Prime Minister at the recent UN Climate Action Summit where 65 countries committed to pursuing net zero emissions by 2050. The Prime Minister also announced that the UK will double our International Climate Finance (ICF) to £11.6 billion from 2021–2025 to enable developing countries to undertake greater climate action. This builds on our existing track record as one of the world's largest contributors of public climate finance – in 2015, the UK committed to provide 'at least' £5.8 billion of climate finance to developing countries to 2020. Through our ICF, we will continue to work across sectors and target our investments to create clean growth markets and leverage further investment from other sources. This will involve driving decarbonisation at scale – for example, through bringing under-supported technologies,

sectors and financing structures to commercial viability – in partnership with British companies and through the international development system using large, multi-donor funds.

**9. *The Government should increase the number of Ministers across Government Departments working on climate change, including a new Ministerial role at the Foreign and Commonwealth Office with explicit responsibility for delivering multi-lateral action internationally on climate change. Reflecting the critical importance of mitigating climate change, and to improve cross-Government co-ordination, the Minister charged with co-ordinating the UK’s action on national and international decarbonisation should be a full Cabinet Minister.*** (Paragraph 43)

The current allocation of Ministerial responsibilities reflects a range of responsibilities for climate change across Government. This includes the Secretary of State for BEIS and the Parliamentary Under Secretary of State in the same department who both have responsibility for climate change. In the FCO, there are two Ministers of State with explicit responsibility for broad multilateral policy delivery, as well as a Parliamentary Under Secretary role responsible for economic diplomacy involving climate change. These FCO roles, alongside further climate change related Ministerial portfolios across Whitehall, reflect the commitment of the Government to mitigate climate change.

The Cabinet represents the collectively agreed policy of the Government, including policy to address climate change, and consequently the Government as a whole remains resolved on the importance of the issue. On 17 October, the Prime Minister announced the creation of a new a new Cabinet Committee on Climate Change to drive further action across government to protect our environment, reduce emissions and improve air quality.

## **Decarbonising power generation**

**10. We commend National Grid Electricity System Operator for its ambition to be able to manage a ‘zero carbon’ electricity grid by 2025. This goes significantly beyond the Government’s projections for possible renewable power deployment by 2032, and indicates that any ‘over-delivery’ on the deployment of low carbon power generation in the 2020s will not be incompatible with the electricity transmission system. We urge distribution network operators to adopt a similar ambition to National Grid System Operator, of operating a zero carbon grid by 2025. Ofgem should work with distribution network operators to ensure that the regulatory framework required to allow this is in place. If sufficient progress is not made we urge the Government to consider strengthening Ofgem’s mandate to require the distribution network operators to speed up the investment and upgrading of the distribution networks required.** (Paragraph 53)

Enabling the electricity system to accommodate zero carbon generation by 2025 requires a whole system approach. The majority of renewable generators are connected to the distribution network and solutions to help manage a zero carbon system, for example work underway to address system frequency issues, require action by distribution network operators (DNOs) and the generators themselves.

Following the Government’s net zero announcement in June 2019, Ofgem has set out its expectations that networks’ business plans for the forthcoming RIIO2 price control are

sufficiently flexible to meet a range of different outcomes.<sup>1</sup> DNOs are considering what those flexibilities will need to be and what action they should include in their RIIO2 business plans.

In a joint letter, the Government and Ofgem also set out clear actions to ensure that the electricity system provides the necessary flexibility to meet our energy objectives, including net zero.<sup>2</sup> The actions are for the Energy Networks Association (ENA), DNOs and the electricity system operator. Key expectations include improving competition and delivering improved network and system co-ordination processes. On the 2nd October 2019 the ENA formally responded<sup>3</sup> to the letter setting out how they will take forward these actions in their current and future work programme.

**11. The Government has indicated that it expects requirements for new power generation capacity to be met through offshore wind power, nuclear power and gas-fired power with carbon capture and storage. There is considerable risk that these technologies may not provide the generation capacity required. *The Government must set out in its response to this Report how it intends to monitor and address any potential shortfall in power generation capacity, and ensure that this can be achieved with low emissions and costs.*** (Paragraph 54)

There are currently two schemes for delivering new capacity: the Capacity Market (CM), which ensures there is sufficient generating capacity to meet demand, and the Contracts for Difference (CfD) scheme, which supports investment in large-scale renewable electricity generation. The CM has supported on the order of 50 GW of secure capacity each year with about 5.5 GW of new build generation having won 15 year agreements, while the CfD scheme has delivered contracts for around 16GW of new renewable electricity capacity.

The Government regularly monitors capacity adequacy through advice from the Electricity System Operator and receives information on a regular basis from the Low Carbon Contracts Company on the status of projects that have been awarded CfDs. The CM Delivery Body provides a monthly report on the delivery of new build capacity in receipt of capacity agreements. Both the CM and CfD scheme have flexibility to respond to changes in the need for generating capacity or issues with project delivery.

**12. Although onshore wind power and large-scale solar power are low-cost and low carbon, the deployment of new installations of these technologies has fallen drastically since 2015. Onshore wind power in particular could lower costs to energy consumers as well as contributing to the UK's decarbonisation, and there is widespread support for increased Government support for such projects across Great Britain. *The Government must ensure that there is strong policy support for new onshore wind power and large-scale solar power projects for which there is local support and projected cost-savings for consumers over the long-term. The Government should actively encourage and support local authorities to adopt planning practices that promote local support for such renewable energy projects. The Government must additionally develop mechanisms to promote community ownership and profit-sharing of low carbon projects, such as joint ventures, split ownership or shared revenue.*** (Paragraph 62)

1 <https://www.ofgem.gov.uk/publications-and-updates/riio-2-response-2050-net-zero-target>

2 [https://www.ofgem.gov.uk/system/files/docs/2019/07/ofgem-beis\\_joint\\_open\\_letter\\_to\\_the\\_ena\\_open\\_networks\\_project.pdf](https://www.ofgem.gov.uk/system/files/docs/2019/07/ofgem-beis_joint_open_letter_to_the_ena_open_networks_project.pdf)

3 <https://www.gov.uk/government/publications/open-networks-project-letter-from-beis-and-ofgem-to-the-energy-networks-association-ena>

The Government remains fully committed to meeting its climate change targets and recognises the important contribution that renewable energy schemes can offer in helping to achieve these targets. Onshore wind and solar PV have deployed successfully to date in the UK, with both technologies exceeding our historic projections of installed operational capacity and their expected contribution to our 2020 renewable energy target. The cost of onshore wind and solar have fallen dramatically over the past ten years. As a result, we are now seeing some projects deploy without subsidy and we expect other projects to follow. We are currently considering next steps in the light of the recent commitment to net zero. In power, we have made great progress in decarbonising electricity generation whilst meeting demand, and over half our electricity generation was from low carbon sources last year, up from 23% in 2010.

The National Planning Policy Framework (NPPF) sets out that local planning authorities should have a positive strategy in place to promote energy from renewable and low carbon sources and should support community-led initiatives for renewable and low carbon energy. Under these criteria, local communities have a much greater say on onshore wind applications in their areas, where they have scope to register their concern or approval of an onshore wind project. Onshore wind projects can thus be granted planning permission if they have met these criteria. Government is supportive of community ownership of low carbon projects, along with joint ventures and profit-sharing models. Joint ventures allow multiple parties to drive forward low carbon projects, sharing knowledge and expertise to develop projects successfully. In addition, community ownership allows local residents to directly partake in climate action, and also allows the local community to benefit from local clean growth.

In recognition of this, BEIS have re-opened the £10 million Rural Community Energy Fund which supports rural communities in England to develop renewable energy projects that provide social and economic benefit to the community. This includes funding for a feasibility study, and if viable, further funding to build a business case and to cover pre-development costs. The Rural Community Energy Fund is being delivered regionally by 5 Local Energy Hubs. These Hubs aim to support local authorities and Local Enterprise partnerships to develop low carbon projects by providing commercial, technical and project management support.

**13. The marine energy sector has come together to propose market support mechanisms to support marine and other less-established renewable power technologies through technology development and commercialisation. *The Government should examine the case for supporting 'Innovation Power Purchase Agreements' and setting minimum allocations of future contract for difference auctions to specific technologies, to support the development and commercialisation of renewable power technologies that are less-established than offshore wind power.*** (Paragraph 64)

The Government has made significant investments in innovation – recognising our strong commitment to cost reduction and delivering capability in the UK. It is also essential to ensure that we manage and minimise policy related costs for households and businesses. The Clean Growth Strategy underlined the need for renewable technologies to demonstrate on-going cost reduction and to compete with other forms of low carbon generation. We consider the appropriate parameters ahead of each Contracts for Difference auction, taking into account value for money for consumers and long-term policy objectives. We continue to engage with developers of innovative technologies to understand their cost-

reduction trajectories, where those savings are likely to be found and, importantly in light of declining costs for other renewables, whether there may be a rationale for funding arrangements outside of the Contracts for Difference scheme. Any proposals must be able credibly to demonstrate value for money for consumers and public funds.

**14. *The Government should develop, by the end of 2020, a clear planning permission framework for re-powering existing onshore wind farms, and ensure that national planning policy facilitates re-powering with the most efficient technology and does not block proposals that attract local support. It must also monitor the proportion of onshore wind power sites that apply for permission to re-power, and be ready to provide market support (for example through eligibility for contracts for difference) if this is not close to 100%. (Paragraph 68)***

Repowering policy is detailed within the National Planning Policy Framework (NPPF), which was last published in February 2019. The NPPF details the differences between a repowering application relative to a new renewable energy generation planning application. No decisions have yet been taken on future Contracts for Difference allocation rounds for established technologies, such as onshore wind; however, the scheme is kept under review and the Government will announce the scope of future allocation rounds in due course.

**15. *The delay between the end of the feed-in tariff scheme and the start of the Smart Export Guarantee scheme has caused unnecessary disruption to the smart energy and small-scale generation market. Nonetheless, the move towards a framework that facilitates greater flexibility and innovation in these markets is welcome, provided it offers a fair and sufficient means of compensation for owners of small-scale renewable generation capacity and a sufficient incentive for people to make the initial investment in such technologies. The Government must ensure that it reviews the functioning of the Smart Export Guarantee scheme by the end of 2020, and should be ready to include a minimum price floor if there is evidence of a lack of market competitiveness—for example, if uptake of tariffs is not significantly greater than the current number of tariffs or if the tariffs offered are significantly lower than wholesale electricity prices. (Paragraph 74)***

From January 2020, the Smart Export Guarantee (SEG) will give small-scale low carbon electricity generators the right to be paid for the renewable electricity they export to the grid. This reflects our continued commitment to ensuring that low carbon electricity – whether at the household level or the national level – is central to the transition to the smart and flexible energy systems of the future. We have started to see positive signals of a nascent market emerging and we expect to see more suppliers bidding competitively for electricity to give exporters their best market price.

Ofgem will report annually to the government on the provisions made by suppliers for smaller scale exporters, including the range, nature and uptake of tariffs offered by suppliers in response to SEG obligations (as well as any other similar tariffs suppliers are willing to share details of).

During the early years of operation, the government will monitor how the SEG is working, including whether meaningful and innovative tariffs and contracts are coming forward that deliver an effective range of options for small exporters. If we consider that insufficient progress is being made, we will look to consult on the operation of the SEG.

**16. The Government must make sure that business rates incentivise embedded low carbon generation and do not cause existing embedded generation to be disconnected. The Government should reduce business rates for organisations that consume the majority of the power they generate to match the rates of organisations that sell the majority of their generation—and stop the administrative burden of loopholes that are being used to counter the discrepancy in rates. The Government should also reinstate the microgeneration exemption from business rates for renewable energy installations producing no more than 50kW. In its response to this Report, the Government should set out why combined heat and power units have been classed as excepted plant and machinery under the business rate regulations, but such a provision is not applied to solar panels and energy storage systems.** (Paragraph 76)

Business rates are an annual tax on non-domestic property, based on rateable value (RV). RV is intended to represent the annual rent a non-domestic property would achieve if let on the open market at a specific valuation date, which is set in law. All properties are subject to the same statutory valuation framework for business rates, ensuring fairness across all ratepayers. Within this legal framework, it is for the Valuation Office Agency (VOA) to decide independently of Ministers how sectors and properties are assessed for business rates. These decisions are challengeable through the established Check, Challenge, Appeal process, including through the courts. The VOA relies upon an extensive body of case law and practice in regard to valuation, and also continues to work closely with sectors, including the renewable energy sector, to ensure their practice remains accurate.

Combined heat and power units remain exempt from rating and the Government is also continuing to support the take up of renewable energy installations, including solar panels, by maintaining the business rates exemption for this energy generating equipment of less than 50kW between its installation and the next business rates revaluation.

