National Audit Office

Report
by the Comptroller
and Auditor General

HM Government

Achieving net zero

HC 1035 SESSION 2019–2021 4 DECEMBER 2020

We are the UK's independent public spending watchdog.

We support Parliament in holding government to account and we help improve public services through our high-quality audits.

The National Audit Office (NAO) scrutinises public spending for Parliament and is independent of government and the civil service. We help Parliament hold government to account and we use our insights to help people who manage and govern public bodies improve public services. The Comptroller and Auditor General (C&AG), Gareth Davies, is an Officer of the House of Commons and leads the NAO. We audit the financial accounts of departments and other public bodies. We also examine and report on the value for money of how public money has been spent. In 2019, the NAO's work led to a positive financial impact through reduced costs, improved service delivery, or other benefits to citizens, of £1.1 billion.

National Audit Office

HM Government

Achieving net zero

Report by the Comptroller and Auditor General

Ordered by the House of Commons
to be printed on 2 December 2020

This report has been prepared under Section 6 of the National Audit Act 1983 for presentation to the House of Commons in accordance with Section 9 of the Act

Gareth Davies
Comptroller and Auditor General
National Audit Office

26 November 2020

HC 1035 | £10.00

This report applies our experience from auditing previous cross-government challenges including large-scale, long-term projects and programmes to highlight the main risks government needs to manage to achieve net zero and maximise value for money.

007992 12/20 NAO

Contents

The National Audit Office study team consisted of:
James Ball, Simon Bittlestone, Nuala Burnett, Helen Duan, Alastair Heffernan, Katy Losse, Hassan Muhamed, Emma Taylor, Emma Wilding, under the direction of Rob Prideaux.

This report can be found on the National Audit Office website at www.nao.org.uk

For further information about the National Audit Office please contact:

National Audit Office
Press Office
157–197 Buckingham Palace Road
Victoria
London
SW1W 9SP

Tel: 020 7798 7400

Enquiries: www.nao.org.uk/contact-us

Website: www.nao.org.uk

Twitter: @NAOorguk

Summary

Introduction

1 In June 2019, government passed legislation committing it to achieving 'net zero' greenhouse gas emissions by 2050. This means reducing emissions substantially from current levels, with the greenhouse gases the UK still emits in 2050 being equal to or less than what is removed from the atmosphere by either the natural environment or carbon capture technologies. Government set the net zero target to deliver on the commitments it had made by signing the Paris Agreement in 2016. The Paris Agreement has seen 188 countries and territories commit to pursuing ways to limit global temperature rises this century to well below 2 degrees Celsius above pre-industrial levels and to try to limit the temperature increase even further to just 1.5 degrees Celsius. Government also aimed to set an example for other countries to follow in the run-up to hosting the 26th United Nations' Climate Change Conference of the Parties (COP26). The conference is due to take place in Glasgow in November 2021, having been postponed from November 2020 due to the coronavirus pandemic.

2 Aiming for net zero represents an increase in the level of ambition from government's previous emissions reduction target. In 2008, government set a target for the UK to reduce its greenhouse gas emissions in 2050 by 80% compared with 1990 levels. Between 2008 and 2018, the UK's emissions reduced by 28%, faster than any other G20 economy. Most of this reduction has come from changes to how electricity is generated, with a switch away from coal and increasing amounts coming from renewable sources such as wind and solar power. Reducing emissions further to achieve net zero will require wide-ranging changes to the UK economy, including further investment in renewable electricity generation, as well as changing the way people travel, how land is used and how buildings are heated.

3 The all-encompassing nature of achieving net zero means that all government bodies, including departments, arm's-length bodies and executive agencies, have a role to play. But some departments have key roles:

- The Department for Business, Energy & Industrial Strategy (BEIS) has overall responsibility in government for achieving net zero. This means it is responsible for ensuring cross-government arrangements are working effectively. It also has policy responsibility for some of the highest-emitting sectors of the economy, such as the power and industrial sectors.
- HM Treasury is responsible for allocating budgets to government departments. Therefore, it is central to assessing the relative priority of policies across government and ensuring that departments have sufficient financial resources to manage programmes aimed at reducing emissions. It is currently reviewing how the costs of net zero should be shared between government, businesses and individuals. HM Treasury is also responsible for strategic oversight of the tax system.
- The Cabinet Office supports the operation of the Cabinet committees, which are the minister-led committees responsible for overseeing emissions reduction. Additionally, the Cabinet Office coordinates cross-cutting corporate functions that have a bearing on government's own emissions, such as around managing estates and procurement, and the creation of Single Departmental Plans, which are the main way that government conducts strategic business planning. It is also carrying out a programme of work aimed at modernising and reforming the civil service, including improving working across departmental boundaries.
- The Department for Environment, Food & Rural Affairs (Defra), the Department for Transport (DfT) and the Ministry of Housing, Communities & Local Government (MHCLG) all have policy responsibility for different sectors of the economy with high emissions. MHCLG is also the government's steward of the local government system and aims to ensure local authorities can function effectively. Local authorities themselves have a key role in supporting emissions reduction at a local level.

Purpose and scope of this report

4 This report is intended to support Parliamentary and public scrutiny of government's arrangements for achieving net zero. We have applied our experience from auditing cross-government challenges to highlight the main risks government needs to manage if it is to achieve net zero efficiently and effectively. This report is a companion to our recent report *How government is organised to achieve its environment goals*.[1] That report provides a similar analysis of government's arrangements to achieve the objectives of its *25-Year Environment Plan*, including to ensure the UK adapts to the impacts of climate change.[2] In the future, we will: assess how well government is managing the risks highlighted in this report; and assess the value for money of individual government interventions aimed at reducing emissions.

5 This report covers:

- the scale of the challenge to achieve the net zero target, and the roles and responsibilities for achieving net zero within government (Part One);
- the coordination arrangements that bring together the different government departments involved in achieving net zero (Part Two); and
- the government's plans for achieving net zero and the risks it needs to manage (Part Three).

Key findings and recommendations

Scale of the challenge

6 Achieving net zero is a colossal challenge and significantly more challenging than government's previous target to reduce emissions by 80% by 2050. Achieving net zero means all parts of the economy, including those that are harder to decarbonise, need to reduce emissions substantially. In some sectors, there are well-understood pathways to net zero but there is uncertainty in other sectors over how to reduce emissions. This is because it is not yet known how quickly some technologies will develop or how much individuals will be willing to change their behaviours. Also, the majority of reductions in greenhouse gas emissions achieved to date have been in the power sector, which required consumers to change their behaviour less than will be necessary for other sectors that need to decarbonise, such as heat and transport (paragraphs 1.6 to 1.9 and Figures 1 to 4).

1 Comptroller & Auditor General, *Achieving government's long-term environmental goals*, Session 2019–2021, HC 958, National Audit Office, November 2020.
2 HM Government, *A Green Future: Our 25 Year Plan to Improve the Environment*, 2018.

7 BEIS projects that the UK's emissions will exceed government's shorter-term targets without further action to close the gap. These targets are set at a level that is less ambitious than will be required to achieve net zero. BEIS's latest projections show that the UK's emissions will be higher than the level set by the fourth and fifth carbon budgets, which are legally binding targets for UK emissions over a five-year period from 2023 to 2027 and 2028 to 2032, respectively. BEIS has been predicting emissions that exceed the fourth carbon budget since 2011. These carbon budgets were set on a trajectory to reduce emissions by 80% by 2050, not to achieve net zero. In 2021, government will set the level of the sixth carbon budget, covering 2033 to 2037, at a level requiring faster progress in reducing emissions so it is on the pathway to achieving net zero by 2050 (paragraphs 1.4, 1.7 and 3.4, and Figures 3 and 10).

8 The costs of achieving net zero are highly uncertain but the costs of inaction would be far greater. There are costs to achieving net zero because of the need to switch to new technologies that in some cases are more expensive than those currently used, and the need to build new infrastructure to accommodate them. The exact amount and timing of future costs are very uncertain because there are several potential ways to achieve net zero. The Climate Change Committee (CCC), in 2019, estimated that the annual costs of achieving net zero could increase over time to being around 1%–2% of GDP in 2050. BEIS is developing its own estimate of what net zero will cost between now and 2050, with this likely to be hundreds of billions of pounds. The CCC will also publish shortly revised analysis of the potential costs of net zero. HM Treasury will investigate how these costs could be shared between government, businesses and individuals. As part of this review, which will conclude in 2021, HM Treasury will consider the range of policy instruments that might be used to support decarbonisation, including the role of regulation. The costs of inaction would be far greater than the costs of achieving net zero because of the need to adapt to substantial climate change, such as building flood defences and dealing with the health impacts of higher temperatures. The CCC has also suggested there are wider benefits of achieving net zero, such as improvements to human health and enhanced biodiversity (paragraphs 1.10 to 1.14).

Co-ordination across government

9 Government has established new coordination arrangements since setting the net zero target. This includes: two ministerial-level cabinet committees; a Climate Change National Strategy Implementation Group (NSIG) made up of senior officials from across departments; and a Net Zero Steering Board for strategy and delivery. The four main departments with lead responsibility for decarbonising sectors of the economy have also set up boards to oversee delivery of their policies aimed at reducing emissions. The development of government's coordination arrangements has been set back by the need to focus resources on tackling COVID-19, with fewer meetings of some new boards than planned. Government also redeployed resources to investigate how it might integrate net zero into the COVID-19 recovery, with new governance arrangements set up to consider which net zero initiatives could contribute. Government implemented arrangements to coordinate its action to reduce greenhouse gas emissions after passing the Climate Change Act in 2008, but these did not endure (paragraphs 2.2 to 2.5 and Figures 6 and 7).

10 Past examples of cross-government working show there are risks government needs to consider carefully for its net zero arrangements to be effective. Government's coordination arrangements for achieving net zero aim for collective ownership rather than there being a single central body with the responsibility and levers to achieve change. Our previous work shows instances where departments leading cross-government objectives struggled with implementation and ensuring all departments play their part. This has been because, for example, the objective has not been given sufficient priority by all departments when it comes to allocation of budgets or when appraising new policies, and because wider government accountability and planning structures have not encouraged collaboration across departments. There also needs to be sufficient capability across the system in terms of technical and behavioural skills and routine sharing of information and learning across departments (paragraphs 2.6 to 2.18).

BEIS, working with HM Treasury, Cabinet Office and the other departments with responsibility for aspects of net zero should:

- set out how it will manage the risks we have identified in this report (paragraphs 2.11 to 2.18) to creating collective responsibility for net zero; and
- establish regular review points, starting with a review by the end of 2021, to consider the effectiveness of the arrangements, including those established within departments such as carbon boards, and whether changes are required.

Cabinet Office should:

- ensure the next iteration of Single Departmental Plans creates a cross-government plan for achieving net zero; and
- utilise its programme of work aimed at modernising and reforming the civil service to increase the visibility of net zero within the civil service and develop key skills, such as in climate science, data analysis and systems thinking, that will be necessary to achieve net zero.

HM Treasury should:

- publish analysis shortly after the next Comprehensive Spending Review, which will allocate high-level budgets to departments in the medium term, demonstrating its impact on expected emissions; and
- ensure its guidance that informs public spending decisions, such as on policy appraisal (the *Green Book*) and guidance for accounting officers, requires departments to evaluate the impact of policies on the achievement of the net zero target, and is consistently adhered to.

11 Government has not set out clearly the roles of public bodies outside central departments in achieving net zero. Arm's-length bodies, regulators and local authorities all have critical roles in the achievement of net zero. Our past work has shown that roles and responsibilities need to be clear and that the perspectives of different delivery bodies need to be incorporated into plans to achieve cross-cutting policy objectives. Local authorities will be key in the achievement of emissions reductions in the transport and housing sectors locally where the decarbonisation challenge will vary by location. But local government representatives we have spoken to have said there is a lack of clarity from central government on the role local authorities should play in achieving net zero. BEIS told us that it plans to engage with local authorities about their role as part of the creation of the net zero strategy (see paragraph 13) and that their roles will become clearer once government publishes sector strategies, such as for heat and transport (paragraphs 2.19 to 2.23).

BEIS and MHCLG should:

- ensure that local authorities' perspectives are incorporated into the formation of sector strategies and the overall net zero strategy; and
- ensure local authorities have the skills and capacity to mobilise the action that is required locally across all sectors.

BEIS, working with other government departments, should:

- consider how to extend its coordination arrangements beyond central government departments to include the perspectives of other public bodies.

12 Government has not yet done enough to ensure that all public sector organisations take the actions necessary to reduce their own emissions. It is important that government leads by example as part of its overall efforts to reach the net zero target and takes opportunities to pilot initiatives and develop supply chains for low-carbon technologies that could be beneficial to the wider economy. In 2018, emissions from public-sector buildings represented 9% of all emissions in the buildings sector. Government sets Greening Government Commitment targets for reducing the environmental impact of its central estate and operations, including reducing emissions. Central government departments have reduced emissions from their buildings and operations by an estimated 46% since 2009-10. But these targets only cover central government's estate, excluding significant areas of impact such as schools, the NHS and military activities. And while there are some minimum requirements for government procurement which relate to greenhouse gas emissions, our past work has noted that these are out of date and compliance has not been monitored. On 30 September 2020, government launched a Public Sector Decarbonisation Scheme to invest £1 billion over the next year to increase public sector buildings' energy efficiency and reduce emissions from heating, along with a £32 million Public Sector Low-Carbon Skills Fund (paragraphs 2.24 to 2.26 and Figure 8).

Cabinet Office and HM Treasury, working with BEIS, should:

- ensure that existing and planned arrangements to help departments reduce their own greenhouse gas emissions align with achieving net zero. In particular, ensure that the new Greening Government Commitment targets, due for release in April 2021, are sufficiently ambitious to set an example to businesses in the UK; and
- ensure that similarly ambitious targets extend to all significant sources of emissions from the public sector, including schools and the NHS.

Delivering the net zero strategy

13 BEIS plans to launch a net zero strategy prior to COP26 in November 2021. It aims that this strategy will set out government's vision for transitioning to a net zero economy by 2050, encompassing all the sectors that need to decarbonise. The strategy will be the culmination of the announcement of policies aimed at closing the gap to the fourth and fifth carbon budgets; setting the level of the sixth carbon budget; sector-by-sector strategies setting out pathways to decarbonisation by 2050; and HM Treasury publishing its review on the cost of net zero and principles for how it could be paid for. Government aims to integrate its plans for establishing a net zero strategy within its wider economic response to COVID-19 (paragraphs 3.2 and 3.3, and Figure 9).

BEIS should:

- prepare contingency plans that consider how to provide greater certainty and transparency around its net zero plans even if a full strategy is not possible prior to COP26 given the ongoing uncertainty around the impact of COVID-19.

14 Establishing a clear strategy before COP26 is a critical step if the UK is to achieve net zero by 2050. Our past work on major projects and programmes has demonstrated the importance of government clearly defining what it is aiming to achieve from the outset. This enables it to identify the people, policies and funding that are needed, both within government and the wider set of actors which it is dependent on, such as businesses and individuals. While doing this for net zero, government must also enable flexibility in its plans to accommodate longer-term uncertainty, such as the rate of technology development and deployment and the degree to which individuals change behaviours. BEIS told us that its strategy would reflect the level of uncertainty in each sector and include milestones for when decisions are needed, such as the preferred technology for decarbonising the heating of buildings (paragraphs 3.5 to 3.9).

BEIS should:

- identify and evaluate the elements of the net zero strategy which are uncertain and develop a plan to reduce this over time, including assigning responsibilities for managing reduction in uncertainty (such as by carrying out sufficient research or piloting); and
- set out its timetable for when key decisions in the pathway to net zero will need to be taken.

15 Government still needs to identify how it will manage the links between different aspects of achieving net zero and how it relates to other government priorities. One of the complexities of the challenge to achieve net zero is that the different aspects of reducing emissions will have an impact on one another. For example, the increasing take-up of electric vehicles to reduce surface transport emissions will increase demand on the power sector. There are also links between activities to achieve net zero and other government priorities. This includes both its other environmental goals, such as for clean air, and wider objectives such as its 'levelling up' agenda whereby it aims to create opportunity for everyone in all regions and address disparities in economic and social outcomes. BEIS has modelled the different activities in achieving net zero that impact on one another. It is now considering how to build on this model to ensure these interdependencies are well managed, including engaging wider expertise on taking a 'systems approach' that joins up policy areas as a whole rather than managing them in isolation (paragraphs 1.9 and 3.10 to 3.12).

BEIS should:

- ensure that the main interdependencies within the achievement of net zero are understood by the relevant departments involved;
- ensure the net zero strategy takes account of the main interdependencies between different work streams; and
- set out its plan for managing interdependencies in the future, including who is responsible for managing each interdependency and how it will review progress on a regular basis.

