



HM Government

GOVERNMENT RESPONSE TO THE COMMITTEE ON CLIMATE CHANGE

2017 Report to Parliament – Meeting
Carbon Budgets

October 2017

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Presented to Parliament pursuant to Section 37 of the Climate Change Act 2008

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Introduction

The Government is committed to delivering clean growth and tackling climate change. The Clean Growth Strategy, published today, sets out our ambitious policies and proposals for decarbonising the UK economy through the 2020s, and seizing the economic opportunities that clean growth offers in each sector with a view to keeping the UK on track to meeting its 2050 target.

We have already made significant progress towards our legally binding 2050 target to reduce emissions by at least 80 per cent against 1990 levels. Provisional statistics indicate that UK emissions in 2016 were 42 per cent lower than in 1990 and six per cent below those in 2015¹. At the same time, the UK's GDP has increased by two thirds since 1990² showing that a strong, growing economy can go hand in hand with reduced emissions. This means that since 1990 we have reduced emissions faster than any other G7 nation while leading the G7 group of countries in growth in national income³.

We exceeded the target emissions reductions of our first carbon budget (2008 to 2012) by one per cent⁴ and we project that we will outperform against our second and third budgets covering the years 2013 to 2022 by almost five per cent and four per cent respectively⁵. This will be a significant achievement.

The Government set the fifth carbon budget in summer 2016, capping emissions at 1,725 MtCO₂e over the period 2028-2032, in line with the recommendation of the Committee on Climate Change (CCC). This is equivalent to an average 57 per cent reduction on 1990 levels.

Our current estimated projection for the fourth and fifth carbon budgets suggests that we could deliver 94 per cent and 93 per cent of our required performance against 1990 levels⁶ – for carbon budgets which will end in ten and fifteen years' time respectively.

Additional ambitious policies and proposals set out in the Strategy will contribute to closing the remaining gap.

¹ BEIS (2017) BEIS provisional UK emissions statistics 1990-2016 <https://www.gov.uk/government/statistics/provisional-uk-greenhouse-gas-emissions-national-statistics-2016>

² ONS (2016) Quarterly National Accounts Statistical bulletins (Series ABMI. Seasonally adjusted chained volume measures) <https://www.ons.gov.uk/economy/grossdomesticproductgdp/timeseries/abmi>

³ Figures on per capita basis. OECD (retrieved September 2017) http://stats.oecd.org/index.aspx?DataSetCode=PDB_LV; World Resources Institute (2017) CAIT Climate Data Explorer <http://cait.wri.org>

⁴ DECC (2014) [Final statement for the first carbon budget period](https://www.gov.uk/government/statistics/final-statement-for-the-first-carbon-budget-period) <https://www.gov.uk/government/statistics/final-statement-for-the-first-carbon-budget-period>

⁵ BEIS (2017) Energy and Emissions Projections 2016 <https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2016>

⁶ This includes an initial estimate of 30 Mt and 80 Mt of additional savings in the fourth and fifth carbon budgets respectively from the more advanced policies and proposals in the Clean Growth Strategy. As we move forward and develop the full range of policies and proposals, we will publish individual impact assessments as appropriate with updated analysis.

Our response to the CCC's 2017 Progress Report

The Government welcomes the CCC's 2017 Progress Report to Parliament – Meeting Carbon Budgets: Closing the Policy Gap (the 'Report').

We acknowledge and have taken into consideration the recommendations in the Report in developing our Clean Growth Strategy⁷, which has been published alongside this paper.

This response to the CCC's report summarises the most relevant elements of the Clean Growth Strategy, and should be considered alongside that document. Where policies and proposals are relevant to more than one of the priority areas identified by the CCC, they are included in the most relevant section.

The Adaptation Sub-Committee of the CCC also published their second assessment of progress on the National Adaptation Programme in June 2017. The Government's response to this (as required by section 37 of the Climate Change Act 2008) has been published alongside this paper.

⁷ BEIS (2017) Clean Growth Strategy <https://www.gov.uk/government/publications/clean-growth-strategy>

Power

The CCC's key recommendations

- **Extension of existing approaches to contract an additional 80-100 TWh low-carbon generation in the 2020s** beyond existing plans (i.e. 130-150 TWh in total)
- **A new strategic approach to carbon capture and storage deployment in the UK** should include power plants as anchor loads for strategic clusters
- **Implementation of plans for increasing flexibility** (e.g. storage, interconnection, demand response, flexible generation)
- **Continued application of a carbon price after leaving the EU**
- **Contingency plans for delay or cancellation of planned projects**, for example of new nuclear power plants

Government response

The Government's policies and proposals for decarbonising the power sector are set out in Chapter 4 of the Clean Growth Strategy (*Delivering clean, smart, flexible power*).

The key areas relevant to the CCC's recommendations are:

- We confirm the Government's intention to phase out unabated coal generation by 2025, and we will shortly publish the Government's detailed response to the consultation.
- We are delivering new nuclear capacity through the final investment decision on Hinkley Point C, and will progress discussions with developers to secure a competitive price for future projects in the pipeline.
- We will work with industry as they develop an ambitious Sector Deal for offshore wind. Provided costs continue to fall, this could result in 10 gigawatts of new capacity built in the 2020s, with the potential to support high value jobs and a sustainable UK industry exporting goods and services around the world. We will also consider whether there could be opportunities for additional offshore wind deployment in the 2020s, if this is cost-effective and deliverable. This would mean up to £557 million for further Pot 2 Contract for Difference auctions, with the next one planned for spring 2019. We will work with the Crown Estate and the Crown Estate (Scotland) to understand the potential for deployment of offshore wind in the late 2020s and beyond and it is our current intention that wind projects on the remote islands of Scotland that directly benefit local communities will be eligible for the next Pot 2 auction, subject to obtaining State aid approval.