**17. Ofgem must consider the interests of future consumers as well as current consumers in its decisions, including the need for decarbonisation. The projected increases in network costs for consumers and businesses that have installed on-site generation and flexibility technologies, arising from Ofgem’s proposed network charging reforms, will act as a disincentive for further consumers or enterprises to install similar technologies. This is not conducive to the overall goal of decarbonisation. However, Ofgem is right to seek to avoid the costs of network usage falling increasingly on vulnerable consumers. Ofgem must revise its proposed network charging reforms to ensure that they do not disincentivise the deployment of technologies that will contribute to the decarbonisation of the UK’s energy system. The Government must ensure that vulnerable consumers do not pay an increasing proportion of network costs, and that all households have the ability to deploy technologies that will reduce their cost of energy and help to decarbonise the economy.** (Paragraph 79)

The Government and Ofgem are working to ensure the full potential of clean energy technologies is harnessed in the transition to a low carbon energy system. In the case of flexible technologies such as storage, for example, the BEIS/Ofgem Smart Systems and Flexibility Plan (and our 2018 Progress Update) lays out a range of actions we are taking to remove barriers, ensure fair market access and support innovation. Whilst these technologies are increasingly important, there are ongoing fixed network costs which remain and have to be recovered through the residual component of network charges. Through its Targeted Charging Review, Ofgem is reforming residual network charges to

reduce what it considers to be harmful distortions in the electricity market and ensure all parties make a fair contribution to fixed network costs. Network charging is a matter for Ofgem as the independent regulator, and decisions on the review are rightly for it to make. Government welcomes the open and inclusive way in which Ofgem is conducting the review and its specific consideration of fairness for vulnerable consumers. It is also important to note that, through its separate Access and Forward-Looking Charges Review, Ofgem is aiming to improve the incentives for efficient network use.

**18. Although it is not possible to directly compare the costs of different power generation technologies, the Government is right to support nuclear power subject to it representing value for money, because full lifecycle emissions from nuclear power will help the UK to achieve its emissions reduction targets. *The Government must make a decision on implementing a regulated asset base framework for nuclear power by the end of this year. Subject to value for money, the Government should seek to support new nuclear power generation so as to sustain, but not grow, the UK's nuclear power industry. It must anticipate any gap in future generation capacity such a policy would cause, and support sufficient renewable power alternatives to fill the gap.*** (Paragraph 84)

New nuclear has an important role to play in providing firm, low carbon power in order to transition to a low carbon economy and achieve our net zero targets, provided it represents value for money for consumers and taxpayers. Although renewables are expected to provide the majority of our low carbon generating capacity in 2050, it is likely that there will be a crucial role for new nuclear power stations and gas-fired power plants with CCUS in order to meet net zero, while maintaining security of supply and keeping costs low.

The Government committed to looking at alternative funding models to finance large-scale new nuclear projects to reduce the costs of capital. We are considering the Regulated Asset Base (RAB) model as a sustainable funding model which has the potential to reduce the cost of raising private finance and therefore costs to consumers and taxpayers. We consulted on this model from 22 July to 14 October to seek views from stakeholders on a nuclear RAB model and its high-level design principles. Following our analysis of responses, should we decide to proceed with introducing a RAB model to facilitate delivery of new nuclear projects, there could be further consultations on the specific design features of a nuclear RAB model.

**19. The Government's support for small modular nuclear reactors in the Nuclear Sector Deal is welcome. *The Government must ensure that it delivers on the recommendations from the Expert Finance Working Group on Small Nuclear Reactors, including on regulatory developments, without undue delay. The Government should set out, in its response to this Report, what steps it has taken since the publication of the Group's report and propose a pathway—with indicative dates for key milestones—for the deployment of a first-of-a-kind small modular nuclear reactor by 2030.*** (Paragraph 88)

The Government is grateful to the Expert Finance Working Group (EFWG) for its report which has formed an important part of the policy evidence base for advanced nuclear technologies. The Nuclear Sector Deal outlined a new framework to support the development and deployment of SMRs/AMRs. We note a number of the EFWG's recommendations align with the policy framework Government intends to put in place over the coming years. We have taken the following steps since the EFWG Report's publication:

- Hosted a ‘Commercialisation of Small Nuclear in the UK’ conference in November 2018 to build the relationship between the finance and advanced nuclear sector;
- Developed the supply chain by providing up to £20 million for Phase 2 of the advanced manufacturing and material programme;
- Modernised the Generic Design Assessment with the UK nuclear regulators. This is almost complete, and guidance will be published soon.

In July we accepted a proposal for a Low-Cost Nuclear Challenge into the Industrial Strategy Challenge Fund and intend to make an initial award of £18 million to the Rolls-Royce led consortium in the Autumn, subject to final approvals. The Challenge seeks to develop an SMR design to GDA step 3 by the mid-2020s to enable an operational FOAK in the early 2030s.

**20. Nuclear fusion is unlikely to make a substantial contribution to the UK’s net zero target for 2050. Nevertheless, it could ultimately provide significant quantities of energy from abundant fuels and without radioactive waste. *The Government must ensure that, whatever the terms of the UK’s departure from the European Union, the long-term future of nuclear fusion research in the UK is not disrupted. It should additionally review the case for providing support for the nuclear fusion industry similar to the measures introduced recently by the US Government.*** (Paragraph 92)

The Government agrees that fusion offers much promise as a clean, safe, baseload energy source of the future. We are committed to build on the UK’s global leadership in fusion R&D and grow the UK’s industrial capability in fusion and related technologies. To this end, the Government confirmed in October 2019 that it will accelerate efforts to realise fusion energy through investment in a new UK fusion reactor design programme, known as STEP (Spherical Tokamak for Energy Production). STEP aims to develop the world’s first commercially viable fusion power plant to deliver clean energy to the UK grid by 2040. The government has committed £220m towards the first five-year design phase. The 20-year project will create high-skilled jobs throughout its lifetime and has potential to create a brand-new UK industry, to export UK fusion technology around the world in subsequent decades. At the same time, the UK Atomic Energy Authority (UKAEA) is also using private investment to create new opportunities for hi-tech companies working in fusion and related fields.

In terms of EU Exit, the contract with Euratom to deliver JET – the EU’s fusion reactor operated by UKAEA in Oxfordshire – lasts until the end of 2020, regardless of any EU Exit scenario. The government is exploring all options to continue collaboration on international nuclear research programmes, in order to exploit the UK’s world-beating expertise.

## Decarbonising transport

**21. There is significant scope for emissions reductions in the transport sector as a result of the purchase of more efficient vehicle models, without requiring technological developments or alternative fuel sources. However, the current fiscal incentives for cars are not sufficient to encourage consumers to purchase lower-emissions vehicles, given**

**that most of the increase in average new car emissions in 2017 was caused by consumers choosing more emitting models. *The Government must reconsider the fiscal incentives for consumers to purchase both new and used vehicle models with lower emissions, and develop a strategy by the time of the Spring Statement 2020 to use vehicle excise duty and other incentives to drive the purchase of vehicle models with lower average emissions. This must include consideration of post-sales vehicle excise duty and the second-hand market.*** (Paragraph 96)

Government grants for ultra low emission plug-in cars, vans, taxis and motorcycles will be available until at least 2020, reducing the upfront purchase price of electric vehicles.

The wider tax system incentivises vehicles with the lowest carbon dioxide (CO<sub>2</sub>) emissions. A reformed Vehicle Excise Duty (VED) system was introduced for new cars from 1 April 2017. On first registration, zero emission cars pay nothing whilst the most polluting pay over £2,000. In subsequent years, most cars move to a standard rate, currently set at £145. The exceptions are electric vehicles which attract a £0 rate and plug-in and non plug-in hybrids which receive an ongoing discount.

For company cars, the government recognises the value of business fleets in supporting the transition to zero emission technology. In 2020–21, all zero emission models will pay no company car tax to help accelerate uptake and ensure a continued supply of the cleanest models to the second-hand market.

The government has also announced its intention to publish a VED call for evidence. This will seek views from environmental groups, industry and more widely on how best to utilise the tax system to support continued vehicle decarbonisation.

Finally, as tax is a matter for the Treasury, any changes are considered by the Chancellor and announced at fiscal events.

**22. *The Government must commit, prior to the UK's withdrawal from the European Union, to adopting transport emissions regulations that are, as a minimum, in line with current and future EU regulations on transport emissions. This should include legislation regarding emissions reductions requirements for heavy duty vehicles, regardless of the terms of the UK's departure from the EU.*** (Paragraph 98)

In the event of the UK leaving the EU without a deal, the existing legislation covering new car and van CO<sub>2</sub> emissions regulation will be copied into UK law by the European Union Withdrawal Act (EUWA). The Government has already laid the Road Vehicle Emission Performance Standards (Cars and Vans) (Amendment) (EU Exit) Regulations 2019 to ensure the retained EU regulations continues to function in a UK-only context. This will ensure that the UK and EU CO<sub>2</sub> emissions targets remain aligned until 31st December 2024. In a deal scenario, whether UK vehicles continue to be captured by the EU regulations will be subject to the terms of withdrawal.

The new EU cars and vans CO<sub>2</sub> emission reduction regulation does not come into legal effect until 1 January 2020. Irrespective of the terms on which the UK leaves the EU, the Government has committed in its Road to Zero strategy to pursue a future approach that is at least as ambitious as the current arrangements for vehicle emissions regulation.

With regard to Heavy Duty Vehicles (HDV), the new HDV CO<sub>2</sub> emission reduction regulation came into legal effect in the UK in July 2019 and sets CO<sub>2</sub> reduction targets for 2025 and 2030. In the event of the UK leaving the EU without a deal a statutory instrument is planned to ensure that this new regulation continues to function in a UK only context.

**23. The Government has said that a 2040 ban on the sale of conventional cars and vans is consistent with the UK's current emissions reductions targets for 2050, but this has been disputed by independent organisations such as the UK Energy Research Centre and the Committee on Climate Change. There is a strong case for bringing the date for a future ban forward, given that several manufacturers already have more ambitious commitments in place. *The Government should act on the advice of the Committee on Climate Change and bring forward the proposed ban on sales of new conventional cars and vans to 2035 at the latest. This ban should explicitly cover hybrid as well as internal combustion engines.* (Paragraph 102)**

In 2017, the government committed to end the sale of all new petrol and diesel cars and vans by 2040. The 2018 Road to Zero strategy reiterated that commitment. The 2040 target was conceived as an ambitious but achievable target. The date was set following extensive engagement with stakeholders across numerous sectors, including the automotive industry, the energy sector, environmental groups and other experts, to identify an ambitious yet deliverable target. The Road to Zero also included our ambition for as many as 70% of new car sales and up to 40% of new van sales being ultra-low emission by 2030.

These targets indicate our ambition for the UK to lead the transition to zero emission vehicles, which is also a key part of the long-term answer to poor air quality and our clean growth objectives. As a clear statement of intent to industry and consumers, the government has stated that it wants to see new cars and vans delivering as many zero emission miles as possible, as fast as possible.

The government takes a technology neutral approach, and it would be premature to speculate precisely which technologies might and might not be able to deliver our long-term zero emission vehicle ambitions.

Against a rapidly evolving international context, the government will seek to maintain the UK's leadership position in the global transition to zero emission vehicles. We will monitor progress and consider what interventions are required if the pace of change is insufficient to deliver against our net zero commitments. We are working closely with all stakeholders through various forums. In the context of the Government's commitment to net zero we will explore the case for bringing this date forward.

**24. The availability of charge points is a significant factor in consumer uptake of electric vehicles. Although the extent of the UK's charging infrastructure is growing, it is not expanding at a pace to match the roll-out of electric vehicles. Interoperability of different charge point networks will be required to avoid the need for a roll-out of multiple extensive networks. Widespread adoption of electric vehicles will not necessarily require an unmanageable increase in power generation requirements, but in order for the electricity demand from widespread electric vehicles to be more comfortably met, and in order for electric vehicles to contribute to increased grid flexibility, smart charging will have to be commonplace.** (Paragraph 109)

**25. The Government must ensure sufficient roll-out of rapid charge points along the strategic road network, and smart charge points at domestic, destination (such as places of work or shopping centres) and local sites. It should work with public services and owners of public land, such as schools and hospitals, to accelerate the deployment of charge points. The Government's forthcoming consultation on the regulation of charging infrastructure must determine measures to deliver interoperability, compatibility with a smart energy system, public availability of real-time information on the current functionality of charge points, and enforcement powers to ensure that charge points are reliable.** (Paragraph 110)

The Government is committed to ensuring the UK has one of the best electric vehicle infrastructure networks in the world.

We want to encourage and leverage private investment to build and operate a self-sustaining public network supported by the right policy framework. The majority of chargepoints are already funded with private money and we have launched a £400 million Charging Infrastructure Investment Fund for investment into public charging infrastructure. Government is conducting a review of the provision of rapid chargepoints along England's key road networks and plans to set out a vision in Autumn 2019. We are also consulting on proposals to ensure that new homes built in England with an associated parking space have a chargepoint from 2021, a world first.