All departments with lead responsibility for decarbonising sectors (BEIS, Defra, DfT and MHCLG) should:

- work on widening government's understanding of links between achieving net zero and other government aims, such as for clean air and 'levelling up'; and
- use this understanding to establish how trade-offs between net zero and other aims will be managed, including the prioritisation of resources.

16 BEIS recognises it needs to do more to establish monitoring arrangements to track progress towards net zero. BEIS reports actual and forecast greenhouse gas emissions annually, broken down by sector, which gives a high-level view of whether the UK is on track to meet net zero. It also projects annually the effect of government policies on reducing future greenhouse gas emissions. But there is currently no process for monitoring the progress of policies on a more regular basis or for escalating problems identified by monitoring information. This limits decision-makers' oversight of whether policies are on course to achieve the necessary emissions reductions and may affect their ability to act early if things go off track. BEIS is working to establish how performance will be reported to the NSIG and Cabinet committees (paragraphs 3.13 to 3.17 and Figure 11).

BEIS, Cabinet Office and HM Treasury should:

- develop and monitor a set of clear, relevant and consistent data on the progress of net zero policies across government along with a process for escalating issues when the data show policies are off track.

17 Neither BEIS nor HM Treasury collates information on the total costs and benefits of government policies that contribute to achieving net zero. Our work on government's preparations for EU Exit found that government did not have spending information at a cross-government level and relied on existing control frameworks and systems of departmental accountability. This created risks to financial management, such as where reprioritisation of either EU Exit work or business-as-usual activity might be necessary, and public accountability. Similarly, government has not yet collated data on current and future spending on net zero-related policies, nor the benefits derived from this expenditure. In lieu of this information, we analysed recent spending proposals and found that, since 2017, government has committed around £20 billion to policies aimed at reducing greenhouse gas emissions. This does not include new commitments included in government's *Ten Point Plan for a Green Industrial Revolution*, which it published in November 2020 (paragraphs 1.14 and 3.17, and Appendix Three).[3]

3 HM Government, *The Ten Point Plan for a Green Industrial Revolution*, November 2020.

BEIS and HM Treasury should:

- collate information on how much government is spending to achieve net zero overall, including how much it has committed and how much it has actually spent. This should include the costs of policies that go through consumers' bills.

18 BEIS recognises the importance of engaging the public to achieve net zero and has recently begun considering how to do this in a coordinated way. Future emissions reductions are likely to require individuals to purchase different products to those they currently use, such as buying a zero-emission car, or to make more fundamental changes to how they live, such as reducing meat and dairy consumption. BEIS estimates that achieving net zero will cost less if the public understands and accepts the changes that are required. But there is evidence of a disconnect between public support for tackling climate change and people's understanding of the changes they need to make in their own lives. Additionally, our past work has shown that government often overestimates consumer buy-in to its policies aimed at reducing emissions. In April 2020, BEIS established a behaviour change and public engagement team for net zero to design a public engagement strategy and share good practice across government. It told us this team had not existed sooner because most prior decarbonisation policies had not required individuals to change their behaviour significantly (paragraphs 3.23 to 3.28 and Figures 12 and 13).

BEIS, with input from other departments, should:

- establish a public engagement strategy that sets out how government will ensure ongoing buy-in to the changes required by the transition to net zero. This should include consideration of how it will tailor its messages for audiences with different characteristics, including ethnic minorities; age groups; geographical locations; and income levels; and
- ensure it has data that enable it to monitor the cumulative social and economic impact on different individuals and communities of the transition to net zero so that government can consider whether to change course if it deems the burden is falling overly onto specific groups.

19 BEIS's plans for engaging the private sector are more advanced but risks remain to securing the investment that is required. Government depends on private sector investment to achieve net zero, both to develop and deploy low-carbon products, such as electric vehicles and heat pumps, and to provide the necessary infrastructure. In 2019, BEIS and HM Treasury published the Green Finance Strategy, which set out how government would mobilise green investment by establishing long-term policy frameworks, improve access to finance and address market barriers. Our past reports demonstrate the difficulties government faces when it seeks to share risks with the private sector and create investor confidence in new initiatives, and the importance of tracking progress where private sector engagement is a critical success factor (paragraphs 3.19 to 3.22).

BEIS and HM Treasury should:

- establish progress measures and monitoring arrangements that enable them to track whether they are achieving the required investment from the private sector.

Concluding comments

20 Government's reorganisation of its approach to tackling climate change reflects the high political priority attached to achieving net zero and the cross-government nature of the challenge. While emissions have reduced steadily over recent years, particularly in the power sector, achieving net zero will require wide-ranging changes across society and the economy at a pace which leaves little room for delay. BEIS, alongside the other departments involved, is yet to put in place all the essential components for effective cross-government working, such as integrated planning and progress monitoring, and processes to manage interdependencies, to ensure all of government steps up to this challenge. Beyond these internal structures government also needs to spearhead a concerted national effort to achieve the ambitious outcome of net zero greenhouse gas emissions by 2050. To do so, it needs to engage actively and constructively with all those who will need to play a part – across the public sector, with industry and with citizens – to inject the necessary momentum.

Part One

Government's net zero target

1.1 This part covers:

- government's climate change targets, including net zero;
- the scale of the challenge to achieve net zero; and
- government's roles and responsibilities for achieving net zero.

The UK's climate change targets

1.2 In June 2019, government brought into law a target for the UK to achieve net zero greenhouse gas emissions by 2050. This means reducing emissions substantially from current levels, with the greenhouse gases the UK still emits in 2050 being equal to or less than what it removes from the atmosphere either through the natural environment or carbon capture technologies. The net zero target applies to emissions generated in the UK ('territorial' emissions) and does not include emissions generated in the production of imports ('consumption' emissions). Government introduced the net zero target through an amendment to the Climate Change Act (2008), which originally set a target of at least an 80% reduction in greenhouse gas emissions in the UK relative to 1990 levels.

1.3 Government set the net zero target to deliver on the commitments it had made by signing the 2016 Paris Agreement. The Paris Agreement has seen 188 countries and territories commit to pursuing ways to limit global temperature rises this century to well below 2 degrees Celsius above pre-industrial levels and to try to limit the temperature increase even further to just 1.5 degrees Celsius. Government also aimed to set an example for other countries to follow in the run-up to hosting the 26th United Nations' Climate Change Conference of the Parties (COP26). The conference is due to take place in Glasgow in November 2021, having been postponed from November 2020 due to COVID-19.

1.4 The Climate Change Act required government to set 'carbon budgets', which are legally binding targets for UK emissions over a five-year period. The first five carbon budgets, running up to 2032, were set to achieve progress towards the 80% reduction target. Government is due to set the sixth carbon budget by June 2021, which will cover the period 2033 to 2037. This will be the first carbon budget that will reflect government's target to achieve net zero by 2050.

1.5 The Climate Change Act places a duty on the devolved administrations to contribute to the UK's long-term emissions reduction goal. The Scottish and Welsh administrations have their own legislated climate targets. The Scottish Government aims to achieve net zero greenhouse gas emissions in Scotland by 2045. Welsh law requires an 80% reduction by 2050, although the Welsh Government has signalled its ambition to meet net zero. Northern Ireland has no devolved legally binding climate targets, but the Northern Ireland Assembly has expressed support for introducing a devolved Climate Change Act.

Scale of the challenge to achieve net zero

Reductions in emissions to date

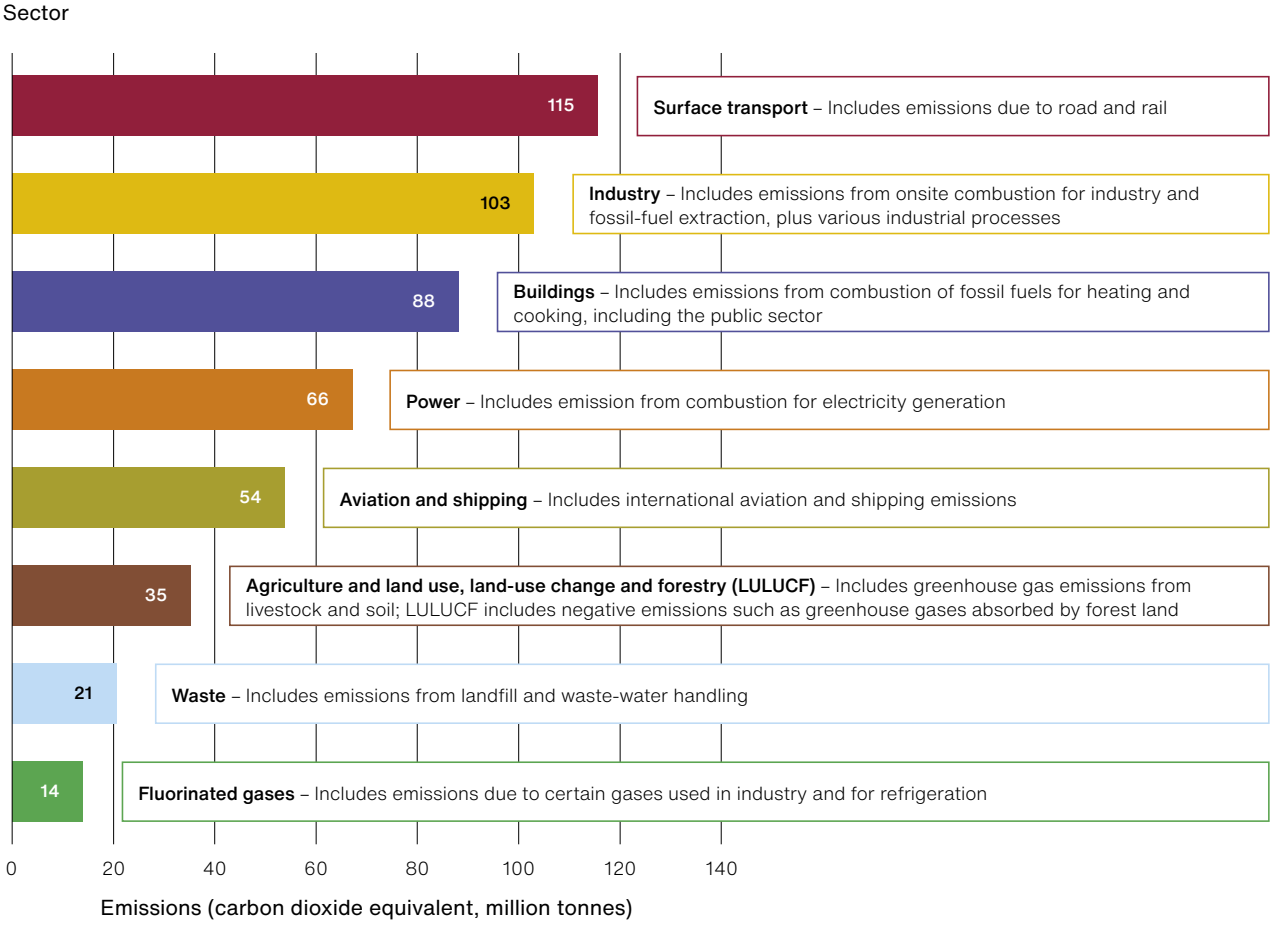
1.6 In 2018, the UK emitted 496 million tonnes of carbon dioxide equivalent (the unified measure of greenhouse gas emissions combining all greenhouse gases). This is 28% less than in 2008. Surface transport is the largest emitting sector (**Figure 1** overleaf). All sectors of the economy have reduced greenhouse gas emissions, although the size of the reduction varies considerably (**Figure 2** on page 19). The power sector is responsible for 56% of the overall decrease in emissions between 2008 and 2018, industry for 22% and waste for 9%. Emissions in power have dropped due to a reduction in use of coal, which has been substituted for partly by natural gas (which produces lower greenhouse gas emissions than coal) and partly by an increase in supply from renewables such as wind and solar power. In industry, emissions have reduced through a combination of improvements in energy intensity (such as greater energy efficiency), switching to fuels with lower emissions (such as coal to gas) and structural changes, for instance manufacturing output moving towards less carbon-intensive sectors. Emissions in waste have fallen as a result of the UK's landfill tax, which has reduced the amount of biodegradable waste going to landfill, as well as increases in methane captured at landfill sites.

1.7 The reductions in emissions to date enabled the UK to meet the first and second carbon budget (**Figure 3** on page 20). Latest projections by the Department for Business, Energy & Industrial Strategy (BEIS) show that the third carbon budget (2018 to 2022) is very likely to be achieved. However, BEIS's projections currently show that, without additional policy action, the UK's emissions are set to be greater than the cap set by both the fourth (2023 to 2027) and fifth (2028 to 2032) carbon budgets.

Figure 1

The UK's greenhouse gas emissions, by sector, in 2018

The UK emitted 496 million tonnes of carbon dioxide equivalent across eight sectors



Notes

1 Categorisation of greenhouse gas emissions sources follows that of the Climate Change Committee, which advises the UK and devolved governments on meeting their emissions reductions targets. These numbers include the UK's contribution to international aviation and shipping, although these are not included in the UK's 'carbon budget' targets (carbon budgets are legally binding targets for UK greenhouse gas emissions over a five-year period).

2 Carbon dioxide equivalent is a unified measure of greenhouse gas emissions combining all greenhouse gases.

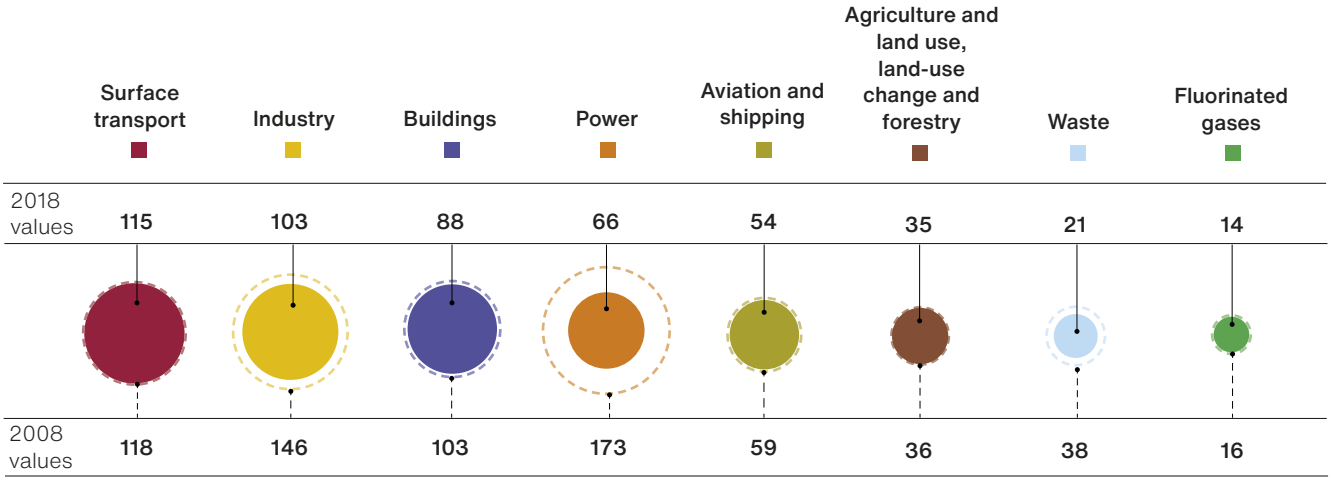
Source: National Audit Office analysis of Department for Business, Energy & Industrial Strategy (2020) data

Figure 2

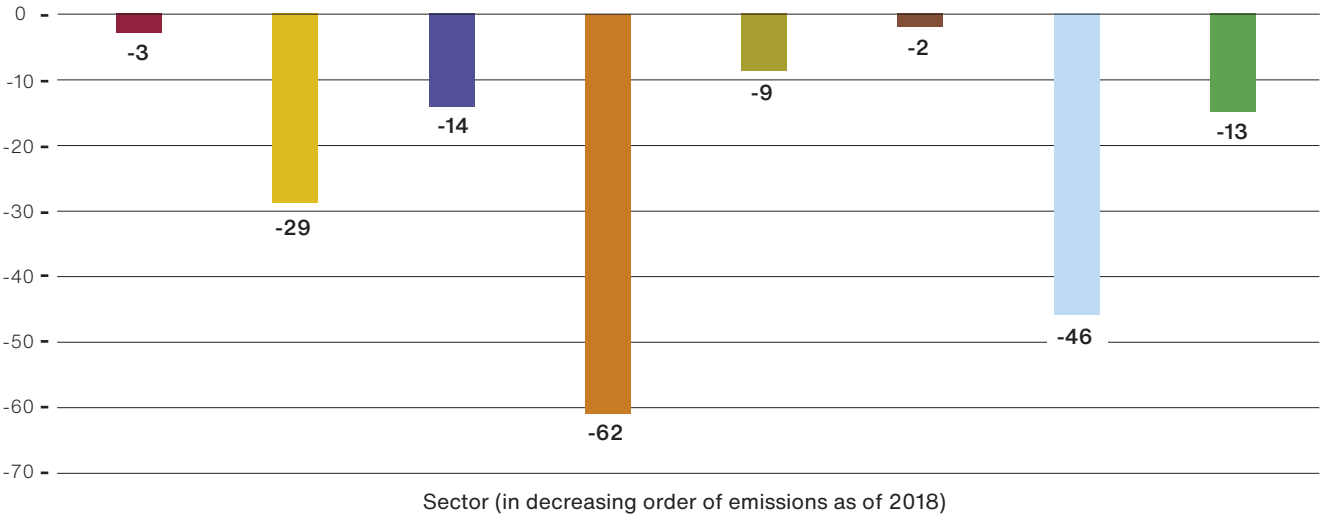
UK emissions reductions by sector, between 2008 and 2018