- We want to see more people investing in solar without government support and are currently considering options for our approach to small scale low carbon generation beyond 2019, and will provide an update later this year. More nascent technologies such as wave, tidal stream and tidal range, could also have a role in the long-term decarbonisation of the UK, but they will need to demonstrate how they can compete with other forms of generation.
- We remain committed to carbon pricing to help reduce emissions in the power sector. Further details on carbon prices for the 2020s will be set out in the autumn 2017 Budget.
- The Government, Ofgem and industry will implement the 29 actions set out in the Smart Systems and Flexibility Plan published on 24 July. These will enable technologies such as energy storage and demand side response to compete effectively within the energy market, help integrate more low carbon generation such as solar into our energy system, and deliver secure, smart appliances and smart tariffs to allow consumers to benefit from using energy at times when it is cheaper. Innovations and other steps to increase flexibility could unlock up to £40 billion in energy cost savings up to 2050⁸.
- The Government has commissioned an independent review into the cost of energy led by Professor Dieter Helm CBE which will recommend ways to deliver the Government's carbon targets and ensure security of supply at minimum cost to both industry and domestic consumers. Once Ministers have had the opportunity to consider the Helm review's proposals, the Clean Growth Strategy will incorporate its recommendations into our further policy development as appropriate.

Innovation

The Clean Growth Strategy sets out the Government's plans to invest around £900 million⁹ in innovation in the power sector, including around:

- £265 million in smart systems to reduce the cost of electricity storage, advance innovative demand response technologies and develop new ways of balancing the grid;
- £460 million in nuclear to support work in areas including future nuclear fuels, new nuclear manufacturing techniques, recycling and reprocessing, and advanced reactor design;
- £177 million to further reduce the cost of renewables, including innovation in offshore wind turbine blade technology and foundations.

⁸ BEIS and Ofgem (2017) Upgrading our energy system: smart systems and flexibility plan

<https://www.gov.uk/government/publications/upgrading-our-energy-system-smart-systems-and-flexibility-plan>

⁹ All figures are indicative and are subject to competitive bidding processes across sectors and value for money tests. Numbers may not sum due to rounding

Other areas

With regard to the CCC's recommendation on contingency plans for delay or cancellation of existing projects, for new nuclear the Government has a monitoring and governance regime in place which ensures good visibility of any potential delays to commissioning dates. Our principal tool for managing risks to security of supply is the Capacity Market – known or likely slippages in project delivery can be mitigated through adjustments to the amount of capacity we secure through the annual auctions.

The Government's strategic approach for carbon capture usage and storage (CCUS) is covered in the cross-cutting issues section of this document.

Buildings

The CCC's key recommendations

- **New-build: Standards to ensure new-build properties are highly energy efficient and designed to accommodate low-carbon heating from the start**, meaning that it is possible to optimise the overall system efficiency and comfort at a building level
- **Existing buildings: A stable framework and direction of travel for improving the energy and carbon efficiency of existing buildings** joining up energy efficiency and low-carbon heat, with: an attractive, well-timed offer to households and SMEs; simple, highly visible information and certification, including enhanced business reporting, alongside installer training; backed by standards for emissions performance of buildings that tighten over time
- **Reformed support for low-carbon heat through the 2020s**, that deals with current barriers, provides a process for decisions on heat infrastructure, and is attractive enough to drive deployment of heat pumps, heat networks and biomethane in line with CCC scenarios
- **Active preparations for strategic decisions in the early 2020s on the role for hydrogen for heat and the future of the gas grid**, including pilots, demonstrations, and research on the challenges of a wider-scale hydrogen switchover

Government response

The Government's policies and proposals for decarbonising buildings are set out in Chapter 4 of the Clean Growth Strategy (*Improving Business and Industry Efficiency and Supporting Clean Growth; Improving Our Homes; Leading in the Public Sector*).

The key areas relevant to the CCC's recommendations are:

Consultations on improvements to Building Regulations

- The Government has commissioned an independent review of Building Regulations and fire safety, being led by Dame Judith Hackitt. The review will report in spring 2018. Subject to the conclusions of that review:
 - the Government intends to consult on making improvements to Building Regulations requirements for new and existing commercial buildings where there are cost-effective and affordable opportunities, and it is safe and practical

to do so. This will look to promote low carbon and higher energy efficiency heating, ventilation and air conditioning systems in new commercial buildings.

- the Government intends to consult on improving requirements for new homes where the evidence suggests that there are cost-effective and affordable opportunities, and it is safe and practical to do so. This will look to ensure that new homes are future-proofed for the installation of lower carbon heating systems where this is cost-effective and affordable. This will help to phase-out high carbon fossil fuels in the future, starting with homes off the gas grid.
- the Government intends to consult on making improvements to Building Regulations requirements, so that any new work (i.e. extensions to a property and other building work) to existing properties meets a high standard of energy efficiency, where the evidence shows there are cost-effective and affordable opportunities and that it is safe and practical to do so. Any improvements would focus on the standards of the work carried out on properties itself, and would not include any wider “consequential” improvements to other parts of the property.