The Alternative Fuels Infrastructure Regulations 2017 and Automated and Electric Vehicle Act 2018 give Government powers to improve both the provision and, customer experience, of electric vehicle infrastructure. Government is prepared to intervene using these powers if the market fails to deliver timely improvements.

The Government is consulting on proposals for new private chargepoints to have smart functionality which will enable EVs to charge off peak, reducing costs for consumers and demands on the energy system.

**26. It is disappointing that the Government cut back the plug-in grant with electric vehicle sales below the indicative target set by the Committee on Climate Change. The Government should set out, by the time of the Spring Statement 2020, how it intends to adjust the plug-in grant scheme in the future, using a transparent framework linked to ultra-low emissions vehicles sales.** (Paragraph 112)

The plug-in car grant was designed to kick-start the early market for electric vehicles, which has developed significantly since the grant launched in 2011. So far, the plug-in car grant has supported the purchase of over 190,000 new cars, including 100,000 plug-in hybrids, by reducing the upfront cost of purchase.

As prices of these cars come down, and as the market for electric vehicles develops, it is right that the Government reviews the subsidy to ensure value for money for the taxpayer. That is why we are now focussing our support on zero emission models. That focus has paid off - registrations of zero emission battery electric vehicles are up 122% this year compared to the same period in 2018.

The plug-in car grant will be available until at least 2020. Consumer incentives will continue to have a role beyond 2020. The government will also continue to offer other incentives for ultra-low emission vehicles, such as lower car tax. We aim to offer as much

notice as possible prior to any changes to the plug-in vehicle grants. As set out in the Road to Zero strategy, we are on track to meet the projection set out by government in 2013 - that between 3 and 7% of new car sales will be ultra low emission by 2020.

**27. *The Government should evaluate the impact of the free charging offered by the ChargePlace Scotland charging network as well as other potential incentive schemes for electric vehicle use.*** (Paragraph 114)

In developing and reviewing incentive schemes for electric vehicles and chargepoints in the UK, the Government considers the pros and cons of a range of incentive schemes to inform decision making whilst ensuring UK-wide policies are adapted to UK needs.

We want to encourage and leverage private sector investment to build and operate a self-sustaining public network supported by the right policy framework. In many cases, the market is better placed than Government to identify the right locations for chargepoints and it is essential that viable commercial models are in place to ensure continued maintenance and improvements to the network.

That is why we have announced a £400 million charging infrastructure investment fund to accelerate the roll out of publicly available charging infrastructure. Government will invest £200 million which will be matched by private investors. The fund is managed and invested on a commercial basis by Zouk Capital. The first £70 million investment will create 3,000 new rapid chargepoints, more than doubling the amount the number of rapid chargepoints across the UK by 2024.

**28. *Uptake of ultra-low emissions vehicles can potentially be driven in the fleet vehicle market more quickly than in the private consumer market. Options for supporting the uptake of ultra-low emissions vehicles in the fleet vehicle market include fiscal incentives and public procurement targets. The Government should commit to adopting regulations on the public procurement of ultra-low emissions vehicles that are at least as ambitious as the EU's post-Brexit. It should further commit to having a 100% ultra-low emissions vehicle fleet by 2022 and to supporting local authorities in also having 100% ultra-low emissions fleets by 2030.*** (Paragraph 117)

The Autumn Budget 2017 set out a target that central government car fleets should be 25% ultra-low emission by 2022. The Road to Zero Strategy added a commitment for 100% by 2030.

The Government Buying Standards (2017) contain procurement guidelines which require that central government vehicle purchases are ULEV by default. These standards and the government fleet commitment mean that central government fleets will be some of the cleanest on the road. We will continue to support delivery of this work through the work of the EST, who will engage closely with the Crown Commercial Services and other key partners to enable and disseminate best practice. We are committed to providing a framework of support to help departments in moving towards ultra-low emission fleets.

The EU's Clean Vehicle Directive, which sets national targets for the public procurement of clean vehicles, was published in the OJEU on 12 July, Member States have until August 2021 to implement its requirements. The UK's implementation will depend on the terms on which we leave the EU.

29. **One current barrier to the uptake of ultra-low emissions vehicles in the UK is an insufficient supply to meet consumer demand, which has led to long waiting times. There is evidence in the UK and internationally suggesting that this could be partly due to inadequate support for the ultra-low emissions vehicle market from manufacturers and dealers. *The Government should review the functioning of the ultra-low emissions vehicles market annually, to determine if there are sufficient incentives for manufacturers and dealers to drive the adoption of ultra-low emissions vehicles, with the first review published by the time of the Spring Statement 2020. This should include consideration of the value of introducing minimum sales mandates on manufacturers, using tradeable sales certificate framework.*** (Paragraph 120)

Adequate vehicle supply, a strong consumer base, the right market conditions and a fit for purpose infrastructure network are all vital to meeting our ambitions. Vehicle supply is currently a key constraint on the market. There are 24 car models eligible for the plug-in car grant, compared to hundreds of conventional vehicle options. Some vehicle manufacturer electrification plans are not specific about planned volumes of vehicles and there is a particular challenge in the supply of ultra-low emission commercial vehicles, with only 11 models eligible for the plug-in van grant. Right now consumer demand is outstripping supply of electric vehicles, with long waiting lists and timeframes for delivery of some electric vehicles to our rapidly growing UK consumer base. More innovation and investment is needed so that ultra-low emission vehicles are ready for mass adoption across all vehicle types in a sustainable and affordable way. We welcome the billions of pounds industry is investing and want to see a greater range and number of ultra-low emission options for sale in the UK in the coming years.

The Government is actively tracking ULEV market developments and we committed in the Road to Zero strategy to review progress towards our ambitions by 2025. Against a rapidly evolving international context, we will seek to maintain the UK's leadership position and meet our ambitions, and will consider what interventions are required if not enough progress is being made.

The new EU cars and vans CO<sub>2</sub> emission reduction regulation does not come into legal effect until 1 January 2020. Irrespective of the terms on which the UK leaves the EU, the Government has committed in its Road to Zero strategy to pursue a future approach that is at least as ambitious as the current arrangements for vehicle emissions regulation.

To support dealers of electric vehicles, Government has endorsed the Electric Vehicle Approved scheme. Developed by the National Franchised Dealers Association and the Energy Savings Trust, it aims to provide customers with a guarantee that approved auto retail businesses have achieved certain standards in EV sales and service.

**A ban on the sale of new diesel-powered heavy-goods vehicles will be needed by 2040 in order for the sector to achieve net zero emissions by 2050. This will require policies now that will drive the development of alternative technologies and demonstrate the technical feasibility of such a ban. *The Government should introduce a ban on the sale of new diesel-powered heavy goods vehicles, for no later than 2040. It should additionally support trials of low-emissions HGV technologies on a timeframe that aligns with the proposed ban, and work with network operators and the delivery industry to plan for the potential charging infrastructure required for zero-emissions HGVs. Given that***

***some HGVs are already being converted to run on hydrogen on a commercial basis, the Government should review the opportunity for market support mechanisms to drive higher rates of HGV conversion.*** (Paragraph 124)

The Government recognises the need to increase ambition and step up the pace of progress to ensure that all transport sector modes including freight play its part in supporting the delivery of our long-term target of net zero emissions by 2050. For this reason, we are developing a new Transport Decarbonisation Plan that will review each mode and put forward the policies needed to put transport firmly on a credible path to net zero before 2050.

A number of schemes and activities are already under way to encourage cleaner and more fuel-efficient trucks: for example, our £25 million Advanced Biofuels Demonstration Competition, our ten-year trial of longer semi-trailers and the £11 million Low Carbon Truck Trial. Through the Low Emission Freight Trial, we have awarded £20 million to collaborative R&D projects which are trialling a range of low emission technologies for freight. The trials are due to complete in March 2020 and we will publish a high-level summary of the findings shortly afterwards. We are currently considering how we can best work with industry to support them in continuing to develop technologies which will lower emission from freight vehicles. We are also working with the Connected Places Catapult (CPC) to identify new ways of bringing novel transport decarbonisation technologies to market, including analysis of the potential impact of demonstrators for zero emission technology solutions for Heavy Goods Vehicles (HGVs). We expect the results being made available in Summer 2020. The Government has also announced it will invest almost £1 million in transport innovators and SMEs via the Transport-Technology Research and Innovation Grants (T-TRIG). This scheme supports innovation in UK engineering and technology that will help to deliver better and sustainable transport. A key theme for the 2019 call is Decarbonising the Transport System. More details can be found at <https://cp.catapult.org.uk/opportunities/t-trig/>

**30. The Government's current long-term targets for decarbonising transport focus heavily on reducing exhaust emissions and increasing sales of low-emissions vehicles, rather than delivering a low-emissions transport system. In the long-term, widespread personal vehicle ownership does not appear to be compatible with significant decarbonisation. The Government should not aim to achieve emissions reductions simply by replacing existing vehicles with lower-emission versions. *The Government should not aim to achieve emissions reductions simply by replacing existing vehicles with lower-emissions versions. Alongside the Government's existing targets and policies, it must develop a strategy to stimulate a low-emissions transport system, with the metrics and targets to match. This should aim to reduce the number of vehicles required, for example by: promoting and improving public transport; reducing its cost relative to private transport; encouraging vehicle usership in place of ownership; and encouraging and supporting increased levels of walking and cycling. The Government should commit to ensuring that the annual increase in fuel duty should never be lower than the average increase in rail or bus fares.*** (Paragraph 131)

We want cycling and walking to be the natural choices for short journeys, and almost £2 billion of investment is projected for the Spending Review period to 2020/21 to encourage higher levels of cycling and walking. While walking, cycling and active travel must remain the best options for short urban journeys, our Future of Mobility: Urban Strategy also

identified public transport as a fundamental part to an efficient transport system. New mobility services must lead the transition to zero emissions, and we are taking significant measures to improve the decarbonisation of passenger transport, such as the Ultra-Low Emission Bus Scheme.

Households spend a significant amount of their total spending on transport fuels, and fuel costs are a factor in helping the competitiveness of British businesses. The government has frozen fuel duty for nine consecutive years, reducing the cost of motoring in real terms. Demand for fuel is very insensitive to price meaning in any given year a fuel duty freeze only has a marginal impact on the amount of fuel purchased, and a limited impact on emissions. The Government is also acting to reduce emissions and improve air quality through Vehicle Excise Duty and the Company Car Tax system as well as through other environmental measures such as a £1.5 billion investment to support the uptake and infrastructure of ultra-low emissions vehicles.

**31. Any move to electric vehicles must have an associated environmental impact assessment, including the potential for recycling lead, lithium, cobalt, nickel and graphite. Hydrogen technology may prove to be cheaper and less environmentally-damaging than battery-powered electric vehicles. The Government should not rely on a single technology.** (Paragraph 132)

The Government remains committed to policies and incentives that are technology neutral. It is essential that we understand the relative environmental performance of different technologies in the real world.

We have conducted an independently verified assessment of the environmental performance of the fuels and technologies available to consumers. The Road to Zero strategy sets out the results of this assessment and government's view on the relative environmental performance of different fuels and technologies, in terms of both greenhouse gas and air pollutant emissions over the period to 2050. Further details of the assessment are provided in the Transport Energy Model Report, published alongside the strategy.

Assuming the current UK energy mix, battery electric vehicles produce the lowest greenhouse gas emissions of all the energy sources and fuels assessed, irrespective of vehicle type and operation. Between now and 2050, we project electricity grid emissions will fall by around 90%, with total greenhouse gas emissions from electric vehicles falling in parallel.

Hydrogen fuel cell electric vehicles also have zero tailpipe emissions. Like battery electric vehicles, their well-to-wheel greenhouse gas emissions depend on the method of energy production.

Through the Environment Bill, the Government is seeking powers as to setting product design requirements and consumer information requirements that will enable us to require vehicles or components of vehicles to be easier to disassemble and to extract materials, as well as provision of consumer information as to materials contained. This will make it easier to keep these materials in circulation for longer reducing the risks from reliance on critical raw materials. Defra has recently commissioned research into resource scarcity and this will cover critical raw materials, including rare earth elements that are used, for example, in electronic components and magnets.

**32. *The Government should review the potential to reduce emissions and support shared car ownership by incorporating Government Department car fleets into car sharing schemes. It should encourage other public bodies and local authorities to do likewise.*** (Paragraph 133)

The Government recognises the potential benefits to shared vehicles and infrastructure. As part of the package of support available to Government Departments to meet their ULEV targets we will encourage and seek to facilitate the sharing of resources, including joint ownership of vehicles and charging infrastructure.