All sectors had emissions reductions between 2008 and 2018, but progress was unevenly distributed; the sector responsible for the most emissions in 2018 – surface transport – saw emissions decline by only 2.6% in the previous 10 years

Greenhouse gas emissions (million tonnes carbon dioxide equivalent)



Change in emissions 2008 to 2018 (%)



Note

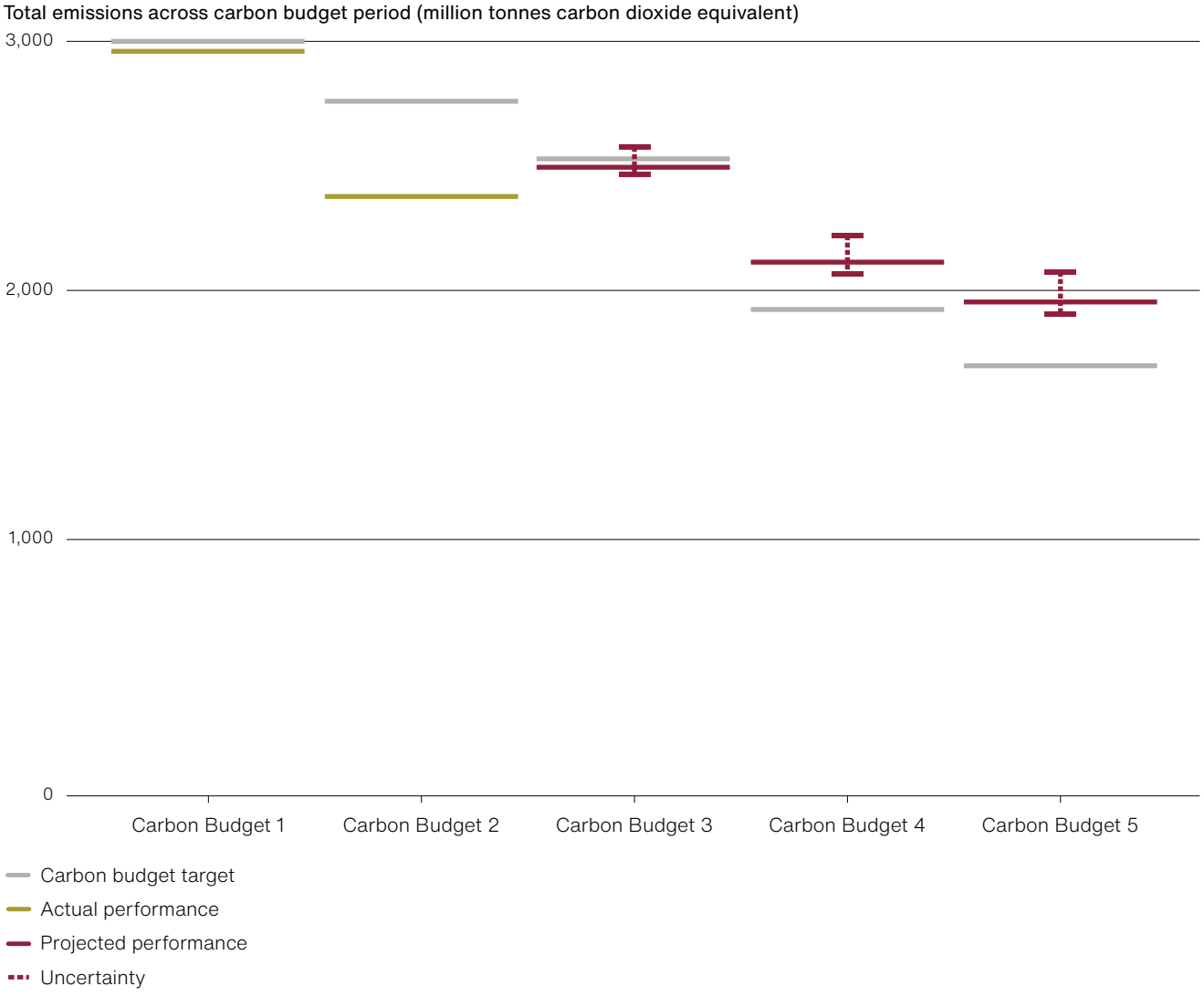
1 Shown are percentage changes rather than total changes by sector. As a result, a small sector that has seen a greater percentage reduction may not have contributed as much to overall emissions reductions when compared with a larger sector with a smaller reduction.

Source: National Audit Office analysis of Department for Business, Energy & Industrial Strategy (2020) data

Figure 3

The UK's progress against its carbon budgets

Five carbon budgets have been set; the first and second have been met and the UK is likely to meet the third, but budgets four and five are currently projected to be exceeded



Notes

1 Carbon budgets are legally binding targets for UK greenhouse gas emissions over a five-year period (as set out in the Climate Change Act, 2008).

2 Performance against carbon budgets (note 1) is measured by the 'net carbon account', which is the sum of the allowances allocated to the UK under the EU Emissions Trading System (ETS) plus the actual emissions from sources not included in the EU ETS.

3 Values for the first and second carbon budgets (green lines) show the actual net carbon accounts. The projections for the other carbon budgets (red lines) use the traded cap assumed when the budgets were set.

4 Uncertainty in the projections (vertical, dashed red lines) is based on the 95% confidence intervals for the reference scenario of the Department for Business, Energy & Industrial Strategy's Energy and Emissions Projections published in 2019. They are approximate and do not capture all sources of uncertainty or the full range of uncertainty.

Source: National Audit Office analysis of Department for Business, Energy & Industrial Strategy (2020) data

Reducing emissions to net zero

1.8 Achieving net zero will require changes unprecedented in their overall scale. There are several different pathways to achieving the target, but all will require changes to the way people live and how businesses operate (**Figure 4** on pages 22 and 23).

1.9 Reducing emissions to net zero is a colossal challenge for government:

- The escalation of the target from an 80% reduction means that all sectors of the economy need to consider how to decarbonise, whereas previously they may have been considered part of the 20% of residual emissions. Government therefore needs to establish plans for harder-to-decarbonise sectors, such as aviation and shipping, and potentially needs new technologies to be developed, such as those that capture carbon dioxide from the air.

- There are uncertainties around how net zero will be achieved. For example, it is unclear what new technologies might emerge, or how successful developing technologies might be in reducing emissions cost-effectively. It is also not clear how much individuals will be willing to change behaviours, such as consuming fewer meat and dairy products, or whether alternative ways of reducing emissions need to be found. The COVID-19 pandemic has led to some changes that reduced emissions, such as people flying less, but it is unclear how much these changes will endure.

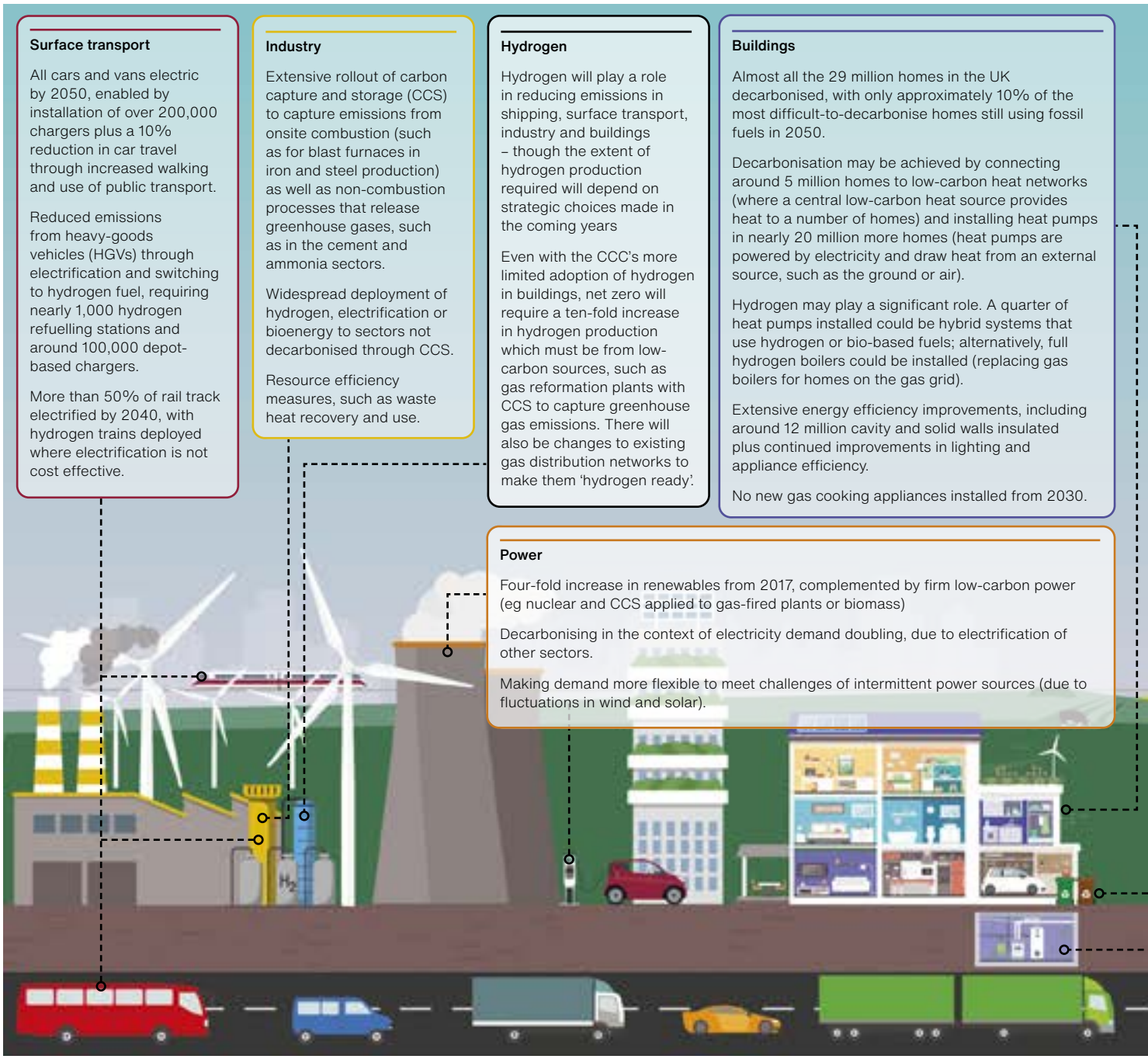
- There are some areas of the economy where government will need to decide its approach to decarbonisation in conjunction with other countries. For example, how heavy goods vehicles are decarbonised is likely to need to mirror the approach in mainland Europe.

- There are links between the different activities that are required to achieve net zero, which government will need to manage carefully. This includes between sectors, such as the increasing take-up of electric vehicles to reduce surface transport emissions increasing the demand on the power sector; or where multiple sectors are drawing on the same resources, such as land or supply chains. Additionally, there are links between the achievement of net zero and government's wider environmental aims, such as using biomass in the power sector potentially having a detrimental impact on air quality. There are also links between achieving net zero and wider government objectives. For example, government investment in new technologies, such as carbon capture and storage, could benefit particular regions of the UK and so support the government's 'levelling up' agenda whereby it aims to create opportunity for everyone in all regions and address disparities in economic and social outcomes.

Figure 4

The changes the UK as a whole may need to make to meet net zero greenhouse gas emissions by 2050

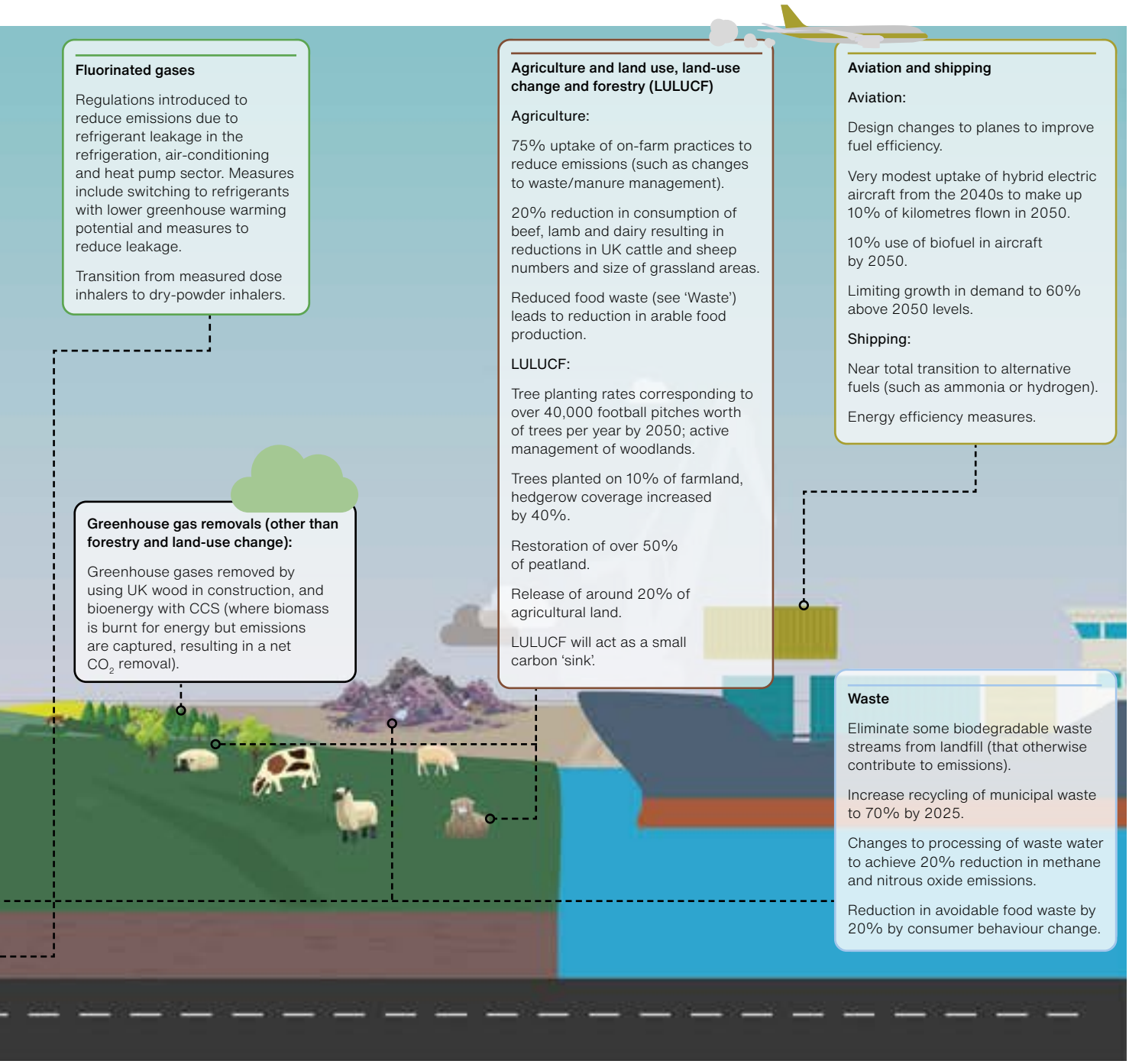
The Climate Change Committee (CCC) identified a number of changes in each emitting sector that could allow the UK to achieve close to net zero greenhouse gas emissions by 2050



Note

1 Shown are measures described in the CCC's 'further ambition' scenario. Projected emissions in 2050 are 96% below 1990 levels; the remaining 4% would be tackled with more speculative options determined later.

Source: National Audit Office analysis of Climate Change Committee documents (2020)



Fluorinated gases

Regulations introduced to reduce emissions due to refrigerant leakage in the refrigeration, air-conditioning and heat pump sector. Measures include switching to refrigerants with lower greenhouse warming potential and measures to reduce leakage.

