

Net zero

How government can meet
its climate change target



About this report

In June 2019, the UK government committed to reach net zero greenhouse gas emissions by 2050. But more than a year on, the UK remains off track to meet even its previous, less ambitious target. This report examines the current government's approach to tackling, and preparing for, climate change – as well as the approaches of previous governments and other countries. It assesses what is working and what isn't, and makes recommendations on how government can get on track to meet its target before it hosts the crucial COP26 climate summit in November 2021.

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Summary

In June 2019, the UK government committed itself to cutting greenhouse gas emissions to “net zero” by 2050, meaning the UK would emit no more than it takes out of the atmosphere. In doing so it became the first major economy to enshrine such a commitment in law.

This raised the ambition of the UK’s legislative target, first established by the Climate Change Act over a decade earlier as an 80% reduction on 1990 levels. The UK’s emissions have already fallen by 43% since 1990, largely accounted for by decarbonisation in the power sector and improvements in energy efficiency.

Yet there is still little evidence that the government, and the politicians who waved the new target through with little debate, have confronted the enormous scale of the task ahead.

Net zero means decarbonising not just the power sector but much more difficult sectors including transport, housing and agriculture, where progress has long been stalled and the UK is off track. It means overseeing the biggest infrastructure transformation in 50 years, including upgrading the UK’s draughty and inefficient housing stock, retiring millions of gas boilers, and enabling the entire petrol and diesel vehicle fleet to be taken off the roads. It means finding ways to finance the substantial investments needed to make those changes. It means changes to the way people heat their homes, travel and what they eat and drink. On top of that, governments will need to prepare the UK for the impacts of a changing climate, including hotter summers and increased flooding.

The scale of the task makes the progress achieved so far in the power sector look easy. That success has been driven by successful approaches developed between government and businesses. It has had an impact on electricity bills, but changes so far have barely begun to touch people’s lives. Net zero will not be like that. Governments will need to persuade people to accept and support big, intrusive changes. Some will require upfront investment, and costs will need to be balanced fairly between businesses, consumers and (current and future) taxpayers. In return, those changes will offer substantial benefits: improved health; new jobs in low-carbon industries; long-term savings. But government should be under no illusion about the difficulty of its target, and of securing the public support needed to meet it.

Theresa May – a prime minister who spent little time on climate change in office – bequeathed the target as part of her legacy. Boris Johnson, her successor, must get the UK on track to meet it. That now needs to happen on top of the immediate task of recovering from the coronavirus crisis. And the effort needs to be sustained over 30 years – a minimum of six parliaments – and survive not only changes of government but also profound economic and social changes.

In November 2021, the UK will host COP26, the next big international climate change conference – delayed by a year as a result of coronavirus. The government should use the extra time it has been afforded to show not only that the UK can set ambitious targets but that it also has clear plans in place to meet them and the capability to ensure those plans are delivered.

We identify seven requirements for the UK to achieve its target. The absence of these has been a barrier to progress so far. Together they reflect the unique challenges of net zero: the need for action across all sectors, sustained over decades; the need to make complex and uncertain choices, and manage the interdependencies between those choices; and the profound time inconsistency problem – people must accept upfront costs in return for benefits which, in terms of preventing climate change at least, are distant and general. The requirements are:

- a **coherent plan** based on a thorough appraisal of practical options, which sets out how, sector by sector, the UK will achieve emissions reductions, and which gives businesses the certainty they need to invest
- **consistent** policy and regulatory frameworks in each sector
- the capacity to **co-ordinate** action across the whole of government and beyond
- an approach to minimising the **costs** of transition and allocating them fairly, while maintaining businesses' **competitiveness**
- the **capability** to make key decisions on net zero, develop policies and implement them – including where technology options are uncertain
- a process that builds public and political **consent** for measures before they are introduced and maintains that consent while the transition is under way
- **effective scrutiny** by parliament and other bodies to hold government to account – and minimise the temptation of 'backsliding'.

These requirements will be met only with strong political leadership. A new PM-chaired Cabinet Committee on Climate Change, announced with much fanfare in October 2019, did not meet until early March 2020. Everyone we spoke to when researching this report agreed that government will succeed in delivering net zero only if the prime minister makes clear that tackling climate change is one of his top priorities.

The prime minister has said he wants to secure a 'green recovery' from the coronavirus crisis. That will happen only if net zero becomes a core part of his government's thinking and its economic policy.

The government is now in the process of upgrading its current climate change plan – the 2017 *Clean Growth Strategy*, which set out actions up to 2032. That document fell a long way short of matching the UK's stated ambition. The new 'net zero plan' that the government intends to publish ahead of COP26 cannot afford to: it must outline a clear and convincing path to meeting the target. It needs to set out what is required from each sector and make clear the timetable for change in areas where solutions are already known. Where there is still uncertainty, the plan should describe when, how and at what level decisions will be made – and how government will equip itself to make those decisions. Clear review points, to take account of technological change and correct for measures that are not achieving expected results, should also be set. As the Council for Science and Technology has argued, the government should take what engineers call a 'systems approach', which helps decision makers to manage uncertainty and complex interactions between different systems.¹

Net zero will largely be delivered not by government but by businesses and individuals. But they will be able to make the changes needed only if government gives them sufficient certainty. In the power sector, offshore wind has achieved striking progress and a huge fall in price because the government established a framework, backed up with industrial policies, that provided price certainty and enabled the market to operate efficiently. The UK is now a leader in offshore wind and the government plans to expand capacity from around 10GW now to 40GW by 2030, enough to meet more than a third of the UK's electricity demand.²

In other critical sectors such an approach has been absent. There is no clear plan for transition in housing or transport – areas that will be more testing and that will require action from the public. Policy has chopped and changed; commitments that appear costly have been abandoned. Tax and subsidies for electric cars have been in flux; the Zero Carbon Homes standard was cancelled in 2015, a year before it was due to come into effect; the Green Deal, the coalition government's flagship energy efficiency programme, was abandoned. These changes have left companies – many of whom had made substantial investments – frustrated and distrustful.

The government will be able to develop and deliver a comprehensive and consistent plan only if it strengthens co-ordination at the centre. The Department for Business, Energy and Industrial Strategy (BEIS) is currently responsible for developing a net zero plan and co-ordinating cross-government action on net zero. But it lacks the necessary authority and clout over other departments. The Cabinet Office should take over responsibility for co-ordinating net zero from BEIS, with government plans for tackling climate change led by a senior Cabinet Office minister. That minister should be supported by a new net zero unit.

The new unit would draw staff from the core net zero policy and delivery departments – BEIS, the Department for Transport (DfT), the Ministry for Housing, Communities and Local Government (MHCLG), the Department for the Environment, Food and Rural Affairs (Defra), the Cabinet Office and the Treasury. It would develop shared analysis to support ministers to make decisions; and follow those decisions through to implementation, ‘unblocking’ issues and chasing progress to ensure attention is sustained.

In June 2020, the Cabinet Committee on Climate Change was split into a tighter strategy committee, chaired by the prime minister, and a larger implementation committee, chaired by the business secretary. But the former is missing representatives from two key departments – housing and transport – which should be included. The latter should be chaired by a senior Cabinet Office minister to ensure it has sufficient authority and allow BEIS to focus on its role reducing energy and business emissions.

The Treasury needs to be fully on board to ensure the target is met at minimum cost and maximum benefit to the economy, without harming the UK’s competitiveness. By adopting the target, politicians have implicitly accepted the macroeconomic costs of achieving it. The Committee on Climate Change (CCC), an independent body established in 2008, puts the investment required at around 1–2% of GDP per year (though it argues that the benefits mean it could well be a net gain to the economy).

But ministers have not yet confronted these costs – or decided how to distribute them. In the past, politicians have often ducked potentially unpopular measures that impose costs on specific groups, such as taxes on motorists. In some cases, approaches to financing schemes have not proved sustainable: for instance, solar feed-in tariffs were abandoned because they were seen to benefit better off electricity consumers, who could afford to install panels, at the expense of the general taxpayer. Ministers will need to allocate costs fairly if net zero is to maintain public consent. In many areas, finding the most cost-effective route will rely on creating the right incentives for the market.

The final stretch of the path to net zero – where the most difficult to decarbonise areas will remain – is expected to be the most expensive. Much will depend on the size of the ‘net’ part of net zero, which will be determined by the UK’s capacity to remove carbon from the atmosphere. The UK may choose to retain the flexibility to use carbon offsets – paying for emissions to be reduced in other countries – rather than squeeze the final net emissions out of the UK economy ‘at any cost’. This will depend on other countries not decarbonising.

The core issue of investment and costs means the Treasury, working with the new unit, must play a central role in net zero. Opposition or apathy will prevent any plan from succeeding. It needs to ensure spending, tax and regulation are all consistent with the net zero goal. It should assess its current approach to appraisal and develop tools so that it can ensure projects are compatible with both net zero and adaptation. It should make net zero a theme of the next comprehensive spending review. And it should produce a tax strategy to support the move to net zero, which will need to address the substantial loss of revenue from fuel duty as the vehicle fleet is electrified.

Co-ordination needs to extend beyond central government – net zero and adaptation need to be incorporated into the objectives of regulators and arm’s length bodies who also have a critical role to play. Government needs to provide guidance to regulators on how they are expected to make trade-offs between net zero and costs to consumers and business, as well as other considerations such as secure and reliable energy supply. The business secretary should include reforms to the roles of Ofgem and National Grid in the net zero plan – current conflicts of interest mean many feel they are not fit for purpose to deliver the energy transition.

The next challenge is building the necessary capability – both to make decisions and to execute them. There is a long list of well-intentioned schemes that have been beset with implementation problems, including the Green Deal for home energy efficiency and the roll-out of smart meters. Policies have often been poorly designed, without enough understanding of delivery. Those that involve encouraging the public to make changes have often proved most difficult – incentives have either been too weak to overcome barriers to action, or overgenerous, leading to costs skyrocketing and destabilising about-turns.

The government needs to ensure that it has the science and engineering expertise to make big decisions. Engineering, which is currently underrepresented in Whitehall, will be a particularly important discipline for addressing the challenge of adopting new technologies and integrating different systems, such as transport and energy. Departments should hire more senior specialists in these areas and the civil service should consider creating a climate change and energy cadre in its Fast Stream development programme, enabling those starting their careers to gain experience in a range of areas and types of role related to climate change.

Government should also assess gaps in delivery capability and consider creating the net zero equivalents of the Olympic Delivery Authority to tackle infrastructure challenges, such as housing retrofit and renewable heat. Government also needs to find new ways of supporting local authorities, which have a critical role but lack capability and resources.

None of this can be done without political and public consent for change. Polls indicate rising public concern about the climate, but most people have not heard of ‘net zero’, let alone been confronted with the level of change that will be required of them. Politicians need to communicate much more about the choices ahead – and the government’s net zero plan should include a strategy for public engagement. The climate assembly convened by parliament has demonstrated that the public support action even when confronted with the costs and adjustments they will face. But this needs to happen on a larger scale. The assembly should be the start of a co-ordinated effort to involve the public in decisions about how the economy will be restructured and their lives will change.

The assembly model should be developed into a standing group of citizen advisers on climate change, convened by the CCC, which government and parliament could draw on for advice. In addition, departments should build public engagement and deliberation into their own policy making on net zero, especially in controversial or costly areas.

Finally, government needs external challenge to be kept on track – which means more effective scrutiny. The CCC has been a powerful agenda-setter but it has had less impact through its evaluation of government performance. After it has advised on the government’s sixth carbon budget later this year, it should make its principal focus scrutiny of government performance – on mitigation and adaptation – and recommending specific measures needed by each department to get back on track. Government should assess whether the committee’s current resources are sufficient for this task, and take steps to bolster its independence.

Parliamentary scrutiny needs strengthening too. Climate change debates rarely take place on the floor of the House; CCC reports have often been ignored; departmental select committees struggle to focus on net zero amid other priorities. The loss of the Energy and Climate Change Committee with the abolition of the Department of Energy and Climate Change (DECC) in 2016 led to a loss of a focal point for expertise. Achieving net zero is a cross-government task – to mirror that, parliament must create a powerful net zero committee. There are several precedents to draw on. The committee should utilise the expertise of the CCC and the National Audit Office (NAO).

By committing to the net zero target the government has recognised the threat posed by climate change. But it needs to show it is equal to the task of tackling it, which will make Brexit look easy and coronavirus look temporary.

COP26 will be the UK’s first major outing on the international stage since Brexit. Its credibility as host will depend on showing that not only can it set ambitious targets, but it can demonstrate how to meet them. The UK accounts for less than 1% of global emissions, but by showing others how to achieve net zero in practice, it could help galvanise collective action. The UK will also need to learn lessons from successful approaches in other countries.

When the CCC called on the government to adopt the net zero target, it identified that there was a ‘governance gap’ that needed to be filled if the country was to achieve the huge economic transformation required. This report aims to fill that gap.

Introduction

In June 2019, as one of the final acts to leave a legacy beyond Brexit, Theresa May's government laid a statutory instrument before parliament – a piece of secondary legislation, under the Climate Change Act 2008. After a debate of an hour and a half, the UK became the first major economy to commit itself in law to become a 'net zero' emitter of greenhouse gases by 2050.

Yet again the UK was leading the way on climate change. This track record started with Margaret Thatcher's landmark speech to the UN General Assembly in 1989, marking her out as the first world leader to acknowledge the need for global action to tackle climate change. The UK then became the first nation to set its climate change targets in law in 2008, in legislation that was copied by many other countries. Boris Johnson, May's successor, embraced the target and won the UK the prize of hosting the next big international conference on climate change, COP26, originally scheduled for November 2020.

Net zero was a step change of ambition from the previous target – which had been to reduce net greenhouse gas emissions by 80% from their 1990 level by 2050. The shift followed advice in 2019 from the Committee on Climate Change (CCC), the body set up by the Climate Change Act to advise government. There was little public debate before the revised target was passed, but just a month later the CCC said the UK was still 'off track' to meet its previous less ambitious target.

It is much easier to set ambitious targets than to deliver them. If the government is to be a world leader on climate change, it must close the gap between aspiration and reality. It must demonstrate that it intends to stick with the commitment, or risk losing credibility. That will require a clear plan and difficult (and costly) choices – by government, business and individuals – to transform the UK from an economy powered by fossil fuels to a near-emissions-free economy. That is a much bigger economic decision than Brexit – and will have more profound, long-term effects on the structure of the economy and the way we live our lives than coronavirus.

In this report, we look at how government should approach the difficult choices net zero will require and what governance is needed to give it the best chance of meeting its target. Our focus is on the UK government, though we discuss the role of the devolved governments in meeting their own targets and contributing to the UK's progress. We also look at how the UK can get on track on adaptation – preparing for the impact of climate change itself.

The government needs to be confident it can address the 'six Cs' that have hampered progress on climate change to date:

- Lack of **certainty**: much of the investment required to reach net zero will come from the private sector. Government needs plans for each sector that give investors the certainty they need to make long-term investments, but it will need to do this without locking itself into expensive solutions, which will ultimately harm business and consumers.
- Lack of **consistency** in government policy: achieving the stability needed for transition relies on successive ministers – and governments – sticking with long-term approaches. But UK governments have historically been prone to constant reinvention of policy and regulation. Measures will need to be sustained over three decades – a minimum of six parliaments.
- Weak **co-ordination** across government: decarbonising the economy requires action across all sectors of the economy; the expertise and levers are held by different government departments, arm's length bodies and regulators; and at different levels of government – local and devolved. If government's approach to net zero is to be coherent, all policies will need to point in the same direction.
- Reluctance to address the **costs** of transition: thus far, the revealed preference of governments has been to duck many measures that directly impose significant costs on taxpayers, business or consumers. While the current government has accepted the overall economic case for net zero, it has yet to address how to distribute costs fairly. Businesses will have to bear some costs, but government will need to ensure they are not put at an unfair competitive disadvantage.
- Gaps in **capability**: net zero requires an understanding of technological possibilities and how best to deploy them; the capacity to design effective policy that takes account of what drives consumer and business behaviour; and an ability to oversee large and complex infrastructure projects. These have not always been hallmarks of UK government.
- Lack of public **consent**: there is broad and growing support for acting on climate change, from the school Climate Strike to Extinction Rebellion via the increasing political salience of the environment among voters. But consent needs to be built for specific measures, particularly those that impose costs or require behaviour change. Policy action has been constrained by politicians' views of what the public will accept.

These are the barriers that the government will need to overcome. But it also needs to be subject to effective scrutiny, in parliament and elsewhere. This is essential to incentivise the government to maintain its focus on net zero even when there are other issues competing for attention, something that has often been a problem for environmental objectives. To be effective, scrutiny needs to be rigorous, systematic and attract attention.

This time next year the UK will, hopefully, be recovering from the impact of coronavirus and looking forward to hosting COP26, postponed from 2020. By then the Treasury should have completed its review of net zero, with the government close to delivering its net zero plan. The UK would be in the best position to exercise global leadership at COP26 if it can show that it has a clear plan to achieve net zero. That is a big ask, especially as coronavirus has eaten into the bandwidth to make progress on domestic policy. That said, the postponement has given more time to plan – the government should make good use of it.

We hope the ideas suggested in this report can feed into that work. They build on earlier work by the Institute for Government and draw heavily on new research and more than 50 interviews with people across the sectors involved: officials and politicians at all levels of government, energy and climate experts, businesses and campaigners.

The report is divided up as follows:

- **Chapter 1** sets out the scale of the net zero challenge
- **Chapter 2** looks at the UK's current approach to tackling climate change, and how this approach has evolved
- **Chapter 3** analyses the difficulties that have confronted the UK government to date in delivering on climate change ambitions – primarily on mitigation but also on adaptation
- **Chapter 4** looks at what the UK can learn from other countries
- **Chapter 5** offers our recommendations on how government needs to change to achieve net zero.

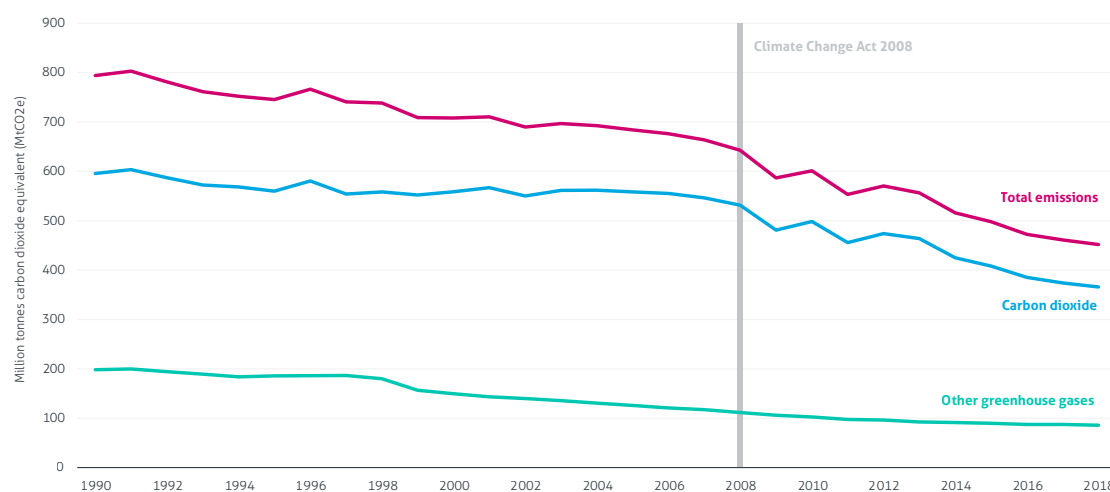
1. The scale of the challenge

Adopting the net zero target is among the biggest policy and economic decisions any government has made in recent decades. Meeting it will require deep changes throughout the UK's economy and society, across all sectors. The transition will require substantial investment and people to change their lifestyles. In this chapter, we examine the scale of the net zero challenge.

The UK has made substantial progress in reducing its emissions

The UK's greenhouse gas emissions* have fallen by 43% since 1990. The initial 'dash to gas' in the 1990s led to a fall in domestic emissions (although that was not its main purpose). But up to 2008, when the Climate Change Act was passed, a large part of the UK's apparent progress was achieved by effectively 'offshoring' emissions to other countries as domestic manufacturing was reduced and the UK imported more goods from abroad.**1 Since then, however, the steep fall has been caused by eliminating domestic emissions.

Figure 1 UK total emissions of greenhouse gases, 1990–2018



Source: Institute for Government analysis of 'Final UK greenhouse gas emissions national statistics', BEIS, February 2020.

This has mostly been driven by a more substantial switch in the power sector away from coal, first to gas and more recently to renewables, coupled with energy efficiency improvements that have reduced demand for electricity. Progress has accelerated since 2012 – and in June 2020, analysis showed that for the first time the UK had completed two months without using any coal power, and that renewables had

* The Climate Change Act 2008 named six major greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. Carbon dioxide, CO₂, makes up the bulk of these.

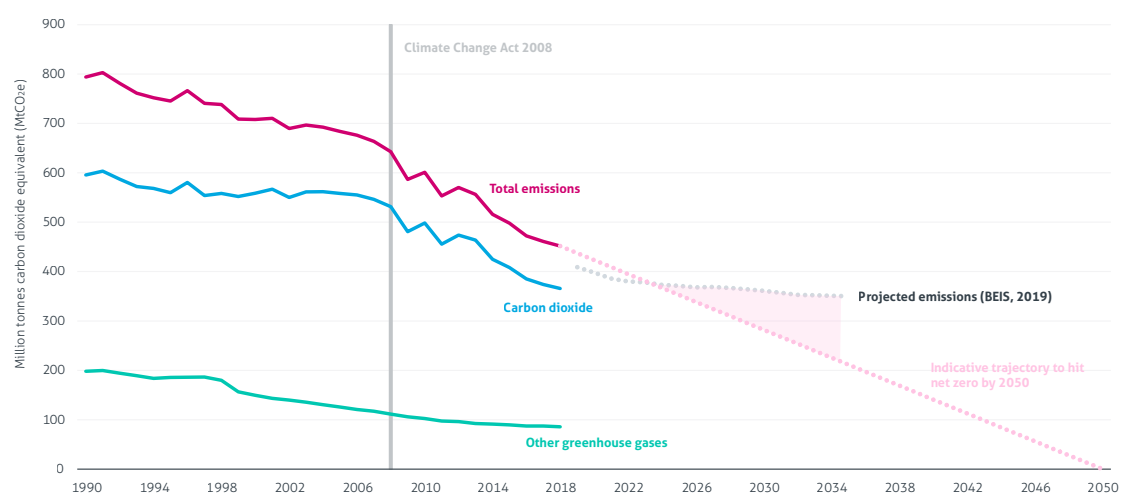
** Between 1990 and 2008, the reduction in domestic emissions was equalled by an increase in 'consumption-based' emissions – which include the emissions involved in producing imported goods. These grew in this period as domestic manufacturing was reduced and more goods were imported. Most countries, including the UK, do not count these emissions in their official targets. But since 2008, the UK's 'consumption-based emissions' have also fallen considerably.

generated more electricity than fossil fuels in the year to date.² The UK's progress in the last decade has been considerably faster than any EU member state – or any other advanced economy.*

But the UK is currently off track to meet its previous, less ambitious 2050 target

Despite this progress, the UK is a long way from being on track to reach net zero. The May government adopted the new, more ambitious target in June 2019 on the basis of advice from the CCC, which had also convened an expert panel to advise on the costs and opportunities of net zero (see Box 1).^{3,4} But the committee's annual progress report published the month after May's net zero announcement showed the UK remained off track even to meet its previous objective of an 80% emissions reduction on 1990 levels.⁵

Figure 2 **UK emissions of greenhouse gases: actual (1990–2018) and projected (2019–35)**



Source: Department for Business, Energy and Industrial Strategy, 'Final UK greenhouse gas emissions national statistics', February 2020, and 'Updated Energy & Emissions Projections: 2018'.