Business energy efficiency

- The Government will develop a package of measures to support businesses to improve how productively they use energy and will consult on this in 2018, with the aim of improving energy efficiency by at least 20 per cent by 2030.
- The Government will ensure incentives for investment in energy efficiency are regularly reviewed, for instance the list of products that qualify for enhanced capital allowances tax relief.
- We will consult in 2018 on how best to improve the energy performance of business buildings in the private rented sector through tighter minimum energy standards.
- We will continue with plans to close the CRC Energy Efficiency Scheme, following the 2018-19 compliance year. We will drive energy efficiency by implementing the previously announced increase to the main rates of the Climate Change Levy from 2019.
- Alongside the Strategy, we are consulting on a new and streamlined energy and carbon reporting framework to replace some existing schemes, such as the reporting element of the CRC Energy Efficiency Scheme, and align with mandatory annual greenhouse gas reporting by UK quoted companies. This will improve the way in which businesses report their energy use, and provide businesses with the information needed to identify how they can reduce energy bills.
- We will undertake an evaluation of the Climate Change Agreements to inform any successor scheme from 2023.
- The Government will build on existing schemes such as the Energy Savings Opportunity Scheme (ESOS), undertaking a comprehensive assessment of its effectiveness, and consider any future reforms.

- The Government will work with stakeholders to improve the market for energy services, building confidence across commercial and industrial customers.
- The Government will explore with stakeholders how we can improve the provision of information and advice to SMEs to encourage the uptake of energy efficiency technologies.

Home energy efficiency

- The Government will explore how voluntary building standards can support future improvements in business building performance.
- For privately rented homes, we have legislated so that from April 2018, landlords of the worst performing properties will need to improve those properties to a minimum of EPC Band E before they can be let, lowering bills for some of the most vulnerable private tenants while ensuring costs of improvements are reasonable and affordable. We will consult shortly on steps to make these regulations more effective.
- The Government will look at a long term trajectory for energy performance standards across the private rented sector, with the aim of as many private rented homes as possible being upgraded to EPC Band C by 2030, where practical, cost-effective and affordable. We will consider options with a view to consulting in 2018. In addition, the Government will also look at how social housing can meet similar standards on the same timetable. When looking at this we will need to take account of the findings of the independent public inquiry into the fire at Grenfell Tower¹⁰ and the Government's separate work looking at wider social housing policy issues¹¹.
- We want all fuel poor homes to be upgraded to EPC Band C by 2030, and our aspiration is that, across the whole housing stock, as many homes as possible reach a similar standard by 2035, where practical, cost-effective and affordable.
- The Energy Company Obligation (ECO) will upgrade around a million homes, supporting £3.6 billion of investment. We have changed the scheme so it is more focused on households with low incomes. We will extend support for home energy efficiency out to 2028 at least at the current level of ECO funding. We will review the best form of support beyond 2022 recognising the need to both save carbon and meet the Government's commitment to upgrade all fuel poor homes to EPC Band C by 2030.
- Alongside the Strategy, the Government has published *Boiler Plus*, improving standards for the 1.2 million new boilers¹² installed in England every year and ensuring control devices are included with every installation so people can more easily control comfort in their own homes for less fuel from April 2018.

¹⁰ Grenfell Tower Inquiry (2017) Terms of Reference <https://www.grenfelltowerinquiry.org.uk/news/prime-minister-announces-inquiry-terms-reference/>

¹¹ Prime Minister's response of 15th August 2017 <https://www.grenfelltowerinquiry.org.uk/key-documents/>

¹² BEIS (2017) Boiler Standards IA <https://www.gov.uk/government/consultations/heat-in-buildings-the-future-of-heat>

- To build the market for energy efficiency, we need to make it as easy as possible for people to pay for and make home energy efficiency improvements. We are publishing a call for evidence on additional measures to encourage energy performance improvements, including a focus on:
 - Working with mortgage lenders to incorporate energy efficiency into their lending decisions, alongside developing innovative “green mortgage” products. The Government is now exploring ways that it could support the launch of more products, and further details are included in our call for evidence.
 - Looking at incentives and other levers that could encourage home-owners to invest in energy efficiency improvements.
- Following the sale of the Green Deal Finance Company, the Government is publishing a call for evidence on how to reform and streamline the Green Deal framework to make the “Pay as You Save” system more accessible to businesses, while ensuring adequate protection for consumers.
- We will work with industry to implement the independent, industry-led *Each Home Counts*¹³ review to improve quality and standards for all retrofit energy efficiency and renewable energy installations.
- We will replace the existing, telephone-only Energy Saving Advice Service with a digitally-led service by spring 2018, working closely with the *Each Home Counts* implementation, offering tailored advice on improving the energy performance of people’s homes.

Public sector

- To encourage organisations to focus on cutting carbon and energy bills in the public sector, the Government will introduce a voluntary wider public and higher education sector target of a 30 per cent reduction in greenhouse gases by 2020/21, against a 2009/10 baseline, and will publish a Call for Evidence alongside this document to gain views from the sector on the target and a proportionate reporting framework to underpin this, as well as further policies to realise carbon and cost saving potential. We will review progress against this voluntary target by 2020, with a view to moving to a more ambitious target during the 2020s (such as a 50 per cent reduction by 2030). Once a reporting framework is in place, and there is clear evidence of the impact of voluntary action, a mandatory target could also be considered.
- For central government, the Greening Government Commitments (GGCs) have already produced significant emissions savings across departments and agencies. We are currently working with departments to agree higher targets for 2020 and actions to

¹³ DCLG (2016) *Each Home Counts: Review of Consumer Advice, Protection, Standards, and Enforcement for Energy Efficiency and Renewable Energy* <https://www.gov.uk/government/publications/each-home-counts-review-of-consumer-advice-protection-standards-and-enforcement-for-energy-efficiency-and-renewable-energy>

further reduce greenhouse gas emissions beyond this date. We will publish the new targets in due course.