Transition from measured dose inhalers to dry-powder inhalers.

Greenhouse gas removals (other than forestry and land-use change):

Greenhouse gases removed by using UK wood in construction, and bioenergy with CCS (where biomass is burnt for energy but emissions are captured, resulting in a net CO_2 removal).

Agriculture and land use, land-use change and forestry (LULUCF)

Agriculture:

75% uptake of on-farm practices to reduce emissions (such as changes to waste/manure management).

20% reduction in consumption of beef, lamb and dairy resulting in reductions in UK cattle and sheep numbers and size of grassland areas.

Reduced food waste (see 'Waste') leads to reduction in arable food production.

LULUCF:

Tree planting rates corresponding to over 40,000 football pitches worth of trees per year by 2050; active management of woodlands.

Trees planted on 10% of farmland, hedgerow coverage increased by 40%.

Restoration of over 50% of peatland.

Release of around 20% of agricultural land.

LULUCF will act as a small carbon 'sink'.

Aviation and shipping

Aviation:

Design changes to planes to improve fuel efficiency.

Very modest uptake of hybrid electric aircraft from the 2040s to make up 10% of kilometres flown in 2050.

10% use of biofuel in aircraft by 2050.

Limiting growth in demand to 60% above 2050 levels.

Shipping:

Near total transition to alternative fuels (such as ammonia or hydrogen).

Energy efficiency measures.

Waste

Eliminate some biodegradable waste streams from landfill (that otherwise contribute to emissions).

Increase recycling of municipal waste to 70% by 2025.

Changes to processing of waste water to achieve 20% reduction in methane and nitrous oxide emissions.

Reduction in avoidable food waste by 20% by consumer behaviour change.

1.10 In its latest progress report to Parliament, the CCC (Climate Change Committee, formerly the Committee on Climate Change), which advises the UK and devolved governments on meeting their emissions reductions targets and preparing for climate change, stated that there were "significant gaps" in government's policies for reducing emissions across the largest emitting sectors of the economy. It highlighted the heating and industrial sectors as areas where government had not made enough progress in setting out how decarbonisation will be achieved. And while plans for decarbonising surface transport and the power sector were more advanced, there was still more that needed to be done in both sectors.[4]

Costs and benefits

1.11 The cost of net zero is subject to significant uncertainty because of questions around how net zero will be achieved; uncertainty in how net zero will be financed; and the timing of expenditure. In 2019, the CCC estimated the additional costs of meeting net zero compared to a scenario in which no further climate-related policy actions are taken. The CCC estimated that the additional resource cost required to achieve net zero could increase over time to around 1%–2% of GDP in 2050. According to the CCC, the most expensive sector to decarbonise is the buildings sector, followed by the costs of greenhouse gas removals and cutting emissions in industry. Achieving net zero incurs costs in all sectors aside from the transport sector, in which achieving net zero results in cost savings. This is driven by continued reductions in battery and fuel costs associated with electric vehicles compared with petrol or diesel cars. The CCC will publish new analysis of the costs of achieving net zero shortly.

1.12 BEIS is developing its own estimates of what net zero will cost, based on modelling different ways in which net zero could be achieved and expects to complete this modelling in the first half of 2021. This is likely to show a total cost of hundreds of billions of pounds. Having a robust estimate of the total costs to achieve net zero would help government to assess the potential financial impact of different pathways, including varying the timing of investment to concentrate it earlier or later in the next three decades. HM Treasury will publish its review of the costs of net zero in 2021, which will investigate how costs should be shared between government, businesses and individuals.

4 Committee on Climate Change, *Reducing UK emissions: Progress report to Parliament*, June 2020, p. 19.

1.13 BEIS has not produced comprehensive estimates of the possible benefits of achieving net zero, but its initial work suggests that costs could be offset even when considering only a narrow set of benefits (fuel savings, air quality improvements and an estimate of the cost of carbon saved by reducing emissions). Benefits may be greater still if global emissions reductions mitigate the need for extensive adaptation measures, such as reinforcing or expanding flood defences, or dealing with the additional health impacts of higher temperatures. While some adaptation will be necessary as a result of the impacts of climate change linked to historical emissions, rapid and concerted global action to limit further emissions could mean avoiding more substantial adaptation costs that would be required in more extreme climate change scenarios. The CCC has also suggested that benefits could potentially outweigh costs of net zero, particularly once wider benefits, such as healthier lifestyles due to more active travel and improved diets, less noise and enhanced biodiversity, are taken into account.

1.14 Neither BEIS nor HM Treasury collates the planned or actual costs and benefits of all government's policies aimed at achieving net zero. Such information is spread out across multiple government departments. We estimate that in the past four years government has committed approximately £20 billion to net zero-relevant policies. This does not include government policies that are paid for through consumers' electricity bills, such as the rollout of smart meters, which government forecasts will cost around £11 billion. These amounts do not factor in potential savings, such as through reduced energy bills in the case of energy efficiency schemes. It is not possible to state how much these amounts equate to per year and they do not include schemes announced prior to 2017. Our analysis took place prior to the publication of government's *Ten Point Plan for a Green Industrial Revolution*, on 18 November 2020. The plan aims to mobilise £12 billion of government investment to create and support green jobs. We estimate at least two-thirds of this funding has been previously announced and so is included in our analysis. A full list of policies considered in our analysis is shown in Appendix Three.

Government roles and responsibilities for achieving net zero

1.15 Government has allocated responsibilities for achieving net zero across government departments. BEIS has overall responsibility for ensuring the target is achieved and has lead responsibility for reducing emissions in some of the largest emitting sectors of the economy (**Figure 5**). Three other government departments have lead responsibility for decarbonising sectors of the economy. Many departments hold secondary roles in the decarbonisation of sectors because of the interconnected nature of the economy. For example, BEIS has a key role in enabling the decarbonisation of surface transport as the uptake of electric vehicles to reduce emissions will place greater demands on the power sector. In its June 2020 progress report, the CCC made recommendations to 15 different departments, reflecting the cross-government nature of net zero.

1.16 HM Treasury has a role to play across all sectors given that it allocates budgets to other departments. BEIS has also identified the different departments that have responsibility for cross-cutting 'enablers', such as ensuring sufficient skills in the economy, as well as for reducing government's own emissions, such as through procurement practices. HM Treasury is also responsible for strategic oversight of the tax system.

Figure 5

Policy responsibility for net zero by government department

The Department for Business, Energy & Industrial Strategy (BEIS) holds overall policy responsibility for net zero; nine other government departments lead or co-lead in specific sectors or on cross-cutting themes, out of 23 ministerial departments overall

	CO	HMT	BEIS	MHCLG	Defra	DfT	DIT	FCDO	DWP	DHSC	DfE	Other government departments
Sectors												
Transport		●	●		●	Lead				●		
Business/Industry		●	Lead							●		
Buildings		●	Lead	Lead	●					●		
Power and greenhouse gas removals		●	Lead		●					●		
Agriculture, Land use, land-use change and forestry, and Waste		●	●		Lead							
Cross-cutting themes												
Green finance		Lead	Lead	●	●	●	●	●	●			
Greening Government	●	●	●	●	●	●	●	●	●	●	●	●
Innovation		●	Lead	●	●	●	●	●	●			
Skills		●	●	●	●	●	●		●		Lead	
Trade policy		●	●				Lead	●				
Public procurement	Lead	●	●	●	●	●	●	●	●	●	●	●
Global influence	●	●	●				●	Lead				

Note

1 CO = Cabinet Office; HMT = HM Treasury; BEIS = Department for Business, Energy & Industrial Strategy; MHCLG = Ministry of Housing, Communities & Local Government; Defra = Department for Environment, Food & Rural Affairs; DfT = Department for Transport; DIT = Department for International Trade; FCDO = Foreign, Commonwealth & Development Office; DWP = Department for Work & Pensions; DHSC = Department of Health & Social Care; DfE = Department for Education.

Source: National Audit Office analysis of Department for Business, Energy & Industrial Strategy documents

Part Two

Coordination across government

2.1 Achieving net zero will require multiple government departments to play a role. This part of the report assesses the arrangements government has put in place to coordinate the activities of departments towards achieving net zero and considers the main risks it needs to manage around coordination.

Government's coordination arrangements

2.2 Since early 2019, government has established new arrangements for coordinating the government departments involved in achieving net zero:

- The **Climate Action Strategy Committee** is a Cabinet committee chaired by the Prime Minister and is responsible for considering matters relating to the achievement of the UK's domestic and international climate strategy.
- The **Climate Action Implementation Committee** is a Cabinet committee chaired by the Secretary of State for Business, Energy and Industrial Strategy and is responsible for considering matters relating to the delivery of the 26th United Nations' Climate Change Conference of the Parties (COP26), net zero and building the UK's resilience to climate impacts.
- The **Climate Change National Strategy Implementation Group (NSIG)** is a group of senior officials from the main departments across government with responsibility for: establishing and implementing a cross-government climate action strategy; and covering domestic and international aspects of mitigation and resilience. The NSIG reports to the two Cabinet committees and is chaired by a director general from the Department for Business, Energy & Industrial Strategy (BEIS) who is the senior responsible officer accountable to the Cabinet committees for climate action.
- The **Net Zero Steering Board**, which supports the NSIG, comprises directors from across government concerned with net zero strategy and delivery.

- Two **COVID-19 and Climate Change Working Groups** under NSIG concerned with a clean, resilient and sustainable recovery from COVID-19, one covering domestic recovery and one covering international recovery, comprising key directors from across government. The groups met from April until July 2020 to investigate how government might integrate net zero into the COVID-19 recovery, with a range of options developed and presented to ministers focusing on how net zero initiatives could contribute.
- **New arrangements within departments**, including boards to oversee progress of emission reduction policies (**Figure 6** overleaf).

2.3 The COVID-19 pandemic has delayed government's development of these arrangements. For example:

- Some departmental boards not meeting as often as intended to date (**Figure 7** on page 31).
- NSIG's decisions over which groups it should create to support it, meaning only the Net Zero Steering Board, Analysis and Communications groups have begun meeting to date. It is now considering the other supporting groups that are needed.
- BEIS plans to establish a central programme management office by April 2021 to track progress across government, identify risks and escalate issues to senior decision-makers.

2.4 Two previous attempts to implement cross-government arrangements to coordinate climate action have not worked as effectively as planned:

- In 2013, we reported on how the National Emissions Target Board was established to provide senior oversight of carbon budget management and national climate policy. But the board did not meet as frequently as intended, nor were attendees as senior as was planned.[5]
- In 2019, our report on government's approach to monitoring the state of the natural environment found that effective inter-departmental working was needed to achieve government's environmental ambitions. Although an Inter-Ministerial Group for Environment and Clean Growth had been established, government had been unable to tell us how often, if at all, the Group had met.[6]

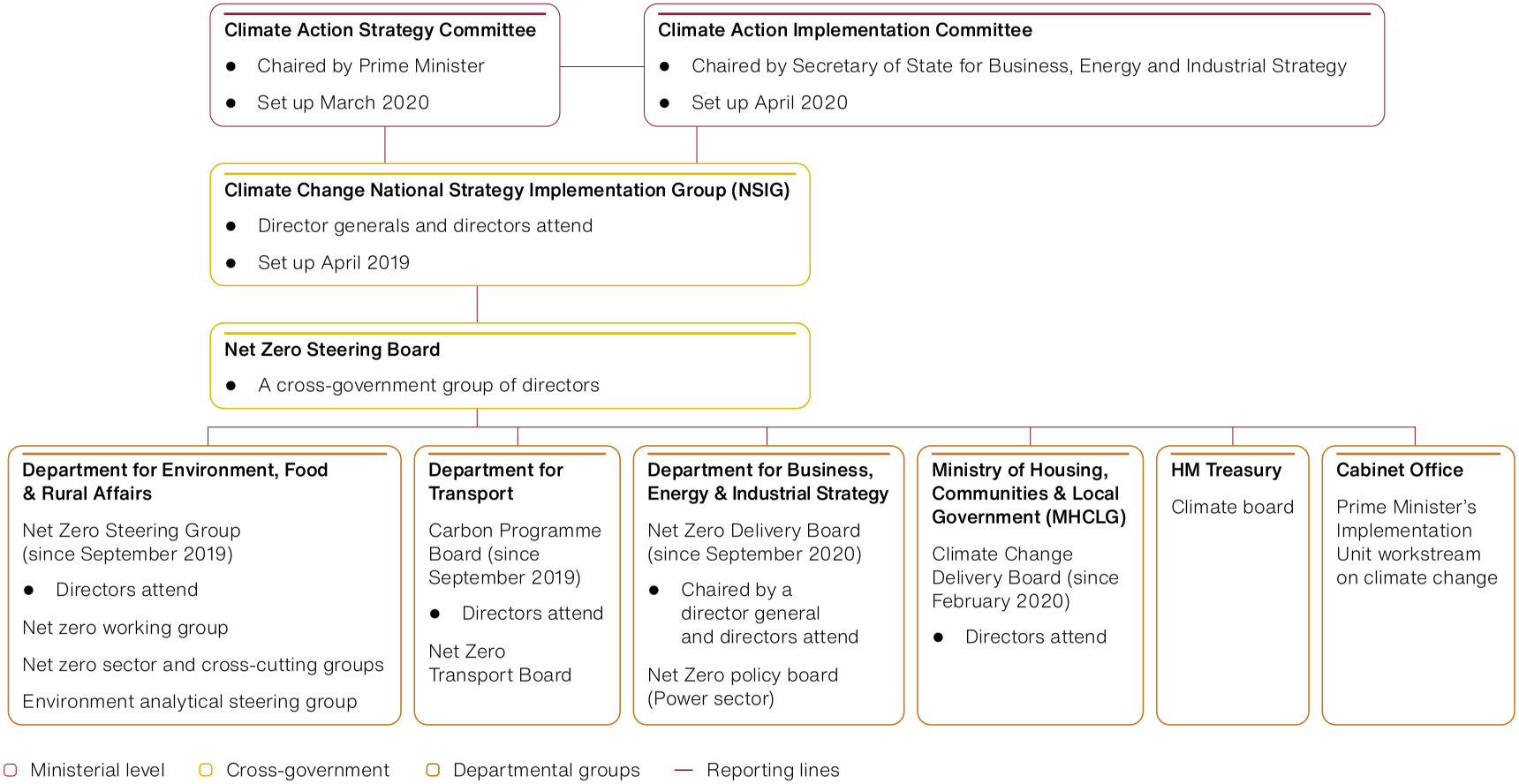
2.5 BEIS told us its latest arrangements are more likely to endure because they have senior political buy-in, including the Prime Minister chairing the Climate Action Strategy Committee, with tackling climate change taking greater priority at the top levels of government than before.

5 National Audit Office, *Carbon Budget Management*, Briefing for the House of Commons Environmental Audit Select Committee, July 2013.
6 Comptroller and Auditor General, *Environmental metrics: government's approach to monitoring the state of the natural environment*, Session 2017-2019, HC 1866, National Audit Office, January 2019.

Figure 6

Cross-government and departmental governance arrangements for delivery of the UK's net zero target

Since 2019, government has established new arrangements for coordinating the government departments involved in achieving net zero



Notes

1 Prior to March 2020, the two Cabinet committees, the Climate Action Strategy Committee and the Climate Action Implementation Committee were one committee, the Cabinet Committee on Climate Change.

2 From April until July 2020, two COVID-19 and Climate Change Working Groups met, under NSIG, concerned with a clean, resilient and sustainable recovery from COVID-19, one covering domestic recovery and one covering international recovery.

Source: National Audit Office review of departmental papers

Figure 7

Meetings of the boards and committees introduced as part of the net zero coordination arrangements

Departmental boards have not met as frequently as intended

	Frequency each board intended to meet	2019							2020								
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Cross-government																	
Climate Change National Strategy Implementation Group	Monthly	1	1	–	1	1	1	1	1	1	1	1	1	1	1	–	1
Net Zero Steering Board	Monthly														1	–	1
Departmental boards																	
Department for Business, Energy & Industrial Strategy Net Zero Delivery Board	Monthly																1
Department for Transport Carbon Programme Board	Every six to eight weeks				1	1	–	1	–	1	1	–	–	1	1	–	1
Department for Environment, Food & Rural Affairs Net Zero Steering Group	Every two to three months				1	–	1	–	1	–	–	–	1	–	1	1	–
Ministry for Housing, Communities & Local Government Climate Change Delivery Board	Monthly									1	1	–	–	–	–	–	1

Not in existence

Note

1 Data correct as of September 2020 when our fieldwork concluded.

Source: National Audit Office review of departmental papers

Risks government must manage

Ensuring cross-government action

2.6 Government departments often face challenges when attempting to coordinate cross-government action. For example, our recent report on childhood obesity found that, while the Department of Health & Social Care oversees the cross-government Childhood Obesity Programme, it had few mechanisms to influence the performance and engagement of other departments, meaning it could not hold other departments to account for delivering their projects within the programme.[7] On the government's preparations for EU Exit, we found that there was a complex structure of boards, from ministerial level downwards, which were supposed to oversee domestic preparations. This meant departments did not know where to go when they needed information or for decisions to be made that required cross-government input.[8]

2.7 Some stakeholders have raised concerns about the coordination arrangements for net zero and whether BEIS has sufficient influence to ensure other parts of government take enough action in their areas of responsibility. For example, the Institute for Government recently recommended that the responsibility for coordinating cross-government action should be passed to Cabinet Office.[9]

2.8 BEIS told us the coordination arrangements it has established are aimed at creating a culture where all relevant departments take ownership of achieving net zero. BEIS told us that the Cabinet committee structure reinforced the collective ownership of net zero across government. It said that this was a better way to ensure action by departments than having one clear 'owner'.