Box 1: The UK's net zero target

In October 2018, the May government asked the CCC to assess whether the UK should set a date as a net zero target in order to meet international climate commitments set out in the 2016 Paris Agreement. The committee concluded a 2050 target was "necessary, feasible and cost-effective" but warned it would require a step change to be "credible". Its judgement was based on a comprehensive assessment of the science and economics – and of the UK's ability to reduce emissions across every sector. The 'net' part of 'net zero' will depend on the UK's capacity to absorb greenhouse gases from the atmosphere, for instance through carbon sinks (such as trees) or through carbon capture and storage (CCS) technologies.

The CCC recommended that international aviation and shipping should be included in the net zero target, and offsets (in effect, paying for emissions

* The IMF defines 'advanced economies' as those with a high level of GDP per capita or a high degree of industrialisation. Investopedia, 'Advanced economies', www.investopedia.com/terms/a/advanced-economies.asp

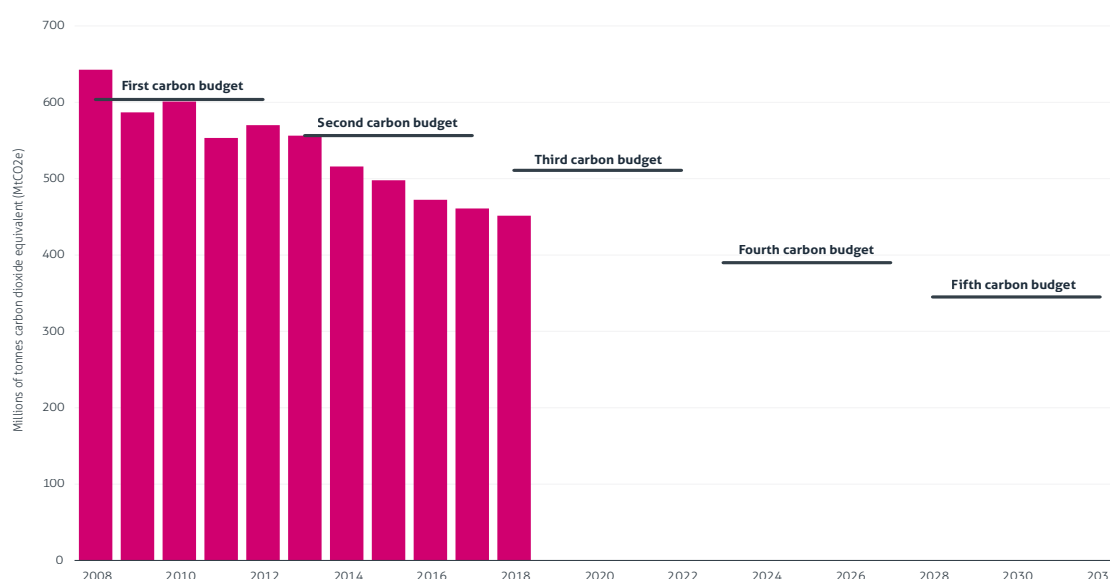
reductions abroad) excluded, if the UK is to be “top of the pile” in terms of ambition. Aviation and shipping have historically been factored into the UK’s carbon budgets, though not formally recognised. The government has so far said that it will “retain the ability” to make up shortfalls on its carbon budgets by ‘buying’ international carbon offsets. Many local authorities, businesses and other organisations have also independently set their own targets; in some cases, however, there is currently a lack of clarity about what is being counted, and how. The CCC also advised the devolved governments separately on their net zero targets, discussed in detail in Chapter 2.

The UK’s current carbon budgets – which set five-yearly restrictions on emissions in line with the UK’s long-term target – are based on the earlier target. As Figure 2 shows, the UK is on track to meet its third carbon budget (covering 2018–22). But according to the CCC it is off track to meet its fourth (2023–27) and fifth (2028–32).

The CCC said there was a lack of policy detail about how the UK intends to carry out low-carbon transitions in the 2020s to meet these targets.⁶ Due to long lead times, of five to ten years, in developing supply chains, it stressed that this gap needs to be addressed urgently or the UK risks missing these targets.

The CCC’s latest assessment, published in June 2020, said not nearly enough progress had been made a year on from the net zero target being adopted. The CCC will provide advice on the sixth carbon budget (2033–37) in December 2020. This will be the first carbon budget to take the UK’s net zero target into account – and the committee said this means it will need to “revise its assessment” of earlier budgets to ensure the “most appropriate path” to the more ambitious goal.⁷

Figure 3 UK carbon budgets and total annual greenhouse gas emissions, 2008–32

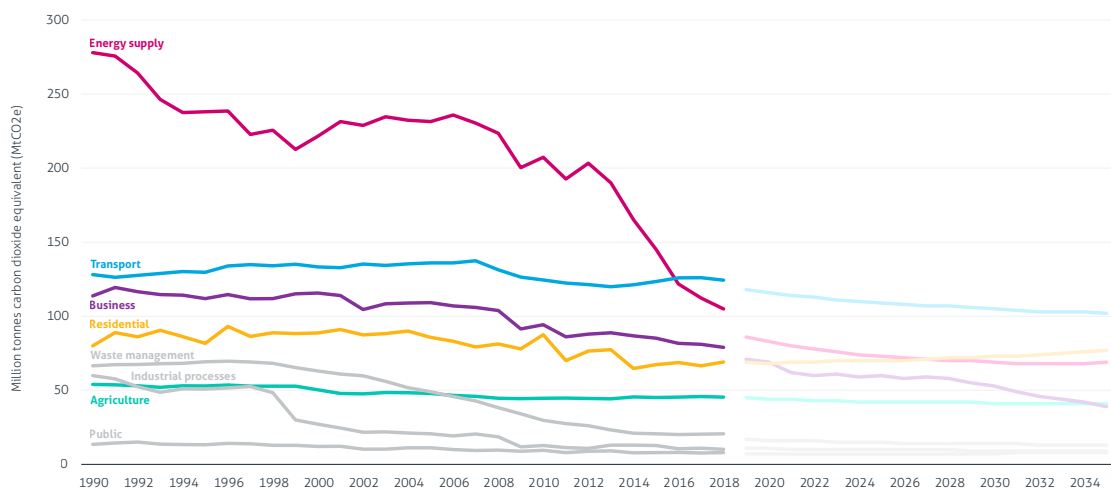


Source: Institute for Government analysis of Department for Business, Energy and Industrial Strategy, ‘Final UK greenhouse gas emissions national statistics’, February 2020, and ‘Updated Energy & Emissions Projections: 2018 – Annex A, Greenhouse gas emissions by source’, May 2019.

Getting on track for net zero will require making progress in the most difficult sectors

The UK is off track because it has failed to make progress in areas beyond the energy sector, with emissions in areas including transport, industry, housing and agriculture all remaining too flat (and projected to continue to do so). Decarbonising these sectors will be much more difficult than the progress made to date. Transitions will be more costly and disruptive, and it will be harder to get the public to embrace changes, while technologies and markets in some of these areas are less mature (compared with, for example, renewables in the energy sector).

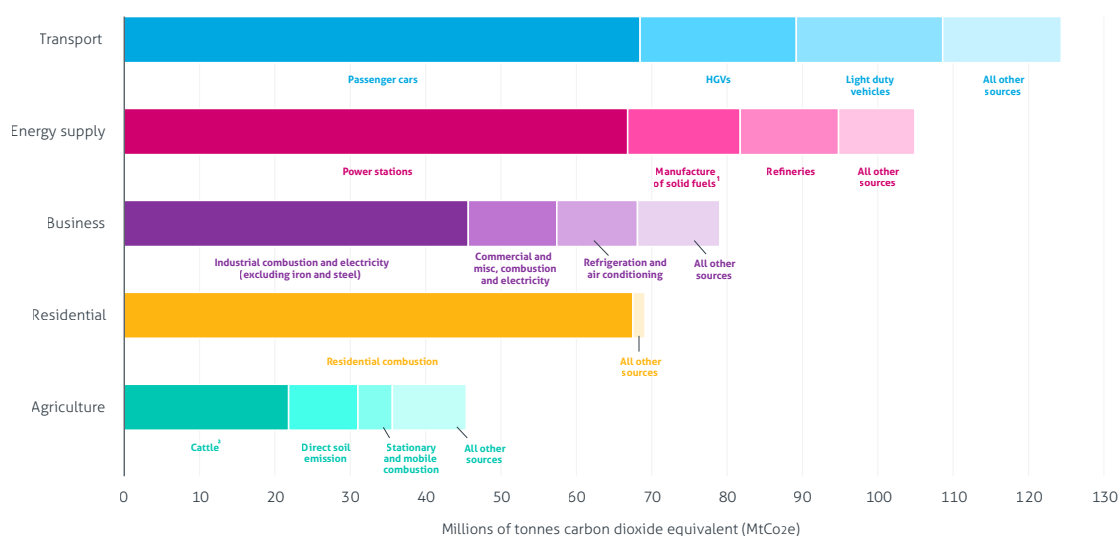
Figure 4 UK emissions by sector, actual (1990–2018) and projected (2019–35)



Source: Institute for Government analysis of Department for Business Energy & Industrial Strategy, 'Final UK greenhouse gas emissions national statistics, 1990–2018' and 'Updated energy and emissions projections: 2018'.

Transport is now the UK's largest source of emissions – and that is before international aviation and shipping are included. Road transport accounts for 90% of the sector's emissions, most of which is from passenger cars (56% of all transport emissions), although heavy goods vehicles make up more than a sixth (see Figure 4).⁸ The central challenge is switching away from petrol and diesel vehicles: there are currently almost 40 million registered cars in the UK, of which only around 300,000 are electric vehicles (EVs).⁹ Government will need to build a nationwide EV charging infrastructure – and adapt the electricity grid to support this. It will also need to encourage the use of public transport, such as trains and buses, encourage the adoption of walking and cycling, and reduce shipping and aviation emissions.

Figure 5 UK greenhouse gas emissions – main sources for largest-emitting sectors (2018)



Source: Institute for Government analysis of Department for Business, Energy & Industrial Strategy, 'Final UK greenhouse gas emissions national statistics', February 2018. Includes other energy industries and enteric fermentation and wastes.

Business and industry have reduced their emissions by around a third since 2008 but are still responsible for around a fifth of the UK's emissions. The government will need to develop policies that get a wide range of different industries to improve their energy efficiency, shift from fossil fuels to electricity or invest in CCS.¹⁰ It will need to do this while ensuring UK companies remain competitive against international firms, to avoid simply pushing emissions to other countries. In areas where decarbonisation creates job losses, it will need to manage the transition and help retrain staff.

Residential combustion – heating and hot water in UK homes – is responsible for around 15% of the UK's emissions, and these emissions have been flatlining for more than five years.¹¹ According to the CCC, more than 85% of the UK's 29 million homes are heated by gas boilers that will need to be replaced; while the UK's housing stock is mostly draughty and inefficient and will need upgrading.¹² New-build homes should be easier to make carbon neutral if government adopts (and sticks to) tough standards. But new builds account for only around 1% of the housing stock each year, so upgrading existing stock is essential to meet the 2050 target.

Several factors make this particularly difficult. While better insulated (and ventilated) homes will produce savings and health benefits down the line, the transition will involve large upfront costs that will need to be paid by a combination of taxpayers, consumers and businesses. Government needs to decide whether actions will be compulsory (for instance, using regulation) or voluntary (in which case it will need to develop incentives to stimulate demand); and it will need to ensure there is a trained workforce capable of supplying upgrades. There is also technological uncertainty about the most cost-effective way to replace gas boilers, which will make achieving an efficient transition across the country more difficult.

Emissions from agriculture have been flat for almost two decades. The CCC has identified ways to reduce emissions from livestock, soils and waste manure management. But it acknowledges that, along with aviation, it is one of the sectors in which it will be impossible to eliminate all emissions by 2050. The UK will need to convert some land that is used for lamb, beef and dairy farming, which is particularly carbon-intensive, to become carbon sinks – areas that absorb CO₂ from the atmosphere, such as forests. Under most scenarios, this will need to be enabled by a dietary shift to lower levels of consumption of dairy and meat products. This is very contentious: politicians will need to make the public case for change, while also reassuring affected communities that livelihoods will be protected. Brexit offers an opportunity to accelerate the agricultural transition – the money that used to support farmers' incomes will now be used to 'pay for public goods', which includes contributing to net zero.

Whatever course the government takes, the public will have a central role and will need to agree to bearing many of the costs of adjustment. They will need to change their lifestyles if the companies that serve them are to make the shift to net zero. They will need to help to pay to replace their boilers and insulate their homes. They will need to fly less, drive electric (or other low-emission) cars and walk and cycle more. They will need to eat less meat and dairy. These changes in behaviour will happen on the necessary scale only with government policies, taxes and regulations that encourage them. But the profound level of change needed in people's lifestyles shows why building public consent and framing a positive vision of the benefits of transition will be so important.

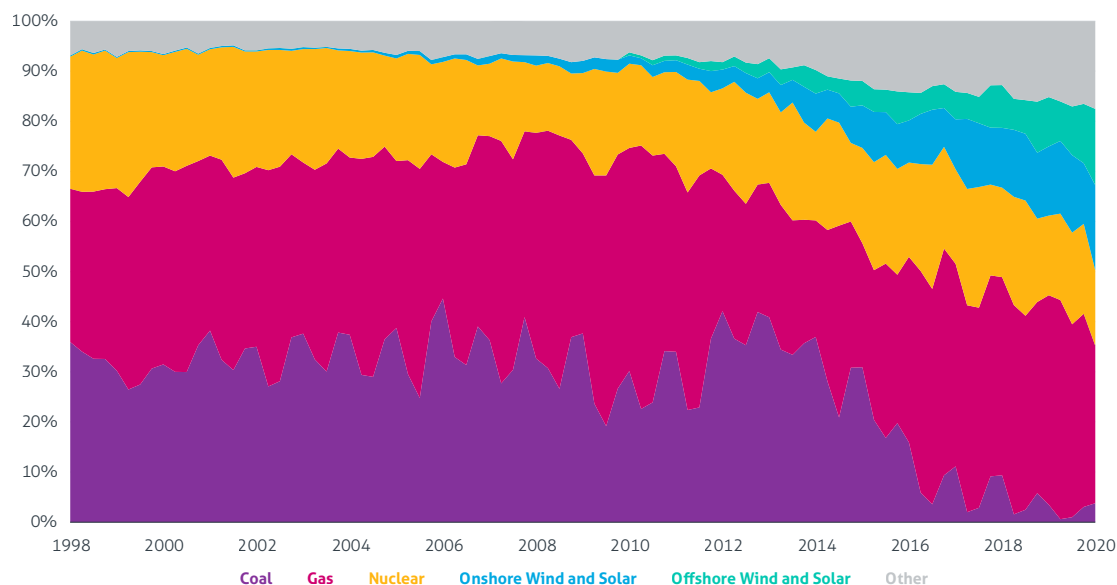
Electricity generation will need to double by 2050

While the energy sector has achieved substantial progress and is on a path to further decarbonisation, it cannot rest on its laurels. It will need to undergo a further transformation in the next 30 years to enable other sectors to switch away from fossil fuels. According to modelling by the Energy Systems Catapult, in almost all pathways to net zero, electricity generation capacity will need to *double* by 2050.* This is needed to support what one interviewee called the "deep electrification of society", including switchovers in transport, industry and housing.

The electricity generation mix will also need to change dramatically, with a large growth in renewables (and a continued role for nuclear) required to complete the move away from fossil fuels (see Figure 5). As well as continuing to expand the UK's growing offshore wind, this will include increases in onshore wind and solar capacity.¹³

* The way the energy sector interacts with transport and heating is an example of why net zero has been described, in engineering speak, as a 'system of systems problem' – meaning that the most difficult problems to resolve will be to do with how different sectors overlap and interact. Energy Systems Catapult, *Innovating to net zero*, 2020, <https://es.catapult.org.uk/reports/innovating-to-net-zero/> Newey G, 'Fixing the system: how to take a systems approach to net zero', Medium, 29 May 2020, <https://medium.com/@guynewey/fixing-the-system-how-to-take-a-systems-approach-to-net-zero-96f62adbcbdd>

Figure 6 UK electricity generation mix by fuel source, quarterly, 1998–2020



Source: Institute for Government analysis of Department for Business, Energy & Industrial Strategy, 'Energy Trends: UK electricity', Table 5.1, 30 July 2020. 'Other' includes: oil, hydro (natural flow), pumped storage, bioenergy, other fuels.

Research by Atkins, an engineering firm, has shown current 'build rates' are a long way behind what is required: for example, the UK is currently building only around 0.2 gigawatts (GW) of solar each year, less than a tenth of what is needed for net zero.*

The energy transition will require a mix of technologies and they will need to be integrated

Increasing renewable electricity capacity alone will not be enough. The grid will also have to be adapted to incorporate a much wider range of technologies, including EVs, heat pumps, storage and demand-side management. These will require more active management at a local level.

Sectors that cannot be decarbonised will need to have their emissions offset with negative emissions technologies, such as carbon sinks and bioenergy with CCS. And owing to the intermittency of renewables, a lack of transmission capacity and low storage capacity, low-carbon electricity will need to be complemented by nuclear and other technologies, such as 'green' hydrogen.

Hydrogen has potential to be an alternative 'green fuel' in areas including transport, heating and industry – with a key benefit that it would be easy to transport and store. It is not yet competitive with existing energy sources, but several countries are investing heavily in it, and some experts believe the price could fall rapidly.**

* Despite costs continuing to fall, solar deployment has dropped considerably from the 'boom years' of 2014–15, due to the withdrawal of subsidy schemes without an alternative plan for financing investment. Beake R and Cole D, *Engineering net zero: the race to net zero*, Atkins, 2020, [explore.atkinsglobal.com/engineeringnetzero/assets/pdf/The%20Race%20to%20Net%20Zero_v7.pdf](https://www.atkinsglobal.com/engineeringnetzero/assets/pdf/The%20Race%20to%20Net%20Zero_v7.pdf)

** Low-carbon hydrogen is an energy vector rather than a source: it is produced through electrolysis – the process of using electricity to split water into hydrogen and oxygen – which means it relies on renewable electricity. The costs of renewable electricity are falling; the other main cost is the electrolysis process, which could also fall in cost as economies of scale are reached. At scale, low-carbon hydrogen is likely to rely on some CCS to be renewable. Nixon S, 'Britain is missing out on hydrogen – the most promising new green technology', *The Times*, 11 June 2020, www.thetimes.co.uk/article/britain-is-missing-out-on-hydrogen-the-most-promising-new-green-technology-x7v3mtn0z

None of these technologies will be a silver bullet; net zero will require a blend of technologies and approaches. The central challenge will be what engineers call 'system integration'. That means joining up all these different technologies and different parts of the energy system (generation, transmission, distribution, consumption); and breaking down silos between electricity, heat and transport.¹⁴

Many changes will require large investments and difficult balancing of costs

Delivering net zero will require substantial investment. The CCC has estimated that it will cost 1–2% of GDP a year between now and 2050, although it could be less than this if innovation exceeds expectations.¹⁵ This cost envelope is the same as what the committee originally predicted meeting the 80% target would require; the rapid fall in the price of renewables led it to adjust its estimate for meeting that target to under 1% of GDP each year.

Major uncertainties make confidently putting a price tag on net zero impossible. For example, it is difficult to predict the speed of innovation in areas such as renewables and battery technology, while much will also depend on how quickly policy and regulation change.

The CCC will provide a more detailed assessment of the investment profile required in each sector up to 2050 in its sixth carbon budget advice in December. So far, it has said the investment required could rise (within its 1–2% of GDP forecast) to around £50 billion per year by 2050.^{16,17} It expects the areas that require most investment to be transport and housing, and the most expensive areas (in terms of the average abatement costs per unit of CO₂) to be housing and industry.¹⁸

When the CCC recommended the net zero target, it judged the target to be necessary (for scientific reasons), feasible and cost effective. It stressed that while there was a substantial investment challenge, the costs to the economy are relatively low, and transition could easily be a net gain to the economy if co-benefits such as health improvements are counted, or innovation helps to deliver growth. Much of the capital investment will have a positive impact on operating expenditure – for instance, EVs are far more efficient than petrol and diesel cars and have lower running costs. Its judgement that net zero was cost-effective was backed by most economists, including an eminent group that advised the committee.*

Some raised concerns, though. Philip Hammond, then chancellor of the Exchequer, warned Theresa May that net zero would cost the UK more than £1 trillion – leaving less money to spend on schools, police and hospitals, and harming competitiveness.¹⁹ The Treasury analysis that underpinned Hammond's letter was criticised by economists and climate experts for ignoring both the costs of inaction and the benefits of action.²⁰

* The CCC set up an Advisory Group on Costs and Benefits of Net Zero, which included a wide range of economic experts, including eminent academic economists, a senior economist from Shell International and the chief economist of the CBI. Elkins P (chair), *Report to the Committee on Climate Change of the Advisory Group on the Costs and Benefits of Net Zero*, Committee on Climate Change, 2019, www.theccc.org.uk/wp-content/uploads/2019/05/Advisory-Group-on-Costs-and-Benefits-of-Net-Zero.pdf; Zenghelis D, 'Zero-carbon future offers great possibilities', *Financial Times*, 10 June 2019, www.ft.com/content/e7b9255c-87a1-11e9-a028-86cea8523dc2

Even if one accepts the overall economic case on the costs and benefits of net zero, as the Treasury now does, £1trn of investment (around £33bn per year, or 1.2% of GDP in 2019, over 30 years) is likely to be not far off the mark. Financing the transition, through public and private means, still represents a substantial challenge. Government will need to work out how to pay for net zero infrastructure and balance costs between taxpayers, consumers and businesses.