- In the 2015 Spending Review, the Government announced £295 million of new funding for public sector energy efficiency across the UK. In England, this increased funding is invested in the existing public sector energy efficiency loan scheme, which is available to the wider public and higher education sectors. The loan scheme administrator currently manages £210 million, and this will rise to some £385 million by 2020. This revolving loan scheme will continue to be recycled to at least 2025. Similar schemes run in Scotland and Wales received £40 million of the 2015 spending review award.
- An Energy Performance Contract provides finance to organisations so that they can invest in cost-effective energy conservation measures, without incurring any upfront capital costs. The Government will continue to support their expansion in the public sector, as they offer a new route to improve energy efficiency, while producing guaranteed savings. To underpin this approach we are continuing support to the RE: FIT programme in 2017/18, alongside Local Partnerships.

Low carbon heat

- Through the Renewable Heat Incentive (RHI), we are spending £4.5 billion between 2016 and 2021 to support innovative low carbon heat technologies in homes and businesses, such as heat pumps, biomass boilers and solar water heaters. We are also reforming the RHI to focus the scheme towards long-term decarbonisation through greater uptake of technologies such as heat pumps and bio methane (biogas to grid)¹⁴.
- As we work to understand different options for the long term decarbonisation of heat, we will need to tackle the challenge of those business properties off the gas grid, particularly those heated by oil boilers and facing volatile costs. Beyond support through the RHI, our ambition is:
 - to phase out the installation of high carbon fossil fuel heating in new and existing business buildings off the gas grid during the 2020s, starting with new buildings as these lend themselves more readily to other forms of low carbon heating. We will involve businesses and industry in developing our new policy, in line with broader Government priorities on delivering clean air.
 - to phase out the installation of high carbon fossil fuel heating in new and existing off gas grid residential buildings (which are mostly in rural areas) during the 2020s, starting with new homes as these lend themselves more readily to other forms of low carbon heating. In line with broader Government priorities on delivering clean air, we are considering a range of policy options to support this, and are investing £10 million in an innovation challenge fund to support low

¹⁴ BEIS (2016) The Renewable Heat Incentive: A reformed and refocused scheme <https://www.gov.uk/government/consultations/the-renewable-heat-incentive-a-reformed-and-refocused-scheme>

carbon heating systems. We will involve consumers and industry in developing our new policy so that it is straightforward for people to get new technologies installed. The Government will also explore the use of the £200 million package of Growth Programme and Countryside Productivity offers to support renewable energy projects in rural areas¹⁵.

- In the Spending Review 2015, we allocated funding out to 2021 to grow the UK heat networks market so it is self-sustaining in the longer term. This could support significant investment of private and other capital by 2021. This will enable the construction of heat networks in areas of high heat demand density such as urban centres, campuses and business parks, including in rural locations. Following recommendations from an industry taskforce, we will also examine the measures necessary to create an effective long-term market framework for the sector beyond 2020.
- We need to lay the groundwork in this Parliament to set up decisions in the first half of the next decade about the long term future of heat. The Government has commissioned research into different heat demand scenarios, the use of hydrogen, what changes might be needed to the electricity grid in response to large scale uptake of heat pumps, the role that bioenergy might play in decarbonising heat and international activity. We plan to publish initial findings from a number of studies later this year, and a full report on our review of the evidence by summer 2018.

Innovation

The Clean Growth Strategy sets out the Government's plans to invest around £184 million out to 2021 in research, development and deployment of innovative energy efficiency and heating technologies, and the gas network.

The Research Councils are investing over £70 million in energy efficiency, including £22 million in buildings research. In addition, we will run:

- A new £10 million grant fund for the innovation of new insulation materials, installation methods and business models for existing buildings.
- A further £10 million grant fund focused on making low carbon heating technologies more affordable, better performing, and attractive to the consumer.

Research Councils are also planning to invest around £19 million to research how people's energy choices can help them stop wasting as much energy.

To inform the decisions that will be needed on our long term approach to decarbonising heat, we will run a £25 million project on using hydrogen as an alternative to natural gas¹⁶, including looking at regulatory standards and the development of appliances.

¹⁵ Defra 2017) £200 million boost for rural England <https://www.gov.uk/government/news/200-million-boost-for-rural-england>

¹⁶ BEIS (July 2017) Funding for innovative approaches to a low carbon built environment

<https://www.gov.uk/government/publications/funding-for-innovative-approaches-to-using-hydrogen-gas-for-heating>

Industry

The CCC's key recommendations

- **An overall approach to long-term industrial decarbonisation**, developing existing 'Roadmaps' into specific actions and milestones and extending coverage to other industries
- **A strategic, funded approach to industrial carbon capture and storage**, based around clusters alongside power installations and shared infrastructure, with a new funding mechanism for industry
- **An effective approach to drive sustained uptake of low-carbon heat in industrial processes and buildings**
- **The EU ETS and EU efficiency standards and policy to be preserved or replicated and strengthened in future**
- **A stronger policy framework for industrial energy efficiency**, including an effective reporting mechanism
- **Tightly regulate and closely monitor any onshore petroleum wells (i.e. shale gas)** during development, production and decommissioning to ensure rapid action to address leaks

Government response

The Government's policies and proposals for decarbonising industry are set out in Chapters 2 (*The Challenges to Delivering Clean Growth*) and 4 (*Improving Business and Industry Efficiency and Supporting Clean Growth*) of the Clean Growth Strategy.