2.9 Additionally, our past work has shown that centralising responsibility for cross-cutting initiatives does not itself necessarily lead to successful outcomes. For example, we found that the first set of Single Departmental Plans did not fully achieve government's ambitions of providing public accountability and a plan-led culture, and the usability of their published performance data was poor, despite responsibility being held by Cabinet Office and HM Treasury.[10] It is also likely that restructuring government's coordination arrangements for net zero would interrupt progress at a critical point.

7 Comptroller and Auditor General, *Childhood Obesity*, Session 2019–2021, HC 726, National Audit Office, September 2020.
8 Comptroller and Auditor General, *Learning for government from EU Exit preparations*, Session 2019–2021, HC 578, National Audit Office, September 2020.
9 Institute for Government, *Net zero: How government can meet its climate change target*, September 2020.
10 Comptroller and Auditor General, *Government's management of its performance: progress with single departmental plans*, Session 2016-17, HC 872, National Audit Office, July 2016.

2.10 However, our previous work suggests there are certain risks that BEIS needs to consider for its approach of creating a culture of collective responsibility to be effective. This includes:

- net zero having sufficient priority in relation to government's other objectives;
- aligning with government's wider structures of accountability;
- having sufficient leadership and technical capability across government; and
- having ways to share information between the departments involved.

Resourcing and prioritisation

2.11 Net zero needs to have sufficient priority in relation to other government spending commitments. Spending reviews, led by HM Treasury, will be crucial as they allocate high-level budgets to departments in the medium term (typically three to five years). A spending review also provides an opportunity for HM Treasury to encourage a coordinated, cross-government approach to achieving net zero. In 2016, we reported that the 2015 Spending Review ended with a substantial projected gap against the fourth carbon budget.[11] Moreover, one of the key decisions made during the Spending Review (cancelling the competition for carbon capture and storage) was likely to increase the long-term costs of meeting later carbon budgets. Net zero was one of six priorities in the 2020 Comprehensive Spending Review launched in July 2020. In October 2020, to prioritise government's response to COVID-19, and to focus on supporting jobs, the Chancellor and the Prime Minister decided to conduct a one-year Spending Review, setting department's resource and capital budgets for 2021-22.

2.12 To demonstrate that net zero is taking sufficient priority across government, departments will need to consider the impact on net zero before implementing policies and programmes that could affect greenhouse gas emissions. This could be, for example, investments in new infrastructure, such as housing or roads. HM Treasury issues guidance to other departments on making investment decisions. For example:

- the *Green Book* requires all policy, programme and project proposals that concern public spending, taxation, changes to regulations, and changes to the use of public assets and resources to consider environment and climate impacts, including greenhouse gas emissions;[12] and
- guidance for departmental accounting officers requires that they consider the value for money of decisions for the Exchequer as a whole and avoid engaging in activities that could be at the expense of another part of the public sector.

11 National Audit Office, *Sustainability in the spending review*, Briefing for the House of Commons Environmental Audit Committee, July 2016.
12 HM Treasury, *The Green Book – Central government guidance on appraisal and evaluation*, 2020.

2.13 HM Treasury has reviewed its *Green Book* guidance and is looking to clarify the definition of value for money to have more emphasis on broader factors beyond the benefit–cost ratio including delivery of strategic objectives, such as environmental concerns. However, we have reported previously on how departments' adherence to guidance, including the *Green Book*, had been inconsistent in other areas of government policy.[13] Additionally, in February 2020 the Court of Appeal ruled as illegal the expansion of Heathrow Airport with a third runway based on government's decision failing to take into account government's commitment to the provisions of the Paris Agreement on climate change. BEIS is updating its guidance on assessing carbon emissions and plans to publish a revised set of 'carbon values' consistent with achieving net zero later this year.[14]

Wider accountability structures

2.14 BEIS's approach needs to align with wider government planning and accountability structures that govern spending and prioritisation. We have found in the past that the business planning process does not help to break down government silos for effective collaboration to happen. Government's structure of departments with separate accountabilities leads to business planning and spending review submissions being created in silos.[15] Our review of the latest published Single Departmental Plans, which are the main way that government conducts strategic business planning, found they do not provide clarity that net zero is yet driving business planning decisions across government.

2.15 Similarly, the wider accountability structures in government sees departmental accounting officers being accountable for economy, efficiency and effectiveness of spending within their department boundary rather than based on shared outcomes with other departments. This can filter down through departments with targets and performance incentives that prioritise departmental objectives over collective government aims. We have seen this, for example, in our reports on centralising shared services which show that such initiatives often fail even when they have a central mandate due to a lack of buy-in from individual departments.[16]

13 Comptroller and Auditor General, *Business support schemes*, Session 2019-20, HC 20, National Audit Office, January 2020.
14 Carbon values are calculated as the cost of removing an additional tonne of emissions from the atmosphere calibrated to a path of emissions consistent with meeting the UK's legal targets.
15 Comptroller and Auditor General, *Improving government's planning and spending framework*, Session 2017–2019, HC 1679, National Audit Office, November 2018.
16 Comptroller and Auditor General, *Crown Commercial Service*, Session 2016-17, HC 786, National Audit Office, January 2017. See Figure 2 for a list of examples of initiatives affected by a lack of buy-in.

Capacity and capability

2.16 There needs to be sufficient leadership capability across the system. Having people who can lead, manage and work in complex systems has been recognised as a priority in government, with a range of measures and initiatives aimed at building this capability in recent years. For example, government created the National Leadership Centre in 2018 to support cross-sector leadership, facilitating and supporting people to collaborate on the country's toughest challenges.

2.17 Departments will also need sufficient technical capacity and capability, including the project management, scientific and engineering skills necessary to oversee development of the activities needed across different sectors. There also needs to be capability to deliver and deploy policies, with a clear handover from policy design to policy delivery. We have reported in the past on how weaknesses in capability undermined government's ability to achieve its objectives and that departments lacked the proper workforce planning needed to know what skills they had, whether they were in the right place and what additional skills they needed.[17] BEIS told us over the past year it has added 250 new people on energy and climate, including 40 people to the central coordination function. This is supported by a £50 million resource uplift. It expects headcount to increase further going forward, with a greater emphasis on project management skills.

Sharing information

2.18 There needs to be sharing of information and learning across departments. On EU Exit, the Department for Exiting the EU (DExEU) kept a tight hold on communications, including not making the status of work across government freely available to departments. This hampered effective coordination and collaboration.[18] Sharing learning is doubly important on net zero where there is inherent uncertainty of the most cost-effective pathway (see paragraph 1.9) and there could be learning from pilots and innovative approaches that could be applied across sectors, such as on how consumers engage with policies.

17 Comptroller and Auditor General, *Capability in the civil service*, Session 2016-17, HC 919, National Audit Office, March 2017. See also: Comptroller and Auditor General, *Specialist skills in the civil service*, Session 2019–2021, HC 575, National Audit Office, July 2020.

18 See footnote 8.

Roles and responsibilities beyond central government

2.19 Public bodies beyond central government departments will have key roles to play in achieving net zero:

- **Sector regulators** can have a big influence on the industries they regulate and can potentially use this to support the achievement of net zero. For example, we recently reported on how Ofgem, the energy sector regulator, needed to ensure electricity network companies transform to support a low-cost, low-carbon energy system in the way that it sets the rules for networks' allowed costs, targets and performance.[19]

- **Arm's-length bodies**, such as non-ministerial departments, non-departmental public bodies, such as in the NHS and UK Research and Innovation, and executive agencies and other bodies, such as public corporations. Departments rely on arm's-length bodies to carry out a range of important functions, many of which are vital to delivering against departments' strategic objectives.

- **Local authorities** have significant scope to influence emissions in their area, both by leading decarbonisation of sectors that account for a substantial proportion of the UK's emissions, including housing and transport, and by influencing local businesses and residents to take climate action themselves. This includes the potential to lead a local decarbonisation plan that manages interactions between different sectors locally and is appropriate to the conditions in their area, such as the nature of the housing stock and local sources of energy generation.

2.20 Our previous work has shown it is important to define roles and responsibilities when public service outcomes are to be achieved through contributions by a range of public bodies. For example, we reported on how the Home Office had not mapped the roles and activities of all the organisations that delivered its modern slavery strategy. This lack of clear accountability contributed to government's inability to establish effective oversight of the system as a whole, meaning it could not achieve its objective of significantly reducing the prevalence of modern slavery. The Home Office has since published statutory guidance to make clear the roles and responsibilities in the modern slavery response.[20] Additionally, our work on the interface between health and social care found that a poor mutual understanding of how different bodies within the system made decisions had hampered joint working.[21]

19 Comptroller and Auditor General, *Electricity networks*, Session 2019-20, HC 42, National Audit Office, January 2020.
20 Comptroller and Auditor General, *Reducing modern slavery*, Session 2017–2019, HC 630, National Audit Office, December 2017.
21 Comptroller and Auditor General, *The health and social care interface*, Session 2017–2019, HC 950, National Audit Office, July 2018.

2.21 Currently, government's central coordination arrangements for net zero only extend to central government departments. BEIS told us that teams in departments with responsibility for particular sectors maintain relationships with other public bodies and that their roles would be established as part of sector strategies. For example, the transport decarbonisation strategy will consider local authorities' role in the provision of infrastructure for cycling and walking.

2.22 Local authority representatives we spoke to told us that there was a lack of coordination across government of departments' different requirements and that government's expectations of local government are unclear. We have also reported on the impact that funding reductions have had on local authorities in recent years, including the reductions in spending on areas where authorities have flexibility in how much and when to spend to fulfil statutory roles, including planning, housing and transport.[22] BEIS told us that its focus has been on enabling local authorities to play a leading role in decarbonisation and clean growth through the support provided through its Local Energy Hubs, which help local authorities to develop plans that can attract investment, and fund the development and sharing of best practice between local authorities. It also plans to engage with local authorities about their role as part of the creation of the overall net zero strategy.

2.23 There is scope for government to set strategic direction for regulators to support the achievement of net zero. We previously reported that regulators often face difficult trade-offs when trying to protect consumers' interests, and they can be made more challenging when government does not provide regulators with a strategic steer on how to manage them.[23] Our review of key regulators found that few currently have a specific duty to consider emissions as part of how they regulate, and not all sectors have a national regulator. For example, there is no regulator with responsibility to consider the emissions caused by residential buildings. There are also no general requirements around emissions that regulators as public bodies must follow, like there are for issues such as equality or minimising regulatory burdens on business. HM Treasury's review of the costs of net zero will consider the range of policy instruments that might be used to support decarbonisation, including the role of regulation.

22 Comptroller and Auditor General, *Financial sustainability of local authorities 2018*, Session 2017–2019, HC 834, National Audit Office, March 2018.

23 Comptroller and Auditor General, *Regulating to protect consumers in utilities, communications and financial services markets*, Session 2017–2019, HC 1992, National Audit Office, March 2019.

Reducing government's own emissions

2.24 Managing government's own emissions is important as it can lead by example as part of the overall efforts to achieve net zero. In 2018, public sector buildings emitted eight million tonnes of carbon dioxide equivalent, 9% of all emissions in the buildings sector. Additionally, the approach taken both by central and local government to reducing emissions has a wider impact in building credibility and trust that net zero is a priority, and to pilot initiatives and build supply chains for low-carbon technologies before, or as part of, wider roll-out.

2.25 We have assessed government's activities to reduce its own emissions through its estate management and procurement practices (**Figure 8** on pages 40 and 41). Overall, we found that while there were aspects of good performance, there are several gaps in coverage of government targets and standards. This is supported by findings in our recent reports on government emissions:

- Earlier this year, we reported how a significant portion of the Ministry of Defence's (MoD) energy usage was not covered by formal emission reduction targets. Military activities, such as the operation of defence equipment (including for land vehicles, aircraft and navy vessels) by the armed forces, are out of scope for the cross-government Greening Government Commitments (GGCs). Emissions from these activities was double those covered by the GGCs for MoD, and in recent years, had been decreasing at a slower rate.[24]
- We found that both the Ministry of Justice, the second largest buyer of goods and services across government, and Department for Transport did not know how they were performing against procurement standards as they did not collate the data.[25]

24 Comptroller and Auditor General, *Environmental Sustainability Overview*, Session 2019–2021, HC318, National Audit Office, May 2020.

25 National Audit Office, *Ministry of Justice: Environmental sustainability overview*, Briefing by the House of Commons Environmental Audit Committee, November 2017; and National Audit Office, *Department for Transport sustainability update*, Memorandum to the House of Commons Environmental Audit Committee, March 2019.

2.26 Government plans several changes aimed at addressing these issues. This includes the following:

- On 30 September 2020, government launched £1 billion of funding over the next year in a Public Sector Decarbonisation Scheme aimed at helping achieve government's ambition to halve greenhouse gas emissions from the public sector by 2032. BEIS intends that the scheme will offer grants to public sector bodies, including schools and hospitals, to fund energy efficiency and low-carbon heat upgrades. At the same time BEIS launched a Public Sector Low-Carbon Skills Fund, worth £32 million, to help eligible public sector bodies develop bids and deliver projects for the scheme.
- New GGC targets are due for release in April 2021, along with new procurement requirements from January 2021. The latter will, for example, require a minimum 10% weighting when evaluating social value, such as environment impacts, in bids for public contracts.[26] Cabinet Office is also in the early stages of developing options to set higher expectations of strategic suppliers bidding for central government contracts.
- The Department for Environment, Food & Rural Affairs (Defra) told us it is considering with Cabinet Office the need for a coordinated review of government buying standards, including alignment with net zero. Defra also told us it is considering restarting compliance reporting with the buying standards and recognises it is useful in detailing the extent of sustainable public procurement across government.
- Cabinet Office told us its Office of Government Property has commenced a programme of work to coordinate activity across the central government estate to transition to net zero, including sharing of best practice and rolling out tools to assist departments in planning the investment required to reduce estate emissions.
- The Infrastructure and Projects Authority is working to incorporate sustainability and net zero in its advice and support as well as in the assurance review process for scrutinising the deliverability of government policies.

26 Public Services (Social Value) Act 2012. Social value refers to the wider financial and non-financial impacts of projects and programmes, including the well-being of individuals and communities, social capital and the environment.

Figure 8

Examples of government's activities to reduce its own greenhouse gas emissions through its estate management and procurement practices

There are aspects of good performance however there are gaps in coverage of government targets and standards

Area of government activity	Scope and importance	Responsible department
Estate management	Central government covers more than 4,600 properties. The wider public sector estate covers some 240,000 properties and represents 9% of all emissions in the building sector.	The Office of Government Property, part of the Cabinet Office. The Department for Environment, Food & Rural Affairs (Defra) oversees the Greening Government programme, although the Department for Business, Energy & Industrial Strategy is responsible for the greenhouse gas reduction target.
Procurement	Central government spends £49 billion every year on contracts for goods and services, of which £18 billion is for common goods and services through the Cabinet Office's Crown Commercial Service frameworks. The wider public sector spends £280 billion a year.	The Cabinet Office is responsible for overall government procurement policy. Defra is responsible for sustainable procurement.