The coronavirus pandemic – with the prospect of pushing unemployment to levels not seen since the 1980s and an expansion of government debt expected to be as much as £300bn–£450bn by the end of 2020/21 – has made the public finances much more challenging.²¹ Unemployment and a steep recession will also make encouraging the public to pay for measures such as upgrades to their homes more difficult.

The final stretch of the path to net zero is likely to be the most expensive because it will concern the hardest to decarbonise areas – that is, where it costs most to remove emissions. How much of these emissions the UK can keep – the ‘net’ part of ‘net zero’ – will depend on its success in expanding carbon sinks and developing CCS capacity. The UK may also decide that it is more cost effective to keep some emissions beyond those it can offset domestically through sequestration by using carbon offsets – paying for other countries to reduce their emissions. But this will depend on progress in reducing emissions in other countries. The CCC has said the UK should aim not to rely on these.

Committing to net zero does not let the UK off the hook on adaptation

While the political focus has been on commitments to reduce the UK’s emissions, these emissions have negligible impact on the effects of climate change in the UK, which are driven by *global* emissions. These climate risks are already becoming more apparent – and that trend will continue.

Before the coronavirus crisis, the UK suffered another episode of severe flooding, again demonstrating the devastating impacts that extreme weather can have on communities and businesses. Hotter summers are also becoming more likely, which will affect health, place strain on infrastructure and potentially require extra capacity in the NHS. Water deficits, impacts on the natural environment and increased pests and diseases are also predicted.

Even if the entire world commits itself to net zero, there will still be an increase in climate change impacts in the UK from past and present greenhouse gas emissions. UK average temperatures have risen by about 1.2C to date above pre-industrial levels, and another 50% rise on top of this by 2050 is largely inevitable, with much higher degrees of warming if the world does not move to net zero emissions quickly.²² Substantial action across all sectors is needed to adapt to these changes, and plan for more extreme change. This includes fundamental changes to buildings, infrastructure, agriculture, forestry, health care, conservation and international aid. Businesses need to plan to operate in a different climate, as do banks and insurers.

The government is required to publish a UK Climate Change Risk Assessment every five years that then forms the basis of the UK's National Adaptation Plan.²³ The CCC's Adaptation Committee concluded in its most recent assessment that the government has failed to increase adaptation to match the scale of risk over the past 10 years, and that the country is not even prepared for the relatively modest but inevitable effects of a global rise in temperatures of 1.5–2C – let alone more extreme change.²⁴

2. The current approach

The UK has been an active participant in international efforts to tackle climate change for more than three decades. Responsibilities for delivering net zero are spread across central and local government, the devolved governments and public bodies. In this chapter, we set out how the UK is approaching net zero – and how its approach to climate change has evolved.

The UK has a long track record of international leadership on climate change

Climate change has never been a subject of mainstream party-political division in the UK, unlike in the US. This has been clear from the moment Margaret Thatcher first identified the need for co-ordinated global action to combat climate change at the UN General Assembly in 1989.¹

The UK was a leading player in establishing the UN Framework Convention on Climate Change (UNFCCC), the international process for co-ordinating efforts that followed from the Rio Earth Summit in 1992.² That led to the 1997 Kyoto Protocol, which committed developed countries to cut their emissions by a specified percentage compared to a 1990 baseline, with a target date of 2010.³ In 1997, the incoming Labour government set more ambitious targets for domestic action, which it then struggled to meet. In 2008, it passed the Climate Change Act, which set out a new approach to reducing emissions (described below). Addressing climate change is also a key aim of UK overseas development assistance, though in this report we focus on domestic efforts.

The UK has also consistently lobbied for strong commitments at UN climate change summits – formally known as Conferences of the Parties (COPs) – and uses its diplomatic channels to support this. It supported the French government at COP21 in 2015, at which countries reached the landmark Paris Agreement to limit global warming to 1.5–2C.* Each country agreed to develop a nationally determined contribution (NDC) consistent with this aim.

In September 2019, it was announced that the UK would host COP26 in 2020 – the next ‘big COP’** after Paris. Now postponed until 2021, it is still billed to be the crucial summit at which countries will present their Paris-consistent plans – and scientists agree it is the last opportunity for agreeing concrete action to avoid the worst impacts of global warming.

* At UN COPs, each country agrees to commit to a nationally determined contribution (NDC) that should be in line with overarching agreements.

** While there is a COP held every year, a ‘big COP’ is held every five years and tends to draw more senior engagement.

While the UK was a member of the European Union (EU), it was also part of EU 'burden-sharing' on agreed targets, and bound by other EU commitments, for example on energy efficiency and deploying renewable energy. It influenced the creation of the EU Emissions Trading Scheme (ETS), which helped to reduce some of the competitiveness problems associated with carbon pricing. It is now developing its own scheme, which will come into operation at the end of 2020.

The Climate Change Act established a world-leading governance architecture

The Climate Change Act 2008 established a new system for setting domestic targets and tracking progress, comprising:

- a legal requirement to reduce the UK's emissions in line with a fixed target
- the independent Committee on Climate Change (CCC) to advise the UK and devolved governments on their targets and the policies needed to meet them, and to monitor progress both on mitigation and adaptation
- a system of five-yearly carbon budgets (a restriction on total emissions), set by government 10 to 15 years in advance, based on advice from the CCC.

This system has been copied by other countries including New Zealand, Sweden and Ireland.*

The CCC comprises eight members drawn from climate science, economics, behavioural science and business and is currently chaired by Lord Deben, a former Conservative environment minister. There is a separate Adaptation Subcommittee, chaired by Baroness Brown of Cambridge (engineering professor Julia King). The CCC is supported by a secretariat of around 30 staff and has an annual budget of around £3.5 million.⁴ It reports annually to the UK and devolved parliaments on progress on both mitigation and adaptation.

The Climate Change Act was developed by the Department for Environment, Food and Rural Affairs (Defra). But in a reshuffle before it came into force the prime minister, Gordon Brown, created a new department – the Department of Energy and Climate Change (DECC) – which for the first time brought together responsibility for climate change mitigation and energy policy.

DECC was responsible for international climate negotiations and domestic action; it had to respond to CCC advice on mitigation, agree carbon budgets and ensure the UK was on track to meet those budgets. The lead on domestic adaptation remained with Defra.

BEIS now leads on net zero

After becoming prime minister in 2016, Theresa May merged DECC into the business department, which was renamed the Department for Business, Energy and Industrial Strategy (BEIS). This was part of a wider reorganisation of departments designed to deliver Brexit. BEIS is now responsible for co-ordinating government action on climate

* More detail on the origins of the 2008 Act are set out in our [case study](#).

change mitigation. In 2017, it published the *Clean Growth Strategy* – the most recent cross-government plan for tackling climate change. It is due to publish a 'Net Zero Plan' in 2021. A senior BEIS official also chairs the National Strategy Implementation Group (NSIG), the main official-level co-ordination mechanism for net zero. In February 2020, it was announced that Alok Sharma, secretary of state for BEIS, would also be president of COP26, and so responsible for leading government's preparations to host the summit. Sharma is supported by the COP26 unit, a group of around 300 officials created to support the conference, who are split between BEIS and the Cabinet Office.

Four departments are responsible for sectors producing 80% of emissions

While BEIS leads on climate change, net zero is a whole-of-government target, with implications for almost every part of it. The department is joined by three others – the Department for Transport (DfT), the Ministry of Housing, Communities and Local Government (MHCLG) and Defra – in overseeing sectors that are responsible for more than 80% of the UK's current emissions. None of these four exercises direct control over these sectors: as we set out below, policy levers in each are scattered across government departments, devolved governments, local authorities and regulators. But they do have influence as co-ordinators and enablers, setting and influencing the policy and regulatory frameworks that govern how businesses and the public behave.

- **BEIS** is responsible for the power and gas networks, and the energy sector. It oversees the UK's energy systems, including by setting the remit of Ofgem, the UK's energy regulator. The generation, transmission and supply of electricity and gas are provided by private companies. National Grid, a private company, is responsible for the operation of the electricity and gas systems. BEIS also leads on energy efficiency, including in homes, which means it has responsibility for improving the performance of the existing housing stock, as well as holding responsibility for industrial emissions and business engagement. It leads the UK's industrial strategy, of which 'clean growth' is one of four pillars. It oversees research funding, which includes investment in low-carbon technologies, and publishes statistics on emissions.^{5,6}
- **DfT** and its arm's length bodies set policy and regulation for all modes of transport, including roads, rail, buses, aviation and shipping, and is also responsible for policy on 'active travel' – walking and cycling. In some areas, such as roads and railways, they also invest in and operate services. DfT and BEIS have established a joint unit, the Office for Low Emission Vehicles, which sets regulation and provides subsidies to support the switch from petrol and diesel cars to electric vehicles (EVs).
- **MHCLG** is directly responsible for improving building standards for new homes. It also holds levers that are vital to upgrading the existing stock of housing, including building standards. It is also the lead department on housing supply and on planning.
- **Defra** is responsible for protecting the environment and leads on adaptation. It sets policy for agriculture and land use and is critical to the development of carbon sinks. It also oversees several public bodies with responsibilities related to

mitigation and adaptation, including the Environment Agency, Natural England and the Forestry Commission. It is currently legislating to create a new environmental watchdog, the Office of Environmental Protection (OEP), which will have enforcement powers on the environment and climate change mitigation.⁷

No.10 and the Cabinet Office set the tone and communicate priorities

The prime minister sets the tone for the whole of government in his own statements and the messages he gives to ministers about what their priorities should be. After assuming the role, Boris Johnson reiterated his commitment to net zero. In October 2019, he announced that he would chair a new cross-government Cabinet Committee on Climate Change made up of senior ministers to drive domestic and international progress across government.⁸ In June 2020, No.10 announced this would be split into a 'strategy committee', chaired by the PM, and a 'climate action implementation committee', chaired by the business secretary.⁹ Both cover domestic and international action, and mitigation and adaptation.

The Treasury controls key levers on tax, spending, appraisal and finance

The Treasury has at least four crucial responsibilities relating to net zero. These are tax policy; spending and allocation; project appraisal (via the Green Book evaluation process, which includes assessing projects' environmental impact); and financial services and regulation, including 'green finance'. The Treasury is undertaking a review of 'who pays' for net zero, which aims to take a long-term strategic view of how to minimise costs and maximise opportunities. It is expected to publish findings in 2021.

Two public bodies that report to the Treasury – the National Infrastructure Commission and the Infrastructure and Projects Authority – should have important roles providing advice on how government's infrastructure strategy takes into account net zero, and evaluating projects and building skills. The Treasury is due to publish an infrastructure strategy later in 2020.¹⁰

Other government departments will play a role in managing the transition

Beyond these core departments, other departments will also have a key role in supporting people to develop skills, change jobs and change their lifestyles in ways that will contribute to net zero. The Department for Education – from primary schooling up to further and higher education, and broader skills policy – has a key role in preparing people for lives and careers in a low-carbon economy. The Department for Work and Pensions (DWP) will also have a role in supporting BEIS to plan for job losses in carbon-intensive industries and help those affected to retrain. The Department of Health and Social Care (DHSC) and Defra work with public bodies and local authorities to encourage people to adopt healthier (and more sustainable) diets, for instance reducing red meat consumption.

Mayors and local authorities will help to deliver net zero at the local level

More than 200 of the UK's local authorities have set ambitious net zero targets, although in many cases it is unclear what emissions are covered.^{11,12} The pathway to net zero will vary for different parts of the UK based on their local economy, geography and labour market. Local authorities make planning decisions, while their powers over energy, housing and transport policy vary. They also work with Local Enterprise Partnerships (LEPs) – voluntary partnerships between local authorities and businesses – to promote action on local priorities in areas including energy.

The devolved governments have a key role to play in shaping net zero and in adaptation

Many aspects of mitigation policy and almost all adaptation policy are devolved. Based on the CCC's advice, the Scottish government has set a 2045 net zero target and the Welsh government has set a target of 95% emissions reduction (on 1990 levels) by 2050. Northern Ireland does not yet have a net zero target but the CCC will advise on one over the course of 2020–22.

Each of the four nations faces different difficulties, and opportunities, in achieving their targets. Scotland is the least densely populated country in the UK and has large capacity for on- and offshore wind power generation, as well as for developing carbon sinks such as peatland bogs and forests (although it currently depends economically on its oil and gas sector). Wales has a large agricultural sector, particularly sheep farming, which will require careful approaches to manage the transition. Northern Ireland also relies on agriculture – and is part of an all-Ireland single electricity market, which it will stay part of after Brexit. As in other areas of devolved responsibilities, decisions made in Westminster will affect the ability of the devolved governments to act.

3. What works – or doesn't – in the UK's current approach?

Achieving net zero will require concerted effort for the next three decades. In this chapter, we assess how the current government is approaching this task, and how previous governments have approached climate change.

We identify areas that are working and areas of weakness that require change by looking at each of the 'six Cs' we identified in the introduction:

- the extent to which government has a long-term approach that gives **certainty** to businesses
- the **consistency** of policy and regulation
- government's ability to **co-ordinate** work between different bodies to deliver its plan
- the need to fairly allocate the **costs** of transition, while protecting businesses' competitiveness
- government's **capability** to make decisions; convert those into workable policy and then ensure that those policies are delivered in practice
- how government is engaging the public and building **consent** for actions.

We also assess the effectiveness of scrutiny.

Despite the rhetoric, political leadership is missing

Before addressing these thorny problems, there is one obvious omission that is hampering progress and must be remedied before everything else. In several speeches, Boris Johnson has reiterated his personal commitment to net zero. But in his actions, he has not prioritised it. In October 2019, he announced that he would personally chair a new cabinet committee on climate change: it did not meet until 5 March 2020, three months after the election and five months after its creation. Even before the coronavirus crisis hit, no one we spoke to felt that net zero was a top three or four priority for the prime minister.

Since March, the prime minister has been rightly preoccupied by responding to the coronavirus crisis. But it will be impossible to get on track for an economic transformation as enormous as net zero if it remains only middle ranking on the prime minister's priority list. Net zero will need to be embedded in the UK's recovery from coronavirus.

Johnson is hardly the first prime minister to favour other objectives – in fact, some of those we spoke to questioned whether climate change was really a top priority for any of his predecessors. Chris Huhne, a former energy and climate change secretary, told us: “The PM is crucial: if he or she is committed the rest will follow, but we haven’t had that [with any PM] yet – Thatcher came closest.” Neither Theresa May nor David Cameron made it a feature of their premierships. But that approach is no longer tenable if the UK is to achieve net zero on its own ambitious timescale. Everyone we spoke to agreed that sustained political leadership is a prerequisite.

It is difficult to find parallels for the scale of the task. Reducing rough sleeping – a simpler problem in many ways, though one that nevertheless had complex roots and involved many departments working together – required sustained prime ministerial focus in the late 1990s and 2000s.¹ The response to the 2007/08 financial crisis required dynamic leadership from Gordon Brown in No.10, both domestically and internationally – but that was concentrated in a short timeframe. Recently government has been preoccupied first with Brexit and then with the response to coronavirus – but neither of these have required sustained effort from successive prime ministers over decades.

The lack of a clear plan for decarbonisation creates uncertainty

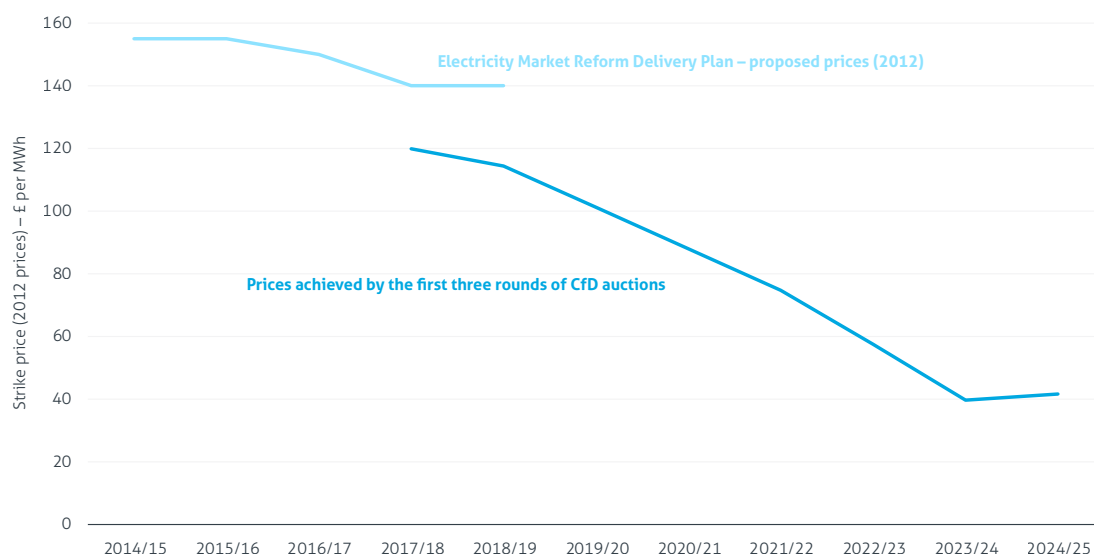
Much of the transition to net zero will be carried out by the private sector, not government – but businesses, investors and consumers need clarity to act. While government has successfully established a framework for transition in power generation, particularly driven by the success of offshore wind, in other critical sectors the pathway is unclear. Successive governments have failed to develop comprehensive cross-government emissions reduction plans.

Progress has been made in the power sector, particularly in offshore wind

The fall in price of electricity generated by offshore wind farms in the past five years – which has enabled plans for a huge expansion in capacity – was highlighted by many of those we spoke to as the UK’s biggest climate change policy success. In auctions held in 2014, the price per megawatt hour (MWh) was £140–£150. At the most recent auction in September 2019, the price was less than £40 (for contracts that will run from 2023/24).

Few predicted such a rapid transformation. It means that, in the early 2020s, electricity will be generated by offshore wind at a lower price than gas-fired power plants. Offshore wind is now at the centre of government’s plans for decarbonising the power sector: capacity will be expanded to 40GW by 2030 – enough to meet more than a third of the UK’s electricity demand – and it could grow to 90GW by 2050.² The CEO of Wind Europe, an industry group, has said the UK is now “the leader in offshore wind across Europe” with the best auction model, allowing for the lowest overall costs to consumers and taxpayers.³

Figure 7 **Strike prices for UK offshore wind projects by year of project delivery, 2014–24**



Source: Institute for Government analysis of Department for Business, Energy & Industrial Strategy, CfD allocation rounds 1-3 auction results, September 2019.

This success has largely been achieved because government established a clear long-term framework and price support within which the market could operate effectively, and accompanied it with a wider industrial and finance strategy to support transition.

Up to 2009, government’s approach was largely technology-neutral. The Renewables Obligation (RO), the main support mechanism for large-scale renewables, provided price support to a range of technologies. But since then, governments have increasingly made a strategic choice to promote offshore wind, having decided it was the most scalable option for decarbonising the power sector.

From 2009, the RO was ‘banded’ to give renewables different levels of support, giving offshore wind and other less mature renewables such as wave and tidal energy an advantage. In 2013, the RO was replaced by Contracts for Difference (CfD),* a system of reverse auctions designed to reduce investors’ exposure to market price risk, while encouraging them to compete to offer savings.⁴ Extra support for offshore wind was preserved, and the government acknowledged there would be limitations to a completely technology-neutral approach.⁵

Alongside these price-support mechanisms, those involved at the time told us there was “a decade of investment, backed up by a serious industrial strategy”. The Crown Estate, which owns offshore territories around the UK, worked to allow access to the seabed; industrial policies were developed to help build up local supply chains – for

* The National Audit Office (NAO) has summarised the way CfDs work as follows: “CfDs fix the ‘strike price’ that generators receive for their electricity for a set period, typically 15 years. A government company, the Low Carbon Contracts Company (LCCC), pays generators the difference between the CfD’s strike price and the reference price (a measure of the average market price). LCCC then recovers these costs through a levy on electricity suppliers. Should the reference price rise above the strike price, generators will pay LCCC the difference, which it then passes on to suppliers. The government expects that these costs and benefits will be passed through to electricity consumers.” National Audit Office, *Investigation into the 2017 auction for low-carbon electricity contracts*, 2018, www.nao.org.uk/wp-content/uploads/2018/05/Investigation-into-the-2017-auction-for-low-carbon-electricity-generation-contracts.pdf

instance through investments in turbine factories at 'green ports' such as Hull – where the jobs created helped build political consent; and the Green Investment Bank helped to open up sources of financing and reduce financing costs.

Many interviewees stressed the point that companies involved in low-carbon transitions such as this need some price certainty, as well as wider support through industrial policy and financing, in order to make the very substantial investments that are required. Lord Turner, the first chair of the CCC, told us that “market-based approaches work, but only when government sits above the market and outlines a strategic plan”.

Michael Liebreich, CEO and founder of New Energy Finance, observed in 2018 that the market often achieves huge changes in a single business cycle (of six or seven years): in the six years prior, coal in the UK had gone from 40% of electricity use to under 5%.⁶ But these sorts of shifts only happen, he said, with stable frameworks in place that allow businesses to act.

While offshore wind emerged as the most viable option to develop at scale, the UK's approach in other renewables such as onshore wind and solar has been less successful. Even with the rapid expansion of offshore wind, both will still be needed as part of the energy mix in a decarbonised power system. Onshore wind, despite being potentially very cheap and having broad public support, has been limited by planning restrictions and strong opposition from Conservative MPs. Small-scale solar was expanded rapidly in the early 2010s through feed-in tariffs, but build rates have since dropped well below what forecasts suggest will be needed.

But other sectors lack a long-term framework for transition

In other sectors – including transport and housing – such a long-term approach, needed to drive change in the next crucial decade, is absent.

In some areas, government has set a long-term goal but lacks detail underneath it that businesses and other players in the system need to be able to plan effectively. In February 2020, the transport department made the decision to bring forward its phase-out date for petrol and diesel cars from 2040 to 2035. This is among the most significant emissions-cutting decisions this government has made, but DfT has still not made clear how it is treating hybrid vehicles in this target. For the 2040 target, they were initially due to be banned alongside petrol and diesel, then not, then included with conditions attached; with the new target many companies face uncertainty yet again (although this will hopefully be clarified in the department's upcoming decarbonisation plan).