The Government's Future of Mobility: Urban Strategy published earlier this year set out 9 key Principles for shaping the future of urban mobility. One of these key Principles is that mobility innovation must help to reduce congestion through more efficient use of limited road space, for example through sharing rides, increasing occupancy or consolidating freight.

The Government is currently developing its plan for implementing the Future of Mobility: Urban Strategy, including a project exploring who shares transport and the factors that contribute to people's decision-making when choosing shared mobility services. This will inform further action to embed the Principle, including measures Government need to take to overcome barriers and make shared electric vehicles more accessible to motorists.

**33. *We commend the Government on its existing work to support the establishment and use of urban delivery consolidation zones. However, with just two major examples of completed projects to point to, there is clearly scope for a wider roll-out. The Government should support the development of urban delivery consolidation centres, working with local authorities to assess the potential of such centres to reduce emissions and identify strategies to support their deployment and effective use.*** (Paragraph 136)

A feasibility study on the use of urban consolidation centres have been carried out by the Connected Places Catapult, which was commissioned by the Department for Transport.<sup>4</sup> There are various good examples of active consolidation centres which are industry-led. The Department for Transport is currently considering how best to encourage further uptake of urban consolidation centres and how the findings of the Connected Places Catapult can be used effectively to support this.

## Decarbonising heating

**34. *Heating accounts for around a third of the UK's overall emissions, which has remained essentially unchanged since 2009. The decarbonisation of heating will be critical to the UK achieving its long-term emissions reductions targets, but there remains considerable uncertainty surrounding what mix of low carbon heating technologies represents the best decarbonisation pathway for the UK, or what mix the Government will pursue. The Government must urgently develop a clearer strategy for decarbonising heat. This will require large-scale trials of different heating technologies operating in homes and cities to build the evidence base required for long-***

4 <https://ts.catapult.org.uk/news-events-gallery/news/consolidation-centres-can-improve-air-quality-in-towns-and-cities/>

***term decisions. The Government must commit now to large-scale trials of low carbon heating technologies, convening relevant stakeholders to determine what evidence must be gathered and to co-ordinate existing work.*** (Paragraph 142)

We recognise that to meet our legally binding net zero target, virtually all heat in buildings will need to be decarbonised by 2050, and emissions from heat in industry should be close to zero carbon. There are several options with the potential to play an important role in a transition to low carbon heating and we are examining the mix of technologies and consumer options needed to decarbonise heat at scale.

We welcome the Committee's call for a clear heat decarbonisation strategy. We have committed to publishing a policy roadmap in summer 2020, setting out the programme of work required to enable key strategic decisions in the first half of the 2020s on how we achieve mass transition to low carbon heating.

We also acknowledge the need for large-scale trials to support future decision-making and have made funding available to demonstrate new low carbon heating technologies. This includes the £16.5 million Electrification of Heat Demonstration Project which aims to demonstrate the feasibility of a large-scale roll-out of heat pumps in Great Britain by installing heat pumps in a representative range of 750 homes, alongside new products and services designed to overcome barriers to deployment.

**35. The use of hydrogen as a fuel offers significant promise for low carbon heating, transport and industrial processing, as well as for energy storage and to help manage intermittent renewable power generation. However, evidence from large-scale trials will be needed to allow the Government to make informed decisions on the UK's future energy system. Demonstrating the safety of hydrogen as a fuel is a critical first step, and we commend the Government for its support of the Hy4Heat programme. The Government must complete the safety demonstration work for hydrogen as an urgent priority. The Government should also commit to completing at least one large-scale trial of hydrogen by 2025 conditional upon safety approval, and start developing now the terms for a competition to deliver such a trial. This should involve co-ordination of existing demonstration and modelling projects and should lead to the terms of a competition being announced no later than the end of 2020.** (Paragraph 150)

We welcome the recognition of the important role hydrogen can play in meeting the decarbonisation challenge in the various sectors.

Although hydrogen is safely used in transport and industrial processes today, further work is needed to prove the safety case for heating. As the committee has identified, the BEIS funded Hy4Heat programme makes a significant contribution in this area, exploring the safety of 100% hydrogen for heating in buildings and the development of appropriate standards.

We are currently working closely with the gas networks and other key stakeholders to develop a robust programme of work needed to establish the safety, technical feasibility, consumer impacts and acceptance of repurposing all, or significant parts, of the gas network to hydrogen. This programme of work will include a strategic approach to unoccupied and occupied trials, building on the evidence gained from ongoing and previous hydrogen heating projects.

**36. *Blending hydrogen into gas supplied via the gas grid could provide an initial market for early hydrogen production facilities. Once clear evidence is obtained on the level at which it is safe to mix hydrogen into the existing gas grid, and which is compatible with existing appliances, the Government should amend regulations to raise the proportion of hydrogen permitted in the grid. With higher blends of hydrogen permitted, the Government should act to support the development of this as a market for hydrogen, perhaps through feed-in tariffs or low carbon obligations analogous to the Renewable Transport Fuel Obligation.*** (Paragraph 153)

We recognise the value of blending hydrogen into the gas grid at levels that do not require changing appliances in order to provide an initial market for early hydrogen production facilities and we are working closely with the Health and Safety Executive (HSE) and Ofgem to ensure that assurances around gas safety and quality are in place to support hydrogen injection demonstrations.

We are working closely with the Health and Safety Executive (HSE) and Ofgem to ensure that assurances around gas safety and quality are in place to support demonstration of hydrogen injection to gas grids. For example, the Government has provided funding to the HyDeploy project at the University of Keele where the HSE have granted permission to run a live test of blended 20% hydrogen and natural gas on the campus gas network. Once the safety case at Keele campus is fully proven, HyDeploy intends to move to a larger demonstration on a public network in the North East, with around 670 households and several businesses using the hydrogen blend from December 2020. HyDeploy then plans to have a larger demonstration in the North West in the early 2020s.

We are collaborating with the HSE and Ofgem to provide the evidence necessary to make any amendments to relevant Regulations and the HSE is reviewing the Gas Safety (Management) Regulations 1996 (GSMR), including looking at the permitted hydrogen content of network gas.

Industry is also playing a part in proving and supporting the blending safety case, with the Institute of Gas Engineers and Managers (IGEM) coordinating work which, if shown to be safe, will allow for a small increase in the amount of hydrogen permitted in the network.

We acknowledge the Committee's recommendation on supporting the development of higher hydrogen blends as a market for hydrogen and will consider these once amendments to regulations have been made and the level of hydrogen in the gas grid has increased.

**37. *The Government's announced future homes standard is welcome. However, regulations requiring improvements to the efficiency of new buildings must be introduced before 2025. The Government should re-introduce the zero-carbon homes standard as a matter of urgency, and no later than the end of 2019. It should additionally ensure that building regulations accurately reflect the current carbon intensity of electricity in Great Britain, and that this figure can be regularly updated (at least annually) in future.*** (Paragraph 160)

**AND**

**38. *The Government should launch its consultation on Part L of the building regulations by the time of the Spring Statement 2020. Beyond that, it must ensure that homes built today are compatible with a net zero emissions future and that the ‘Future Homes Standard’ reflects this.*** (Paragraph 161)

The government launched a consultation on Part L of the Building Regulations in September 2019 consulting on the 2020 uplifts to requirements for new dwellings and setting a trajectory for the 2025 Future Homes Standard, for new homes to be future proofed with low carbon heating and world leading levels of energy efficiency. Government will launch a consultation later this year considering uplifts for non-domestic and existing buildings.

The Standard Assessment Procedure (SAP) will be updated in parallel to uplifts to the Part L requirements in 2020. SAP 10.1, published alongside the Part L Domestic consultation in September, has adopted updated data for electricity grid carbon factors, increasing the timespan of future CO<sub>2</sub> and Primary Energy value projections from three to five years. This measure will ensure both the current and projected future carbon intensity of the grid are accurately reflected in SAP.

**39. *The Government should set out, in its response to this Report, the criteria that will be used to determine ‘practicality’ and ‘affordability’ in its energy efficiency targets, and provide an indicative percentage of homes that it is intending to help reach Band C by 2035.*** (Paragraph 165)

Currently, around 17 million homes in England are below EPC Band C. Our preliminary estimates suggest that delivering our EPC C aspiration will require mobilising between £35 – £65 billion of investment to improve homes below EPC band C across the UK. Our analysis suggests that our EPC C aspiration for all homes represents good value for money both for Carbon Budget 5, and in the context of achieving net zero. However, the optimal level of energy efficiency for the UK is dependent on our preferred heat decarbonisation pathway.

For our preliminary estimates of the cost of delivering our EPC C aspiration, we ran a model of the housing stock, installing measures that improved each property to EPC C at the lowest cost. We then imposed constraints reflecting possible definitions of “practical”, “cost-effective” and “affordable” to better understand how these might impact the measures installed and investment required. The definitions of “practical”, “cost-effective” and “affordable” will vary depending on the context and defining these too prescriptively could lead to undesirable outcomes as such definitions may not result in least cost decarbonisation. As a result, we have used a more scenario-based approach to explore the implications of a range of definitions.

**40. *Previous initiatives to encourage the installation of energy efficiency improvements in the ‘able-to-pay’ market have failed because they have focused too narrowly on providing financial support for specific interventions. The Government’s new energy efficiency policy must provide all homeowners with the incentive to make energy efficiency improvements to their property, with particular thought given to lower income households. By the time of the Spring Statement 2020, the Government should consider adjusting Stamp Duty so that it varies according to the energy performance of the home as well as the price paid for it. Homebuyers should then be able to make***

*energy efficiency improvements within a defined time after purchasing the property, and claim back corresponding reductions in the Stamp Duty paid retrospectively. The adjustments made to Stamp Duty could be designed in order to be revenue-neutral to the Government. Robust certification of energy efficiency will need to be put in place to ensure that such a scheme is not open to exploitation and the Government should consider how best to incentivise upgrades in council, housing association and rented homes.* (Paragraph 171)

To meet our Clean Growth Strategy aspiration for all homes to achieve EPC Band C by 2035, the Government is developing policies and initiatives that will increase the rate of energy efficiency installations across all tenure types. To better inform our approach in realising our targets, alongside the Clean Growth Strategy, we called for evidence on building a market for energy efficiency where we sought views on the Government's role in overcoming existing demand and supply side barriers and stimulating the market to improve the energy performance of owner-occupied homes through more direct interventions.

Informed by the results of the call for evidence, we are developing a suite of mutually supporting policies to help build a vibrant and sustainable market for energy efficiency. These policies take into consideration those from lower income households, building upon work already being undertaken to support this group of homeowners through the extension of the Energy Company Obligation (ECO) scheme.

Good progress has been made since the publication of the Clean Growth Strategy and we continue to explore further policy initiatives. These include assessing the relative viability and impact of introducing revenue-neutral fiscal incentives, in conjunction with BEIS' Local Energy Hubs and Local Authorities, aimed at encouraging homeowners to improve the energy efficiency of their homes. Reports of our findings are due to be published by Summer 2020.

**41. The Green Deal's 'golden rule' heavily restricted the energy efficiency improvements that could be paid for by the scheme. Although some energy efficiency improvements may not deliver net cost-savings to homeowners, they may still represent cost-effective options for the UK to meet its emissions reductions targets. The Government's new energy efficiency policy must enable homeowners to access the finance needed to cover the upfront costs of energy efficiency improvements that offer a cost-effective contribution to the UK's decarbonisation, not just net cost-savings to individual homeowners. In analogy to the existing 'Help to Buy' scheme, the Government should establish a 'Help to Improve' scheme by July 2020 that offers matched funding and interest-free loans to homeowners, to cover the costs of making energy efficiency improvements.** (Paragraph 175)

The government is committed to building a vibrant and sustainable market for energy efficiency to better enable improvements to be made to the home energy performance of properties. We do not believe there is one 'silver bullet' policy that will drive uptake of energy efficiency measures amongst owner occupiers, and instead we are developing a suite of mutually supporting policies across all tenure types that will mobilise the investment required. The policies being developed have incorporated lessons learnt from

past policies, including the Green Deal, and respond to overcoming existing demand and supply side barriers, and the piloting of new approaches that are adaptable based on how the market responds.

We set out several of our key actions to better stimulate the able to pay market in the Green Finance Strategy. This included the announcement of the £5 million Green Home Finance Innovation Fund that will support the development and piloting of green mortgages and other green home finance products. The outcome of the scheme will be used to inform the development of future policy to build a market for green home finance.

**42. We commend the Government for supporting research into, and the development of, 'green mortgages'. The Government should consider the case for encouraging mortgage lenders to take energy efficiency into account for all mortgage applications, and should support the industry in capturing any potential in such a system for driving a market in energy efficiency improvements.** (Paragraph 177)

The government acknowledges the important role lenders can play in driving energy efficiency improvements and have therefore made EPC data available through open data, with a commitment to update this at least every six months. Consideration is also being given as to how this data could be made available on a live basis. By enhancing data availability for lenders, it will enable them to drive energy efficiency through better evaluation of the EPC performance of their lending portfolios. Further, in the Green Finance Strategy, we committed to consult on requirements for lenders to support homeowners to improve the energy efficiency of homes in their portfolios and continue to engage with a range of lenders to inform this consultation.