Source: National Audit Office review of departmental papers

Current arrangements for reducing emissions	Performance and issues with coverage
Greening Government Commitments (GGCs): targets for reducing the environmental impact of the central government estate and operations. **Cabinet Office's property sustainability board:** comprises cross-government representatives and considers how government can achieve a well-maintained net zero estate. It includes representation from the Ministry of Defence (MoD) and Ministry of Justice (MoJ), which combined, account for 71% of central government reported emissions. **Functional standard for property:** published in February 2020, requires that government property should be managed to optimise sustainability and value for money and should aim to achieve net zero carbon emissions for each building or property portfolio.	• In 2018-19, government is estimated to have reduced its emissions by 46% compared with 2009-10, exceeding the 43% target set by the GGCs. • 17 of 22 central government departments and non-ministerial government departments and their arm's-length bodies exceeded their individual target. • GGC targets cover the central government estate but there is no equivalent process to set greenhouse gas reduction targets for the wider public sector estate and its operations, for example, the NHS or schools.
Government buying standards: a set of 11 broad product specifications, for example construction projects and buildings, and transport (vehicles), for public procurers to get a quick insight into key sustainability issues when planning a procurement, including mandatory and best practice levels. Departments are also required to 'consider and consult' on social value when procuring public services; and report on how they understand and reduce the supply chain impacts as part of GGCs (see above). Government has a target that 25% of its car fleet be ultra-low-emission vehicles by 2022.	• Of the 11 standards, only one – the standard for sustainable vehicle procurement – was updated in 2017 by the Department for Transport, the remaining 10 were last updated in either 2012 or 2015. • The GGCs now only require departments to describe their approach to sustainable procurement rather than report percentage compliance with the government buying standards. • There has been slow progress on government procurement of low-emission vehicles, for example, only 0.1% (12 of 16,500) of the MoD's non-military fleet were ultra-low emission vehicles, as at August 2019. Similarly, as at March 2017, only two of the MoJ's 1,483 vehicles were ultra-low emission (hybrid) vehicles. MoJ's latest annual report shows that this number has increased to 16 ultra-low emission (hybrid) vehicles as at March 2020.

Part Three

Delivering the net zero strategy

3.1 This part of the report sets out government's plans to establish a strategy for achieving net zero prior to the 26th United Nations' Climate Change Conference of the Parties (COP26) and the risks it must manage in taking the strategy forward.

The net zero strategy

3.2 Government plans to launch a net zero strategy prior to the COP26 conference in November 2021. It aims that this strategy will set out its vision for transitioning to a net zero economy by 2050, encompassing all the sectors that need to decarbonise. It will also incorporate its delivery plans for achieving the emissions target set by the sixth carbon budget, which covers the period 2033–2037. The process building up to the launch of the strategy will include:

- establishing the policies required to close the gap to achieving the fourth and fifth carbon budgets, which cap the UK's emissions between 2023–2027 and 2028–2032 respectively;
- setting the level of the sixth carbon budget;
- the publication of sector strategies, including for transport, heating and energy;
- the publication of HM Treasury's review of how net zero should be paid for; and
- government setting the UK's Nationally Determined Contribution, as part of the Paris Agreement, setting out how it will contribute to the goal of keeping global heating below 2 degrees Celsius.

Many of these announcements and publications will be later than government previously intended, along with the COP26 conference itself, which was postponed from November 2020 due to the COVID-19 pandemic (**Figure 9** on pages 44 and 45).

3.3 The Department for Business, Energy & Industrial Strategy (BEIS) aims to ensure the net zero strategy aligns with plans for a clean, resilient recovery from COVID-19. For example, a clean recovery may deliver jobs and investments in the near term while promoting a low-carbon economy in the longer term. Government is therefore considering basing its COVID-19 recovery plans around support for selected low-carbon industries and choosing policy options, such as tax incentives, skills and training, and regulation, that promote a clean and resilient economy. In November 2020, government published its *Ten Point Plan for a Green Industrial Revolution*, which aims to mobilise £12 billion of investment to create and support up to 250,000 green jobs.

3.4 Even if government publishes its net zero strategy before COP26, many external stakeholders are frustrated that government has not established a plan to achieve net zero sooner, particularly given the target to reduce emissions by 80% had existed for 11 years prior to setting net zero. BEIS has projected that emissions will exceed the fourth carbon budget without further action since at least 2011, with recent projections showing a widening gap against the fifth carbon budget (**Figure 10** on page 46).

Risks government must manage

Mitigating uncertainty

3.5 Our past work on major projects and programmes has demonstrated the importance of government clearly defining what it is aiming to achieve so that it can identify key enablers needed to achieve its objectives, such as people, policies and funding. Programmes are harder to achieve where what is to be achieved has not been defined. For example, we found that government's preparations for the border after EU Exit were made more difficult by the uncertainty stemming from the ongoing UK–EU negotiations. Departments had to plan for multiple scenarios and changes in focus, and this constrained their ability to communicate with the stakeholders that would play a key role.[27]

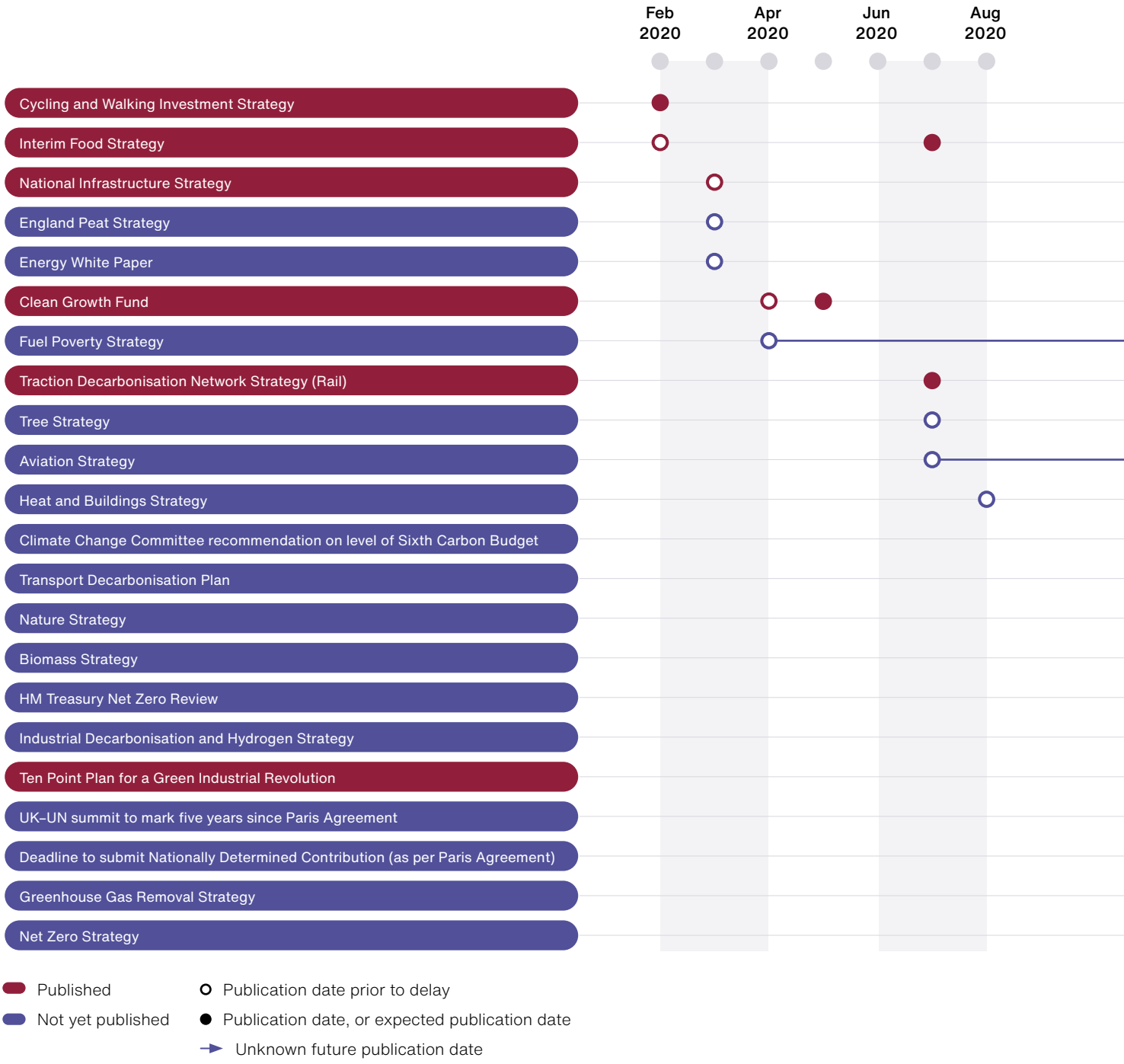
3.6 Mitigating uncertainty is also important to ensure stakeholder buy-in. We have previously described the need for greater certainty in government's and regulators' decisions to improve market confidence in the pipeline of investment and contracting opportunities.[28] Without greater certainty there is a risk that investors will require a greater rate of return or will choose instead to invest in other countries. For example, we found the lack of consistency in government's approach to energy efficiency could increase long-term costs because businesses in the supply chain may require a higher return on risky investment in training, accreditation and capacity.[29]

27 Comptroller and Auditor General, *The UK border: preparedness for EU Exit*, Session 2017–2019, HC 1619, National Audit Office, October 2018.
28 Comptroller and Auditor General, *Planning for economic infrastructure*, Session 2012-13, HC 595, National Audit Office, January 2013.
29 Comptroller and Auditor General, *Green Deal and Energy Company Obligation*, Session 2015-16, HC 607, National Audit Office, April 2016.

Figure 9

Government publications in the run up to COP26

Timeline showing when strategies relevant to achieving net zero were going to be published and their revised publication dates where these have been delayed



Source: National Audit Office analysis of Department for Business, Energy & Industrial Strategy documents

Notes

1 Shown are major strategies and reports; government is also engaged in numerous consultations covering a range of net zero issues.

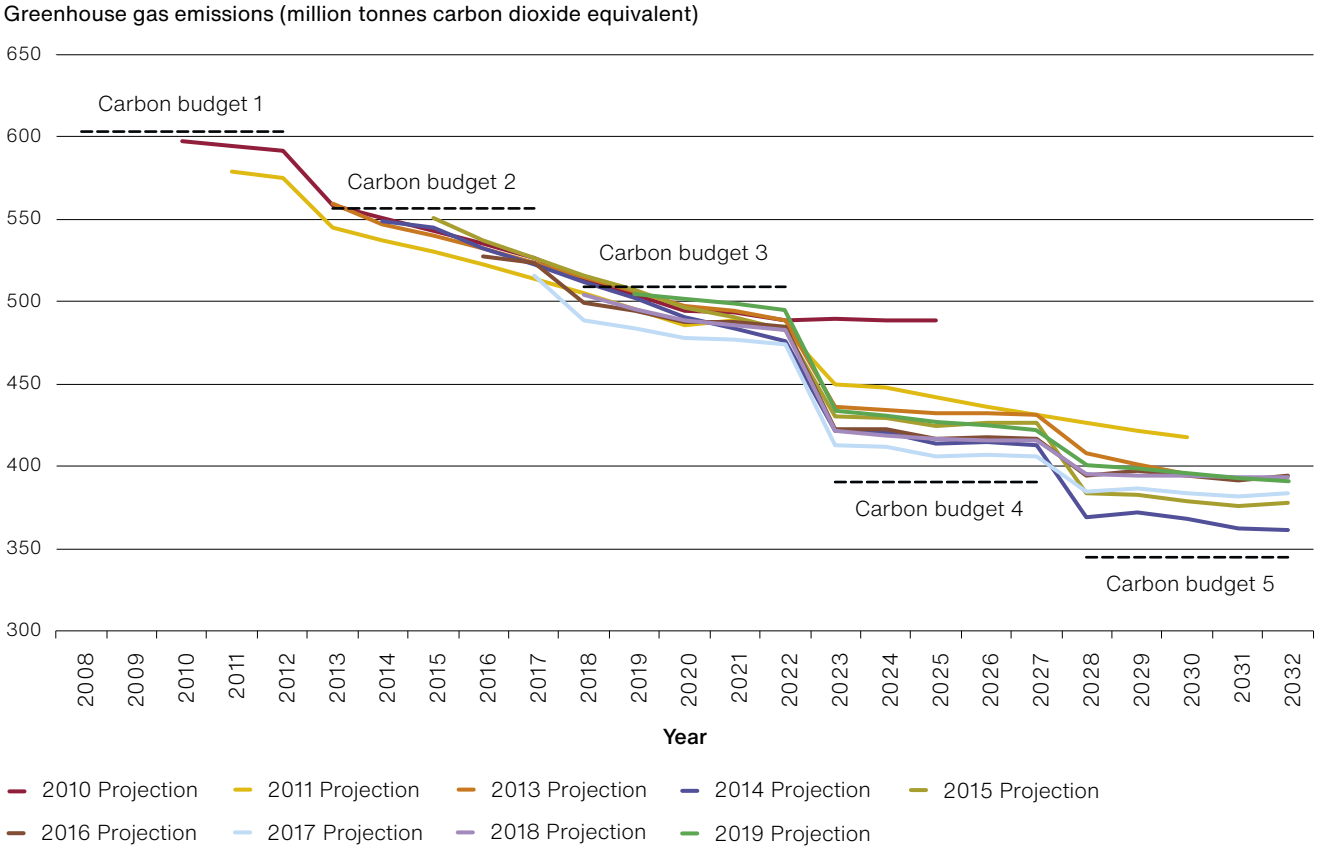
2 Government committed in 2019 to a National Bus Strategy, one of the aims of which is to help the economy meet net zero ambitions, but a date has not been set for publication.

3 HM Treasury is publishing an interim report later in 2020 in lieu of the delayed HM Treasury Net Zero Review.

Figure 10

How government's assessment of whether it will meet future carbon budgets has changed over time

Each line shows a projection of the UK's future performance against its carbon budget targets; each projection has shown that the UK would exceed the level of the fourth and fifth carbon budgets without further action



Notes

1 Carbon budgets are legally binding targets for UK greenhouse gas emissions over a five-year period (as set out in the Climate Change Act, 2008).

2 Performance against carbon budgets (note 1) is measured by the 'net carbon account', which is the sum of the allowances allocated to the UK under the EU Emissions Trading System (ETS) plus the actual emissions from sources not included in the EU ETS.

3 The Department for Business, Energy & Industrial Strategy (BEIS) has published projections of the net carbon account, by year, since 2010, as shown on the graph; no projection was available for 2012.

Source: National Audit Office analysis of the Department for Business, Energy & Industrial Strategy's statistics

3.7 For net zero, government needs a strategy that balances the need for greater clarity of its plans with being able to accommodate the uncertainty inherent in aiming to achieve a target over a 30-year period. BEIS told us that sector strategies would reflect the level of uncertainty in each sector but with milestones set by which things need to be made more certain. The strategy for decarbonising heat, for example, will set out how government will keep its options open on which technology to deploy but that it will need to be clearer on this by the mid-2020s. While sector strategies will chart a pathway out to 2050, the level of detail in later decades will be less than for earlier years.

3.8 BEIS has used modelling to test the key uncertainties, producing a set of four scenarios with varying rates of technology deployment and innovation. BEIS has used its model to identify 'no regrets' actions that are very likely to be required in the next five years regardless of the pathway taken and will therefore need to be reflected in the sector strategies. BEIS told us the net zero strategy would set out regular review points where government would reconsider the actions required to achieve the target.

3.9 BEIS told us that its process for creating the net zero strategy is running well so far. There remains a lot to do to pull together a coherent plan that encompasses all sectors, incorporates carbon budget targets, has clear milestones and is sufficiently detailed to achieve stakeholder buy-in. This is particularly so given the ongoing uncertainty around the impact of the COVID-19 pandemic and the consequences of the end of the transition period following the UK's withdrawal from the EU. Additionally, our work on government's preparations for EU Exit found that on several occasions internal decisions and processes took longer than planned.[30]

Managing interdependencies

3.10 Our previous work has shown the importance of understanding interdependencies and having a plan for managing them for a project or programme to succeed.[31] For example, as we reported in 2020, the Ministry of Defence has received two new aircraft carriers into service, along with 18 jets, and has developed much of the UK infrastructure to support them. However, a key interdependency – the Crowsnest airborne radar system, which provides a crucial element of protection for a carrier strike group – is 18 months late, affecting how Carrier Strike can be used during this period.[32] In contrast, for the 2012 Olympics, the Olympic Executive achieved greater integration across its programme by establishing seven cross-cutting work streams within an overarching programme plan. This helped to ensure cross-programme coordination and management of interdependencies.[33] Past experience shows that the need to manage interdependencies effectively becomes more acute if government is delivering to a fixed completion date, as it is with net zero, and the project delivery slips, meaning activities become compressed and need to happen in parallel.[34]

30 Comptroller and Auditor General, *Learning for government from EU Exit preparations*, Session 2019–2021, HC 578, National Audit Office, September 2020.
31 Comptroller and Auditor General, *Lessons learned from Major Programmes*, Session 2019–2021, HC 960, National Audit Office, November 2020.
32 Comptroller and Auditor General, *Carrier Strike – Preparing for deployment*, Session 2019–2021, HC 374, National Audit Office, June 2020.
33 Comptroller and Auditor General, *The London 2012 Olympic Games and Paralympic Games: post-Games review*, Session 2012-13, HC 794, National Audit Office, December 2012.
34 Comptroller and Auditor General, *Completing Crossrail*, Session 2017–2019, HC 2106, National Audit Office, May 2019.