Others in the sector told us that while the department had developed various scenarios it did not have a clear set of agreed targets about the speed of the switchover to EVs, which is necessary to plan the roll-out of charging infrastructure and how the electricity grid and storage capacity will need to adapt. There are also not yet developed plans for HGVs or other modes of transport, such as aviation and shipping, although DfT has signalled its intention to address these gaps.

There is no clear vision of how low-carbon transition will be delivered in other sectors, too. On home heating, while the government brought forward some funding as part of its coronavirus response, it does not have a strategy for paying for upgrades on a larger scale, which is preventing companies from innovating and developing potential solutions. The CCC's latest assessment was damning: "Over 10 years after the Climate Change Act was passed, there is still no serious plan for decarbonising the UK heating system."⁷

The lack of clear long-term plans for decarbonisation frustrates investors and businesses. It means they have little certainty on which to base their decisions, and fear governments will be vulnerable to constant churn in policy and regulation as ministers change their minds or succumb to lobbying from different interest groups. Nick Mabey, CEO of E3G, a think tank, argued that reforms in offshore wind succeeded only because the government had a long-term plan that gave ministers the evidence to see off critics.⁸ Other sectors need similar certainty.

It is unclear how government will approach key decisions

In many areas, uncertainty about choices between different technology options appears to be contributing to a lack of clarity. The 2017 *Clean Growth Strategy* uses the word 'uncertainty' 18 times – stressing that "huge uncertainties" about technology underlie key decisions in areas including heating, transport and carbon sequestration.⁹ This is understandable: government should be careful to avoid locking itself into choices that may prove not to be cost-effective (although limited political appetite for difficult decisions may also help to explain a cautious approach).

But those we spoke to felt technological uncertainty did not excuse the opacity about *when* government expects it will take key decisions – and how it will approach making them.

These include critical decisions in specific sectors – how to replace gas boilers; which fuels should be used in our transport system; whether and how much to invest in nascent technologies like tidal and wave power – as well as overarching decisions, such as the extent to which the UK continues to expand its renewable electricity capacity or, following the path of Germany and the EU, begins investing more in developing hydrogen as an alternative power vector.

Interviewees told us the key strategic choice about the latter needs to be made "in the 2020s". But there is little sign that the government has a clear process for approaching that choice – and so far hydrogen pilots have been limited.

The same is true about decision making in specific areas, such as renewable heat. A member of the CCC told us it would be "horribly complex" to work out the right future energy and technology mix for domestic heating. The government has started to run pilots and gather evidence, and a further pilot was announced by the chancellor in July 2020.¹⁰ But these have also been small in scale, and not backed up through wider policies, such as retraining. There will be lots of difficult interdependencies involved in making decisions like this – and government will need good evidence on which to base its choices.

The government also risks undermining what certainty there is already. It has a plan to improve energy efficiency for the poorest households as part of its fuel poverty strategy. But there are signs that energy efficiency is not regarded as a priority by No.10 – reports in June 2020 suggested that Dominic Cummings, the prime minister’s chief adviser, was blocking £9.2bn of funding, promised in the Conservative manifesto, for what he described as “boring old insulation”.¹¹ The chancellor subsequently brought some funding forward, but it remains less than the manifesto commitment.

This may be emblematic of the wider risk of excessive ‘techno-optimism’, which several interviewees warned of in the current government’s approach. There have been other signals that No.10 is more interested in R&D and cutting-edge (but unproven) technologies than more mundane delivery challenges. In June 2020, it decided to invest £100m in direct air capture (DAC), a technology which aims to remove carbon from the sky by sucking air through a large filter.¹²

Technologies such as DAC are undoubtedly exciting and potentially useful (even if some have argued R&D funding would be better targeted elsewhere). But banking on highly uncertain technologies should not be mistaken for a plan for net zero – or a reason to duck decisions or delay urgent action. Even on the most optimistic assumptions of the potential of carbon capture, the UK will still need homes that keep warm in winter, heated as necessary by renewables, and stay cool in summer. There is little time for a blue skies technology option to emerge, be proved to work, and be deployed at the global scale required.¹³

Government lacks a comprehensive net zero plan to join up approaches in different sectors

As well as plans for each sector, the Climate Change Act requires government to publish a whole-of-government plan that draws together sectoral plans and sets out how overall emissions targets would be met. The idea was that such a plan would be published every two or three years and revised more frequently so that it remained up to date.

However, successive governments have failed to keep their overarching climate strategies up to date or develop plans that match up to their emissions targets. The first plan, published in 2008, was *Climate Change: Taking Action*. This set out departmental targets as a way of holding different sectors to account. The coalition government replaced this with the 2012 *Carbon Plan*. But between 2012 and 2017, successive governments failed to update this.

In 2017, the May government published the *Clean Growth Strategy*. It was judged by the CCC to be well short of what was needed to get on track to meet the government’s previous, less ambitious target. In its 2019 progress review, the CCC criticised BEIS for failing to develop the strategy into a co-ordinated cross-government approach.¹⁴

The government is due to publish an updated net zero plan in 2021, in advance of the November COP summit. The building blocks can be individual sectoral plans but they need to be brought together, taking what engineers refer to as a ‘systems approach’ that allows interdependencies to be understood and managed.

A lack of policy consistency has undermined progress

Policy making in the UK is notoriously short-termist. A regular complaint is that incoming governments, or ministers, overturn the policies put in place by their predecessors – and ministers in the UK change jobs frequently. These policy changes, combined with changes to the personnel and institutions making and implementing policy, have undermined the efforts of those implementing policies on the ground.

Climate change policies have been subject to frequent change

Across most of the sectors we looked at, frequent policy churn was highlighted as one of the biggest barriers to an orderly and cost-effective transition.

In transport, the switch to low-emissions cars has also been undermined by chopping and changing the regime for taxing company cars and vehicle excise duty. The level of subsidy for low-emissions vehicles has also been subject to successive cuts. A BEIS Select Committee report in 2018 complained that progress in the UK was much slower than in other countries and concluded that “the current fiscal regime for EVs provides inconsistent messages about the Government’s ambitions for EVs”.¹⁵

The electrification of UK rail over the past 60 years has also been stop-start. Interviewees told us there have been short bursts of accelerated investment, with large amounts of new track completed in ‘boom’ periods in the 1960s, the mid-1970s, the late 1980s and the late 2010s. But these have been interrupted by long delays and periods of little or no progress.

In housing, the often-cited example is the 2015 decision to abandon the ‘zero carbon homes’ standard, originally announced in 2006 and due to begin coming into force by 2016.¹⁶ Ministers at the time, particularly George Osborne, the chancellor, justified this as prioritising increasing housebuilding, but a panel of housing experts at a roundtable agreed there was little evidence it had this effect.¹⁷

In energy policy, David Cameron became increasingly concerned about the effects of what he came to refer to as “green crap”, which included, for example, extra charges on electricity bills to support the deployment of renewables.¹⁸ There was a similar about-turn on CCS. The government appeared to be committed to it but in 2015 Treasury opposition forced the abandonment of the policy.¹⁹ By 2019, CCS was back in favour, with BEIS consulting on possible business models for CCS in the future.²⁰ In the February 2020 budget, the chancellor announced that the government would commit £800m over the next decade to develop CCS.²¹

All these administrations were committed to large reductions in greenhouse gases. But they also had other more pressing priorities. In the wake of the financial crisis, ministers were sensitive to anything that raised costs for households. Departments also often have other bigger priorities that appear to clash with emissions-cutting measures, for example the housing department wanted to enable housebuilding at a lower upfront cost.

Meanwhile adaptation is far from the top of the political agenda – with only periodic boosts to funding for flood defences and preventive measures after severe flooding incidents. The CCC’s 2019 progress report said: “The priority given to adaptation, including through the institutional and support framework in England, has been eroded over the past 10 years.”²²

Constant change leaves businesses feeling ‘burned’

Constant policy reinvention makes life hard for businesses. In fact, this was the number one complaint about government’s approach to climate change from businesses who are members of the Confederation of British Industry (CBI).

Many businesses have been left ‘burned’ by unexpected changes in direction after making investments when a policy framework appeared stable. For instance, housebuilders invested considerable resources in changing building techniques and supply chains and retraining to prepare themselves for the zero carbon homes policy, which largely went to waste when the policy was abandoned. As well as losing taxpayers £100m, the NAO estimated that the cancellation of CCS in 2015 resulted in £80m of losses for businesses, while interviewees told us the decision led to a loss of trust in government.²³

The decision to bring forward the phase-out date of petrol and diesel cars from 2040 to 2035 was welcome from an emissions perspective. But one interviewee said it was a “snap decision” made in No.10, surprising even DfT, which had been given no time to brief or consult with companies in advance. Such an approach to decision making leaves companies feeling “spookable”, as one interviewee put it. It increases their scepticism about future commitments – and policy and regulatory risk is ultimately priced into future plans.

The way in which government engages with businesses does not always help. Some forums are seen as effective. For instance, the Automotive Council – an industry-run organisation made up of senior executives, set up in 2009 – has improved dialogue between government and the sector (although interactions over Brexit have been fraught, which may have set back progress).²⁴ But in other areas, government’s engagement with the private sector was seen as patchy and piecemeal.

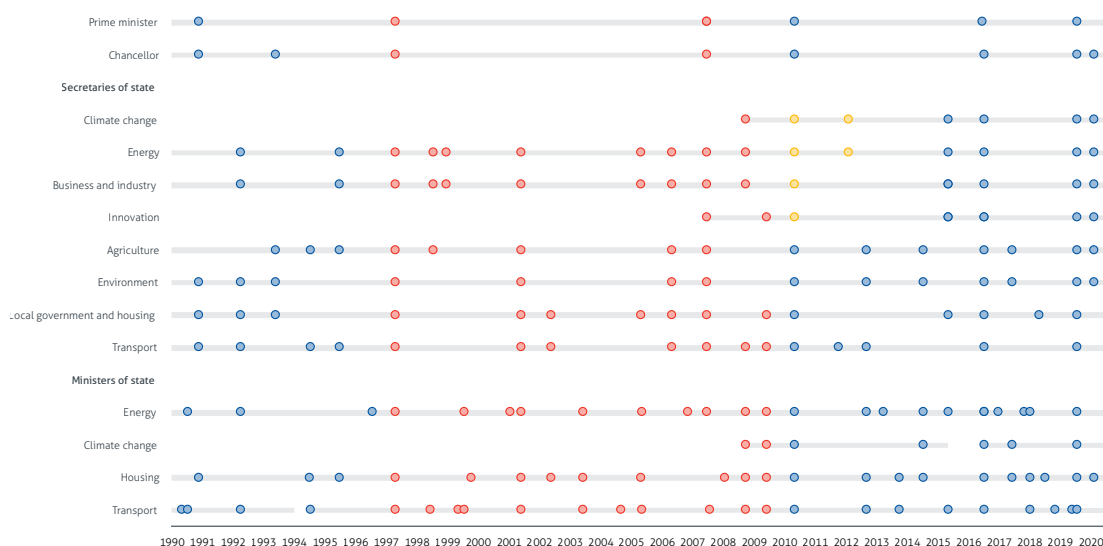
One industry association we interviewed said firms felt government’s approach was generally not well co-ordinated between departments – and it was difficult for companies without a dedicated resource for policy and public affairs to make sense of what was going on or find a route in.

High turnover among people and institutions is a problem as well

Turnover of key personnel – both ministers and officials – and institutions is a perennial Whitehall problem. But it has affected the departments and bodies involved in climate change policy acutely, undermining progress. Ministerial leadership and focus matters particularly in departments in which climate change has to compete with other priorities. But since 1997, there have been 12 transport secretaries, 12 communities secretaries, 11 business secretaries and 10 environment secretaries.

DECC had four secretaries of state over the eight years it existed.²⁵ In key junior ministerial posts, change has also been rapid. There have been nine housing ministers since 2010; the longest serving – Grant Shapps – stayed just over two years; three ministers lasted nine months or less.²⁶

Figure 8 **Turnover of ministers in key posts relevant to climate change**



Source: Institute for Government 'Ministers database'.

The officials advising these ministers also turn over rapidly. Many policy officials stay in post only 12–18 months before moving to a new area, meaning they have little time to get to grips with complex issues. Interviewees recounted stories of entire teams turning over within two years in departments core to net zero. This is borne out in the data: over 40% of the senior civil servants in MHCLG left their roles in 2016/17 (the last year this data was published).²⁷ In Defra it was over 30%. BEIS has struggled with high turnover since it was created in 2017, particularly in policy roles. At one point it offered an £80,000 tender for consultants to help it improve its staff retention.²⁸

The institutions making and delivering policy have been subject to frequent change too. The creation of BEIS appears to have been particularly disruptive. Guy Newey, a special adviser in DECC who became a policy adviser in BEIS, told an IfG event that it led to “a year of lost time”. The decision to abolish DECC was motivated by the need to make space for the new Brexit departments but it was a “rushed process” that left BEIS scrabbling to build a coherent identity around a disparate set of issues.^{29,30}

Arm’s length bodies have also been vulnerable to frequent cuts.³¹ The Energy Savings Trust (EST) and the Carbon Trust – set up in the 1990s as government-backed organisations to promote home and business energy efficiency respectively – were spun out from government in the 2010s. The EST is now a social enterprise. The Building Research Establishment, which played a major role in looking at how to drive up building standards, was privatised in 1997 along with other government laboratories.

The abandonment of the zero carbon housing standard meant the closure of the Zero Carbon Hub, removing an important focus of expertise. Meanwhile, the selling off of the Green Investment Bank led to a loss of expertise in green finance which government is still struggling to rebuild.

The story has been similar for institutions involved in technological innovation. In the mid-2000s, research funding was channelled through the research councils and the Technology Strategy Board (TSB). The TSB was incorporated into Innovate UK in 2014, which itself was then brought under the umbrella of UK Research and Innovation (UKRI), along with the research councils, in 2018. Two years on from its creation, the government now has plans to create another new funding agency modelled on the US Advanced Research Projects Agency (ARPA).

Not all change is bad. But the level of change in policies, ministers and institutions has clearly hampered progress in an area that demands stable long-term approaches.

Government lacks the mechanisms to effectively co-ordinate action on net zero

Net zero cannot be delivered by one department on its own, by one level of government on its own, or even by single governments on their own. Effective co-ordination is a prerequisite of a well-planned transition to net zero.

Climate change levers are spread across Whitehall and beyond – and the co-ordinating departments lack clout

When responsibility for climate change lay in the environment department, the department owned the policy *area*, but few of the levers. When Defra was formed in 2001, replacing it, it took responsibility for climate change mitigation and adaptation, but its portfolio covered only agriculture, waste and some elements of land use.

This problem is not confined to the UK – in fact it was ranked as one of the biggest problems by two studies of climate change governance in countries around the world. One found that environment ministries, which are typically given responsibility for climate change, are “usually among the weakest departments in government”; the second said they often wield little power over other key departments, such as finance, trade and industry.^{32,33} This was certainly true of DECC, which made progress in the energy sector but struggled to influence the business, transport and housing departments. It is also true of Defra on co-ordination of adaptation.

The creation of BEIS allowed trade-offs between climate change policy and industrial strategy resolved internally. Others noted that DECC was a small department with a big agenda – and that merging climate into the newly expanded business department gave it more clout. But, as former DECC secretary Chris Huhne told us, it came at the cost of losing the only voice focused on climate change in cabinet.

Most interviewees agreed that now climate change is not top of the ministerial priority list even in BEIS. Several noted that business secretaries spend most of their time trying to rescue UK businesses under threat – and this is even more likely to be true as the economy is restructured after coronavirus. One estimated that business secretaries might spend, on average, a tenth of their time on climate change.

This is evident in BEIS's single departmental plan (SDP) – documents outlining each government department's priorities. One of BEIS's five main objectives is to "ensure the UK has a reliable, low cost and clean energy system". But the others include delivering the Industrial Strategy, maximising investment and promoting competitive markets and responsible business practices. BEIS's role in co-ordinating action on climate change across government is not mentioned. The SDP also pre-dates the need to deal with the fallout from coronavirus.

Only one of the main net zero departments prioritises climate change

Of the main net zero departments, only Defra's SDP (updated, like those of the others, after the net zero target was adopted in 2019) gives any real priority to net zero:

- **Defra** has historically been a strong advocate of action on climate change – and its four objectives focus on protecting the natural environment and sustainable food production.³⁴ One of its secondary objectives is to mitigate and adapt to climate change, while another focuses on reducing emissions to improve air quality.
- **DfT** has six objectives, covering the reliability of journeys, connectedness and the transport system's effect on the economy and productivity.³⁵ One refers to a "stronger, cleaner, more productive economy"; another to "making transport safe, secure and sustainable". But none of the headline objectives mentions emissions or decarbonisation. The need to invest in technologies that reduce emissions is mentioned briefly (in Section 4.2).
- **MHCLG's** plan has seven objectives that include building homes, supporting local government, strengthening communities and "making the vision of a place you call home a reality".³⁶ None of the objectives, nor any of the actions beneath them, mentions emissions or decarbonisation.
- **The Treasury's** plan does not mention emissions or decarbonisation.³⁷

BEIS struggles to hold other departments to account

BEIS, like DECC before it, struggles to hold other departments to account for emissions reductions in their sectors. Under successive governments, departments such as housing and transport have not been held to account for their poor performance on emissions reduction.³⁸ Even Defra, normally a reliable ally because of the impact of climate change on the natural environment, reined back its actions under Owen Paterson, a climate change-sceptic secretary of state who also cut down its work on adaptation. Without strong and consistent backing from the centre, it is difficult for a department with little clout, such as BEIS, to push other departments to prioritise emissions over other issues.

There was agreement from officials that legislating a commitment to achieve net zero has galvanised departments in a way that the 80% target never did. This may seem odd, given the earlier target was also a legislated commitment, and one on which government was off track. But officials told us that with net zero, departments felt there was less room to “hide”, whereas previously they competed to be in the 20% that did not need to be decarbonised. Nevertheless, it is far from clear that this effect has yet been translated into sustained action, or that departments are being effectively held to account.

The Scottish government appears to have a more effective method. It has developed a ‘clearing house’ for trading emissions between ministers, which has forced the cabinet in Holyrood to confront choices about where emissions reductions will be made (although some cautioned that this process had been made more difficult by over-ambitious sectoral targets).

Net zero and COP26 have led to the creation of new machinery in Whitehall, but co-ordination is still underpowered

The prime minister has created more government machinery to drive action from the centre on climate change, but this does not appear to be functioning effectively yet.

After her dismissal as COP president in February 2020, Claire O’Neill’s leaked letter to the prime minister described the problem. At that point, the Cabinet Committee on Climate Change had still not met, four months after it was announced. O’Neill said that in the absence of the necessary leadership and co-ordination there was “Whitehall knot-tying, infighting and obfuscation”, with “departments fighting internal battles about who is responsible and accountable for COP actions” – including those needed to get on track domestically ahead of the conference.³⁹

Johnson’s revamp of cabinet committees in late June – splitting them into a strategy and implementation committee – created more structures along the lines of committees used to manage the UK’s EU exit in autumn 2019.^{40,41}

Figure 9 **Cabinet committees on climate change, October 2019 to June 2020**

	Climate Change October 2019 – June 2020	Climate Action Strategy June 2020 – Present	Climate Action Implementation June 2020 – Present
Prime minister	Chair	Chair	
Foreign secretary			
Chancellor of the exchequer			
Chancellor of the Duchy of Lancaster			
Secretary of state for business, energy and industrial strategy			Chair
Secretary of state for environment, food and rural affairs			
Secretary of state for transport			
Secretary of state for international development			
Secretary of state for housing, communities and local government			
Secretary of state for international trade			
Secretary of state for work and pensions			
Secretary of state for Scotland			
Minister for business, energy and clean growth			
Minister for Pacific and the environment			

Source: Institute for Government analysis of Cabinet Office, 'List of Cabinet Committees', 29 June 2020.

But the government's preference for tight committees with small memberships means that two crucial departments – housing and transport – are absent from the key strategy committee (although they can be called for specific meetings) which will hamper the ability of this committee to set direction in these areas. In its Brexit preparations, the government suffered from the absence of key departments on its equivalent strategy committee – and it has now expanded the membership of its coronavirus strategy committee to include the home secretary and the business secretary, neither of whom were part of the initial line-up.

While the big trade-offs and choices have to be made by ministers, there is also underpinning civil service machinery, including a National Security Implementation Group (NSIG) chaired by a director general in BEIS. But one long-standing Whitehall insider told us that – before the pandemic – this group met not in the Cabinet Office but in a building 30 minutes' walk away, showing that this is not a central priority. A similar signal is sent by the fact it has a departmental, not Cabinet Office, chair.

Several interviewees recalled that official-level co-ordination and analytical capacity had been stronger during the brief existence of the Office of Climate Change (OCC) – a unit created by Defra in 2006, which provided policy support to help ministers make trade-offs. The unit was established with a separate identity from Defra, specifically to work across government. But when DECC was created the OCC became the nucleus of the DECC strategy unit and lost its cross-government identity.

There are also examples of lower-level joining-up to tackle a shared task. The most notable of these is the establishment of the Office for Low Emission Vehicles (OLEV), which brings together DfT with its responsibility for transport policy and BEIS with the same for the automotive sector. But that model has not been applied in other areas where departments need to act together to reach net zero, most obviously housing.

The Treasury has a critical role to play in joining up departments and policies

The Treasury has traditionally played a sceptical role when it comes to climate change, showing concern about costs and the impact of climate-led actions on the UK's competitiveness. Its critics say it takes too narrow a view of these, which inhibits both mitigation and adaptation (where there are returns to resilience), and that it focuses on costs to consumers and risks to competitiveness, which can make it harder to make the necessary long-term changes.

Under the coalition, there were repeated battles between the Liberal Democrat-led DECC and George Osborne's Treasury. There is a long list of DECC policies and proposals that were rejected by the Treasury, including the idea that it should accept any responsibility for the Carbon Plan, a proposal for clean air zones, and the zero carbon homes policy; the Treasury also decided on the sale of the Green Investment Bank in 2017.⁴²

There have been various attempts in the past to factor 'sustainability' into spending reviews, but the NAO criticised the Treasury after the last multi-year spending review, in 2015, for not doing more to encourage departments to focus on environmental issues.⁴³ The Treasury should have provided clearer signals about how it would treat carbon reduction proposals, engaged more extensively with those planning carbon budgets, and made better use of external expertise to scrutinise departments' proposals, the auditor said.