**43. We commend the Government for strengthening the requirements on landlords to improve the energy efficiency of the least efficient homes in England and Wales. However, these measures will affect only 2.5% of the housing stock. The Government should amend building regulations so that renovations to buildings must always result in an overall improvement in energy efficiency.** (Paragraph 179)

The Government has committed to look at a long-term trajectory to improve the energy performance standards of privately rented homes in England and Wales, with the aim for as many of them as possible to be upgraded to EPC Band C by 2030, where practical, cost-effective and affordable. We are exploring policy design options with a view to consultation in due course. We ran a series of regional stakeholder workshops in England and Wales this summer to discuss options.

We recognise the need improve the efficiency of our existing building stock and the opportunity that home renovations provide to take additional efficiency measures. We will be consulting later this year on the energy efficiency requirements under Part L of Building Regulations for existing buildings.

**44. The Renewable Heat Incentive has significantly underperformed on the Government's expectations. With the Renewable Heat Incentive due to close to new applications in 2021, the Government must ensure that it avoids a repeat of the disruption caused by the closure of the feed-in tariff, and announces its plans for the successor scheme to the Renewable Heat Incentive no later than the Spring Statement 2020. The successor scheme must be far more effective than the Renewable Heat Incentive scheme has proven to be.** (Paragraph 180)

As of August 2019, the RHI has supported in excess of 70,000 domestic applications as well as a further 20,000 non-domestic applications. As per the accompanying Impact Assessment to the Renewable Heat Incentive Amendment Regulations 2019, the scheme is on track to deliver 21.6TWh of Renewable heat in 2020/21 and is forecast deliver 122.6MtCO<sub>2</sub>e of carbon savings over its lifetime. The Renewable Heat Incentive has funding agreed until 31 March 2021.

The government has committed to phasing out the installation of high carbon fossil fuel heating systems in off gas grid properties and will be consulting on options in early 2020. Additionally, in the 2019 Spring Statement the Government committed to accelerating the decarbonisation of our gas supplies by increasing the proportion of green gas in the grid. To meet our climate targets, we need to reduce our dependence on burning natural gas to heat our homes. We will consult on the appropriate mechanism to deliver this commitment in due course.

**45. The Government’s announcement that fossil-fuel heating systems will not be permitted in new builds after 2025 may support the growth of supply chains for low carbon heating technologies and deliver consequent cost-reductions as well. *The Government should further support the deployment of low carbon heating technologies by setting out a clear roadmap by the time of the Spring Statement 2020 for rebalancing levies on electricity and gas, to better reflect the emissions intensities of each fuel.*** (Paragraph 183)

The Government has committed to re-balancing the main rates paid for gas and electricity in the Climate Change Levy to a 1:1 ratio by 2025. Budget 2018 continued the re-balancing of rates by announcing that the electricity rate will be lowered and the gas rate increased in 2020–21 and 2021–22, so that the gas rate reaches 60% of the electricity main rate by 2021–22.

## The UK energy system

**46. The development and deployment of energy storage technologies will be critical to the UK’s transition towards a flexible, low carbon energy system. It is disappointing that the Government has not made the Parliamentary time available to define energy storage in primary legislation. *The Government must ensure sufficient support for the development and deployment of energy storage technologies. Large-scale, inter-seasonal storage currently appears to pose the greatest technical challenges, and should be supported through demonstration projects, including in future large-scale trials of low carbon heating. The Government should provide a dedicated legal definition of energy storage in primary legislation as soon as possible. Such a commitment should be included in the next Queen’s Speech, if Parliamentary time is not found for such legislation before then.*** (Paragraph 192)

The Government agrees that storage will play a key role in helping to reduce emissions to net zero by 2050. In the 2017 Smart Systems & Flexibility Plan and 2018 Progress Update, Government and Ofgem set out a range of actions to remove barriers to electricity storage, with the aim of creating a best in class regulatory framework. We have committed to implementing all actions by 2022.

In the Plan, the Government committed to use primary legislation to define storage as a distinct subset of generation. We will honour this commitment as soon as parliamentary time allows. Whilst a legislative definition is important, Ofgem has already provided regulatory clarity by consulting on defining storage in its modified generation licence for storage, published June 2019.

Government agrees that further innovation is needed to realise the potential of storage in our energy system. Government is investing through a range of activities including, the Storage at Scale competition launched in January 2019 which committed up to £20 million to support the development of large-scale, long-duration storage, which would leverage a minimum of £8 million of private investment.

**47. The roll-out of smart meters is one important enabling component of a flexible energy system that can match demand to supply, allowing increased deployment of intermittent renewable power generation. However, the Government's roll-out is severely behind schedule, in part because the original scheme had fundamental design faults, as highlighted by our predecessor Committee and the then Energy and Climate Change Committee. *The Government must ensure that it takes all reasonable steps to achieve a national roll-out of smart meters as soon as possible. In order to reduce consumer resistance to smart meters, the Government should run public engagement initiatives to raise public awareness that by having a smart meter installed, consumers can contribute to long-term reductions in the UK's greenhouse gas emissions. Ofgem should require energy suppliers to collect and publish data on consumer acceptance rates for smart meter installation, and the reasons given by consumers for rejecting a smart meter. The Government should then be ready to act on this information to drive greater installation rates of smart meters, for example by introducing a consumer incentive mechanism. It should also require installation of a smart meter in properties without one whenever the owner or renter changes.*** (Paragraph 199)

The Government has previously responded to the predecessor Committee views on the Programme.<sup>5</sup> The roll-out is making good progress and there are nearly 15 million smart and advanced meters operating across Great Britain.<sup>6</sup> The Government is consulting on a proposal to introduce a market wide obligation so energy suppliers continue installing smart meters after 31 December 2020 (when the current rollout duty ends)<sup>7</sup> and the rollout can be completed as soon as practicable. This consultation invites proposals for policies and measures that could help create additional consumer incentives to drive the pace of smart meter installations post-2020 and also seeks views on coordinated consumer engagement needed to achieve this.<sup>8</sup>

Smart Energy GB, a not for profit organisation funded by energy suppliers, leads the programme of national engagement to raise awareness of smart meters, drive behaviour

5 <https://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/inquiries/parliament-2015/smart-meters-inquiry-15-16/>

6 Smart Meter Statistics in Great Britain: Quarterly Report to end June 2019, 29 August 2019: <https://www.gov.uk/government/statistics/statistical-release-and-data-smart-meters-great-britain-quarter-2-2019>

7 Delivering a smart system, smart meter policy framework post-2020, 16 September 2019: <https://www.gov.uk/government/consultations/smart-meter-policy-framework-post-2020>

8 Delivering a smart system, smart meter policy framework post-2020, 16 September 2019, pp. 35–36: <https://www.gov.uk/government/consultations/smart-meter-policy-framework-post-2020>

change and help consumers benefit from smart metering. Its campaign activity now means 98% of people across Great Britain are aware of smart meters.<sup>9</sup> Smart Energy GB's current campaign is now focussed on how having smart meters will help tackle climate change.<sup>10</sup>

The Government expects energy suppliers to continue to enhance their consumer engagement and fulfilment strategies to help increase consumer acceptance and installations of smart meters. We are working with energy suppliers to identify and share good practice and benchmark performance. We will continue to monitor their performance and speed of improvement.

**48. Market-wide half-hourly settlement of energy consumption costs will incentivise energy suppliers to offer tariffs that reward consumers for using energy when it is abundant, helping to enable higher levels of intermittent renewable power generation. However, Ofgem has highlighted the dependence of market-wide half-hourly settlement on widespread smart meter deployment. Given the low current uptake of smart meters, this indicates that there could be very significant delays in the introduction of market-wide half-hourly settlement and the benefits of widespread 'smart' tariff adoption. *Ofgem should clarify what it determines to be the critical mass of smart meters required for market-wide half-hourly settlement. Since the introduction of market-wide half-hourly settlement will help to catalyse smart meter take-up, Ofgem should not set an overly stringent critical mass, and should be prepared to recover the costs of incomplete smart meter deployment from the suppliers of those consumers who do not have smart meters (in a way that protects vulnerable consumers).*** (Paragraph 200)

The Government is fully supportive of the programme Ofgem has underway on market-wide half-hourly settlement, which is a key action in the joint Government-Ofgem Smart Systems and Flexibility Plan and will help maximise the benefits from the roll-out of smart meters. Ofgem plan to make a decision on the approach and timeframe for implementation in Q3 2020. The Government has taken powers in the Smart Meters Act 2018 to allow Ofgem to implement market-wide half-hourly settlement more swiftly and smoothly, without them having to rely on current industry code processes to the same extent. This will help ensure that the benefits to consumers of new tariffs, products and services enabled by smart metering and half-hourly settlement will become available sooner.

Ofgem will respond separately to this recommendation.

**49. Energy capacity secured through the Capacity Market supplies energy to the grid relatively infrequently throughout the year, and supports the co-deployment of increasing levels of intermittent renewable power generation. Nevertheless, contracts awarded through the Capacity Market provide funding for energy capacity technologies. So far, this has mostly supported technologies such as gas-fired and diesel generators, which are not in line with the UK's ambition to reach net zero emissions. *In keeping with the UK's ambition to move towards net zero emissions, the Government should ensure that the Capacity Market supports low carbon technologies as far as possible without detriment to the wider deployment of renewable power generation. As***

9 Smart Energy Outlook, March 2019, Smart Energy GB: <https://www.smartenergygb.org/en/-/media/SmartEnergy/essential-documents/press-resources/Documents/Smart-energy-outlook-March-2019.ashx..>

10 Thank you smart meter ad, Smart Energy GB: <https://youtu.be/dH5YzTTsLvo>

***it reviews the success of the Capacity Market to date, the Government should consider introducing a minimum proportion of Capacity Market funding that must be awarded to low carbon technologies.*** (Paragraph 206)

The Government agrees that the Capacity Market has been instrumental in supporting the co-deployment of increasing levels of intermittent renewable power generation. It is important to note that technology neutrality is a key principle upon which the design of the Capacity Market is based. The principle ensures that a wide variety of technologies can compete in the Capacity Market on a level playing field. This in turn ensures that competition in the auctions is maximised and therefore capacity is secured at the lowest cost to the consumer.

To make sure that the Capacity Market continues to complement decarbonisation, we recently (June 2019) made changes to enable intermittent renewables that are not in receipt of other forms of subsidy to compete in the auctions. We also recently consulted on the implementation of a carbon emissions limit into the Capacity Market. The limit will effectively exclude new build coal and diesel plants from the Market this year and existing plants from 2024. Finally, in 2016 we worked closely with Defra and Ofgem to implement air quality pollutant controls for diesel engines operating in the Capacity Market.

***50. Non-generation suppliers bidding for Capacity Market contracts should be eligible to bid for contracts of up to fifteen years, in line with new generation facilities.*** (Paragraph 207)

The Government has recently (July 2019) published the Five-year Review of the Capacity Market. The review was based on a call for evidence held in August 2018. Agreement lengths for all technologies were discussed in the review and we have committed to monitoring agreement lengths over the coming years, to make sure that they continue to achieve the right balance of risk and reward. As part of this, DSR specifically, as stated we intend to research and gather evidence on the potential for DSR to access multi-year agreements. The capacity auction outcomes to date have provided learnings that we will take into consideration as part of our monitoring of agreement lengths.

***51. Regulation of UK energy markets will play a key part in the development of a smart and flexible energy system. The RIIO price control framework has helped to support innovation in the gas and electricity networks, but it is vital that the second price control framework promotes even greater levels of innovation as the energy networks undergo a period of significant change. Ofgem must ensure that its second price control framework does not dilute its support for innovation and that the framework should further enable and incentivise network operators to innovate as part of their core business, rather than through standalone projects. Ofgem should work with network operators, energy suppliers and flexibility services providers to ensure that flexibility systems are always considered and deployed ahead of infrastructure construction, where possible and affordable.*** (Paragraph 212)

Network price controls are a matter for Ofgem, and BEIS has no formal role in their process. Innovation is a key part of the RIIO price control and remains to be so in the upcoming RIIO-2 price control. In Ofgem's RIIO-2 Business Plan Guidance, Ofgem states that they expect companies to 'fund more innovation in RIIO-2 using their totex

allowance, as part of their [business as usual] activities, rather than relying on additional innovation stimulus funds.<sup>11</sup> The Network Innovation Allowance will continue to run also, to support projects alongside.