The key areas relevant to the CCC's recommendations are:

- Publication of joint industrial decarbonisation and energy efficiency action plans with seven of the most energy intensive industrial sectors, building on three years of joint industry-Government co-operation. These action plans identify steps by industry and Government that can be taken now to support long term low carbon growth, energy efficiency and emissions reductions on a sector by sector basis. These include the sharing of best practice and innovation opportunities, including through a new online portal, facilitating dialogue to improve access to finance and cross-sector consideration of the best uses of biomass across industry.

- The Government remains committed to using carbon pricing as an emissions reduction tool and will ensure that a clear price signal continues to incentivise industrial emissions reduction.
- We will develop a framework to support the long term low carbon development of energy intensive industrial processes, such as carbon capture usage and storage and electrification.
- For the EU Emissions Trading System (EU ETS), we remain committed to reducing emissions in the traded sector, and the UK already has a range of domestic policies in place to support this. We will seek to ensure that our future approach is at least as ambitious as the existing scheme and provide a smooth transition for the relevant sectors.
- For sectors not covered by the EU ETS, two sector policies operate at EU rather than UK level and are particularly important for driving emissions reductions – new car and van CO₂ regulations, and EU fluorinated gas quotas. We remain committed to reducing emissions in these areas and will offer certainty to industry as soon as possible on our future relationship with the EU. We will seek to ensure our future approach is at least as ambitious as the current arrangements.
- EU products policy sets minimum standards for a range of products such as white goods and lighting, which improve energy efficiency. We continue to support these policy measures, which cut energy bills, increase energy security, reduce emissions and help customers make informed choices, and we will keep step with equivalent standards wherever possible and appropriate, or even exceed them where it is in the UK's interest to do so. This may include products not yet covered by European legislation, such as smart appliances.
- The Government will establish an Industrial Energy Efficiency scheme to help large companies install measures to cut their energy use and their bills.
- We are consulting on the design of a new industrial heat recovery programme. This £18 million fund will encourage investment by manufacturers to recover and reuse heat from industrial processes that would otherwise be wasted.

Innovation

The Clean Growth Strategy sets out the Government's expects to invest around £162 million¹⁷ of innovation funding out to 2021, in research, development and demonstration of energy, resource and process efficiency alongside better low carbon fuels and carbon capture, usage and storage. This includes:

- up to £20 million in competitions to encourage switching to lower carbon fuels
-

¹⁷ All figures are indicative and are subject to competitive bidding processes across sectors and value for money tests.

- up to £20 million of funding available for a Carbon Capture and Utilisation demonstration programme to invest in new innovative technologies that capture and utilise carbon dioxide.

Other areas

With regard to the CCC's recommendation on onshore petroleum wells, the UK already has one of the most robust regulatory regimes in the world for shale gas and we will look to consider improvements as the industry develops. All operators are required to describe the management of fugitive emissions in an emissions management plan which is monitored by the Environment Agency. In addition, under the Infrastructure Act 2015, hydraulic fracturing activity cannot take place unless appropriate arrangements have been made for monitoring methane emissions.

The Government's strategic approach to carbon capture usage and storage is covered in the cross-cutting issues section of this document.

Transport

The CCC's key recommendations

- **Stretching standards for new car and van CO₂ beyond 2020**, that require increased electric vehicle sales, are independently enforced and use real-world testing procedures
- **Policies to deliver a high uptake of electric vehicles, of around 60% of new car and van sales by 2030**, including: time-limited financial support, preferential tax rates and effective roll-out of charging infrastructure
- **Implementation of policy to deliver 8% of sustainable biofuels by energy by 2020** and maintain the biofuels volume after 2020
- **Policies to support emissions reduction from HGVs**, including new vehicle efficiency standards requiring electric options for smaller trucks, more efficient logistics, increased uptake of eco-driving measures, and a shift to lower-carbon modes (e.g. rail)
- **National and local policies to reduce demand**, to deliver car-km reductions of at least 5% below the baseline trajectory
- **A plan to limit UK aviation emissions to the level assumed when the fifth carbon budget was set**: around 2005 levels by 2050, implying around a 60% potential increase in demand, supported by strong international policies

Government response

The Government's policies and proposals for decarbonising the transport sector are set out in Chapter 4 of the Clean Growth Strategy (*Accelerating the Shift to Low Carbon Transport*).

The key areas relevant to the CCC's recommendations are:

- The Government has announced an end to the sale of all new conventional petrol and diesel cars and vans by 2040.
- We are spending £1 billion to drive the uptake of ultra low emission vehicles (ULEVs). If battery prices continue to fall there will be less need for Government subsidies for new vehicles in the future. We will provide support for ULEVs to help the development of a mature and self-sufficient market.
- The Government will set out further detail on a long term strategy for the UK's transition to zero road vehicle emissions by March 2018.