Economists have also argued that the process for appraising projects given in the *Green Book* – central government guidance on appraisal and evaluation, issued by the Treasury in 2018 – falls short when it comes to climate change. While emissions are counted, they are often priced low compared with other costs and benefits. And there is currently no process for assessing whether government's overall portfolio of projects match its carbon budgets.

In addition, the Treasury has never systematically integrated climate change objectives into other tax policy. It has more opportunistically attempted to raise taxes with environmental credentials, but it has often felt bitten in these attempts.

The Treasury's approach may now be changing, with the government's clear commitment to net zero. In addition to launching the net zero review, it has appointed a new director of net zero to lead its work.

Co-ordination needs to extend to regulators and other arm's length bodies

It is not just central government that needs better co-ordination; government operates through a network of arm's length bodies, including regulators with key roles to play in low-carbon transitions. But they have not yet adapted sufficiently. In some cases, their objectives do not appear to be properly aligned with the overall objective of net zero. Several interviewees thought Ofgem's remit, for example, needed a clearer focus. Its statutory duty is to protect current and future consumers – but that in itself does not help the authority to make trade-offs between affordability now, long-term security of supply and a decarbonised power system.

Ofgem's website now says that its role "is to protect consumers now and in the future by working to deliver a greener, fairer energy system". The current chair and chief executive have used their vague remit to allow a new focus on net zero – but this is not guaranteed.

Some pointed to more fundamental problems with the way key institutions are set up in the energy system, arguing they are not fit for purpose for the transformation required for net zero – particularly when it comes to making key decisions such as between electricity and hydrogen. Responsibilities are currently split between BEIS (which sets overall goals), Ofgem (which is responsible for regulation but also manages capital programmes) and National Grid (which manages the electricity system but also owns and operates other parts of the electricity and gas system). But none has the capacity or incentives to oversee transformation. National Grid has much of the technical expertise, but it has a core conflict of interest due to its role as an operator. As a study by academics at Exeter University concluded: "The current picture of governance is confused, with multiple advisory and regulatory bodies, working to different objectives, overseeing different aspects of the energy system."⁴⁴

... to the devolved governments

Net zero will be reached most effectively by the UK as a whole if the four nations work well together – enabling one another where policies or problems overlap, and learning from one another's approaches. Scotland, for example, has a critical role in delivering the overall UK target through expanding forests and developing CCS in the North Sea. But co-ordination between the nations currently appears to be limited. There is no dedicated forum for engagement between the lead ministers in each of the four nations and policies are developed separately, with collaboration only when essential. This ought to be a regular subject of discussion in revamped intergovernmental machinery – not least to share good practice.

One area the UK government might have learnt from the Scottish government is on how it supports energy efficiency programmes in local government. Over the past five years, Scottish local authorities have been given a capital budget to improve energy efficiency based on population needs. They have to submit regular plans to justify this funding, which central government has supported them to develop, and over the past decade they have built delivery capability. An evaluation conducted in 2019 found the programme had improved results and succeeded in encouraging innovation.⁴⁵

... and to local government

This example from Scotland appears to be a rare case of a central government and local authorities working together effectively on climate policies. More commonly – among both central government departments and local authorities we spoke to – there appears to be frustration that the relationship does not work as well as it could. There is a lot of enthusiasm at the local level for climate action – and many local authorities have translated this into ambitious targets to reach net zero as early as the 2030s. But they mostly do not have the powers, resources or capabilities to ensure they meet these targets. Housing is the key area of emissions at a local level, but several councils we spoke to told us they were entirely reliant on central government coming forward with proposals for financing a transition.

Forums for engagement between the two levels appear limited. Most councils told us they found out about central government policies only when they were announced. For their part, officials in central government questioned capability at a local level (discussed more below) and complained that when they did make funding available or set up pilots, local authorities were slow to respond. It is clear that there is both a lack of capability at a local level and communication between the two levels is poor. In areas with two-tier government, such as rural areas with county and district levels of local government, co-ordination is harder still.

Local Enterprise Partnerships (LEPs) provide space for some co-ordination. However, these have had their funding cut and are dominated by business voices, which means climate targets are not always a key concern. Some local authorities said the coalition's changes to the National Planning Policy Framework – based on a view that excessive red tape was holding back housebuilding and economic growth – had made it much harder to achieve climate change goals through local planning decisions.

Adaptation requires co-ordination too

Adaptation to climate change is highly localised and specific. National government sets the policy frameworks and provides funding but substantial local input is needed. For example, the measures that are required to make the housing stock resilient to both higher temperatures and increased risk of intense rainfall will depend on where the stock is located. They will be different to the measures required to future-proof major infrastructure, protect against potential new diseases resulting from higher temperatures or help schools cope with hotter summers.

The current mechanism in the UK for joining up these efforts is in the National Adaptation Programme, which should address the risks and opportunities set out in the UK Climate Change Risk Assessment (CCRA).⁴⁶ But this was described by interviewees as “too fluffy” with vague commitments not backed up by concrete action. There was fear among our interviewees that the adoption of the net zero target could reduce the focus on adaptation. Most local authorities are supposed to produce their own adaptation plans, but the government currently does little to scrutinise the adequacy of those plans.⁴⁷

Government lacks a clear approach to allocating the costs of transition

While transitioning to net zero will bring substantial benefits, it will also require direct and indirect costs to be met, as people and businesses face the burden of adjustment. A key question facing government is how to distribute these costs fairly. In the past, ministers have often ducked measures that impose costs and some approaches to financing investments have not proved sustainable.

Politicians implicitly accepted the overall cost of net zero when they accepted the target

A critical part of the government's decision to accept the 2050 net zero target was the CCC's assessment of how much it would cost.⁴⁸ As we described above, owing to the rapid fall in the price of renewables the CCC estimated this as within the 1–2% of GDP cost envelope that parliament had already agreed to when it signed up to the 80% target in 2008. The Treasury's estimate of a full cost of £1trn over 30 years would work out at around £33bn per year (or 1.2% of GDP in 2019).

The committee made a wider economic case for this investment, arguing that it could easily produce a net gain in the economy, once co-benefits such as health improvements, increased innovation and reduced running costs (after upfront capital investment) are counted. They also noted that government actions will have a large impact on the overall cost: risks such as "ineffective policy" and "policy delay" could make it much more expensive.

Given that both the CCC and the Treasury highlighted the potential costs, we can assume that by endorsing net zero ministers have accepted these macroeconomic costs. But in many areas they have not yet decided how to allocate them. There are several options.

Box 2: Allocating the costs of net zero

The government will need to choose which measures to take to reach its target. In general, ministers will want to choose measures that minimise the costs and maximise the benefits of net zero. The CCC provides analysis (in terms of average abatement costs) to help inform this, although there will likely be areas where government deviates from this because it thinks certain measures are politically unacceptable, even if they might be cost-effective.

In terms of distributing the cost of measures, government can broadly choose between:

- current taxpayers
- current consumers
- current businesses/producers (which ultimately means the burden is borne by shareholders, employees and/or consumers of their products)

-
- future taxpayers (by borrowing now and adding to national debt that will have to be serviced in the future)
 - future consumers (by guaranteeing future prices).

It is easiest to see the costs when there is a straight financial transaction. But there are also significant indirect costs from the move to net zero, including:

- welfare losses – as consumers have to adjust their behaviour
- negative externalities – the loss associated with, for example, having a wind turbine located close to your home
- regulatory costs – as businesses have to adapt to new regulation, increasing their operating costs
- adjustment costs – for example, as people lose their jobs, have to retrain or move location.

The main benefits of delivering net zero in terms of helping international efforts to tackle climate change are very long-term and will not be felt for more than a generation – and also depend on global action. This is one reason why making the case for upfront investments can be difficult. But it is also important to take account of other nearer-term benefits, such as:

- better insulation allowing people to enjoy more comfortable home environments and reducing death and illness from cold in winter
- the move to EVs and other low-carbon forms of transport improving air quality and therefore health in urban areas
- a diet with less meat and dairy reducing the future burden of ill health and opening the way for other environmental benefits.

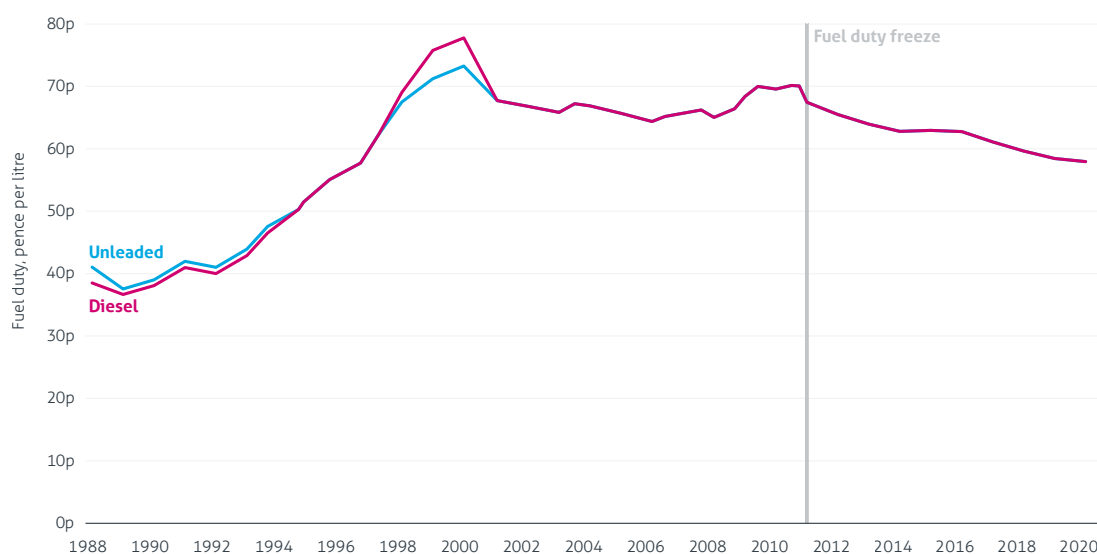
Governments have often struggled to design or ducked policies that impose costs

Governments have proved willing to impose costs in some areas, but these have not always been perceived as fair or proved sustainable. For example, successive governments made electricity consumers pay for the development of renewables and energy efficiency through a variety of ring-fenced obligations. Imposing the costs on electricity consumers could be a more regressive way of raising revenue than through general taxation. In the case of solar feed-in tariffs, those who could afford the upfront cost of solar panels made a substantial return at the expense of the average electricity consumer, which led to the scheme being seen as unfair and abandoned.

The Green Deal, an energy efficiency subsidy programme, was another attempt to find a way to encourage consumers to meet the upfront capital costs of investment. Consumers could borrow for the initial investment and pay it back over time through a surcharge on their power bills. But as we set out above, it had very low take-up because it was poorly designed and the Treasury insisted on a high interest rate that acted as a deterrent.

In other areas, ministers have ducked imposing costs on specific groups where they think it would be politically unpopular. Motorists are a good example. Since 2009, successive governments have frozen fuel duty in nominal terms (see Figure 9). Previously, the policy was to raise fuel duty in real terms to signal to car drivers and car makers that there would be a market for more fuel-efficient cars. The Institute for Fiscal Studies calculated in October 2019 that the freeze means fuel duty has been cut in real terms by just under 20% since 2010/11, at a cost to the Exchequer of around £6bn a year: the cost is even more if compared to previous plans which envisaged raising fuel duty in real terms every year.⁴⁹ This has potentially contributed to the slow decline in transport emissions, as cars have become less fuel efficient. Even with an 80-seat majority and low pump prices, the chancellor avoided any increase in his March 2020 budget.

Figure 10 UK excise duties, hydrocarbon oils, 1988–2020 (April 2020 prices)



Source: Institute for Government analysis of Institute for Fiscal Studies, 'Fiscal Facts: tax and benefits', August 2020.

With EVs, the UK has used subsidies or tax reliefs to reduce the costs to buyers of making the switch – at the expense of the general taxpayer. But as we set out above, repeated changes to the tax and subsidy regime has caused problems for businesses. A regulation, on the other hand, would place the burden on businesses, distributed between their shareholders, their employees and their consumers.

Ministers will repeatedly have to address the issue of costs as they develop their plan for net zero. In some areas, such as housing, government urgently needs a clearer strategy; MHCLG lacks a plan for encouraging homeowners to finance upgrades to the housing stock, which are forecast to cost hundreds of billions over the coming decades. The Treasury is looking at the question of “who pays” as part of its net zero review.

As ministers make choices about costs, they will need to be careful to maintain public consent

To maintain public and political consent, the government will need to ensure it delivers a “just transition”, mitigating impacts on different groups. Spreading the burden in a way that is seen as fair is likely to be crucial to securing support for measures.

Some groups, such as poorer households, will find it more difficult to pay for upgrades – for instance, the retrofitting of homes or the replacement of petrol and diesel cars. The government may choose to address this through specific policy interventions – for instance, requiring electricity companies to offer cheap tariffs to low-income households, or making extra funding available to low-income households for upgrades.

There will be some industries that cannot adjust and some individuals who find their skills redundant. Government will need to target retraining and support to help manage the transition in these areas to minimise the damage caused by the loss of productive potential and avoid a long-term increase in demand for welfare payments. Several interviewees cited as a warning the scarring effects caused on whole areas by the failure to properly manage the transition away from coal mining in the 1980s.

Government will also need to consider how much it is willing to pay for the final tranche of emissions reductions – and what burden it is right to place on UK taxpayers. The CCC suggests that the final 10–20% of reductions will be the costliest, and the government may want to use the option of investing in international credits to deliver cheaper emissions reductions elsewhere rather than straining to squeeze the final emissions out of the UK economy. The CCC suggests this option may come into play only if the rest of the world is not decarbonising.

Ministers will need to protect businesses’ competitiveness

Government will also need to be conscious of the burden on UK businesses and their competitiveness. If it imposes too high costs compared to other countries, it risks simply displacing carbon-intensive economic activity from the UK to other countries – in effect, harming the UK economy while making little difference to global emissions. This will be less of a problem if all countries commit to deep emissions reduction – but it was the concern that the UK may be placing itself at a disadvantage that led the Treasury to insist on a review of net zero if other countries had not followed the UK’s lead.

One solution to this problem is carbon border taxes – a way of imposing a fee on products imported from countries without an equivalent carbon pricing plan. The EU is already proposing a scheme to ensure that its businesses face a level playing field against imports from countries that are not playing their part in reducing emissions. The CCC notes that this is an option for the UK as well as it pursues its independent trade policy.

Government lacks capability to make and implement policy effectively

There will be many complex decisions on the path to low carbon. Government will also need to make and deliver policy effectively across a wide range of areas if it is to achieve the level of change required. In this section, we look at whether government has the necessary technical, policy, commercial and delivery capability in place.

Government lacks the expertise needed to inform key decisions

Net zero will require many highly technical decisions. But interviewees did not feel that government is currently well set up to approach these choices. There is a lack of clarity about when and how they will be made. But there was also concern about the expertise on which decisions would be based.

Ministers will need advice based on deep scientific, engineering and technical understandings of physical systems and technologies. But this capability is notoriously patchy in Whitehall. As Dominic Cummings (and many before him) has identified, arts and humanities graduates are over-represented in the upper echelons of Whitehall, while scientists and engineers are scarce. This is set to continue: just 45 out of 400 generalist Fast Streamers surveyed in 2019 either had a science degree or declared themselves a member of the science and engineering profession.⁵⁰

A broader review of science and engineering capability in government in 2019 found it had been degraded over the past decade, with patchy skills and experience across departments, and reduced expertise as public sector research establishments have been pushed away from Whitehall or sold off.⁵¹ Although most government departments have chief scientific advisers, their clout within departments is variable.

The gap in engineering capability is arguably an even bigger problem for net zero. While climate science is critical to understanding the problem of climate change, engineering is critical to understanding the feasibility of the solutions, and developing the 'systems approach' that is required for tackling such a complex and interdependent set of problems. Several interviewees pointed to the paucity of engineers in government – and argued all the expertise is held in consultancies. A former senior official in DECC told us they struggled to access engineering expertise and at one point had to design a recruitment process from scratch in order to attract the necessary capability.

More recently, BEIS has drafted in engineers from the Health and Safety Executive (HSE) to help inform work on the future of the gas network – an area in which HSE has built up expertise. The Environment Agency has developed engineering expertise on flood defence.⁵² But technical expertise – at senior and junior levels – is not as widespread or well integrated.

Government has often struggled to design policies that work in practice

The big successes of climate policy so far, such as offshore wind, have been where business has been the key actor. But the track record of successive UK governments on policies that require large-scale public adoption does not inspire confidence.

The Green Deal initiative set out to revolutionise the take-up of energy efficiency measures in homes but was shut down after only two years with low take-up, having delivered almost no energy savings. One reason for the programme's failure was that the Treasury insisted on a high interest rate. But policy makers in DECC also had a poor understanding of how to design the necessary behavioural incentives to generate demand for the scheme.⁵³ Interviewees told us that policy makers were warned that the design of the scheme was fatally flawed but went ahead regardless.

The NAO was withering in a 2016 assessment: "[The policy] looked good on paper... but in practice the design not only failed to deliver any meaningful benefit, it increased suppliers' costs and therefore energy bills."⁵⁴ It said the department based the policy on wrong assumptions, failed to test its plans and implemented them chaotically. One former DECC official described the Green Deal as a classic example of Whitehall officials "chucking a policy over the fence to delivery" with little idea of how it would be implemented.

The UK's smart meter programme has been similarly bedevilled by implementation problems. The original SMETS1 design, which the department had resorted to speed up roll-out, would not work if the household changed supplier. A 2018 NAO report concluded: "The facts are that the programme is late, the costs are escalating, and in 2017 the cost of installing smart meters was 50% higher than [BEIS] assumed."⁵⁵ It urged the department "to make sure the team culture does not become defensive, and resistant to inconvenient truths".

These problems are not confined to the UK government. The biggest scandal of all was the huge waste of money in Northern Ireland's implementation of the Renewable Heat Incentive scheme, which even led in large part to the collapse of the power-sharing executive in 2017. The report of the inquiry, published in March 2020, criticises the executive for insisting on a bespoke NI scheme, with limited capacity to design, implement and monitor it – but it too points out the problems of high turnover, lack of expertise and lack of interest as evidence emerged of widescale abuse.⁵⁶

These examples suggest policy teams did not have sufficient grip of the realities of delivery. This is not helped by rapid staff turnover. The workforce model in Whitehall militates against officials developing deep expertise in a policy area, and instead encourages officials to move around to gain experience and promotion (which is often the only route to a pay rise).⁵⁷ But there are also problems with commercial and delivery capability.

Commercial capability and market understanding are crucial too

The government will rely on the private sector to deliver many of its ambitions. This means it will need to shape market incentives. But interviewees said government is not as strong in this area as it should be. Chris Huhne, former energy and climate change secretary, and a former senior official from DECC both agreed that “commercial understanding [of civil servants] was a big gap” during the coalition government. Another interviewee said poor understanding of the energy market was a key factor in the problems with the smart meter roll-out.

There have been improvements in commercial capability in government in the past five years, but it is yet to be properly embedded in policy making.⁵⁸ Getting the market incentives right in areas beyond the energy sector will be very difficult and current officials acknowledged there is more work to do to improve commercial expertise.

Some interviewees felt that government defaulting to relying on the market – as opposed to taking responsibility and controlling the levers itself – made achieving some policy ambitions more difficult. In other countries, governments have taken more active roles. In the UK, this would entail a break with orthodoxy of the past 40 years, although the Johnson government has shown more willingness than its predecessors to reassess where the market has worked, and where it has not.⁵⁹ Taking more direct responsibility would also require government building more capability itself.

Delivery capability remains a big gap

Delivery capability is another continued area of weakness. Often it has not been sufficiently integrated into policy making, as the Green Deal example showed. Net zero will also require some of the largest infrastructure transformations the UK has delivered in generations – including a national retrofit programme, a switch away from gas boilers and the roll-out of EV charging infrastructure. One senior official described these infrastructure challenges as “eye-watering”.

But the UK has historically performed poorly on infrastructure and project delivery. Previous Institute for Government research found reasons for this include that projects are often over-ambitious, poorly planned and poorly evaluated – and that ministers and officials had limited expertise and a poor understanding of risk.⁶⁰ Lack of resources has been a problem on climate projects specifically: a former DECC permanent secretary said cross-government analysis showed it had the second largest delivery programme in Whitehall but only the Department for Culture, Media and Sport (DCMS) was smaller in terms of capacity.

Project delivery has been improving in recent years – particularly thanks to the work of the Infrastructure and Projects Authority, which has rolled out a Major Project Leadership Academy, a training programme for senior officials. Nevertheless, Whitehall still does not have a reputation for overseeing large and complex infrastructure projects on time and budget.

The scale of the delivery task in the coming years suggests this will need to change – and government will need to think hard about how to organise itself for some of the toughest infrastructure projects it faces. A former senior Treasury official told us: “It’s fair to say there is [currently] no delivery mechanism for energy efficiency or heat.”

Capability in local government has been degraded over the past decade

Capability problems extend beyond Whitehall: as noted above, they are also a major barrier in local government. Local authorities lack the resources to match their ambitious targets. Some larger cities, such as Nottingham and Manchester, have retained capacity by keeping a continuous focus on climate policy. But interviewees told us that capability in most local authorities has been “hollowed out” over the past 10 years as a result of austerity, meaning local authorities were “deprived of expertise”.

Jobs in local authority environment departments were often among the first to go – as councils protected more front-line roles. One interviewee said there was now a “severe skills shortage” meaning local authorities lacked the ability to do energy planning or design low-carbon transport systems. In transport, local authorities have several levers: they help to develop local transport strategies, they are responsible for clean air zones (which according to one expert are currently a “fragmented nightmare”); and they control procurement, such as of vehicles used to deliver services, such as waste collection. But low capability makes it difficult for them to use these effectively.

Low capability contributes to problems in the planning system, too. Planning should be a tool for stitching together policies to ensure they work for low-carbon lifestyles. But a planning expert told us local authorities barely have capacity to deal with business as usual, let alone factor net zero into planning decisions.