BEIS and Ofgem's Smart Systems & Flexibility Plan set out a clear expectation on the networks that alternatives such as flexibility services and energy efficiency should be able to compete with new network build. Since the plan was published, the networks have published commitments to open up all significant new network reinforcement to competition.<sup>1213</sup> Ofgem is developing the next set of distribution price controls, RIIO-ED2, and will be considering how flexibility procurement will be considered within this price control.<sup>14</sup>

**52. The energy markets regulator has an explicit duty to protect consumers' interests in the reduction of gas- and electricity-supply emissions of targeted greenhouse gases, alongside other considerations such as minimising costs. However, there is no specific link between the regulator's objectives and the UK's emissions reduction targets. In addition, some have expressed concerns that the regulator focuses too heavily on reducing costs for current consumers, at the expense of contributing to the UK's decarbonisation. *When the Government reviews the upcoming recommendations from the National Infrastructure Commission on the future regulation of the energy market, it should consider the case for amending the energy market regulator's principal objective so that it explicitly includes ensuring that regulations align with the emissions reduction targets set out in the Climate Change Act 2008.* (Paragraph 216)**

As the Committee correctly identifies, Ofgem, the GB energy regulator, already has statutory duties under Part 1 section 3A(1A)(a) of the Electricity Act 1989 (EA89) and Part 1 section 4AA(1A)(a) of the Gas Act 1986 (GA86) to consider the reduction of gas and electricity supply emissions of targeted greenhouse gases. The regulator also has the duty to "have regard [...] to the effect on the environment" of activities connected with the generation, transmission, distribution and supply of electricity and the conveyance of gas through pipes under Part 1 section 3A(5) of the EA89 and Part 1 section 4AA(5) of the GA86 respectively. Ofgem also published its Strategic Narrative 2019–2023 in July, which set out how the regulator aims to deliver on its key priorities, including decarbonisation. Government will of course carefully consider any recommendations made by the National Infrastructure Commission following the publication of its study into the future of utility regulation.

**53. Local authorities have a vital role to play in the UK's decarbonisation. Many local authorities are pursuing emissions reductions projects, but the capacity and capability for decarbonisation at the local level varies. *The Government should introduce a statutory duty on local authorities in England and Wales, by Green Week 2020, to develop emissions reduction plans in line with the national targets set by the Climate***

11 [https://www.ofgem.gov.uk/system/files/docs/2019/06/riio-2\\_business\\_plans\\_guidance\\_june\\_2019\\_-\\_published.pdf](https://www.ofgem.gov.uk/system/files/docs/2019/06/riio-2_business_plans_guidance_june_2019_-_published.pdf)

12 Energy Networks Association. (2018). Energy Networks Association's Flexibility Commitment. Available at: <http://www.energynetworks.org/assets/files/ENA%20Flex%20Commitment.pdf>

13 Energy Networks Association. (2019). Our six steps for delivering flexibility services. Available at: <http://www.energynetworks.org/assets/files/ENA%20Flexibility%20Commitment%20Our%20Six%20Steps%20for%20Delivering%20Flexibility%20Services.pdf>

14 [https://www.ofgem.gov.uk/system/files/docs/2019/08/open\\_letter\\_consultation\\_on\\_the\\_riio-ed2\\_price\\_control.pdf](https://www.ofgem.gov.uk/system/files/docs/2019/08/open_letter_consultation_on_the_riio-ed2_price_control.pdf)

***Change Act 2008, and to report periodically on progress made against these plans. In preparation for this new obligation, the Government should establish centralised support to help local authorities develop decarbonisation strategies and deliver initiatives aimed at reducing greenhouse gas emissions. It should also support local authorities' access to low-cost, long-term finance in order to enable the delivery of such strategies. The Government should adopt UK100's proposals for 'Clean Energy Action Partnerships'.*** (Paragraph 223)

The Government agrees that local authorities have a key role to play in helping the UK to bring all greenhouse gas emissions to net zero by 2050. The BEIS Local Energy programme was established to support Local Enterprise Partnerships and local authorities in England to play a leading role in delivering clean growth. The programme has provided funding to all LEPs in England to produce energy strategies. The Local Energy Programme has also established five Local Energy Hubs, which are supporting local authorities to build capability. In addition, the government funds a range of energy measures to help reduce emissions from public sector buildings, including local authority buildings, through the Public Sector Energy Efficiency Loan Scheme.

**54. Emissions reductions in the transport and heating sectors will involve greater impact on, and require greater involvement of, consumers than the decarbonisation of the power generation sector, which is where the UK has achieved the bulk of its emissions reductions so far. Although public support for measures to reduce emissions appears high, this is not always matched with awareness of what actions consumers can take to support decarbonisation. In co-ordination with existing organisations, such as the Energy Saving Trust, who work to raise consumer awareness of available emissions-reduction measures, the Government should publish an easily-accessible, central guide for members of the public explaining what measures individuals and households can take to support the UK's decarbonisation.** (Paragraph 227)

Achieving clean growth has to be a shared endeavour between Government, devolved nations, local authorities business, civil society and the British people.

The Government is taking action to raise awareness, including through the Green GB & NI campaign, and the first Green GB & NI week in 2018. This aims to raise awareness of climate action and to showcase the opportunities, benefits and challenges of reducing our emissions to net zero, ending the UK's contribution to climate change whilst growing our low carbon economy.

The Government recognises the importance of clear communications to members of the public on how to reduce their carbon footprint, building on the range of tools publicly available. We will consider the most appropriate way to deliver this.

**55. The Government should re-introduce a telephone and visiting advice service in England which offers bespoke advice on measures such as residential energy efficiency and low carbon heating and transport.** (Paragraph 228)

The Government commissioned Each Home Counts Review acknowledged the importance of consumers receiving trusted, impartial advice on energy efficiency. The Review also made recommendations on how energy efficiency advice could be improved.

Simple Energy Advice, a new digital and phonenumber service launched last year to provide homeowners with impartial and tailored advice on how to cut their energy bills and make their homes greener, as well as information on any available financial support.

**56. Product labelling already helps consumers choose products based on qualities such as healthiness, environmental impact and employee or animal welfare. *The Government should explore the feasibility and potential benefits of establishing a standard for the emissions associated with the manufacturing and transportation of consumer goods, to enable retailers to label their products with emissions information and to enable consumers to factor this into their purchasing decisions.*** (Paragraph 230)

The Government has been working with stakeholders to understand the potential effect product labelling has on influencing purchase behaviour. Labels could enable consumers to consider a range of different factors when purchasing a product, such as its durability, recyclability, reparability or its environmental impact. This Government will seek new legal powers in the forthcoming Environment Bill to allow clear labelling and information schemes to enable citizens to make fully informed purchasing decisions.

Ecolabels are an effective way to promote resource efficiency, enable consumers and businesses alike to make more resource efficient and sustainable decisions about the purchasing, use and disposal of products.

We see this power as an important step in our transition away from the traditional ‘linear’ economic model of ‘take, make, use, throw’, and will help us achieve our aim in the Resources and Waste Strategy 2018 of becoming world leaders in using resources more efficiently.

We will also explore the feasibility and potential benefits of using this power to display information on other aspects of a products environmental impact. We will work with key stakeholders including industry, trade associations and standard-setting bodies to identify which product groups might be most amenable to consumer information and eco-labelling schemes.

**57. The decarbonisation of the UK’s economy is critical for the environment and is a legally-binding target for the Government. Although decarbonisation offers opportunity for economic growth, it will inevitably also entail costs. The Committee on Climate Change has estimated that achieving net zero emissions could cost around 1–2% of GDP by 2050. It is important that these costs are shared fairly among citizens. *The Government must ensure that its policies for achieving net zero emissions consider the economic impacts on individuals. The Government should aim to cover the costs of measures through progressive means rather than through energy bills.*** (Paragraph 233)

The Government accepted the Committee on Climate Change’s recommendation to conduct a review into the costs and benefits of transitioning to a net zero economy. The review will consider how to pay for this transition and how to achieve this in a way that works for households, businesses and the taxpayer, as well as how we can ensure this is compatible with plans for a thriving and competitive economy.

58. *In line with the Government's focus on 'place' in its Industrial Strategy, the Government should include the potential for supporting economic growth in disadvantaged regions in its determination of where to locate demonstration projects and other initiatives.* (Paragraph 234)

The Government is committed to working in partnership with local places to develop Local Industrial Strategies (LIS) that will be long-term plans based on clear evidence and aligned to the national modern Industrial Strategy. LIS, led by Mayoral Combined Authorities or Local Enterprise Partnerships, will promote the coordination of local economic policy and national funding streams and establish new ways of working between national and local government, and the public and private sectors. The development of LIS, through extensive local consultation with businesses, public partners and civil society, will build on unique local strengths to ensure every community, and the country, reaches their economic potential and creates high quality good jobs.

## Carbon capture and storage

59. **Carbon capture and storage has been widely identified as a key technology for decarbonisation in several sectors. The Energy Technologies Institute estimated, prior to the UK's net zero emissions ambition, that meeting the UK's original 2050 emissions targets without the use of carbon capture and storage would incur an additional £30 billion in costs. This puts the Government's desire for value-for-money in context. We commend the Government for recapturing lost momentum in the development of carbon capture and storage. However, there are concerns that its action plan lacks clarity and ambition.** (Paragraph 241)

60. *Industry must have clarity on the framework through which it can invest in carbon capture, usage and storage (CCUS), as well as the timetable for the Government's CCUS Action Plan. The Government must provide greater clarity on the details of its action plan, and should set out in its response to this Report: what it considers to be deployment at scale; what constitutes cost-effectiveness or sufficient cost-reduction; how it expects to share costs with industry; and what the major milestones for the plan are, as well as when they are expected to be achieved. The Government should learn from previous carbon capture and storage projects and ensure that a sufficient number of projects, of sufficient scale, are undertaken to optimise the chance of successful deployment, and that the knowledge gained from publicly-funded work is publicly accessible.* (Paragraph 242)

We agree with the Committee on the importance of putting in place commercial frameworks to unlock investment in CCUS. It is why our CCUS Action Plan committed to bringing through new CCUS business models as a critical first step to moving to deploying CCUS in the 2020s.

In July, we published our consultation on potential business models for CCUS.<sup>15</sup> This represents a major milestone to helping us achieve our CCUS ambitions and developing a sustainable commercial framework that can unlock private sector investment and support a cost reduction trajectory. The consultation closed on 16 September and we are currently reviewing the consultation responses and we will respond to the consultation by the end of the year.

15 <https://www.gov.uk/government/consultations/carbon-capture-usage-and-storage-ccus-business-models>

Our CCUS Action Plan addresses many of these issues. For example, it covers the question of “scale”, in particular highlighting that:

- At an individual facility level, according to the Global CCS Institute, a large-scale facility is defined at “involving the capture, transport and storage of CO<sub>2</sub> at scale of at least 400,000 tonnes of CO<sub>2</sub> annually.”
- “At scale” deployment definition varies, but the Committee on Climate Change has advised that between 75 – 175 MtCO<sub>2</sub>/year may be required to meet net zero by 2050.

We have made clear that we will use the 2020s to test and develop CCUS in the UK context, supported by the development of robust and investable business models which will enable a clear cost reduction pathway, by taking full advantage of innovation and competition. To achieve this, we will seek to progress CCUS in the UK through a staged approach, to allow Government, and industry, to develop and test commercial regulatory concepts throughout the 2020s, including through initial deployment.

The aim of this approach is to allow lessons to be learnt and applied, to identify, test and then secure initial cost reductions with the ultimate goal of enabling commercial deployment in the UK should it be cost effective and value for money to do so. As part of this, we will set out our approach to sharing costs with industry.

In our consultation on CCUS business models, we have built on this by setting out parameters to guide the commercial development of CCUS business models to help support CCUS being developed at lowest cost. These include:

- The design of the models should instil confidence among investors and should attract innovation and new entrants to the market.
- The models should be cost efficient – providing value for money for taxpayers and bill payers, driving cost reductions and attracting new investment.
- There should be appropriate and fair cost sharing between the Government and CCUS developers, being mindful of impacts on taxpayers and bill payers.

You also asked about our progress in meeting the significant commitments made in the Action Plan, key points to note include:

- We have met our commitment to consult on potential business models for CCUS (published in July 2019) and will respond to the consultation by the end of the year as committed to in the Action Plan;
- We have consulted on the potential for re-use of existing oil and gas infrastructure for CCUS (published in July 2019) and will respond to the consultation by the end of the year;
- We have announced an Industrial Energy Transformation Fund, worth up to £315 million, which will help businesses with high energy use to cut their bills and transition to a low carbon future, including through transformative decarbonisation investments such as fuel switching and carbon capture. We will consult on the Fund’s design, including eligibility criteria by the end of 2019;

- Our commitment to provide £50 million in innovation match funding to support CCUS technology, and in June 2019 we announced £26 million of innovation funding to 9 projects to help advance the rollout of CCUS across the UK;
- We will, working with UKRI, provide further detail on next steps for CCUS innovation in due course, as current innovation programmes begin to deliver results (for example, our Industrial Clusters Mission backed by £170 million to create the world's first net zero carbon industrial cluster by 2040, where we envisage CCUS will play a key role) and continue to work with UKRI, academia and industry to develop innovative new R&D projects and collaborative partnerships.