- We will encourage ULEV uptake through schemes that build on our experience in delivering initiatives - for example the £40 million 'Go Ultra Low Cities' scheme.
- We want to have one of the best electric vehicle charging networks in the world. We will set out our strategy to achieve this using regulation, funding and private investment. To support this:
 - In addition to workplace and residential charging support, the Government has also allocated an additional £80 million to support charging infrastructure deployment, alongside £15 million from Highways England to ensure rapid charge points every 20 miles across 95 per cent of England's Strategic Road Network¹⁸.
 - New powers under the Automated and Electric Vehicles Bill¹⁹ will allow the Government to set specific requirements for the provision of electric vehicle charge points or hydrogen refuelling infrastructure at motorway service stations and large fuel retailers, as well as ensuring that charge points are convenient to access and work seamlessly right across the UK.
 - The Bill will also allow the Government to require all new charge points sold or installed in the UK to be 'smart' enabled. This will help shift charging away from peak times of the day, reducing demand on the electricity system and keeping costs lower for everyone.
 - We will consider the role of regulation to accelerate the UK's transition to widespread provision of ULEV infrastructure.
- We will announce plans for the public sector to lead the way in transitioning to zero emission vehicles, with an ambitious uptake requirement for central government and new Buying Standards to encourage procurers to choose the cleanest, low emission vehicle.
- We will promote sustainable alternative fuels, which reduce the carbon emissions from petrol and diesel vehicles, and we will set targets to support development of advanced fuels suitable for HGVs and aviation.
- We have recently relaunched the Future Fuels for Flight and Freight Competition – a £22 million industry competition to encourage development and deployment of low carbon HGV and aviation fuels.

¹⁸ UK Parliament (2017) Electric Vehicles: Written question – 59924, <http://www.parliament.uk/business/publications/written-questions-answers-statements/written-question/Commons/2017-01-13/59924/>

¹⁹ Cabinet Office (2017) Queen's Speech Background Briefing Notes 2017 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/620838/Queens_speech_2017_background_notes.pdf

- The Government's Freight Carbon Review²⁰, published in February 2017, identified a range of measures to help fleet operators reduce their emissions, including through improved fuel efficiency. The Energy Saving Trust is piloting a scheme to advise HGV fleet operators on reducing fuel consumption. The Government will set out further measures to support the pathway to low emission freight by March 2018, as part of a long term strategy for the UK's transition to zero vehicle emissions.
- Our 2016 Rail Freight Strategy²¹ highlighted the potential to reduce emissions by growing rail freight and reducing HGV journeys. We will accelerate our activity to enable cost-effective options for shifting more freight from road to rail, including using low emission rail freight for deliveries into urban areas, with zero emission last mile deliveries.
- We will continue to invest in our public transport network, and help people to cycle, walk or travel by bus or train.
- Our Cycling and Walking Investment Strategy²² identifies £1.2 billion which may be invested in cycling and walking from 2016-21. Under this new strategic approach, Local Cycling and Walking Infrastructure Plans identify improvements required at the local level, and enable a long-term approach to developing local cycling and walking networks, ideally over a ten year period.
- As announced in the 2016 Autumn Statement, the Government will provide £100 million for a national programme of support for retrofitting and new low emission buses in England and Wales, including hundreds of new low emission buses and retrofitting of thousands of older buses.
- The Government will seek more use of electric, bi-mode (electric and diesel hybrid) and alternative fuel traction on the railway. We will continue to invest in route electrification where it provides benefits to passengers. The industry is also developing trains powered by alternative fuels, for example using battery and hydrogen power.
- We will set out our strategic approach to the aviation sector in a series of consultations over the next 18 months²³, including a paper on how to support growth while tackling the environmental impacts of aviation. This will culminate in the publication of a new Aviation Strategy for the UK by the end of 2018.
- Industry and the Government have made a joint £3.9 billion commitment between 2013 and 2026 to the development of new aircraft technology with the Aerospace

²⁰ DfT (2017) Freight Carbon Review 2017: Moving Britain Ahead

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/590922/freight-carbon-review-2017.pdf

²¹ DfT (2016) Rail Freight Strategy 2017: Moving Britain Ahead

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/552492/rail-freight-strategy.pdf

²² DfT (2017) Cycling and Walking Investment Strategy

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/603527/cycling-walking-investment-strategy.pdf

²³ HM Government (2017) Beyond the Horizon: The future of UK aviation – a call for evidence on a new strategy

<https://www.gov.uk/government/consultations/a-new-aviation-strategy-for-the-uk-call-for-evidence>

Technology Institute²⁴. We have announced that we will extend the Renewable Transport Fuel Obligation to include incentives to use biofuels in aviation.

Innovation

The Clean Growth Strategy sets out the Government's plans to invest around £841 million out to 2021 in innovation in low carbon transport technology and fuels, including:

- £246 million over four years in the design, development and manufacture of batteries for the electrification of vehicles, as part of the 'Faraday Challenge'²⁵. The Government has also awarded £10 million to build UK capability in the development and commercialisation of automotive battery packs.
- Up to £20 million for vehicle-to-grid products and services.
- £40 million out to 2021, to fund the development of advanced low carbon fuels derived from wastes or industrial and agricultural by-products.