3.11 BEIS is still considering how it will incorporate its understanding of interdependencies into government's management of the net zero strategy. BEIS has used its modelling to take account of the interdependencies between different sectors. BEIS is also developing a 'system of systems' map to develop its understanding of how the individual sectoral systems (buildings, surface transport and so on) join up. It expects this could provide a basis for stakeholder engagement and a framework for understanding how such a map could be used to support decision-making. It is also engaging wider expertise, such as the Prime Minister's Council of Science and Technology, on taking a 'systems approach' that joins up policy areas as a whole rather than managing them in isolation.

3.12 Our recent report on electricity networks showed that changes may be needed in the management of the power sector to enable more effective management of interdependencies. We found that increasing complexity has arisen in the energy system, with many actors such as different generators of electricity and network companies requiring greater coordination to achieve net zero at least cost. Some stakeholders have argued for a coordinating body to consider, for example, the potential to reduce network costs by prioritising the development of nearby sites that can share common network connections.[35]

Monitoring progress

3.13 To achieve net zero, government needs adequate monitoring information so it can track its progress and act where necessary. On net zero, there are, broadly, three levels of monitoring data government can collect:

- Data on greenhouse gas emissions showing whether the UK is on track to achieve net zero.
- Data on factors that contribute to reducing emissions; these could include the deployment of a technology (such as the number of electric vehicles sold) or may track outcomes (such as the energy efficiency of households).
- Data on government's policies that aim to bring about reductions in greenhouse gas emissions. Such data may consist of how much policies have cost and what they have achieved.

3.14 Our past work illustrates the risks of failing to collect adequate performance data at each of these three levels (**Figure 11**).

35 Comptroller and Auditor General, *Electricity networks*, Session 2019-20, HC 42, National Audit Office, January 2020.

Figure 11

Case examples: the risks to government of not collecting suitable performance data

Past National Audit Office reports illustrate the consequences of not collecting the right kinds of monitoring data

Lack of data on outcomes prevented the Department of Health evaluating a key cancer scheme

Government setup the Cancer Drugs Fund in 2010 to allow people access to cancer drugs that would not otherwise be routinely available on the NHS. As we reported in 2015, the Fund had successfully improved access to cancer drugs. However, data on the key intended outcome – whether or not patient outcomes improved – were not available. This ultimately meant the Department of Health could not evaluate the impact of the fund, while academic research suggested that spending the money in other ways would have offered better value for money.

Creating good indicators to track progress can be a challenge as our report on environmental metrics describes

The government needs a system to measure its environmental performance so that it can understand whether it is on track to meet environmental goals. In 2019 we found that there was a patchwork of environmental indicators that did not align clearly with government's overall objectives and not all of which had good mechanisms for taking action in response. We concluded that a new draft framework for tracking progress against government's environmental ambitions was promising because it took a broad, 'whole system' view, though significant challenges still needed to be overcome, including to fill data gaps.

Risks from not collecting suitable data on specific policies is illustrated by our reporting on the Renewable Heat Incentive scheme

The Renewable Heat Incentive is a scheme to encourage a switch from fossil fuel heating systems to renewable and low-carbon alternatives in homes and business premises in Great Britain. One of the Department for Business, Energy & Industrial Strategy's (BEIS's) objectives for the scheme has been to grow supply chains which can support a national transition to low-carbon heating. BEIS scaled back its measurement of the supply chain, citing challenges around the cost effectiveness of collecting data, rendering it much more reliant on 'soft' market intelligence from stakeholders and deployment data. This means BEIS has been unable to determine whether or not the scheme is on track to meet its objectives.

Source: Comptroller and Auditor General, *Investigation into the Cancer Drugs Fund*, Session 2015-16, HC 442, National Audit Office, September 2015; Comptroller and Auditor General, *Environmental metrics: government's approach to monitoring the state of the natural environment*, Session 2017–2019, HC 1866, National Audit Office, January 2019; and Comptroller and Auditor General, *Low-carbon heating of homes and businesses and the Renewable Heat Incentive*, Session 2017–2019, HC 779, National Audit Office, February 2018

3.15 BEIS has not yet embedded comprehensive performance monitoring into its coordination arrangements. BEIS collects and publishes greenhouse gas emissions statistics annually, in line with its international obligations. It also projects annually the effect of government policies on reducing future greenhouse gas emissions. These give government a clear annual view of where it currently stands on the path to net zero. But it does not draw together performance indicators that would enable it to track progress on a more regular basis. BEIS is currently working on what such indicators should cover and how these are to be reported. It is also working with the Climate Change Committee (CCC) to develop new measures of progress that are more straightforward to understand, such as the number of heat pumps installed. It expects these could be used both for monitoring as well as in public communication of progress towards net zero.

3.16 The lack of monitoring arrangements in the cross-government coordination set up means there is no single place where information is brought together to enable the progress of all key net zero policies to be monitored and reviewed as a whole. In 2019, BEIS and the Prime Minister's Implementation Unit carried out an ad hoc exercise to collect such data. BEIS is currently considering ways of turning this data collection exercise into a more regular framework of policy monitoring. At present, however, government does not have a consolidated list of policies key to achieving net zero nor a view across the whole of the performance of relevant policies. This means it cannot identify in a structured way the areas that are at highest risk of going off track that would otherwise enable it to redeploy resources or escalate issues to senior decision-makers.

3.17 We noted in Part One that government does not collate information on the totality of spending across government on policies aimed at achieving net zero. Similarly, our work on government's preparations for EU Exit found that government did not have spending information at a cross-government level and relied on existing control frameworks and systems of departmental accountability. This created risks to financial management, such as where reprioritisation of either EU Exit work or business-as-usual activity might be necessary, and public accountability.[36]

Stakeholder engagement

3.18 Achieving net zero will require a range of different organisations and individual citizens to play some part. We have seen in the past the challenges caused by government not putting enough thought early on into what stakeholders needed or fully understanding what was required from them.[37] There are also opportunities to learn from innovative practices that may be occurring in the private sector or at a local level that it could roll out more widely.

The private sector

3.19 Achieving net zero will require the private sector to contribute in several ways, including:

- investing in new low-carbon infrastructure, such as new electricity generating capacity;
- businesses with high energy use, such as in industry, to transition to low-carbon alternatives and increase energy efficiency; and
- sectors, such as transport and heating, developing and deploying low-carbon products that can be rolled out on a mass scale.

36 See footnote 30.
37 See footnote 30.

3.20 Government has a key role to play in ensuring the private sector provides the investment that is needed. This could be by sharing risks on projects and investments that the market cannot bear alone; ensuring regulation requires monopoly infrastructure providers to invest in reinforcements that support the low-carbon transition, such as electricity networks expanding their capacity; providing funding that supports research and innovation; and using levers such as legal obligations and influencing techniques to change business practices.

3.21 BEIS has established a central team that is responsible for identifying common challenges that span sectors and technologies. In 2019, it jointly published with HM Treasury the *Green Finance Strategy: Transforming Finance for a Greener Future*. This set out how government plans to align private sector financial flows with clean growth and strengthen the competitiveness of the UK financial services sector. The plan consisted of three core pillars:

- **greening finance**, the process of incorporating the risks and opportunities presented by climate change into mainstream financial decision-making;
- **financing green**, through mobilising and accelerating flows of private finance into key clean growth sectors; and
- **capturing the commercial opportunity**, by ensuring UK financial services capture the domestic and international commercial opportunities arising from the 'greening of finance'.

3.22 Our past work raises some issues for government to consider around ensuring private sector investment in achieving net zero:

- **Considering different business models:** The costs to consumers of Hinkley Point C, the UK's first new nuclear power station for more than 20 years, could have been significantly lower if government had considered sharing more of the project risks as its investors would have required a lower return than the 9% that was agreed, although this could have exposed taxpayers and consumers to the risks of the project running late or over budget.[38] Government also needs to be careful not to allocate too much of the risk to the private sector. We found that its last competition for carbon capture and storage projects failed partly because the competition's terms required investors to cover certain risks that made one of the two projects in the running for support commercially unviable.[39] BEIS told us that each sector- or technology-specific team is responsible for identifying the right business models and risk-sharing arrangements in their area. For example, the team within BEIS that is overseeing the deployment of carbon capture and storage is developing the business models to support deployment of that technology.

38 Comptroller and Auditor General, *Hinkley Point C*, Session 2017-18, HC 40, National Audit Office, June 2017.
39 Comptroller and Auditor General, *Carbon capture and storage: the second competition for government support*, Session 2016-17, HC 950, National Audit Office, January 2017.

- **Investor confidence:** We have reported in the past how sudden changes to government's approach on consumer-funded energy policies potentially reduced investors' confidence, with the risk of increasing long-term costs as investors would require a higher rate of return.[40] Government's forthcoming net zero strategy is an opportunity for it to provide greater clarity to investors.

- **Tracking progress:** Government also needs to maintain sufficient oversight where activities contributing to net zero are being undertaken by the private sector so that it knows if things are going off track. We reported that sector regulators did not have good enough understanding of businesses' costs in supporting vulnerable consumers, limiting their ability to understand companies' incentives to provide that support.[41] BEIS told us it plans to develop metrics to monitor whether sufficient private investment is coming into each sector.

Individuals

3.23 Achieving net zero will depend on individuals adopting new technologies, changing their habits and lifestyles, or a combination of both. This includes, for example, purchasing zero-emission vehicles, such as electric vehicles, instead of cars that run on petrol or diesel; replacing domestic gas boilers with renewable alternatives, such as electric heat pumps; and consuming fewer meat and dairy products (**Figure 12**). The CCC estimated in 2019 that more than half (62%) of the remaining emissions reductions will happen either through individual choices and behaviours or through individual choices and behaviours in conjunction with the development of new technologies. But at the same time it finds there is a disconnect between people's concern about climate change and an understanding of what is required to achieve emissions reductions in the UK.[42] According to BEIS, if the public is more engaged and bought into the changes required it will substantially reduce the costs of reaching net zero.

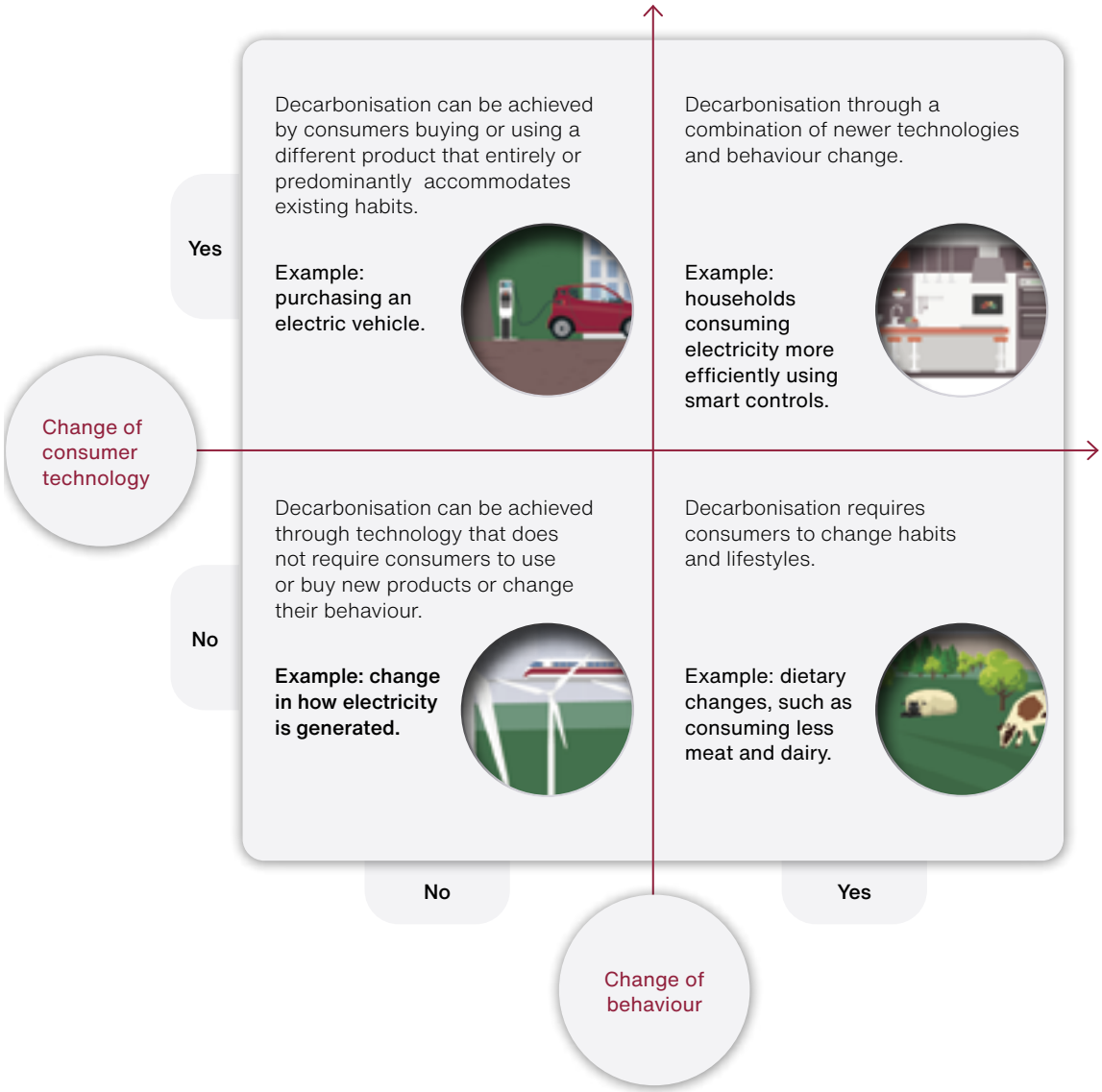
3.24 We have found in a series of previous reports that government has overestimated consumer buy-in to its schemes that have aimed to reduce greenhouse gas emissions.[43] As the time available to achieve net zero reduces, similar overestimates of take-up in future policies could be more difficult to recover from, or require more costly or stricter measures to bring about the changes needed. Therefore, when weighing up policy options there may be merit in government recognising the benefit of options that require less behaviour change, even if it costs more upfront, as it may increase the chance of success and limit the costs of needing to find alternatives later on.

40 Comptroller and Auditor General, *Controlling the consumer-funded costs of energy policies: The Levy Control Framework*, Session 2016-17, HC 725, National Audit Office, October 2016.
41 Comptroller and Auditor General, *Vulnerable consumers in regulated industries*, Session 2016-17, HC 1061, National Audit Office, March 2017.
42 Committee on Climate Change, *Net zero: The UK's contribution to stopping global warming*, May 2019, p.194.
43 See footnote 29; Comptroller and Auditor General, *Low-carbon heating of homes and businesses and the Renewable Heat Incentive*, Session 2017–2019, HC 779, National Audit Office, February 2018; and Comptroller and Auditor General, *Rolling out smart meters*, Session 2017–2019, HC 1680, National Audit Office, November 2018.

Figure 12

Examples of behaviour and technology changes required to achieve net zero

Some changes required to achieve net zero will need consumers to change habits and lifestyles, whereas others can be facilitated by new technologies that accommodate existing habits



Note

1 This figure is not exhaustive.

Source: National Audit Office analysis

3.25 In April 2020, BEIS formed a new behaviour change and public engagement team. This team is pulling together a new behaviour change work programme to look across all the differing elements of behaviour change that contribute to net zero to be incorporated into government's overall net zero strategy. It will also aim to ensure that policy teams follow good practice in behaviour change policies and has recently established cross-government working groups to bring together officials, covering themes such as decarbonising homes, mobility and diet. It recently held briefings to disseminate the findings of the Climate Assembly (**Figure 13**). Additionally, HM Treasury plans that its review of the costs of net zero will aim to increase understanding of how the transition to net zero will happen, making the public aware of some of the difficult decisions that need to be made.

3.26 BEIS told us that there had not been a central public engagement team for net zero - or for achieving the previous 80% emissions reduction target – before this year because most emissions reductions have come from changes in how electricity is generated. This did not require individuals to change their behaviour significantly. Emissions reductions required in other sectors, such as transport and heating of buildings, mean moving into a new phase of government policy in which individual decisions are more important. BEIS also told us that teams across government have for several years considered public engagement and behaviour change on discrete policies but this is the first time that that work is being brought together to ensure it is more consistent.