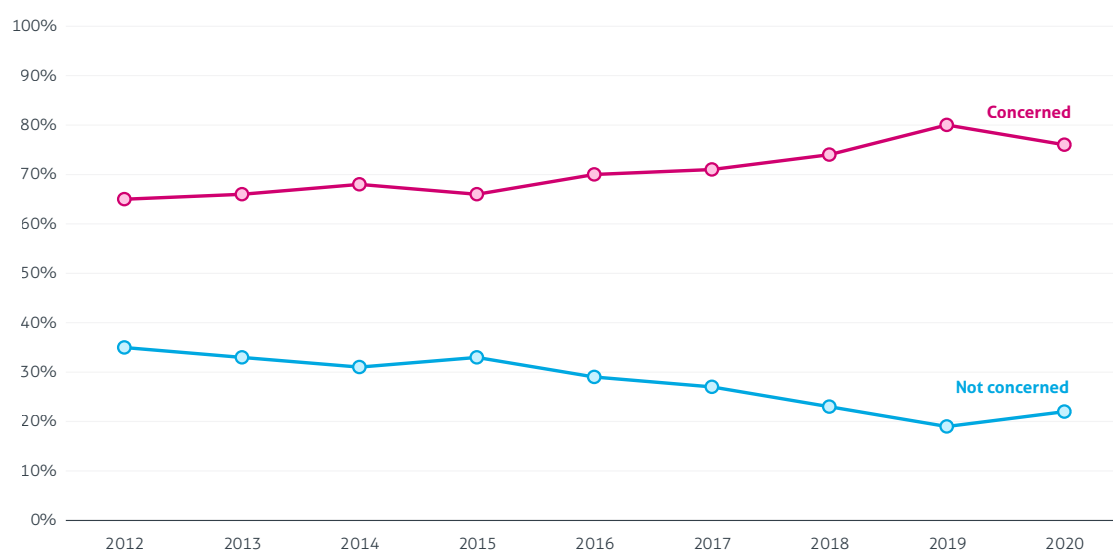
Government needs to build public consent

While the UK has already achieved a substantial fall in emissions, those reductions have barely started to touch on the lives of most citizens and consumers. That is going to change. No sector will be exempt from the transformation required for net zero: the CCC has estimated that more than 60% of the emissions reductions to come require some element of behaviour change.⁶¹ As Rebecca Willis, an expert in climate change and public engagement, told us, for the first time the changes will “go right to the heart of people’s lives”. Building and maintaining support for these changes is arguably the biggest barrier of all to achieving progress.

The public is increasingly concerned about climate change, but polling offers only limited insights

Public concern about climate change and the environment has steadily risen over the past decade. Polling suggests it rose in importance as an issue for voters particularly over the course of 2019, with public attention focused by school climate strikes and Extinction Rebellion protests.⁶² The coronavirus pandemic has led to a small fall in public concern, as issues such as jobs have become foremost in many people’s minds. But recent polling suggests that most people want a “green recovery” from coronavirus and think this is compatible with a rapid recovery.⁶³

Figure 11 UK public concern about climate change, 2012–20



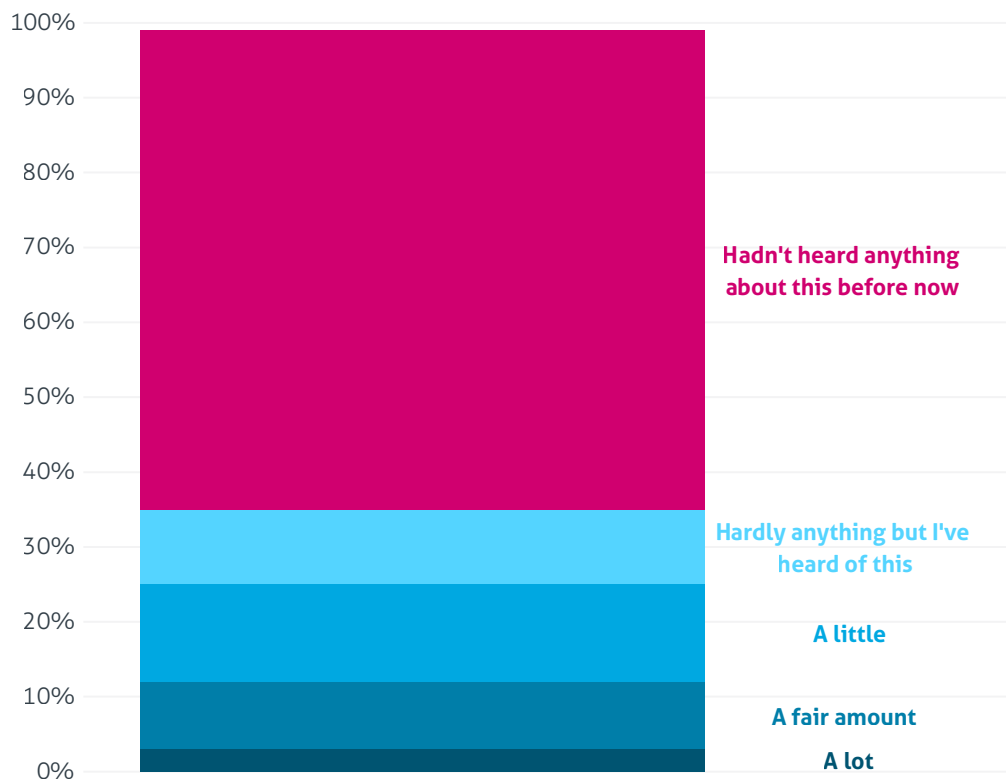
Source: Institute for Government analysis of Department for Business, Energy & Industrial Strategy, ‘BEIS Public Attitudes Tracker: Wave 33’, 7 May 2020. Question 21: How concerned, if at all, are you about climate change, sometimes referred to as “global warming”?

However, most polling on climate change has only limited value because it does not present respondents with real choices, for instance weighing benefits (such as preventing climate change as well as longer-term savings or cleaner air) against possible detriments (such as costs, lifestyle changes or disruption). When polling does do this, the framing is often crude and unhelpful – for instance, some polls ask the public if they would prefer to address climate change or protect the economy and jobs; in reality, these goals are not mutually exclusive.

But government needs to build public consent for specific actions

Net zero was in every major party's manifesto, and politicians can claim to have "latent consent" for it. But there was minimal discussion of hard choices or their impacts at the 2019 general election. And as Figure 9 shows, almost two thirds of people have never heard the term "net zero".⁶⁴

Figure 12 **UK public awareness of the concept of "net zero", March 2020**



Source: Institute for Government analysis of Department for Business, Energy & Industrial Strategy, 'BEIS Public Attitudes Tracker: Wave 33', 7 May 2020. Question 220: The Government promotes the concept of "Net Zero". Before today, how much, if anything, did you know about this concept?

Research has found that politicians often underestimate the importance that voters place on addressing climate change.⁶⁵ One study showed politicians consistently overestimate opposition to onshore wind: only 2% of the population strongly opposes onshore wind, but more than half of MPs believed the level of strong opposition was more than 20%.⁶⁶ This needs to change as the government develops more detailed plans for action. Communicating with the public more will help ministers to better understand public preferences, both broadly and on specific issues.

Public engagement will also help government to avoid policies failing due to a lack of popular legitimacy. This is common when policy makers forgo public engagement in controversial or complex areas. It has disrupted everything from the reconfiguration of hospitals,* to finding long-term solutions to the storage of nuclear waste,⁶⁷ to proposals for nationwide road pricing.⁶⁸ Government will need to develop a detailed strategy for engaging the public with serious choices about how the economy will be restructured and their lives will change.

* High-profile campaigns have halted A&E closures at the Whittington (2010), Lewisham (2013) and Trafford (2014).

The UK parliament's climate assembly shows what is possible, but it should be only the start

The recent climate assembly, convened by six House of Commons committees, provides a template for engaging the public with the choices involved in reaching net zero. Its initial results are very promising, but it needs to be learned from and embedded in government's and parliament's approach.

The assembly set out to take a group of members of the public, provide them with testimony from experts and key stakeholders and information about the costs and benefits of different options, as well as what changes would mean in practical terms for their lives, and then ask them to make recommendations.⁶⁹ A group of 100 members were chosen from more than 30,000 people who were initially invited to apply. The group was representative of the UK population and its views on climate change: around 20% were not concerned with climate change and sceptical of the need for action, in line with the polling cited above.⁷⁰

An interim report was published in June 2020 setting out some of the assembly's initial views.⁷¹ Its key finding was that 79% of assembly members agreed or strongly agreed that steps taken to help the economy recover from coronavirus should be designed also to help achieve net zero. In addition, 93% agreed or strongly agreed that government should continue to encourage more sustainable lifestyles as the lockdown was eased, even when they were informed about the costs and disruption this could impose on them. The interim report also included anonymised quotes from the discussions, which showed broad support for net zero while noting concern about protecting jobs and managing the impact of transition.

The assembly's final report, which will include more detailed sector-by-sector recommendations, will be presented to parliament in September 2020. It is set to provide detailed insight into the preferences of citizens on how to deliver net zero having been fully briefed on the options. One of the key benefits of such an exercise is the data it produces, which can then be used by policy makers, parliamentarians and expert committees. But it should be only the start – the approach needs to be made standard practice for public engagement by government and parliament. The first test for this government will be how it responds to the report's recommendations.

Central government can also draw on expertise developed at the local level. Local government has been holding citizen juries on climate and environmental policies for over a decade. Several local authorities we spoke to – including in Nottingham, Bristol and Waltham Forest (in London) – said deliberative processes had formed a key part of their approach to policy making. The local level has become a key outlet for public enthusiasm to address climate change. This is one reason why it is important to address the co-ordination and capability problems that are holding back local efforts – or else this enthusiasm will turn to disillusionment as aspirations cannot be achieved.

Building political consent for net zero policies is essential, too

The actions required for net zero need political consent, too. There is widespread support across parliament for net zero, particularly among younger MPs. A good example of the attitudes of the younger generation of MPs is Simon Clarke, the 35-year-old Conservative MP for Middlesbrough South and East Cleveland first elected in 2017, who is now housing minister. In September 2018, Clarke organised a letter signed by more than 130 backbench MPs indicating support for net zero and stressing opportunities for UK businesses, including in the north-east.

Nevertheless, interviewees including senior officials felt ministers and many MPs are still only just beginning to get to grips with the scale of change required. Onshore wind remains difficult for many Conservative MPs, while industry decarbonisation is tricky for some Labour MPs. Politicians across the house remain wary of imposing new costs on motorists by switching to EVs, while the fuel duty freeze has been kept in place partly as a result of what a former secretary of state described as an “incredibly well organised lobby”, led by Robert Halfon and other Conservative MPs.

Several interviewees felt the public was “ahead” of politicians in some areas – as shown by the study of onshore wind cited above – and that deliberative processes could help close the gap. Policies that have geographically concentrated impacts need political and public consent to be built, locally and nationally.

The success of offshore wind also offers an example of the importance of thinking about how to build political consent as part of the policy process. There were concerns in the early 2010s that much of the benefit of a switch to offshore wind would be reaped by German and Dutch manufacturers (who produced much of the technology used) but these were allayed by industrial policies which helped domesticate more of the supply chain, and as a result gained the support of MPs who were concerned with developing low-carbon jobs.

Scrutiny of the government on climate change is too weak

Effective scrutiny will be vital to both net zero and adaptation. It increases the political price of poor performance. The CCC has been an effective agenda-setter, but its impact on performance outside BEIS (which is also its sponsor) and on adaptation has been less strong. In parliament, net zero has been given insufficient attention, and scrutiny by different committees is not joined up.

The CCC has had more impact through advice than on government’s performance

The CCC has established itself as an authoritative and influential player. Its recommendations for carbon budgets have been accepted; as was its proposal that government adopt the net zero target. It has managed to maintain its independence despite being an executive non-departmental public body (NDPB) of the department responsible for climate change. It has attracted big hitters with scientific, business, economic and environmental credentials.

Where it has had less impact is when it reports that the government is off course. The CCC has repeatedly said in its reports that the government is off track on a large number of policy actions, and in entire sectors critical to transition, such as housing and transport. The 2019 assessment was fairly typical: government was off track on 24 out of 25 policy actions that the CCC had identified the previous year.⁷² But these warning shots have been repeatedly ignored. This is partly due to lack of political prioritisation, weak co-ordination and accountability and other problems we have described in this chapter.

But it is also not helped by the 'call and response' format of interaction between the committee and government established by the Climate Change Act. The phrasing of the Act means the government has to respond to CCC advice on carbon budgets "as soon as is reasonably practicable". Successive governments have taken this to mean around two years, but this has often left little time for governments to then set out how they will deliver these targets and the CCC to scrutinise those proposals. As already noted, successive climate change plans, when they have eventually been published, have typically fallen a long way short of setting out how government proposes to meet the targets it has set. This means the CCC lacks a concrete set of commitments against which it can hold the government to account.

The CCC can point to some areas where it has influenced actions on adaptation such as funding for flooding in the post-coronavirus recovery plan and linking future drought risk to the water meter roll-out. But it has been unable to prevent broader backsliding on commitments from successive governments. The CCC itself is comparatively under-resourced on adaptation with only four people in the secretariat working to support it compared to more than 20 on mitigation.

The new Office for Environmental Protection (OEP), which will be established once the Environment Bill becomes law, is intended to fill some of the 'governance gap' left by Brexit. It will have some of the enforcement powers that currently reside in the European Commission but it is not yet clear how the OEP will use those powers, nor how it will co-ordinate with the CCC.

Parliamentary scrutiny of government performance on climate change is weak

Scrutiny of net zero in parliament – both in parliamentary debates and by committees – is also limited. Parliament devotes very little time on the floor of the House to climate change and does not pick up on CCC reports in a regular way. Last year the only substantive debate was on an opposition day motion to declare a climate emergency. Some MPs say that they are reluctant to appear like zealots – but even so this is surprising given the scale and significance of the transformation to which government is committed.⁷³

This means what scrutiny there is largely takes place on the committee corridor – but this too is fairly weak, particularly since the merger of DECC into BEIS. Select committees follow departmental lines, so the BEIS Select Committee now leads on scrutiny of climate change, but also covers the many other areas in the department's portfolio.

The table below highlights the change. In the final year-long session in which it existed, the Energy and Climate Change committee initiated 16 inquiries on energy and climate change topics. Since then, such inquiries have made up between a third and a sixth of the BEIS Select Committee’s work (although the one inquiry initiated in the current session is a comprehensive look at domestic and international policy). The relative lack of scrutiny is an inevitable – but possibly unintended – consequence of the abolition of DECC.

Table 1 **Departmental select committee inquiries into energy/climate change issues**

	Non-energy and climate change	Energy and climate change
2020 session (BEIS)	6	1
2017–19 session (BEIS)	13	7
2016–2017 (BEIS)	8	2
2015–2016 (ECC)		16

Other committees should have an interest too. But those that cover areas such as housing and transport have yet to dedicate specific inquiries to looking at the implications of net zero. Few committees have held hearings with the relevant department to follow up the findings of CCC reports. Both the Environment Audit Committee and the EFRA Select Committee undertook inquiries on adaptation, but other committees did not focus on this, despite it being a significant issue for other departments. These would have signalled parliamentary and political interest to ministers.

The Environmental Audit Committee was established in 1997 as a public accounts committee for the environment partly to address the cross-cutting nature of environmental issues. But it has never lived up to that billing. Mary Creagh, its former chair, noted that while the NAO has developed considerable expertise in environmental measurement, and the EAC’s scrutiny had led to improvements in some government departments, such as the Ministry of Justice, environmental audits still receive scant political and media attention.

4. What can the UK learn from other countries?

Countries around the world are grappling with the threats posed by climate change. Many have also set net zero targets. In this chapter, we highlight lessons from seven countries: Germany, France, Norway, Finland, Sweden, Ireland and New Zealand.

Approaches cannot necessarily be easily transferred from one country to another. The challenges countries face in meeting their targets vary considerably: New Zealand and Ireland both have major livestock sectors, while Norway's economy relies heavily on oil production; Finland is highly forested, which partly explains its ambitious 2035 target, but politicians there are concerned about the social impact of extensive energy taxation. German policy makers have to confront the interests of their established car manufacturers; in France, officials are concerned about relying on individual behaviour change – and have seen how divisive climate action can become.

There are also big differences in political culture, such as the degree of cross-party consensus or public trust in experts, and in the capability of government at different levels. Nevertheless, much can be learned from comparing approaches.

Other countries have also put a legal framework around climate action

Most of the countries we looked at have established a legal framework for tackling climate change: whether it is the *Loi Energie et Climat* (2019) in France,¹ based on the 2017 national climate plan, Germany's *Klimaschutzgesetz* (climate protection law) in 2019,² New Zealand's Climate Change Response (Zero Carbon) Amendment Act 2019,³ or Sweden's Climate Act 2017, which requires government to report progress to the Riksdag (parliament) every four years.⁴ Ireland's new coalition government, elected in February 2020, has said it will bring forward a climate action bill that will set a target of halving emissions by 2030 and reaching net zero by 2050.⁵

Although the UK can point to its world-leading position in legislating first on legally binding targets, it has not had any recent primary legislation on climate change. It updated its target in 2019 through secondary legislation, which means that it is well over a decade since MPs had a consequential debate about climate change.

For EU member states, national targets have to be aligned to meet EU commitments – which as of 2020 focus on 2030 rather than 2050. The EU will discuss raising its commitment ahead of COP26 as part of discussions on the European Commission's proposed 'Green New Deal'. Commitments in EU law carry more certainty than those in domestic law: they need the consent of the EU27 to be changed and the Commission (backed up by the European Court of Justice) has enforcement powers. For remaining member states, they have more force than purely domestic commitments enforced by domestic oversight bodies.

The downside is that the EU can be slow to act, needing to achieve the agreement of a qualified majority of member states for action. This means progress has often been constrained by the interests of influential member states (such as Germany blocking tougher regulations on vehicle emission standards) while all can be locked into policies which may be overtaken by technological change.

Wherever lead responsibility lies, political leaders need to signal that climate change is a top priority

The lead department on climate change varies between countries. In most cases the lead on climate matters is a dedicated environment department. The exception is Finland, where this responsibility lies with the Ministry of Economy and Energy.

But in all cases climate change is seen as a cross-departmental issue. Interviewees stressed the importance of the head of government putting their personal weight behind climate change efforts. In Germany, we were told that Chancellor Angela Merkel had signalled that climate action was a priority for the Kanzleramt (federal chancellery). In Sweden, the minister for the environment and climate is also the deputy prime minister.

In France, President Emmanuel Macron chairs the Ecological Defence Council, which meets three to four times a year to take big policy decisions. He appointed Nicolas Hulot – a big-hitting environmentalist described by one interviewee as “France’s David Attenborough” – to the post of minister for ecology and inclusive transition in 2017 and charged him with leading on climate change (although this was possibly more about appearances than prioritisation: Hulot resigned in 2018, complaining he was being ignored).

Mechanisms are needed to co-ordinate cross-departmental activity

Leadership from the top is necessary but not sufficient for progress. All countries have to confront the same challenge as the UK – that tackling climate change has to go beyond the lead department. A consistent message was that departments must be held responsible for making their contributions to the national target – whether for 2030 or 2050.

In Norway, the ‘climate cure plan’ is co-ordinated by the environment agency, but is a result of a process where individual agencies develop their own plans to form part of the plan, looking at low-, medium- and high-cost plans for abatement. That bottom-up process led to the development of Norway’s first two plans – with a high degree of cross-party backing – in 2008 and 2012. A third round is under way.

... and to assure progress

Ireland modelled its governance structures on the UK’s Climate Change Act, but it has now gone further. It has established a Climate Action Delivery Board within the office of An Taoiseach (the prime minister) composed of permanent secretary-level officials to oversee the delivery of the detailed Climate Action Plan, which lists more than 180 actions and specific measures. The group meets quarterly and publishes progress reports – and there is a parallel group at director general level to handle the detail.

The legislation makes each minister responsible for the performance of their department – with an obligation to buy offsets if they fail to deliver the carbon budgets set for their department by the environment ministry. The Climate Action Bill, which the new coalition government has said it will bring forward in the Oireachtas (the debate chamber) as a priority in the current Dáil (parliament), will enshrine this system of ministerial accountability into law.⁶ In Germany we were told that its environment agency is good at evaluation – looking backwards – but less good at setting the agenda, which the UK’s CCC excels at.

Ways have been found to integrate climate considerations into policy decisions

Accountability for carrying out departmental plans is one way of ensuring that departments play their part. But there is always a risk that other policy decisions do not take proper account of the implications for climate change. The Swedish government’s climate action plan, published in December 2019, incorporated a commitment to review all relevant past legislation and objectives for their compatibility with the new plan.

In New Zealand, since November 2019 all policy proposals going to cabinet have to have a climate impact policy assessment.⁷ The government also publishes the papers going to cabinet as part of its more general approach to transparency – so its compliance with this requirement can be easily monitored.

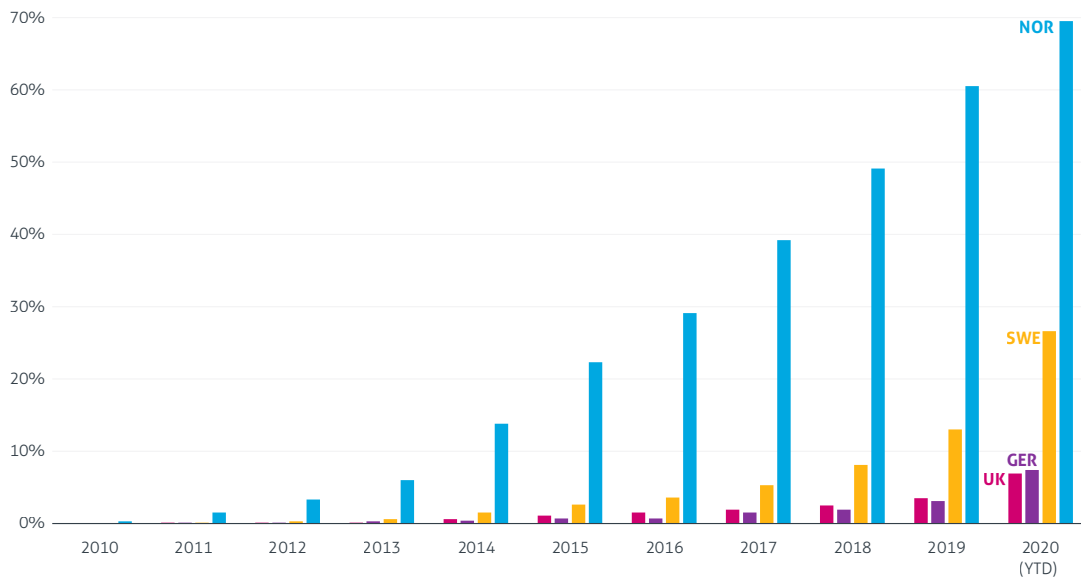
Some countries have used fiscal instruments to drive change

In no country we looked at does the finance ministry lead on climate change. But where the UK Treasury has, in the past, been regarded as a brake on ambition, Scandinavian countries have made more use of fiscal policy to drive change.