Following the end of the CCS Competition in November 2015, we have assessed evidence from organisations such as the National Audit Office, Parliamentary Advisory Group and Public Accounts Committed evaluating previous CCUS projects to inform and develop CCUS policy and our ambition to deploy CCUS by the mid-2020s, as acknowledged in our consultation on potential business models for CCUS.

For example, the consultation on CCUS business models sought views on specific issues that have been highlighted by evidence to Government since the CCS Competition ended in November 2015. This included how to mitigate cross-chain risk and splitting the full-chain, fixed price model and CO<sub>2</sub> storage liability.

We agreed that all work will be publicly accessible. This is why for the previous CCS Competition we published over 80 key knowledge deliverables for use by future projects and academia to support the development of CCUS. A similar approach will be taken in the future.

**61. The Government's new ambition, to reach net zero emissions by 2050, will probably require the active removal of at least 130 million tonnes of carbon dioxide from the atmosphere annually by 2050. This is significantly greater than the extent of greenhouse gas removal envisioned in any of the Government's previous 'illustrative pathways' to meeting its original 2050 target, and is also at the limit of what is expected to be reasonably deliverable. *The Government should plan for the deployment of greenhouse gas removal technologies capable of removing around 130 million tonnes of carbon dioxide by 2050. It should develop and publish, within six months of this Report's publication, an illustrative pathway detailing the full extent of greenhouse gas removal that it projects to be possible from each major technology option by 2050, as well as a strategy for ensuring this pathway is feasible, including any policy decisions required now.* (Paragraph 252)**

The Government asked the Royal Society and the Royal Academy of Engineering to review greenhouse gas removal (GGR) technologies; their report was published in 2018. It contains a scenario which, by deploying a range of GGR methods "with many methods deployed at the limit of their maximum deployment", could remove 130 million tonnes of CO<sub>2</sub> per year. The Government has not set a fixed target for GGR deployment in 2050, recognising that some technologies are at a low stage of technological readiness and a range of uncertainties remain.

We are taking active steps to strengthen our understanding of GGR technologies – see response to recommendation 64. Looking ahead, our carbon capture, usage and storage

(CCUS) action plan commits us to moving to CCUS deployment in the 2020s. CCUS infrastructure is necessary to enable deployment of DACCS (direct air capture with carbon capture and storage) and BECCS (bioenergy with carbon capture and storage) – the GGR technologies with the greatest potential.

Among the public goods which land managers will be incentivised to deliver through the new ELM (Environmental Land Management) scheme, currently being developed by Defra, will be mitigation of and adaptation to climate change, including measures delivering greenhouse gas emission reduction and carbon sequestration.

**62. *The Government should launch a consultation to inform the development of a future framework for managing and incentivising greenhouse gas removal, and to provide greater certainty to encourage private investment in the development of these technologies. The consultation should examine potential frameworks for valuing, incentivising, measuring, reporting and validating greenhouse gas removal by different technologies.*** (Paragraph 253)

BEIS commissioned a study on incentivisation of GGRs which has recently been completed and published.<sup>16</sup>

It presents a number of options for consideration, spanning a wide range of possible approaches. The work considered incentivisation efforts in other countries and was advised by a panel of experts. The Government will consider carefully the results of this research. The Government also recently consulted on potential new business models for CCUS.<sup>17</sup> This consultation closed on 16 September, and we have committed to respond to it by the end of the year.

**63. *The step-change in greenhouse gas removal required by the Government’s new ambition to reach net zero emissions by 2050 will require a significant increase in current support for greenhouse gas removal technologies. Some urgently require research and development, whereas others could be deployed at scale now with the correct support. In line with its future strategy for greenhouse gas removal, the Government should be ready to increase funding for research, development and demonstration of greenhouse gas removal technologies. It must also ensure that it is seizing currently available opportunities for greenhouse gas removal, and should develop an effective framework for managing and incentivising forestation and land use management to achieve net emissions removals.*** (Paragraph 254)

We are taking active steps to strengthen our understanding of GGR technologies, such as through the £8.6 million GGR research programme delivered by UK Research & Innovation, which will continue until 2021, and a new programme under the Strategic Priorities Fund, worth £31.5 million, for a number of demonstration projects, announced on 10 September 2019. Government support for CCUS research, innovation and demonstration is described in the CCUS Action Plan (see response to recommendation 61). We continue to monitor research funded by others, both in the UK and overseas.

16 [https://www.gov.uk/government/publications/greenhouse-gas-removal-policy-options?utm\\_source=fd8be8e8-482d-4148-bd6b-fed743a38451&utm\\_medium=email&utm\\_campaign=govuk-notifications&utm\\_content=immediate](https://www.gov.uk/government/publications/greenhouse-gas-removal-policy-options?utm_source=fd8be8e8-482d-4148-bd6b-fed743a38451&utm_medium=email&utm_campaign=govuk-notifications&utm_content=immediate)

17 <https://www.gov.uk/government/consultations/carbon-capture-usage-and-storage-ccus-business-models>

We also recognise existing opportunities to increase GGR through forestation and land management. We will consult on a new Tree Strategy for England early next year, which will consider changes to our tree planting ambitions in light of the UK's net zero emissions target. We will also soon launch the £50 million Woodland Carbon Guarantee, which will boost the domestic carbon offset market and provide long-term payments for land managers who plant trees to sequester carbon. Further, we will incentivise land managers to deliver public goods, including greenhouse gas emission reduction and carbon sequestration, through the new Environmental Land Management (ELM) scheme.

**64. Solar radiation management does not address the fundamental problem of excess concentrations of greenhouse gases in the Earth's atmosphere, and does not appear to be a long-term solution to global warming. Nevertheless, it may be considered as a short-term solution if global greenhouse gas emissions are not reduced quickly enough to avoid significant global warming. In this scenario, detailed understanding of the wider effects of solar radiation management will be vital. *UK Research and Innovation should review the current state of research into solar radiation management, the likely timeframes that would be required for detailed research and potential testing of such technologies, and the case for any increased research now. It should ensure that research into solar radiation management is sufficient to allow for any potential future decisions to be made on the deployment of such technology to be sufficiently well-informed.*** (Paragraph 258)

Informed by a 2015 public engagement exercise, UKRI are prioritising investment in research in carbon dioxide removal approaches whilst recognising the need for further research to understand the wider environmental, social, ethical, and governance implications of any geoengineering activity such as solar radiation management (SRM).

The Government has commissioned modelling of the effects of SRM on climate in the past, but no such work is underway at present, as the World Climate Research Programme's (WCRP's) Geoengineering Model Intercomparison Project (GeoMIP) is investigating such effects, and they will be reviewed by the Intergovernmental Panel on Climate Change (IPCC) in its 6th Assessment Report.

## Appendix 2: Ofgem Response

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### Cover letter from Dermot Nolan, Chief Executive, Ofgem.

Ofgem is a non-ministerial government department and an independent National Regulatory Authority, recognised by EU Directives. Our principal objective when carrying out our functions is to protect the interests of existing and future electricity and gas consumers. We do this in a variety of ways including:

- promoting value for money;
- promoting security of supply and sustainability, for present and future generations of consumers, domestic and industrial users;
- the supervision and development of markets and competition; and
- regulation and the delivery of government schemes.

We work effectively with, but are independent of, government, the energy industry and other stakeholders within a legal framework determined by the UK government and the European Union.

In Ofgem's written evidence<sup>18</sup> to the committee (October 2018), we set out our position on key issues such as smart systems and flexibility, forward-looking charges and price signals, half-hourly settlement, as well as the role of RIIO and network price controls. Ofgem's responses to the recommendations in the report<sup>19</sup> '*Clean Growth: Technologies for meeting the UK's emissions reduction targets*' are set out below.

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18 Written evidence submitted by Ofgem (October 2018): <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/science-and-technology-committee/technologies-for-meeting-clean-growth-emissions-reduction-targets/written/92053.html>

19 Clean Growth: Technologies for meeting the UK's emissions reduction targets (August 2019): <https://publications.parliament.uk/pa/cm201719/cmselect/cmsctech/1454/145402.htm>

## Annex to letter

### Recommendation 10

We commend National Grid Electricity System Operator for its ambition to be able to manage a 'zero carbon' electricity grid by 2025. This goes significantly beyond the Government's projections for possible renewable power deployment by 2032, and indicates that any 'over-delivery' on the deployment of low-carbon power generation in the 2020s will not be incompatible with the electricity transmission system.

*We urge distribution network operators to adopt a similar ambition to National Grid System Operator, of operating a zero carbon grid by 2025. Ofgem should work with distribution network operators to ensure that the regulatory framework required to allow this is in place. If sufficient progress is not made, we urge the Government to consider strengthening Ofgem's mandate to require the distribution network operators to speed up the investment and upgrading of the distribution networks required.*

## Ofgem Response

A key objective of Ofgem's regulation is to ensure that network companies support the transition to a smarter, more flexible, sustainable and decarbonised energy system, taking the appropriate steps to mitigate their own environmental impact. With the UK and Scottish Governments recently agreeing new net-zero emissions targets, and the Welsh Government declaring a climate emergency, there will be an increasing focus on decarbonisation, particularly in the transport and heat sectors. This is reflected in Ofgem's new corporate strategy, which sets out the key objective of decarbonising to deliver a net zero economy. Ofgem sees its role as an active enabler of decarbonisation, by ensuring that consumer interests are protected in this transition.

RIIO-2, the next round of network price controls<sup>20</sup> - which will operate from April 2021 (gas transmission, gas distribution and electricity transmission) and April 2023 (electricity distribution) - will have a critical enabling role in driving better value for consumers by learning lessons from both the current and previous price controls, at the same time as preparing the networks for the energy system of the future. Ofgem is currently setting the next round of price controls. Our aims for RIIO-2 are to prepare our networks for a net zero future, whilst ensuring costs are kept as low as possible for consumers and maintaining high levels of service and reliability. The new price controls should promote the delivery of high quality services at lower cost to consumers, paving the way for a cheaper, smarter, and more sustainable energy system.

As the growth in electric vehicles accelerates and more homes and businesses source their heat and power from cleaner energy sources, a core responsibility of networks will be to facilitate these changes. This means responding to the demands for low carbon connections in a timely way, finding efficient ways to respond to new sources of demand like electric vehicles, heat pumps, and flexibility on the networks, and supporting innovation that

20 RIIO (setting Revenue using Incentives to deliver Innovation and Outputs) is Ofgem's price control mechanism for gas and electricity networks

could expand the range of possibilities for the decarbonisation of heat, power, and transport. Ofgem's network regulation also needs to be flexible and prepare for different conditions – but without adding unjustifiable costs to consumers.

Because of the uncertainty about the speed of change, and the infrastructure needed to meet it, Ofgem is considering adding an adjustment and flexible mechanisms into the next network price control. This would allow network companies to scale up their investment within the price control period if changes toward net zero are more rapid than expected—for example, through much higher rollout of electric vehicles or increased certainty on approaches to decarbonise heat.

More generally, Ofgem is also encouraging gas and electricity distribution network companies to start working together and with other stakeholders at a local level, to help facilitate understanding of local solutions for decarbonised heating in the future.

#### **Recommendation 17**

Ofgem must consider the interests of future consumers as well as current consumers in its decisions, including the need for decarbonisation. The projected increases in network costs for consumers and businesses that have installed on-site generation and flexibility technologies, arising from Ofgem's proposed network charging reforms, will act as a disincentive for further consumers or enterprises to install similar technologies. This is not conducive to the overall goal of decarbonisation. However, Ofgem is right to seek to avoid the costs of network usage falling increasingly on vulnerable consumers.

*Ofgem must revise its proposed network charging reforms to ensure that they do not disincentivise the deployment of technologies that will contribute to the decarbonisation of the UK's energy system. The Government must ensure that vulnerable consumers do not pay an increasing proportion of network costs, and that all households have the ability to deploy technologies that will reduce their cost of energy and help to decarbonise the economy.*

## **Ofgem Response**

Our energy system is undergoing a radical transformation. We are generating and using electricity in different ways, in different locations, and at different times. To facilitate the energy transition, Ofgem is working to create a smarter, more flexible energy system. We published a plan (with government) for delivering this in 2017,<sup>21</sup> and continue to report on the actions set out in the Plan.

There are two types of network charges: 'forward-looking' charges which send signals to users regarding their behaviour on the networks by the charges they incur, and 'residual charges' which recover the remainder of the total revenues that network companies are allowed to recover.