3.27 As part of its public engagement, government will need to consider the diversity of its audience and the need to tailor messages, such as to different ethnic minorities, age groups, those living in rural and urban areas, and those with different income levels. The transition to net zero will mean different things to different people, with varying degrees of disruption to their lives. It will also be important for government to have data that enable it to monitor the cumulative impact on individuals, who may be adversely impacted in more than one way by the changes.

3.28 The impact of COVID-19 may provide an insight to the sorts of behaviour change that might be acceptable to the public for achieving net zero. Some 93% of Climate Assembly UK members agreed that as lockdown eases, governments should take steps to encourage lifestyle changes more compatible with net zero. Additionally, 62% of members agreed that COVID-19 had changed their views on how the UK should get to net zero, with assembly members expressing a new sense of opportunity for change, with altered perceptions of what government can do.

Figure 13

Climate Assembly UK: understanding the public's views on how the UK should meet its net zero target

Climate Assembly UK recently published the results of the first UK-wide citizens' assembly on climate change

What was the Climate Assembly?

- The Climate Assembly was a citizens' assembly commissioned by six select committees of the House of Commons in 2019 to consider the question "How should the UK meet its target of net zero greenhouse gas emissions by 2050?". It was made up of 108 individuals selected, through a civic lottery, to be representative of the UK population across a range of demographic, attitudinal and geographic criteria.
- The Assembly gathered across several weekends in early 2020. Meetings consisted of panels of speakers and experts introducing and prompting discussions on net zero topics. The Assembly would then vote on recommendations.
- A report summarising the views and recommendations of Climate Assembly UK was published on 10 September 2020.

Key themes for how the UK should meet its net zero target

Climate Assembly UK issued a range of detailed recommendations that had both found support among the Assembly members and that offered a path to net zero. The Assembly found that five key themes recurred during its deliberations and stated that these should be at the heart of government's and Parliament's approach to achieving net zero.

- **Education and Information:** improved education and information on climate change were seen as vital to achieve buy-in to the changes most needed.
- **Fairness:** climate change solutions should be fair to people with different jobs, incomes, travel preferences, housing arrangements and who live in different parts of the UK.
- **Freedom and choice:** choice should be maintained where possible but not at the expense of taking the necessary measures to ensure a healthy environment for future generations.
- **Co-benefits:** the UK should ensure it takes advantage of potential rewards that come with tackling climate change, particularly for local communities, high streets and local businesses.
- **Nature:** there was strong support from the Assembly for measures with positive impacts on biodiversity and wildlife while helping the UK move towards its net zero goal.

The Assembly also stressed the importance of **strong and clear leadership from government and a joined-up approach across society** as key elements in reaching net zero by 2050.

What now?

- The six select committees will use the relevant recommendations of the Assembly to inform their work in advising the government on how to make progress and in holding it to account. The Business, Energy and Industrial Strategy Committee has indicated that it will hold an overarching inquiry into the findings of the Assembly to take forward its work by examining the policies that can deliver net zero and provide solutions that are fair and equitable.
- The Climate Change Committee has utilised the findings of the Assembly in its report: *Reducing UK emissions: progress report to Parliament, June 2020.*
- After the publication of the report, the Secretary of State for Business, Energy and Industrial Strategy stated that his officials would look at the Assembly's recommendations in detail; expert leads would present the findings of the Assembly in a series of seven briefings to government; and his officials would consider further how to extend the kind of public engagement achieved by the Assembly.

Source: National Audit Office analysis of Climate Assembly UK report

Appendix One

Our audit approach

1 This study applies our experience from auditing previous cross-government challenges including large-scale, long-term projects and programmes to highlight the main risks government needs to manage to achieve net zero and maximise value for money.

2 Where we can, we include evaluative commentary on the progress government has made so far, and how well placed government is to manage these risks in the future. These are broad and complex issues and so our aim has been to highlight the most significant potential strengths and areas for improvement across government's approach to achieving net zero rather than to assess the value for money of any particular aspect. The report examines risks in relation to:

- the scale of the challenge to achieve the net zero target and the roles and responsibilities within government (Part One);
- the coordination arrangements that bring together the different government departments involved in achieving net zero (Part Two); and
- government's plans for how it will achieve net zero and the risks it needs to manage (Part Three).

3 **Figure 14** gives our evaluative criteria. Our evidence base is described in Appendix Two.

Figure 14
Our audit approach

The objective of government

In June 2019, government passed legislation committing it to achieving 'net zero' greenhouse gas emissions by 2050. This means that the UK's total greenhouse gas emissions should be equal to or less than the emissions the UK removes from the atmosphere either by the natural environment or carbon capture technologies.

How this will be achieved

The Department for Business, Energy & Industrial Strategy (BEIS) has overall responsibility for ensuring the target is achieved and has lead responsibility for reducing emissions in some of the largest emitting sectors of the economy. Achieving net zero will require wide-ranging changes to the UK economy, including further investment, as well as changing the way people behave. The all-encompassing nature of achieving net zero means that all government bodies, including departments, arm's-length bodies and executive agencies, have a role to play.

Our study

This study is intended to support Parliamentary and public scrutiny of government's arrangements for achieving net zero. We have applied our experience from auditing previous cross-government challenges to highlight the main value-for-money risks government needs to manage to achieve the target.

Our evaluative criteria

- The scale of the challenge to achieve the net zero target and roles and responsibilities within government.
- The coordination arrangements that bring together the different government departments involved in achieving net zero.
- Government's plans for how it will achieve net zero and the risks it needs to manage.

Our evidence (see Appendix Two for details)

We reviewed the scale of the net zero challenge and the roles and responsibilities within government. We:

- reviewed published and internal departmental documents; and
- interviewed departmental staff and key stakeholders.

We assessed the coordination arrangements and government's plans for net zero, and set out the risk it needs to manage. We:

- reviewed published and internal departmental documents;
- interviewed BEIS, Cabinet Office, Department for Transport, HM Treasury and Ministry of Housing, Communities & Local Government staff; and
- reviewed reports from our back catalogue to identify relevant risks and what government can learn from these experiences.

Our conclusions

Government's reorganisation of its approach to tackling climate change reflects the high political priority attached to achieving net zero and the cross-government nature of the challenge. Achieving net zero will require wide-ranging changes across society and the economy at a pace which leaves little room for delay. BEIS, alongside the other departments involved, is yet to put in place all the essential components for effective cross-government working, such as integrated planning and progress monitoring, and processes to manage interdependencies, to ensure all of government steps up to this challenge. Beyond these internal structures government also needs to spearhead a concerted national effort to achieve the ambitious outcome of net zero greenhouse gas emissions by 2050. To do so, it needs to engage actively and constructively with all those who will need to play a part – across the public sector, with industry and with citizens – to inject the necessary momentum.

Appendix Two

Our evidence base

1 We reached our independent conclusions following an analysis of evidence collected between April and September 2020. Our main methods are outlined below.

Document review

2 In designing and carrying out our work we took account of previous relevant National Audit Office reports on sustainability, spending reviews, government's preparations for EU Exit and complex, cross-government programmes to draw out the main value-for-money risks government needs to manage to achieve the target.

3 We also reviewed key documents including:

- the organisation and governance charts at the Department for Business, Energy & Industrial Strategy (BEIS), Department for Environment, Food & Rural Affairs (Defra), Department for Transport (DfT) and the Ministry of Housing Communities & Local Government (MHCLG);
- key submissions to the Climate Action Cabinet committees and the Climate Change National Strategy Implementation Group;
- meeting minutes, papers and terms of reference of departmental boards concerned with greenhouse gas emissions;
- policy option documents concerned with net zero and carbon budgets;
- estate management, procurement and policy and project appraisal guidance for departments concerned with greenhouse gas emissions;
- 2020 Comprehensive Spending Review guidance for departments and supporting technical guidance concerned with emissions;
- BEIS, Defra, DfT and MHCLG' public Single Departmental Plans for 2018-19 and 2019-20;
- green finance recovery papers; and
- Climate Change Committee (CCC) reports.

4 We used this documentary evidence to understand:

- government's understanding of the scale of the net zero challenge, including costs;
- net zero governance arrangements in government;
- how government sets direction for net zero including prioritisation, resourcing and coordination across government;
- government working with external bodies including individuals and the private sector; and
- arrangements for progress monitoring, learning and improving.

Interviews

5 We conducted semi-structured interviews with officials at BEIS, Cabinet Office, Defra, DfT, HM Treasury and MHCLG. This was to understand the scale of the challenge and government's roles and responsibilities for achieving net zero; arrangements for coordinating the government departments involved in achieving net zero; government's plans to establish a strategy for achieving net zero; and how government is aligning its own processes and emissions with net zero.

6 We also used these interviews to identify relevant documentary evidence. We interviewed officials at BEIS, Cabinet Office, Defra, DfT, HM Treasury and MHCLG.

7 We also discussed government's approach to achieving net zero with key stakeholders, including the CCC.

Appendix Three

Net zero policies announced since 2017

Figure 15
Estimated value of policies announced since the start of 2017 that support government's net zero ambitions

	2017	2018
Surface transport	• Faraday battery challenge – £274 million • Hydrogen for Transport Programme (to build hydrogen refuelling stations) – £23 million • Additional funding for Low Emission Bus Scheme – £11 million • Investment in Charging Infrastructure Investment Fund – £200 million • Heavy goods vehicles platooning trials – £8.1 million • Cycling and Walking Investment Strategy 2017 – £1.2 billion	• Ultra-Low Emission Bus Scheme – £48 million • Research and development for low cost wireless charging and public on-street charging solutions – £40 million • Additional funding for Clean Bus Technology Fund – £40 million • First of a Kind 2 competition (decarbonisation of rail theme) – £1.75 million
Industry	• Industrial Decarbonisation (Industrial Strategy Challenge Fund) – £170 million • Carbon Capture and Utilisation Demonstration innovation programme – £20 million • Industrial Fuel Switching Competition – £20 million • Accelerating Carbon Capture and Storage Technologies – £4.4 million	• Industrial Energy transformation fund – £315 million • Carbon Capture, Usage and Storage Innovation Programme – £24 million • Industrial Heat Recovery Support Programme – £18 million • Low Carbon Hydrogen Supply competition – £33 million
Buildings	• Boiler Plus standards • Renewable Heat Incentive scheme – £4.5 billion up to 2021 • Investment in low carbon heating and energy efficiency options for UK homes and businesses – £90 million	• Heat Networks Investment Project – £320 million • Local supply chain energy efficiency – £4.7 million

2019	2020
• Additional funding for Clean Bus Technology Fund – £25 million • First of a Kind 3 competition (noise and environment theme) – £1.375 million	• Automotive Transformation Fund – £1 billion • Plug-in vehicle grants – £532 million • Zero emission vehicles exemptions from Vehicle Excise Duty – £120 million over next five years • Roll out of electric vehicle charging infrastructure – £500 million • Cycling and Walking Plan – £2 billion in dedicated spend • Britain's first all-electric bus town – £50 million • Green economic recovery in automotive sector – £73.5 million • First of a Kind 2020 competition (environment and sustainability theme) – £2.35 million
• Clean Steel Fund – £250 million • Low Carbon Hydrogen Production Fund – £100 million • Industrial Energy Efficiency Accelerator – £13 million	• Carbon Capture and Storage Infrastructure Fund – £800 million • Changes to Climate Change Levy – £270 million net gain (projection over next five years) • Green Recovery package for industry – £350 million
• Future Homes Standard • Transforming Construction Industrial Strategy Challenge Fund – £170 million • Boosting Access for Small and Medium-sized Enterprises to Energy Efficiency competition – £6 million	• Clean Heat Grant – £100 million • Green Gas Support Scheme – funded via Green Gas Levy • Green Heat Networks Scheme – £270 million • Low carbon heat support – £100 million • Green Homes Grant – £2 billion • Public Sector Decarbonisation Scheme and Low Carbon Skills Fund – £1.032 billion • Social Housing Decarbonisation Fund – £50 million

Figure 15 *continued*

Estimated value of policies announced since the start of 2017 that support government's net zero ambitions

	2017	2018
Power	• Investment in smart systems to support global move to renewable energy – £102.5 million • Investment in smart energy innovations – £70 million • Investment in renewables innovation – £15 million • See also carbon capture, utilisation and storage schemes under 'Industry'	• National Fusion Technology Platform at Culham – £86 million • Investment in small modular reactors – £62 million • Office for Low Emission Vehicles contribution to Vehicle to grid (Department for Business, Energy & Industrial Strategy funding included elsewhere in this list) – £12 million
Agriculture and land use, land-use change and forestry	• Grant scheme to restore England's peatlands – £10 million	• Transforming Food Production Fund – £90 million • Creation of new 'Northern Forest' – £5.7 million • Specialist team and guidance to support reductions in ammonia emissions – £3 million
Other	• Aviation and surface transport: Future Fuels for Flight and Freight Competition – £22 million	• Aviation: investment in the 'future flight' challenge – £125 million • Cross net zero: Investment in the 'driving the electric revolution' challenge – £78 million • Waste: Food waste reduction fund – £15 million • Waste: Plastics and Waste Investment Fund – £20 million

Notes

1 The 'Other' category includes policies related to all other sectors: aviation and shipping, fluorinated gases, waste and greenhouse gas removals. Policies listed under 'Other' also include policies that act across sectors, such as green financing.

2 Our analysis does not include the Prime Minister's recent *Ten Point Plan for a Green Industrial Revolution* (announced on 18 November 2020). This aims to mobilise £12 billion of government investment to create and support green jobs; we estimate that at least two-thirds of this funding has been previously announced and so is already included in the above table.

3 This analysis was carried out by reviewing policy documents, government press releases and other relevant documents from 2017 to the end of October 2020 and recording net zero commitments by sector (it does not, therefore, include the Ten-Point Plan, see above, or the 2020 Spending Review).

4 To bound the data collection, we excluded: policies announced prior to 2017, unless they have been substantially reformed since 2017; policies without a clear aim of contributing to meeting climate change commitments; policies not funded by central government directly (meaning spending commitments announced by the devolved administrations or local authorities is not included); and policies paid for by consumer through, for example, their energy bills (such policies include the Smart Meter scheme, which is forecast to cost £11 billion).

Source: National Audit Office analysis

2019	2020
• Visionary Fusion reactor design programme – £222 million • Development of new fusion facilities – £184 million • Rural Community Energy Fund – £10 million	• Upgrades to ports and infrastructure to support growth of offshore wind capacity – £160 million
• Environmental Land Management (ELM) scheme – £24.95 million in year 2019–20 (rising when scheme replaces EU Common Agricultural Policy) • Cleaner food systems for healthy people and a healthy planet – £47 million • Urban Tree Challenge Fund – £10 million • Woodland Carbon Guarantee – £50 million	• Nature for Climate Fund (tree planting and peatland restoration) – £640 million • Green Recovery Challenge Fund – £40 million
• Shipping: Support for low-carbon maritime technology – £1.5 million • Green Finance: Clean Growth Fund – £20 million • Green Finance: Green Finance Institute – £2 million • Waste: Smart Sustainable Plastic Packaging challenge – £60 million • Waste: Reusing and recycling materials in innovative ways – £30 million • Removals: Greenhouse gas removal technologies – £31.52 million	• Cross net zero: net zero policy development – £10 million • Cross net zero: additional investment in Department for Business, Energy & Industrial Strategy's Energy Innovation programme of at least £495 million • Cross net zero: COVID-19 Sustainable Innovation Fund – £191 million • Removals: Direct Air Capture – £100 million

5 In some cases it was not possible to identify how much of a spending pledge related to net zero itself. For example, the recently announced £5 billion boost for bus services includes funding for zero emission vehicles but as no figure was quoted for this component of the spend it could not be included in the table above. Similarly, some additional funding for active travel is available from the Clean Air and Transforming Cities Funds, but it was not possible to identify how much precisely was for net zero-specific interventions. In some cases, the precise mix of public versus private investment was not clear and these have not been included.

6 This analysis is not necessarily exhaustive but is intended to be broadly indicative of the total government commitment to net zero policies in recent years. There is also a risk that some policies included in the analysis are implicitly included in other policies. We have attempted to mitigate the risk of 'double counting' by carrying out several reviews of the schemes listed above.

7 As a consequence of these limitations, this analysis should only be considered as broadly indicative of government's commitments with regards to net zero but not a precise quantification of how much government has proposed spending on meeting its climate change commitments.

This report has been printed on Pro Digital Silk and contains material sourced from responsibly managed and sustainable forests certified in accordance with the FSC (Forest Stewardship Council).

The wood pulp is totally recyclable and acid-free. Our printers also have full ISO 14001 environmental accreditation, which ensures that they have effective procedures in place to manage waste and practices that may affect the environment.

National Audit Office

Design and Production by NAO External Relations
DP Ref: 007992-001

£10.00

ISBN 978-1-78604-347-4