²⁴ Aerospace Technology Institute <http://www.ati.org.uk/>

²⁵ BEIS (2017) Business Secretary announces Industrial Strategy Challenge Fund investments, <https://www.gov.uk/government/news/business-secretary-announces-industrial-strategy-challenge-fund-investments>

Agriculture, Land-use and Forestry; Waste; F-Gases

The CCC's key recommendations

- **The new 'Smart' inventory for agriculture emissions to be introduced in 2018**, to enable better monitoring and tracking of progress
- **A stronger policy framework for reducing emissions from agriculture and land use in all UK nations to 2022**, as current progress is off track
- **New farming policies to 2030** that move beyond the current voluntary approach and replace CAP with a framework that links support to emissions reduction and removals
- **Addressing financial and non-financial barriers to increase afforestation and on-farm tree planting**
- **Strengthened approaches through the waste chain, from creation to disposal**, including reducing waste arising, separate collections (e.g. of food waste), stopping biodegradable waste going to landfill, and maintaining or increasing methane capture at landfill sites
- **A UK approach to reduce F-gas emissions by at least 68%**, in line with the EU regulatory minimum: Government to investigate and pursue any further cost-effective opportunities

Government response

The Government's policies and proposals for decarbonising these sectors are set out in Chapter 4 of the Clean Growth Strategy (*Enhancing the Benefits and Value of Our Natural Resources*).

In meeting carbon budgets we are committed to policy development that enhances our natural assets, helps prepare for the impacts of climate change and supports our commitments on clean air.

The key areas relevant to the CCC's recommendations are:

- The Government's 25 Year Environment Plan will set out the Government's approach to improving our natural environment, including reducing both carbon emissions and other dangerous pollutants.
- We will take the opportunity of leaving the Common Agricultural Policy to address climate change more directly by designing a new system to support the future of

farming and the countryside, with a strong focus on delivering better environmental outcomes, including tackling climate change.

- We will work with industry to encourage the use of low-emissions fertiliser. We will review the levels of take up over the next five years using data from the British Fertiliser Practice Survey. This will provide evidence to shape our future policies.
- We will work with industry to produce a UK Bioeconomy Strategy that will bring together biological industries, academia and innovators, linking up farmers and land managers with high tech industries. Through a thriving innovation-based bioeconomy, we will develop less carbon intensive products such as bio-based chemicals, plastics and other materials.
- We will develop a new network of English forests with the right incentives and rules to establish and support new regional and national community woodlands to help reach 12 per cent woodland cover in England by 2060. We have allocated funding to woodland planting to support our commitment to plant 11 million trees²⁶.
- We will unlock private finance to invest in forestry by establishing forestry investment zones to offer investors streamlined decision making and more certainty, within shorter timelines.
- We will fund larger-scale woodland and forest creation, and we will design woodland creation incentives that attract more landowners and farmers to plant on marginal land, including through agroforestry and bioenergy production, to help diversify land-based businesses and enhance the farmed environment.
- The UK will work towards being a Zero Avoidable Waste economy by 2050. We will set out a new Resources and Waste strategy which seeks to maximise resource productivity, reduce waste in our energy and resource systems, promote well-functioning markets for secondary materials and incentivise producers to design better products. The strategy will focus on three key areas:
 - Maximising resource productivity - through more efficient manufacturing processes
 - Maximising the value we get from resources throughout their lifetimes - by designing products more smartly to increase longevity and enable recyclability
 - Managing materials at end of life – by targeting environmental impacts
- We will take action through the Courtauld 2025 Agreement to reduce the amount of food that is wasted in the UK. This could deliver up to £20 billion worth of savings to the

²⁶ Forestry Commission and Natural England (2017) Countryside Stewardship opens for 2017
<https://www.gov.uk/government/news/countryside-stewardship-opens-for-2017>

UK economy between 2015 and 2025²⁷. We will also divert more food from landfill to support resource productivity and avoid further emissions.

Innovation

The Clean Growth Strategy sets out the Government's plans to invest £99 million out to 2021 on innovation in natural resources. The Government wants the UK to be at the forefront of land-based innovation – ensuring our industry remains at the cutting edge of agricultural and bio-based technology development through the forthcoming bio economy strategy and through the existing £160 million Agri-Tech Strategy²⁸.

Other areas

With regard to the CCC's recommendation to introduce a new SMART inventory for agriculture emissions in 2018, verification work is ongoing and the new model is expected to be used to report this year's inventory.

With regard to F-gases, our current policies will cut UK F-gas emissions from 17 MtCO₂e in 2015 (about 3 per cent of total UK emissions) to 9.3 MtCO₂e by 2023, 6.6 MtCO₂e by 2027 and 3.2 MtCO₂e by 2035, representing an 81 per cent cut from 2015 levels²⁹.

The UK led the way in pledging to phase down use of hydrofluorocarbons (HFCs) by 79 per cent by 2030. Following the UK lead, 197 countries agreed under the United Nations Montreal Protocol to a global phase down of HFCs which will see the UK and other developed countries go even further by delivering an 85 per cent phase down by 2036.

²⁷ WRAP (2016) The Courtauld Commitment 2025 to transform UK food and drink <http://www.wrap.org.uk/content/courtauld-commitment-2025-transform-uk-food-and-drink>

²⁸ Defra (2015) Agricultural technologies (agri-tech) strategy <https://www.gov.uk/government/collections/agricultural-technologies-agri-tech-strategy>

²⁹ BEIS (2017) Energy and Emissions Projections 2016 <https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2016>

Cross-cutting policies

The CCC's key recommendations

- **A new strategic approach to carbon capture and storage deployment in the UK**, including preparations for possible use in the production of low-carbon hydrogen
- **An updated strategy for increasing the supply of sustainable bioenergy feedstock and using it effectively**
- **A strategy for developing options for removing greenhouse gases from the air**

Government response

The Government's policies and proposals for cross-cutting priorities are set out across the Clean Growth Strategy.