In Finland, which has what it describes as a comprehensive approach to energy taxation, the finance ministry is included in the list of departments that have to produce plans to show how they will achieve net zero – and that plan has to include action on taxation. This is an area the UK Treasury has traditionally been reluctant to subject to any significant interdepartmental discussion.

In Norway, the use of tax incentives has been critical in rapidly accelerating the switch from internal combustion to electric cars in the past decade. The country now has the highest penetration of EVs in its fleet in the world.

Figure 13 **Electric cars as a share of all new car registrations in UK, Germany, Sweden and Norway, 2010–20**



Source: Institute for Government analysis of European Alternative Fuels Observatory, Vehicles and Fleet Statistics, European Commission 2020.

Sweden also makes extensive use of carbon taxes, while the centrepiece of Germany's new climate protection plan is the introduction of carbon pricing for heat and transport from 2021.⁸

State investment banks play an important role in financing transitions

In several countries, state investment banks have helped to increase the supply and reduce the costs of green finance. In Germany, for example, the state investment bank KfW has played an important role in financing both renewables and energy efficiency programmes. The UK was building this capability and expertise in green finance through the Green Investment Bank (GIB) before it was abolished in 2015. There were reports in July 2020 that the government is considering recreating the GIB.

Ireland and France have tried citizens' assemblies as ways to gain public consent

The Irish government's climate change action plan came out of a citizens' assembly that ran from 2016 to 2018. This is one of several such exercises, and has helped develop some expertise in large-scale public engagement exercises. After months of debate, members voted in favour of a raft of ambitious policy measures including increasing the carbon tax, taxing agricultural emissions and building resilience for adaptation.⁹ The Irish government has used the springboard of that citizens' assembly to develop and build support for its plan.

In France, Macron established a citizens' convention on climate. This was part of his response to the *gilets jaunes* protests that were triggered by his increase in fuel duties to meet France's commitments under the Paris Agreement. He committed to submit the convention's proposals "without filter" either to a referendum or a vote in parliament, or to implement them directly.¹⁰

In June, the assembly presented its recommendations, which included changes to the law to embed opposition to “ecocide”, changes to tax, and banning flights where a train journey of four hours or less could be taken instead. Macron rejected three proposals but agreed in principle to take most forward (though none is yet agreed or implemented). Several members of Macron’s government made vocal their opposition to measures proposed by the assembly before the parliamentary debate has begun. As Claire Mellier-Wilson, a climate change academic who observed the assemblies in France and the UK, has said, this raises difficult questions about how deliberative and representative democracy interact.

Some countries have focused on managing the transition

In Germany, a coal commission has been established to help badly impacted regions adapt to the consequences of the decision to wind down the coal industry and the simultaneous move away from nuclear, although there was frustration that the government chose not to accept all of the commission’s recommendations, as had been expected.

In New Zealand, the government has established a Just Transition Unit in its business department. Its initial focus is on working with one region – Taranaki – which will be highly impacted by decisions on the future of oil and gas. The government held a Just Transition summit in 2019 and emphasises that it is working in partnership with the Maori community, who have a large population in the region. The New Zealand government regards managing a “just transition” as key to maintaining “social licence” to tackle climate change. Similarly, in France the ministry responsible for climate change has “inclusive transition” in its name.

Local government is being supported to play a positive role

In Germany, the Länder (states) play a critical role in the country’s climate change objectives. They are consulted and have some levers over federal policy making and take a lead in implementation. In Norway, the government has established an infrastructure fund for cities to bid into – but a condition of applying is that their bids have to be net zero. In France, a key implementation body for energy efficiency is ADEME, which has lots of regional offices. It runs energy efficiency programmes locally, so has much more understanding and engagement with local issues.

Lastly, in Ireland the government set up a network of four Local Authority Climate Action Regional Offices (CAROs) in 2018. Each has a lead local authority and the objective is to “enable a more co-ordinated engagement across the whole of government and will help build on the experience and expertise which exists across the sector”.¹¹ These offices focus on both mitigation and adaptation.

5. How government can achieve net zero

There has been much discussion of how government and the civil service needs to change, or be 'rewired', to address shortcomings identified by the coronavirus pandemic. The government sees this as crucial to meeting central parts of its agenda, such as 'levelling up'. A change of approach is also needed if government is to meet another of its targets – getting the UK on track on climate change – and use the post-pandemic moment to accelerate a shift to a low-carbon economy. In this chapter, we set out our recommendations on how government needs to change to achieve net zero.

Net zero needs to be embedded into the UK's recovery from coronavirus

Net zero cannot be left until after the UK has recovered from coronavirus. The investments government makes to help the economy bounce back from the deepest recession since records began will influence the trajectory of emissions for years to come. After the 2007/08 financial crash, as with many previous recessions, a global dip in emissions was quickly erased as many countries chose carbon-intensive investments as a route to faster growth.¹ There is broad consensus among economists that this time should be different.

The Committee on Climate Change (CCC) reviewed studies as part of its 2020 progress report, finding strong evidence that 'green stimulus' measures such as housing retrofit would be among the most effective ways to create sustainable jobs and growth across the country.² Many countries, including the UK, have already committed to implementing such measures to help reach net zero.

Distinguished economists Professors Lord Stern and Joseph Stiglitz have argued that recovery packages can "either kill these two birds with one stone – setting the global economy on a pathway towards net-zero emissions – or lock us into a fossil system from which it will be nearly impossible to escape".³ The World Bank has proposed that countries assess projects already required under mitigation and adaptation targets against factors including the impact on regional jobs creation.⁴

The prime minister has acknowledged the force of these arguments, saying he wants the UK to secure a "green recovery" from coronavirus. The chancellor, in his July mini-budget, brought forward a £2 billion Green Homes Grant and £1.1bn for retrofitting public buildings.⁵ He announced a new taskforce, Project Speed, which would focus on how to "build back better, greener, faster" (even though other budget measures, such as a £27bn Road Investment Strategy, seem to go in the other direction).

But the green stimulus measures announced so far are smaller than those announced by other countries, such as Germany and France, outlined in the table below.

Table 2 **Key green stimulus measures in selected countries**

Country	Key measures
Germany	<ul style="list-style-type: none"> • €130bn recovery package targeted at low-carbon industries, including: <ul style="list-style-type: none"> • €40bn for transition in the energy sector (of which €9bn will support low-carbon hydrogen) • €8bn for electric vehicles (EVs), doubling the current subsidy • €7bn for rail and public transport.⁶
France	<ul style="list-style-type: none"> • €15bn of extra funding announced for “ecological conversion of the economy” targeted at clean transport, housing renovation and future industries (also in response to suggestions by the French climate assembly)^{7,8} • Environmental conditions attached to €7bn bailout for Air France, including that domestic flight CO2 emissions must be halved by 2025 • Paris to create 650km of cycle routes.
Canada	<ul style="list-style-type: none"> • Requirement for large businesses that apply for loans to publish climate disclosure reports consistent with a specified standard annually, including stating how they will contribute to national climate targets.⁹
New Zealand	<ul style="list-style-type: none"> • \$1bn for “nature jobs” focused on the regions, including pest and weed control operations and biodiversity projects.¹⁰

Not only has the UK committed less funds to green measures, its plans are also less ambitious in terms of setting a path towards net zero. Several countries, such as France and Canada, have attached ‘green strings’ to bailouts to signal shifts that will be expected in corporate and consumer behaviour. Germany has gone so far as to place a large bet on hydrogen as part of its coronavirus recovery (and the EU is discussing proposals to do the same). Germany published a new national hydrogen strategy alongside the funding, with the stated aim of becoming a world leader in hydrogen and using the technology to drive economic growth.¹¹

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- **The Treasury and the Project Speed taskforce should assess which of the decarbonisation measures the UK has committed to already would have greatest impact on economic growth and job creation and prioritise those measures in the coronavirus recovery plan.**

Government needs to develop a comprehensive net zero plan

To get on track for net zero, the plan the government publishes in 2021 needs to be comprehensive and clear. It must give businesses and individuals the certainty they need, and government should put in place co-ordination mechanisms to ensure its implementation. That will require a level of leadership that has not been seen to date – and which BEIS will struggle to provide.

The government needs a comprehensive net zero plan well in advance of COP26

A clear plan does not mean every step can be filled in between here and 2050 – there are major uncertainties and the UK will need to recognise this and continually adapt to these. But as the CCC's 2020 progress report shows, most of the critical decisions need to be taken in the next few years, with investment largely completed by 2035. The latest report provides some of the key building blocks for that plan, namely a set of immediate actions departments need to take by the end of 2021 and a list of required changes in each sector.

The box below sets out components that a plan should include if it is to be as comprehensive as possible and provide clear signals about the UK's approach.

Box 3: A plan for net zero

The starting point for any comprehensive net zero plan needs to be a clear view of the emissions picture for each sector. This should show the gap between the current trajectory and net zero by 2050. This will take account of government's assumptions about carbon sequestration capacity. Government will also need to make clear what is counted in the net zero target, establishing a consistent definition of 'net zero' to ensure efforts by different bodies add up.

For each sector the plan should seek to answer the following questions:

- What (if any) emissions reduction will be delivered on current trends?
- How much additional effort is needed to close the gap to a net zero trajectory?
 - What are the available options? How much do they rely on demand- versus supply-side interventions?
 - Where solutions are known, how can take-up be ensured and on what timescale?
 - Who is expected to do what and do they have the necessary capability? If not, how can those gaps be filled?

- Where solutions are not yet known, when does government need to be able to make decisions, and what does it need to know to make them (e.g. on proof of technology, feasibility of deployment)? What is the timescale for those decisions?
- Who needs to be involved in making decisions and ensuring delivery?
- How will the costs of specific measures be distributed and what will the wider impact of measures be (for instance on jobs)?
- How much public support do measures have? How will the public be involved in decision making and how will measures be communicated?
- Do different parts of government and public bodies have the necessary powers and resources to take decisions and implement measures?
- What does the overall sectoral plan look like when individual measures are brought together? Is that acceptable in terms of cumulative burdens and sequencing? If not, how should it be adjusted?

The next stage is to bring the sectoral plans together into a single net zero plan – which may then require more iteration of the sectoral components. At this stage, policy makers will need to ask:

- Does the overall plan add up? Is it acceptable in terms of cumulative burdens and sequencing? Is the overall investment profile manageable? Is it feasible in terms of, for example, grid capacity, skills availability and the distribution of costs and benefits to specific groups?
- Where might advances in technology change priorities about which areas to decarbonise and when? Which areas risk not delivering emissions reductions as fast as hoped? How should the plan be adapted if this happens?
- How far does the plan fit with the government's wider agenda? Can it be made to fit better with other goals, such as 'levelling up' and the 25-year environment strategy?
- How do other plans need to be adjusted to support the net zero plan (and increase the benefits or reduce the costs) such as industrial strategy, skills strategy, or the coronavirus recovery plan?
- How far is the UK relying on offsets to deliver net zero, particularly when the most expensive areas remain?

The final stage is to set out how progress at critical points will be monitored to ensure that the UK is on track. There also need to be review points to look at whether the plan itself needs improving.

The aim of the plan should be to develop clear sector by sector 'roadmaps' that provide a framework for government action and resource allocation, but also give other key bodies, regulators and private businesses a clear basis for planning. These roadmaps need to highlight critical dependencies and choices that ministers need to make – though where possible the aim should be, as with offshore wind, to develop the right framework and let other actors respond. They also need to make clear where further investment, or more research, is needed.

These roadmaps need to be co-developed with those who will ultimately have to carry out the changes on the ground, while guarding against the inevitable bias and greater lobbying power of incumbents. Businesses, local government and key public bodies need to be involved from the start.

The lead in developing each sectoral plan should come from the lead department for each sector – but they will need to be brought together to ensure interdependencies between sectors are managed and departmental proposals are properly stress-tested so that the UK has a plan that adds up. Such a central function is vital to the 'systems approach' that engineers have identified as suited to net zero.

The UK's current plan, the 2017 *Clean Growth Strategy*, reads more like a list of (probably desirable) measures to promote a low-carbon economy rather than a comprehensive strategy with a clear plan to achieve net zero sector by sector.

To be fully comprehensive the plan should incorporate adaptation planning as well – this will be important in infrastructure planning and construction, which need both to be zero carbon but also adapted to cope with future climate change.

- **The net zero plan the government intends to publish ahead of COP26 must be comprehensive and contain credible commitments that put the UK on track for net zero. It needs to set out what is required from each sector, a timetable for change, and how decisions will be made in areas where there is still uncertainty.**

BEIS lacks the authority to develop a comprehensive net zero plan and assure it is delivered

There was agreement among most of those we spoke to – including former senior officials and secretaries of state – that BEIS lacks the clout and authority to develop a plan in the way described above and ensure that it is delivered. The consensus was that the push to net zero required much greater impetus within government: the prerequisite was political leadership from the top, but more powerful structures were needed at the centre to support that.

We heard several proposals for change. Some argued for a new super-department for net zero, which would see all the key sectors brigaded together under a single secretary of state. Others thought climate change would always be a cross-government endeavour and it was not worth the inevitable disruption of a machinery of government change. A former secretary of state noted the loss of an "Oliver Letwin figure" – the former minister for government policy in the Cabinet Office who was highly influential and "able to knock heads together" in the Cameron administration.

Our view is that the key is to complement departmental capacity with a strong centre to drive change – and to have the Treasury as a critical partner. To be effective that central function would need to be designed from first principles.

The centre of government needs both capacity and authority

The scale of the challenge of net zero requires official and political capacity at the centre to:

- analyse and present choices and trade-offs to ministers to enable them to set the strategy for addressing problems
- draw those options together into a coherent plan to achieve net zero, bringing out the dependencies between sectors
- oversee enactment of the plan, to make sure each department – and the government as a whole – is on track to meet its commitments, and to amend and update as circumstances change.*

The re-creation of shared analytic capacity would mirror some of the initial activity of the Office for Climate Change established by David Miliband in 2006. While that sat in Defra, it was deliberately designed to ensure that it was not seen as 'of Defra'. People were recruited from across government and beyond, and it established a distinct ethos. This enabled it to be seen as shared capacity for the whole of government, not pushing a departmental line. That approach would help ministers to make some of the big calls on net zero.

The second capacity, as we described above, is to pull together individual decisions into a coherent plan. That means that the central mechanisms need to be able to challenge every department to draw up a suitable plan for their sector. A bottom-up approach of ad hoc commitments disconnected from the aggregate target will not work.

The third capacity is about assuring delivery. That is not the same as carrying out the plan itself, but about ensuring that plans are being met, that impediments are addressed, that decisions are made at the right time and, if required, the approach changed. The nearest analogy is the Government Olympic Executive, which sat inside government but was able to assure ministers that the work of the Olympic Delivery Authority and the London Organising Committee was on track.

These three capacities should be brought together as part of a new net zero unit in the Cabinet Office, headed by an official at director general level. The Cabinet Office would take overall responsibility for climate change mitigation and adaptation, setting carbon budgets and responding to CCC, as well as conducting international climate negotiations. This would allow BEIS to focus on the energy sector and industry.

* Our suggestions on the central capacity needed to deliver net zero broadly align with those made by the government's own Council on Science and Technology in a report published in August 2020. See Council for Science and Technology, *A Systems Approach to Delivering Net Zero: Recommendations from the Prime Minister's Council for Science and Technology*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/910446/cst-net-zero-report-30-january-2020.pdf

Drawing on the model of the National Economic Council secretariat established to respond to the financial crisis, this new net zero unit could draw on staff not just from the Cabinet Office but also from the Treasury, BEIS, DfT, MHCLG and Defra – and other departments as required. Those staff could retain a dual allegiance, becoming links between the strategic centre and the expertise in departments.

This new unit would report to a senior Cabinet Office minister. This minister would require strong backing from the prime minister and would need to command enough authority in the cabinet to be able to 'knock heads together' and keep departments on track.

The experience of the Department for Exiting the EU in planning for Brexit, which suffered from not being seen as an authoritative and honest broker, suggests that it is more powerful to house that unit at the centre, with a strong ministerial lead. This is the model the Johnson government adopted for no-deal planning, and subsequently for Brexit preparations.

- **The Cabinet Office should take over responsibility for co-ordinating net zero from BEIS. Tackling climate change should be led by a senior Cabinet Office minister, supported by a new dedicated net zero unit.**

The composition of the climate change cabinet committees needs to change

With the support of a net zero unit, ministers can both be presented with the key choices they need to make and supported in making those decisions, and then delivery can be tracked. But the two new cabinet climate change committees – which are the key forum for ministers discussing options – also need to be adapted.

While the desire to keep committees tight is understandable, the experience of Brexit shows the government needs to secure buy-in from key delivery departments and their secretaries of state. The exclusion of the housing and transport departments from the strategy-setting committee sends the wrong signal.

The implementation committee is currently chaired by Alok Sharma, the business secretary, but is clearly intended to oversee detailed action, which would be difficult for a departmental secretary of state. Industrial emissions remain a problem area, and Sharma needs to be held to account for progress in reducing industry's contribution, as well as energy reforms. The business secretary will also find it harder to command authority than a more senior minister.

The UK should also learn from the approach of Ireland and Scotland in making the cabinet committees a forum for confronting choices about where emissions should be reduced.

- **The housing and transport departments should be included in the climate change strategy committee, chaired by the PM. The climate change implementation committee should be chaired by the senior Cabinet Office minister responsible for climate change.**

The Treasury must put its full weight behind net zero

There are signs that the Treasury is already gearing up for its critical role in net zero. Its newly appointed climate change director has a brief to look at energy, climate change and environment, but not just through the normal Treasury spending lens. Treasury officials see this as a role more analogous to the Productivity and Growth team established by Gordon Brown early in his tenure with a much more active mission to look at the potential for supply side reforms to improve the performance of the UK economy.

Treasury senior management is also engaged with an oversight board chaired by the second permanent secretary and the director general for tax and welfare. The Treasury's net zero review, now due to report in spring 2021, hopes to establish agreed principles for managing the transition, which will be an important element in the plan set out above.

It would be a significant move forward if the Treasury – while maintaining its vital role of defender of taxpayer interests in the short but also the longer term – saw its role as helping the government meet its net zero target at minimum cost to the economy and with maximum wider benefit.

- **Working in close partnership with a net zero unit, the Treasury should translate the findings of the net zero review into a broad approach to the economics of net zero that is embedded in all of its policy tools and processes.**

Interviewees felt that the process for appraising project plans would also need to be updated. This is currently done through the Green Book process, which is designed to compare alternative options for achieving the same outcome against one another and assess their value for money and wider benefits. The Green Book was updated in 2018, before the net zero target was adopted, partly to better account for environmental objectives. It sets out a process for quantifying and valuing changes in emissions (there is a "low", "central" and "high" price per tonne of CO₂ that can be used depending on the type of project).

Interviewees raised two main problems. First, some called the way the Green Book is currently used too "permissive". While carbon emissions are factored in, they are often priced low compared to other costs and benefits. This means that – on large transport projects, for example – emissions rarely make much of a difference to project appraisals. The A303 Stonehenge tunnel, which was approved in 2020 before being paused for further consultation after an archaeological find, will increase CO₂ by 2 million tonnes over 60 years but the disbenefit from this CO₂ was calculated as just £86m, or less than 8% of the construction costs of the project.¹²

A cross-government review of carbon valuation is currently being conducted, after which BEIS is expected to publish updated values.¹³ The revised values are likely to be higher, but interviewees said that for some projects they would need to be several times higher if carbon is to be seriously factored into how projects are designed.

The second problem is a wider one. The Green Book is not designed to weigh up disparate projects or to assess whether government investments as a whole are consistent with the government's overall objectives. The government does not currently have any systematic way to compare the value for money and equity of different types of options for reducing emissions over the next 30 years. This will be important in working out how to allocate costs and where in the economy to target the heavy lifting.

It also does not have a rigorous method for assessing whether its overall plans add up to its carbon budgets or longer-term trajectory to net zero. While carbon costs of projects are currently measured, how they fit into overall carbon budgets is not properly factored into project decisions. One interviewee said this was even the case for very large projects such as HS2 and the A14 road improvement. The environmental statements of roadbuilding schemes typically state that they will account for a negligible percentage (for instance, less than 0.01%) of the UK's overall carbon budget over a five-year period and therefore would not have a "material impact" on the UK's targets.¹⁴ But there is no attempt to add all these amounts up across government and factor them into decision making.

Enabling both a comparison of disparate projects and a proper consideration of overall carbon budgets would require a very different analytical process to the marginal, project-by-project approach the Green Book uses. But several interviewees felt such an approach is needed to complement the Green Book assessments.

One former senior Treasury official said a new approach was needed to complement the Green Book that "looked from the other end of the telescope" and forced government to think "where am I going to spend my carbon budget?".

- **The Treasury should review and update its process for appraising projects to make it consistent with the government's plan for net zero.**

The most sensitive area for the Treasury is tax policy, which needs to support and not undermine progress to net zero. This would be helped by a tax roadmap, showing taxpayers how and when taxes might change.*

The Treasury should develop this in partnership with the departments responsible for the relevant sectors so that it underpins the commitments in the net zero plan. This more strategic and transparent approach should prevent some of the chopping and changing that has undermined, for example, the willingness of people to switch to EVs.

A net zero tax roadmap should form part of the Treasury's contribution to the net zero plan, as it does in Finland.

* The Institute for Government has previously suggested this as a broader approach to help make tax policy more effective at influencing behaviour, in our 2017 report [Better Budgets: Making tax policy better](#).

As part of this work, the Treasury should also review broader carbon pricing.¹⁵ The UK currently has a wide range of carbon prices across different sectors, which creates confused signals. In some sectors, such as industry, prices are set too low to effectively drive change in behaviour. Experts from government, business and academia have argued in favour of addressing this by gradually establishing an economy-wide carbon price that rises slowly over time.^{*,16}

Several interviewees, including a former DECC secretary of state and a former CCC chair, argued this would be the most effective way to harness the potential for innovation in the private sector and drive net zero through the economy. While public consent would need to be established for specific measures, there appears to be support for efforts to make carbon pricing more consistent.¹⁷ The UK could learn from countries where ambitious approaches to carbon pricing have been successful, such as Sweden and Finland.

- **The Treasury should publish a tax roadmap to net zero in 2021, to support government's net zero plan.**

The next spending review needs to be a 'net zero spending review'

Coronavirus has caused a further delay of the long overdue spending review, which is now set to take place in autumn 2020. Assuming it is a multi-year spending review, it needs to support the government's net zero plan. The timing is not ideal – it would have been easier to develop in tandem with the net zero plan – but it will have to anticipate the spending that will be required in the early years of the plan.