The current system of residual network charges incentivise users to install generation on their sites, often without an associate reduction in system costs, and in many cases, in places that actually increase the costs of running the network. This is often not smart, renewable technology, but small gas and diesel-fired generators. We want to see a set of

21 Upgrading our energy system: smart systems and flexibility plan (2017) | <https://www.gov.uk/government/publications/upgrading-our-energy-system-smart-systems-and-flexibility-plan>

electricity network charges which mean that where the use of smart, flexible or renewable technologies leads to savings in the costs of the network, that they share in these savings. However, we also want to ensure that the costs of running the network, that do not change with use, are distributed fairly across all users.

Ofgem have set up a programme of work to reform electricity network charging to ensure they are fit for purpose. Our reforms to access and forward-looking charges, plus our wider work to promote a flexible energy system, will ensure that where market participants can take action to reduce system costs they share in those benefits. The Targeted Charging Review (TCR) is about ensuring users pay a fair share towards the costs of the network existing. Left unchecked, the current system will leave those who are unable to afford or unwilling to invest in smart, flexible energy solutions bearing a greater share of network charges over time. We estimate that our TCR reforms will reduce consumer bills by £4bn-£6bn over the next 20 years, and aim to unlock further savings of £4bn-£15bn through our reforms to access and forward looking charges.

A new framework for charging will help remove distortions which may unnecessarily add costs to energy bills, including to vulnerable consumers, and build a more efficient decarbonised energy system, as the UK pursues its net zero emissions target for 2050.

#### **Recommendation 48**

The roll-out of smart meters is one important enabling component of a flexible energy system that can match demand to supply, allowing increased deployment of intermittent renewable power generation. However, the Government's roll-out is severely behind schedule, in part because the original scheme had fundamental design faults, as highlighted by our predecessor Committee and the then Energy and Climate Change Committee.

*The Government must ensure that it takes all reasonable steps to achieve a national roll-out of smart meters as soon as possible. In order to reduce consumer resistance to smart meters, the Government should run public engagement initiatives to raise public awareness that by having a smart meter installed, consumers can contribute to long-term reductions in the UK's greenhouse gas emissions. Ofgem should require energy suppliers to collect and publish data on consumer acceptance rates for smart meter installation, and the reasons given by consumers for rejecting a smart meter. The Government should then be ready to act on this information to drive greater installation rates of smart meters, for example by introducing a consumer incentive mechanism. It should also require installation of a smart meter in properties without one whenever the owner or enter changes.*

## Ofgem Response

The industry working group considering the transition to market-wide half-hourly settlement (MHHS) has concluded that a pre-requisite for its success is for a sufficient number of smart meters to be installed before the transition begins.<sup>22</sup> We do not believe that the expected profile for smart meter rollout<sup>23</sup> will significantly impact the introduction of MHHS.

We expect that the rollout of smart meters and the introduction of MHHS will incentivise suppliers to provide new products and services to their customers, which in turn will help them move their electricity consumption to times of day when it is cheaper to generate and transport. It is this combination of factors, rather than levels of smart meter deployment alone, which will lead to the system savings that we expect to realise from settlement reform.

We are currently developing an Impact Assessment (IA) to consider the costs and benefits of the Target Operating Model<sup>24</sup> (TOM), including the impact of different options for the commencement and phasing of implementation. This will include the costs relating to transition to the new systems. In terms of timescales, we are considering three different Implementation Periods (2, 3, or 4 years) starting after mid-2020, followed by the Migration Period (1 year), which includes moving all the meters (both smart and traditional) to the new system.

The IA will feed into the Economic Case of the Full Business Case, which will support our final decision on market-wide half-hourly settlement, and set out the timetable for implementation in the light of the expected costs and benefits (and including any considerations that relate to thresholds for smart meter penetration).

BEIS are currently consulting on a policy framework to continue to drive the rollout post 2020, under which Ofgem would provide regulatory oversight of energy suppliers' progress against installation targets, taking action in line with our enforcement guidelines. BEIS are also calling for ideas for additional policy measures that the Government could consider to further complement and support the smart meter rollout post-2020. Households who do not switch are currently protected by the default tariff cap. Whenever the price cap is lifted, some backstop protection may need to remain in place for vulnerable or other groups of customers, who may struggle to find a fair price in an increasingly complex digital market, where smart meter-enabled innovations like time of use tariffs become more common. We will carefully monitor the market, including price cap compliance, to consider the case for future price protection, particularly for various specific vulnerable groups. Many consumer groups have particularly emphasised that they want to

22 The Design Working Group, chaired by ELEXON, submitted their final report on the Target Operating Model and Transition to Ofgem in August 2019. The document can be found here: [https://www.ofgem.gov.uk/system/files/docs/2019/10/dwg\\_final\\_report\\_stage\\_2v1.0.pdf](https://www.ofgem.gov.uk/system/files/docs/2019/10/dwg_final_report_stage_2v1.0.pdf)

23 Smart meter policy framework post-2020 (September 2019): <https://www.gov.uk/government/consultations/smart-meter-policy-framework-post-2020>

24 Design Working Group preferred TOM report (February 2019): <https://www.ofgem.gov.uk/publications-and-updates/design-working-group-preferred-tom-report>

understand how consumers in vulnerable situations will be protected post-price cap, and have explicitly expressed desire for longer-lasting protections for consumers in financially vulnerable situations.<sup>25</sup>

#### **Recommendation 49**

Market-wide half-hourly settlement of energy consumption costs will incentivise energy suppliers to offer tariffs that reward consumers for using energy when it is abundant, helping to enable higher levels of intermittent renewable power generation. However, Ofgem has highlighted the dependence of market-wide half-hourly settlement on widespread smart meter deployment. Given the low current uptake of smart meters, this indicates that there could be very significant delays in the introduction of market-wide half-hourly settlement and the benefits of widespread ‘smart’ tariff adoption.

*Ofgem should clarify what it determines to be the critical mass of smart meters required for market-wide half-hourly settlement. Since the introduction of marketwide half-hourly settlement will help to catalyse smart meter take-up, Ofgem should not set an overly stringent critical mass, and should be prepared to recover the costs of incomplete smart meter deployment from the suppliers of those consumers who do not have smart meters (in a way that protects vulnerable consumers).*

### **Ofgem Response**

The transition to market-wide half-hourly settlement (MHHS) has defined a prerequisite of having sufficient smart meters rolled out before transition can start. We do not believe that the expected profile for smart meter rollout, as recently set out in the BEIS ‘*Consultation on a Smart Meter Policy Framework post-2020*’,<sup>26</sup> lead to delay in the introduction of MHHS.

We expect that the rollout of smart meters and the introduction of MHHS will incentivise suppliers to provide new products and services to their customers, which in turn will help them move their electricity consumption to times of day when it is cheaper to generate and transport. This – rather than an absolute threshold for smart meter installations – will lead to the system savings that we expect to realise from settlement reform.

We are currently developing an Impact Assessment (IA) to consider the costs and benefits of the Target Operating Model<sup>27</sup> (TOM), including the impact of different options for the commencement and phasing of implementation. This will include the costs relating to transition to the new systems. In terms of timescales, we are considering three different *Implementation Periods* (2, 3, or 4 years) starting after mid-2020, followed by the *Migration Period* (1 year), which includes moving all the meters (both smart and traditional) to the new system.

25 Before we would recommend to government to lift the Default Tariff Price Cap, we will assess if Conditions for Effective Competition are in place in the market, as set out in our published framework. We will consider whether customers who appear to be in vulnerable circumstances due to financial or other reasons are in need of additional price protection.

26 Smart meter policy framework post-2020 (September 2019): <https://www.gov.uk/government/consultations/smart-meter-policy-framework-post-2020>

27 Design Working Group preferred TOM report (February 2019): <https://www.ofgem.gov.uk/publications-and-updates/design-working-group-preferred-tom-report>

The IA will feed into the *Economic Case of the Full Business Case*, which will support our final decision on market-wide half-hourly settlement, and set out the timetable for implementation in the light of the expected costs and benefits (and including any considerations that relate to thresholds for smart meter penetration).

BEIS are currently consulting on a policy framework to continue to drive the rollout post 2020, under which Ofgem would provide regulatory oversight of energy suppliers' progress against installation targets, taking action in line with our enforcement guidelines. BEIS are also calling for ideas for additional policy measures that the Government could consider to further complement and support the smart meter rollout post-2020. We expect them to hear ideas for financial incentives and penalties as part of this process.

Households who do not switch are currently protected by the default tariff cap. Whenever the price cap is lifted, some backstop protection may need to remain in place for vulnerable or other groups of customers, who may struggle to find a fair price in an increasingly complex digital market, where smart meter-enabled innovations like time of use tariffs become increasingly common.

#### **Recommendation 52**

Regulation of UK energy markets will play a key part in the development of a smart and flexible energy system. The RIIO price control framework has helped to support innovation in the gas and electricity networks, but it is vital that the second price control framework promotes even greater levels of innovation as the energy networks undergo a period of significant change.

*Ofgem must ensure that its second price control framework does not dilute its support for innovation and that the framework should further enable and incentivise network operators to innovate as part of their core business, rather than through standalone projects. Ofgem should work with network operators, energy suppliers and flexibility services providers to ensure that flexibility systems are always considered and deployed ahead of infrastructure construction, where possible and affordable.*

### **Ofgem Response**

The RIIO-1 price control (which runs up until 2021/2023) provides strong incentives for companies to innovate and look for efficiencies within the operation of their network, such as the Totex Incentive Mechanism. The Totex Incentive Mechanism enable companies to retain a financial share of any efficiencies they realise during the course of the price control period. It means any underspend is shared between the network company and its customers. Therefore, efficient spending leads to better returns for investors and lower network charges for customers. Additionally, RIIO-1 provides companies with additional innovation funding through the Innovation Rollout Mechanism, Network Innovation Allowance, and Network Innovation Competition.

One of Ofgem's key ambitions for RIIO-2<sup>28</sup> is that network companies fund more innovation as part of their regular activities, and roll out past proven innovations into their

28 RIIO-2 Sector Specific Methodology – Core document (May 2019): [https://www.ofgem.gov.uk/system/files/docs/2019/05/riio-2\\_sector\\_specific\\_methodology\\_decision\\_-\\_core\\_30.5.19.pdf](https://www.ofgem.gov.uk/system/files/docs/2019/05/riio-2_sector_specific_methodology_decision_-_core_30.5.19.pdf)

business. We have retained the Totex Incentive Mechanism, plus we have also introduced a Business Plan Incentive, and will ensure that the RIIO-2 business plans of companies will be challenged on their level of innovation ambition.

For RIIO-2, we have also decided to replace the Network Innovation Competition with a new innovation funding pot, to focus on strategic challenges related to the energy system transition.

Additionally, for RIIO-2 we have stated that any Network Innovation Allowances that companies will receive will be based on the extent to which the companies improve the public reporting of projects they have funded, including costs and benefits, as well as demonstrating that successful innovation is being diffused across the energy sector.

We are also maintaining existing expectations and requirements for companies to collaborate on network innovation projects with each other, and with third parties. For example, we are maintaining the requirement for companies to create and maintain joint industry-wide gas and electricity innovation strategies, in order to provide strategic direction to their innovation activities.

Ofgem is committed to a technology-neutral regulatory framework, that provides a level-playing field for all flexibility solutions.

Flexibility should be deployed where there is evidence that it is both possible and affordable. Ofgem is encouraging Distribution Network Operators (DNOs) to routinely tender flexibility. Based on this policy push, all DNOs have committed to seek flexibility for any reinforcement.<sup>29</sup>

We are reviewing how DNOs calculate the value offered to them by flexibility services. We are also placing clear expectations on them to ensure that the price paid for flexibility services accounts for the option value of flexibility, compared to traditional reinforcement. Full assessments of option value should account for the benefits of avoiding reinforcement costs where load growth does not meet projections. They should also account for future technologies that may be able to meet network and system needs at a lower cost than traditional reinforcement.

Ofgem is also driving increased transparency within DNOs, encouraging them to publish their decision-making processes externally, to ensure that there are no conflicts of interests in the decisions they take.

We are driving policy through licence conditions to ensure that the key enablers required to establish flexibility markets are delivered by DNOs. This is in response to recent recommendations from the Energy Data Taskforce.<sup>30</sup>

We are working with stakeholders across the industry to make sure these reflect the needs of users. Going forward, Ofgem will be hosting an industry stakeholder workshop in November on flexibility, flexibility valuation, and the coordination of flexibility services.

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29 Energy Networks Association's Flexibility Commitment (December 2018): <http://www.energynetworks.org/assets/files/ENA%20Flex%20Commitment.pdf>

30 Delivering Energy Data Taskforce recommendations (July 2019): <https://www.ofgem.gov.uk/publications-and-updates/delivering-energy-data-taskforce-recommendations>