The Government recognises the cross-cutting nature of many of the actions needed to meet our carbon budgets, and to this end we will reinstate a regular Clean Growth Inter-Ministerial Group, which will be responsible for monitoring implementation of the Strategy and driving ambitious clean growth policies.

Carbon Capture, Usage and Storage (CCUS)

We now see a new opportunity for the UK to become the global technology leader for CCUS, working internationally with industry and governments to bring about global cost reductions. We will do this through:

Re-affirming our commitment to deploying CCUS in the UK subject to cost reduction: We will build on the success of the Offshore Wind Cost Reduction Taskforce³⁰ and convene a CCUS Cost Challenge Taskforce to deliver a plan to reduce the cost of deploying CCUS. This will then underpin a deployment pathway for CCUS in 2018, setting out the steps needed to meet our ambition of deploying CCUS at scale during the 2030s, subject to costs coming down sufficiently. This will include looking at the options for permanent storage of carbon dioxide domestically as well as elsewhere via international shipping.

Following the advice from the Parliamentary Advisory Group on CCUS the Government will review the delivery and investment models for CCUS in the UK to understand how the

³⁰ Offshore Wind Cost Reduction Taskforce <https://www.gov.uk/government/groups/offshore-wind-cost-reduction-task-force>

barriers to deployment can be reduced, and how the private and public sectors can work together to deliver the Government's ambition for CCUS.

We will work with the ongoing initiatives in Teesside, Merseyside, South Wales and Grangemouth to test the potential for development of CCUS industrial decarbonisation clusters.

We will set up a new Ministerial-led CCUS Council with industry to review our progress and priorities. Through the CCUS Council we will also monitor costs and deployment potential with the option of revising our deployment path accordingly.

International collaboration: The Government will convene and lead a new international working group to drive down the cost and accelerate deployment of CCUS, including by:

- Participating in Mission Innovation and its Carbon Capture Challenge and working closely with private-sector led initiatives such as the Oil and Gas Climate Initiative;
- Developing closer collaborative working with countries such as Norway, the United States, Canada and Australia including joint working on innovation and carbon dioxide transport and storage solutions and working multi-laterally through the Carbon Sequestration Leadership Forum and North Sea Basin Task Force;
- Continuing to be a global leader in CCUS investments through the UK's £60 million international CCS programme which has been running since 2012, by investing a further £10 million in the programme. This will further strengthen international action on CCUS and draw on UK technical and commercial expertise; and
- Organising an international Global Carbon Capture Usage and Storage Conference in 2018 with international partners.

Innovation: The Government will spend up to £100 million from the BEIS Energy Innovation Programme to support Industry and CCUS innovation and deployment in the UK including £20 million of funding available for a Carbon Capture and Utilisation demonstration programme to invest in new innovative technologies that capture and utilise carbon dioxide. The programme will also support next generation capture technologies, with an aim to lower the cost of capture compared to the current best performing technologies; and small-scale industrial capture demonstrations to reduce the risks associated with carbon capture on an industrial site. We also intend to support the application of CCUS in low carbon hydrogen production; develop our understanding of the role of Greenhouse Gas Reduction (GGR) technologies, including bio-energy with carbon capture and storage; and support innovations that reduce the cost of transporting and storing carbon dioxide. The Government intends to set out further detail in 2018.

Sustainable bio-energy

We will develop a new incentive structure to harness the potential for growth in forestry and renewables being supplied from within the UK, including on bioenergy, as part of our ambitions for strengthening the rural economy and encouraging diversification of farm businesses.

We will continue to review the mandatory sustainability standards and greenhouse gas saving (GHG) criteria related to the Government's financial incentive measures to ensure that support for bioenergy continues to deliver GHG savings in a sustainable manner. In parallel with this we will continue to seek that the forthcoming revision to the European Renewable Energy Directive (RED2) contains measures that allow the UK to ensure that energy delivered from biomass continues to contribute to decarbonisation of the economy.

Greenhouse Gas Removal (GGR) technologies

We are taking active steps to strengthen our understanding of GGR technologies³¹ and, where appropriate, move forward with deployment. The Government's strategic approach to GGR has two main elements:

- A Government programme of research and development, which aims to improve our understanding of GGR technologies, to help overcome the uncertainties around their costs, deployment potential, and impacts on the environment. We have been working with the Research Councils, who launched a new £8.6 million research programme looking at all GGR technologies in April 2017. We will also develop robust estimates of sustainable biomass resource available to the UK, reporting during 2018, and consider Royal Society scientific views on GGR.
- The Government will consider the scope for removing barriers and strengthening incentives to support the deployment of GGR, to position the UK at the leading edge of GGR development. This includes, for example, considering options for developing a carbon offset market and exploring how UK timber could be used in construction. We are also considering how best to take forward CCUS, as set out above. We will conduct a study on how GGR activity can be incentivised, in the UK and in other countries, which will help us develop policy and accounting frameworks fit for the future. And we will also consider how legal, financial and regulatory frameworks could support the rollout of GGR technologies at scale.

We will develop our strategic approach for GGR technologies, including consideration of whether to reprioritise existing innovation spend, in light of these pieces of work.

³¹ These include afforestation, bio-energy with carbon capture and storage (BECCS), direct air capture (capturing carbon dioxide from the air and storing it), enhanced weathering (crushing suitable rocks that react with carbon dioxide and spreading over land), and methods for storing carbon in the oceans, such as ocean liming.







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