The easy approach to making this a 'net zero spending review' would be to ensure that some of the capital budget is allocated to net zero infrastructure projects, with some big-ticket items to help the UK on a path to net zero. But that would be a missed opportunity. Instead, the Treasury should use the spending review as an opportunity to embed net zero in government's plans.

If the autumn deadline for the spending review makes proper alignment impossible the Treasury may need to create a 'net zero reserve' not allocated to departments straight away, but released into departmental budgets next year when the net zero plan is finalised. Net zero spending cannot wait until a spending review in 2024 or later.

- **The Treasury should ensure all future spending reviews set the UK on a course for net zero.**

* The Zero Carbon Campaign – a commission made up of figures with impressive credentials in government, business and academia – published a report in June 2020 with recommendations on how to achieve more consistency and establish broad and slowly rising carbon prices in the UK. The commission undertook polling which found that, done carefully, these measures would be popular and recommended that the CCC should take on an additional role advising and monitoring the government on carbon charges.

Box 4: A net zero spending review

The spending review should start from an audit of government spending to ensure current spending commitments are tested for their net zero compatibility and how far they help build resilience to future climate change impacts. Any programmes or plans which take the UK away from its net zero goals, or would result in a potential higher adaptation cost in the future, should be scrutinised again.

Departments should be required to demonstrate how their future spending plans align with the sectoral trajectories in the net zero plan (or those the CCC has recommended, if the plan is not yet finalised). This should cover all areas of spending, which means doing a climate impact assessment across the entire programme for the five key departments. The Treasury and net zero unit should prioritise areas for assessment where necessary.

All capital spending should be adaptation-proofed; all departments should ensure that their own operations and estates plans support the government's net zero and adaptation objectives. The Treasury and net zero unit should ensure that there is sufficient funding earmarked for net zero transition – for example in skills funding, the research budgets and help for impacted communities. Where local government is expected to contribute, the government needs to assure itself local authorities have sufficient resources.

The net zero plan and associated spending review should be subject to challenge from outside before they are finalised. This could be from the CCC but could draw on a wider group of experts and interests.

The government needs to make sure all regulators and public bodies have aligned incentives and the capabilities needed to enable transition

The independent economic regulators should all have clear duties to act in ways that support the government's plans for net zero. In many cases their duties are permissive, but that may allow too much leeway for individual boards and chief executives to interpret their remit. The government should also clarify how they are supposed to balance short-term affordability with the long-term goal.

The boards of other arm's length bodies should also be clear about what role they are expected to play in delivering net zero and how these fit with their other statutory responsibilities. Departments have tended to lay multiple objectives on these bodies, without any clarity about how it expects them to reconcile them.

Regulation in the energy sector may require more substantial reform. Many we spoke to felt the current institutional set-up is not fit for purpose to manage the energy transition. There are signs the government acknowledges this – in late 2019, there were reports that discussions between the three players would take place this year,

with National Grid open to giving up its role as electricity grid system operator.¹⁸ But these talks do not yet appear to have happened.

A radical proposal, favoured by several interviewees, is to create a new integrated independent system operator, which would carve out the system operator role from National Grid and combine it with a large part of Ofgem's functions (leaving a narrowly focused economic regulator). This new body would have the powers and operational expertise to design as well as operate a decarbonised energy system which was able to support the mass conversion to electricity.

This may not be the right answer, but government does need *an* answer. BEIS does not appear to have a clear view. Given the strong interests involved, an independent review – drawing on expertise from the sector – may be the most effective way for government to assess options and come to a clear proposal, though it would be worthwhile only if its chair had the confidence and support of the business secretary.

- **In the net zero plan, the business secretary should set out reforms of key institutions in the energy sector – including National Grid and Ofgem – to remove conflicts of interest, while maintaining a focus on consumers.**

Government needs to build the capability required for net zero

Government is not renowned for science and engineering expertise, nor its implementation of climate policies. To achieve net zero, government needs to improve how it develops and uses specialist expertise in policy making on climate change and ensure it has the capability needed to translate policies into action.

Departments need to recruit more senior scientists and engineers – and ensure their advice is accessible to ministers

Government should put in place the senior-level scientific and engineering expertise it needs to inform key decisions on net zero. Interviewees identified engineering as a particular gap given the difficulty of the implementation challenges government faces. First, departments should undertake to identify the key net zero policy areas that require high-level scientific and/or engineering expertise. In key net zero departments this is likely to be in multiple teams: for example, BEIS's responsibility for the future management of the energy system means it must have experts in a wide range of technologies.

Departments should then conduct an audit of where they currently face gaps in expertise. This should be co-ordinated by the permanent secretary and involve the chief scientific adviser (CSA), the director of analysis and the departmental head of the policy profession – who between them hold responsibility for the department's policy portfolio and use of evidence. The Government Office for Science should support departments to conduct these audits, drawing on its experience of conducting a broader science capability review across government in 2019.

Based on this process, departments should develop a plan for ensuring they have the necessary technical capability in place for net zero. This is likely to involve some recruitment – for instance, bringing in high-level external science and engineering expertise around key challenges. These positions could sit within the CSA office or within policy teams. As we argued in previous work, in highly technical areas it may be necessary to create senior roles without substantial management responsibilities to attract people with deep subject expertise from business or academia.

Departments should also make better use of secondments. Our research shows these offer many benefits but are underused.¹⁹ Whitehall should benefit much more from the active discussion around net zero in academia and the business world.

In addition to recruitment and secondments, departments should look at the other ways they bring in expertise, including expert networks and advisory committees. While these are not a replacement for having key people on the inside, they can help departments access a wider range of expert opinion and be used as a sounding board for ideas. Again, these are used patchily across Whitehall.²⁰ DfT's new Net Zero Transport Board is a good model.²¹

Departments accessing expertise is not enough; it is critical that it is used to inform the advice to ministers – and ministers develop trusting relationships with scientific advisers. Departmental CSAs should act as this conduit, but many have struggled to navigate Whitehall effectively in order to do this in practice.²² Most are not on departmental boards.²³ Sir David MacKay, a physicist who was CSA at DECC between 2009 and 2014, and highly influential in ensuring advice was based on rigorous science, was highlighted as an exception rather than the rule.

- **Core net zero departments should conduct audits of the technical expertise they need for net zero, particularly in engineering, and recruit senior roles or bring staff in on secondments to address gaps. They should integrate scientific advice into their top teams and ensure it feeds into advice to ministers.**

The civil service needs to develop a pipeline of climate change experts

Climate change will be a key priority for the government for the whole career of those currently entering the civil service. Among those joining now will be the future permanent secretaries who will be front and centre as the UK seeks to tackle the most difficult emissions in the latter stages of transition, and adapts to growing climate threats.

The civil service needs to develop a pipeline of internal expertise. Climate change is a demanding area for any civil servant – as we have set out, it requires often deep technical expertise and an understanding of complex systems, such as the UK's energy systems; of economics and approaches to financing transitions; of the commercial approaches of businesses and how to design markets; of policy delivery as well as policy making; and of the international dimensions of climate change and reducing emissions in other countries. The best civil servants working on climate policy combine these skills, but they are relatively rare.

The current career development model in Whitehall makes it difficult to build and maintain such a focused skillset. While there is a climate change cadre in the Department for International Development (DfID), there is no dedicated cross-government programme that helps junior officials planning their careers to identify and pursue a career in climate matters.

This should change. Given the priority many young graduates attach to tackling climate change, this would help the civil service to continue to attract top talent.

There are several options in terms of design. One would be for the civil service to create a new 'climate change fast stream' alongside the other areas in which it has developed so-called 'clusters'.²⁴ This would work in much the same way, with officials moving between placements that provided them with a range of experience. The host departments could be the core net zero departments. There could also be postings in local government and regulators, to help build capability and join up approaches in those areas.

In designing the scheme, the civil service should consider the need to develop officials with a broad range of experience across different areas of climate change policy *and* officials with deep knowledge of particularly critical areas – say, carbon capture and storage – and the policy, delivery, finance and commercial aspects of that area.

- **The civil service should create a 'climate change cadre' as one of the clusters in the Fast Stream.**

Departments should look at where new bodies could help with delivery

The infrastructure transformations required for net zero will be some of the most complex in a generation. But Whitehall departments often lack project management expertise and find it difficult to focus on long-term challenges.

Many interviewees argued that creating arm's length delivery bodies could help government overcome these problems. The Confederation of British Industry has called for a delivery body for residential heat.²⁵ A group of climate change academics at Exeter University have called for a new body to oversee the energy transition.²⁶ A roundtable of housing experts we convened recommended the re-creation of a convening body to continue the work of the Zero Carbon Hub, abolished in 2015, and were enthusiastic about a delivery body for retrofit, too.

Delivery bodies are not a panacea. They rely on political patronage and can be vulnerable to being forgotten when there is a change of government. One interviewee from a government agency noted that setting them up is hard because "they tend to step on everyone's toes". There are many different kinds – ranging from powerful project management bodies with large budgets to small industry-backed convening organisations – with different strengths and weaknesses.

* Including 'Trade and Economy', 'Infrastructure and Industry', 'Education, Environment and Communities', 'Security and Defence', 'Brexit', and 'Social Justice and Welfare'.

But when they work, they do offer several potential benefits. A dedicated organisation – with a clear mission – can offer more consistency and be insulated from shifting departmental priorities in Whitehall. It can concentrate the necessary project management expertise (sometimes helped by more flexibility over recruitment).

The Olympic Delivery Authority is a good example of this, as our study of what lay behind the success of the 2012 Games showed.²⁷ Established in 2005 with responsibility for developing the Olympic Park and other venues, it acted as a project manager, overseeing the work of a range of construction firms. It secured leaders with serious business credentials and invested in developing expertise in construction and major financial project management, which it identified as gaps. It was also powerful: government equipped it to co-ordinate the local authorities and resolve planning disputes. These capabilities, as well as the cross-party support it received, were vital to it successfully managing its large programmes and contracts.

Convening bodies can also become a focal point for the wider delivery chain of private companies, investors, local government and regulators. The Zero Carbon Hub, though a very different kind of organisation, shows this. It was a small industry-backed body that built consensus. Independent of government – but with government buy-in – it was trusted by housebuilders.

The infrastructure challenges of net zero are varied – and are of course different in nature to hosting the Olympics. Housing retrofit and residential heat, for example, will involve supporting millions of consumers across the country to upgrade their homes, and creating a workforce and market capable of doing that efficiently, rather than overseeing a handful of enormous projects. They will require policy, regulation and financing to be aligned – and serious co-ordination.

While the solutions are unlikely to be the same as what has come before, there was wide consensus that Whitehall will struggle to grip many of these challenges itself. As one former senior Treasury official said to us: “Someone needs to be responsible for getting these things done.”

- **Government departments should assess where there is a need for additional capability to oversee the delivery of large net zero infrastructure projects – such as mass retrofit or the replacement of gas boilers – themselves and assess the case for creating arm’s length delivery bodies or convening organisations.**

Capability in local government needs to be strengthened, too

Local government can bring enthusiasm, local knowledge and potentially also public consent to help tackle net zero – but it has suffered a haemorrhaging of capacity in the past decade. It needs to be given a clear framework within which it can act on both mitigation and adaptation but the government needs also to think how it can best support local government with expertise and technical capacity.

The Environment Agency already has a scheme to embed some of its experts into local government – and this is a model that could be replicated in other areas. Government should also consider the Irish model of Climate Action Regional Offices, designed to support local delivery. These could be hubs for developing plans, sharing expertise and diffusing good practice, as well as co-ordinating with arm's length bodies active in the region. The strength of the German Länder also offers lessons.

- **The government should develop plans for improving mitigation and adaptation capacity at a local level, for example by funding regional offices. These should be stated within the net zero plan.**

Government needs to build and maintain public consent

Building and maintaining public consent will be the defining challenge of the next three decades of decarbonisation. Politicians need to take a lead and create a sense of public urgency in the same way as they do in response to other crises and emergencies. This is essential to create a political environment conducive to the level of action needed. In words the prime minister has used on coronavirus, the government needs to level with people about the changes required.

- **The government's net zero plan should also include a strategy for communicating with and engaging the public on the choices net zero presents and the changes that will be required.**

The climate assembly set up by the parliamentary select committees is a good start but what matters most is what comes next. First, the government should properly consider and respond to the assembly's proposals. The citizens' assembly in France demonstrates that the goodwill built up through these processes can be quickly undermined if they are not treated seriously by parliamentarians. The data generated through the initial exercise should be used widely by policy makers, parliamentarians and expert bodies.

Second, the citizens' assembly cannot be seen as a one-off. Reaching net zero will continue to require public consent. Public engagement must be baked into the government's – and parliament's – approach, and incorporated into policy making and scrutiny in each of the key sectors set out in the net zero plan.

There are two important actions government must take to ensure the work of the assembly and the expertise developed among attendees is maintained, and used to secure broad public consent for the changes coming:

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- **The climate assembly model should be developed into a standing group of citizen advisers, hosted by the CCC, that can be commissioned by government or parliament to consider key net zero policy areas.**
 - **Departments should build in deliberative processes with citizens as part of their policy making. This should be included in the early stages of policy development, rather than operating as consultation after options have been generated.**

Scrutiny of net zero needs to be beefed up

Scrutiny can provide incentives for government to stay on track and an early warning system where government falls behind. Ambitious targets alone are not enough: they need to be backed up by mechanisms to ensure governments stick to them. But currently scrutiny of government's progress on net zero and adaptation is too weak.

The Climate Change Committee will need to refocus

The CCC's big outstanding task is to recommend a sixth carbon budget (covering 2033 to 2037) that puts the UK on a clear trajectory to net zero. It may also need to revise the intermediate budgets to smooth the path. Once the sixth carbon budget is set – covering most of the way to net zero – the CCC recognises that its carbon budget advice, up to now one of its key roles, will become less important.

It will need to refocus on rigorous scrutiny on the credibility of government plans. It will need to act as a 'critical friend': scrutinising the quality of plans and of the policy making underlying those plans; keeping track of the government's progress in delivering them; and advising, where necessary, on the measures needed to get back on track. This is a different role and may require additional capability – currently the CCC has limited resources and is spread thin across a wide range of complex and technical policy areas.

As the CCC's role morphs into a sharper assessment of government performance, it will also need stronger guarantees of independence. It is currently a non-departmental public body of BEIS, which means it relies on those it is scrutinising for its budget. BEIS also approves the appointment of new members. While its independence has been broadly protected to date, this is an uncomfortable position, and there is a risk that a government that did not appreciate the CCC's advice could hobble it by reducing funding.

A radical change would be to make it a parliamentary body – not just able to report to parliament but funded by it as well. But short of that, the CCC would benefit from some of the guarantees of independence the Treasury conceded when it established its fiscal watchdog, the Office for Budget Responsibility (OBR), in 2010. The OBR was given its own multi-year budget line and the Treasury Select Committee (TSC) has to confirm both the chair and the members of the Budget Responsibility Council – a stronger provision than the norm of pre-appointment hearings. Moreover, the Treasury can dismiss members only with the consent of the TSC.

Some argue the CCC should also be given additional powers. One proposal – from former chair Adair Turner – is that the CCC could be given a more direct instrument to help the government get back on track if it deviates. He proposes the CCC could be made responsible for recommending a carbon price profile for the next 15 years, and adjusting this up or down annually. If ministers did not follow the CCC advice, they would then have to explain why.

This option would have benefits, but it would mean the CCC intervening much more directly in sensitive areas of policy and would require cross-party support for more prominent use of carbon pricing to be successful. It would make strengthening the CCC's independence more important – when the committee was first established the option of giving it the direct power to levy a carbon tax was considered but rejected on the basis that it would likely cause political conflict and prevent it from building a reputation as a trusted adviser.

- **Once the sixth carbon budget is set, in December 2020, the CCC should refocus on scrutinising government performance.**
- **BEIS should take steps to bolster the CCC's independence and review whether its budget and remit is sufficient for the role it will need to take in helping the UK to reach net zero and get on track on adaptation.**

The CCC will also need to devote more resources to adaptation, which in many ways is a more complicated area to oversee than mitigation, with detailed tailored plans required at a local level. Adaptation may benefit from a renewed focus post-coronavirus on resilience, but that cannot be assumed and there is a danger that resilience will come to mean only pandemic planning. The CCC could take over responsibility from Defra for the Climate Change Risk Assessment – that would then make the latter the adaptation equivalent of the CCC's carbon budget advice. The government would then be required to produce a plan to show how it has addressed the risks the CCC identified.

That would also require extra resources to allow the CCC to expand its very small adaptation team. With the greater focus on national resilience, the government should see benefits in providing the limited additional resources that are needed to allow the CCC to raise the public profile of the need for effective adaptation plans at all levels.

Parliament needs a dedicated committee to focus on net zero and adaptation

Net zero and adaptation are huge challenges but they receive little attention in parliament. Many departmental committees have not made time to consider the CCC's reports; even when they do, parliament still treats them as departmental issues and there is little attempt to join up.

The wide range of departments involved means that net zero should be suited to cross-committee working. But parliamentary staff note that there is little natural appetite among many MPs for joint inquiries – though there was one on air quality, the EFRA Select Committee and the Environment Audit Committee could not agree to run a single inquiry on the Environment Bill, so did parallel inquiries.

There is increasing use of 'guesting' – allowing a committee member to join in an evidence session hosted by another committee – which is a helpful innovation. But this remains ad hoc and there is a need for a more permanent solution. Table 3 sets out several models for joint or cross-cutting committees.

Table 3 **Models for parliamentary oversight of cross-cutting issues**

Model	Description	Pros	Cons
Joint inquiries e.g. air quality	One-off joint committee inquiry established when chairs agree.	Joint working on areas of cross-cutting interest.	Ad hoc and dependent on the agreement of individual chairs. Not systematic and not a planned programme of scrutiny.
Future relationship with the EU committee	Non-departmental committee looking at UK–EU negotiations and preparation for Brexit (successor to the DExEU Select Committee).	Able to call evidence from a range of interests (though work so far has focused on Cabinet Office/No.10 negotiating team). Standing committee.	Establishment dependent on agreement of government.
Committees on arms export controls	A 'concurrent meeting' of the four key committees – BEIS, Defence, Foreign Affairs and International Trade – to oversee the government's arms export policy.	Has a very specific task and a trigger – examination of government's quarterly report on arms exports. Described as a "semi-permanent running inquiry".	Dependent on government producing regular report (but could also examine the annual CCC report) to trigger inquiry. Set up delayed in 2019 (members yet to be nominated).
Liaison Committee	Committee of chairs of all select committees able to question the prime minister.	Increasing use of chairs and other members invited to attend other select committees and ask questions but no precedent (so far) for a subject-specific standing grouping of chairs.	Again dependent on co-operation of chairs and on willingness of government witnesses to attend. Establishment would require a change in standing orders which would need tacit consent of government.

Joint Committee on the National Security Strategy ²⁸	Mixed committee of Commons and Lords including some committee chairs to scrutinise the National Security Council and the National Security Adviser.	Can draw on specific expertise in the House of Lords and benefits from the presence of committee chairs, which links back into the Commons and Lords. Standing committee.	Low engagement by chairs (additional call on time) contributes to a very low profile, despite high-powered membership; not clear adds value to work of constituent committees.
Lords Covid-19 Committee ²⁹	Recommended by Lords Liaison Committee to examine government response to Covid-19.	Can draw on specific expertise in the Lords which can provide more rigorous technocratic scrutiny.	No track record as yet. Lords will establish committees only where the Commons does not have a subject committee. Net zero is more than a technocratic issue so needs political, i.e. Commons input.

Parliamentarians should consider which model will allow them to hold government to account most effectively. There are pros and cons to each. The existing Environment Audit Committee already has a clear basis, but other options may have a higher profile and more impact. A committee in the Commons would have more political clout but one in the Lords may be able to draw on deeper expertise.

This committee may need the ability to draw on extra analytical resources – one reason why the Public Accounts Committee is often so effective is that it can draw on the expertise and work of the National Audit Office (NAO). A cadre of experts in the NAO or expert staff in the CCC working more closely with parliamentary committees would help ensure they can effectively probe government.

- **Parliament should form a cross-cutting or joint committee to scrutinise government progress on net zero, which utilises the expertise of the CCC and the NAO to hold departments to account.**

Parliament should debate climate change more regularly

MPs are often reluctant to debate climate change. Last year was the exception – but it took an opposition day debate inspired by Extinction Rebellion for parliament to discuss the 'climate emergency'. This contrasts with routine statements every time there is a terror incident, and regularly scheduled economic statements. There are statements on individual cases of flooding but little focus on adaptation.

This sends completely the wrong message – and is out of step with the major change in the structure of the economy and people's lives required by the government's targets. The government should schedule an annual update to respond to the CCC assessment of progress. This would raise the public profile and begin to show that politicians were grasping the significance of the commitments they themselves have endorsed. It should also seek to invite the public into parliamentary debates on decision making, starting with the report of the climate assembly.

- **Parliament needs to adopt a much more active role in holding the government to account on climate change and, at the very least, debate the annual report from the CCC. It should also debate the climate assembly's proposals.**

Conclusion

In the past four years government has grappled with massive, preoccupying challenges: Brexit, then the coronavirus pandemic. But those are both – hopefully – temporary shocks to the system. Net zero is different.

Although the commitment was entered into with little dissent in 2019, it requires a wholesale reorientation of the economy – and changes to the way we live, the way we move, the way we eat and the way we use our land. It touches every citizen, every business and every part of government. Meanwhile, a failure to prepare adequately for climate change will also impose increasing burdens on people's lives as the middle of the century approaches.

To date neither the effort on mitigation or adaptation has been equal to the scale of the challenge. Leadership has been lacking and progress has been impeded by many of the long-standing structural and capability issues that this government has identified as a barrier to achieving its objectives.

Delivering net zero and ensuring effective and timely adaptation will require cross-boundary working, improved scientific and engineering capabilities, and the development of and application of deep expertise. It will require government to leverage innovation and apply it rapidly, which means creating the conditions for the market to operate effectively.

But that will happen only if the government makes tackling climate change central to its purpose.

As it leaves the EU, the UK has an opportunity to again take a lead in confronting the threat of climate change – building on Margaret Thatcher's lead in 1989, and the innovation of the Climate Change Act 2008. Hosting COP26 will be the first major outing for 'Global Britain'. At the conference, the government needs to show it can not only set ambitious targets, but also meet them.

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