

Office for
**Budget
Responsibility**

Discussion paper No.4

Next steps for climate change analysis

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1 Introduction

1.1 The Office for Budget Responsibility's (OBR) core duty and mandate, as set out in the Budget Responsibility and National Audit Act, is "to examine and report on the sustainability of the public finances". Climate change presents one of the single largest potential threats to fiscal sustainability.¹ While some of the associated fiscal risks have already begun to crystallise (in the form of lower fuel duty receipts due to electric vehicles, growing subsidies for renewable energy, and healthcare costs of summer heatwaves), their full effect is likely to only be felt by future generations. And while the precise trajectory of global temperatures is both uncertain and susceptible to government policy in the UK and abroad, the direction of travel over the coming decades is clear: global surface temperatures have already risen by around 1 degree Celsius since 1900 and are expected to rise by around a further 1 degree even if all existing national commitments and pledges to cut emissions are met.² In all of these ways, climate change is similar to another long-term threat to the public finances, that of an aging population, that has been a traditional focus of fiscal sustainability and risk analysis in the UK and other advanced economies. While we are not ourselves experts in climate science, we can seek to apply economic and fiscal analysis to the evolving work of experts in the climate field in order to fulfil our core mandate.

1.2 The range of potential fiscal risks presented by rising global temperatures stem from pressures on government to bear some or all of the economic costs of climate change. These climate change-related risks to the economy fall into three broad categories, one a direct cost, and two the indirect costs of policy:³

- **Damage** from climate change: the direct net costs to the economy (assets, productivity and disruption to global trade) associated with rising global temperatures and sea levels, and more frequent and severe extreme local weather events, including heat waves (and/or cold snaps), thunderstorms, floods, fires, and the effects on human physiology. (Linked to this are also *indirect* effects such as declining productivity due to worsening health and increasing inactivity, and the associated losses of tax revenue). There may also be some economic benefits from climate change, such as higher crop

¹ For example, the IMF has stated that "climate change presents a major threat to long-term growth and prosperity, and it has a direct impact on the economic wellbeing of all countries"; The UN has estimated that "countries may need to spend up to \$300 billion a year by 2030 and \$500 billion by 2050" in its 2021 *Adaptation Gap Report*. Also see the European Central Banks Occasional Paper Series, *The role of the IMF in addressing climate change risks*, 2022, which discusses the mitigation, adaptation and transition policy and financial risks, and the Finance Ministers for Climate Action's June 2023 report, *Strengthening the role of Ministries of Finance in Driving Climate Action*, which discusses the public finance implications and the role of fiscal levers.

² Climate Action Tracker, November 2022 update. If global pledges and commitments are not met, then it is expected that temperatures would likely rise further.

³ Standard taxonomies used to describe the economic risks of climate change divide it into two categories i) physical risks (of a warmer world) and ii) transition risks (of transitioning off fossil fuels), with each of these having policy choices: i) 'adaptation' (to the warmer temperatures), and ii) 'mitigation' (to reduce the overall degree of climate change). From our perspective the risk all stems from the physical risk of climate change, and that 'transition risks' are comparable to the policy choice of 'mitigation', in that they are both really the choice to use a different form of energy. We have therefore reframed how we consider these costs of climate change risk for our analytical purposes into the three buckets of damage, adaptation, and mitigation.

yields, lower heating bills, and fewer winter deaths in northern European countries like the UK, which should also be taken into account in calculating the overall *net* damage from climate change;

- **Adaptation** to climate change: an indirect cost (largely from policy decisions) associated with increasing the resilience of the economy to a hotter and more volatile climate, including through the construction of additional flood defences, expansion of fire-fighting capacity, installation of additional air-conditioning units, and upgrading of critical infrastructure; and
- **Mitigation** of climate change: the second indirect cost, associated with trying to reduce the UK's carbon and other climate-related emissions to meet the Government's legislated target of reaching net zero emissions by 2050, and thereby helping to limit the rise in global temperatures. These include (amongst others) the costs associated with incentivising the switch from petrol to electric vehicles, improving the energy efficiency of existing building stock and the replacement of gas-fired boilers with renewable sources of heating, and the construction of carbon capture and storage facilities. However, in the long run mitigation is estimated to potentially result in net *savings* to the economy.⁴

1.3 Both national *adaptation* and global *mitigation* policy choices feedback to determine the level of overall potential economic *damage* of the physical risk of climate change by reducing the level of climate change and minimising the impacts of the extreme events when they occur.

1.4 Ultimately, the long-run fiscal cost of climate change will depend on which of these economic costs are borne (directly or indirectly) by government. This will, in turn, depend upon the mix of adaptation and mitigation strategies adopted by the UK and other countries and the mix of policy instruments (tax, spending, and regulation) used to implement them. In attempting to estimate those potential fiscal costs, it is therefore necessary to consider a number of different scenarios. These scenarios would vary the extent of (i) global and UK action to mitigate emissions and therefore limit the rise in global temperatures; (ii) UK investment in adaptation to climate change; (iii) resulting damage to the UK economy from climate change; and (iv) the share of the costs associated with i, ii, and iii borne by the public sector.

1.5 Over the last five years, the OBR has made great efforts to understand and analyse the fiscal implications of climate change. To date, our analysis has focused primarily on mitigation risks, most notably in the climate change chapter of our 2021 *Fiscal risks report* (FRR) which provided the UK's first comprehensive estimate of the fiscal costs of reaching the Government's legislated net zero target by 2050.⁵ However, in order to both put this estimate of *mitigation* costs in the appropriate context and to provide a more complete picture of the *overall* fiscal implications of climate change, it is important to also deepen our

⁴ See for example the Climate Change Committee, *Sixth Carbon Budget*, December 2020. From 2041 they estimated the transition would result in increasing savings to the economy compared to the unmitigated counterfactual in their 'Balanced net zero pathway'.

⁵ OBR, *Fiscal risks report*, July 2021. Chapter 3: Climate change.

Introduction

understanding of the potential fiscal cost of climate change-related *adaption* and *damage* - some amount of which is likely to be necessary and inevitable even if all countries successfully meet their net zero objectives.

- 1.6 In all of our work in this area, we have relied and built upon the ground-breaking analysis of other institutions engaged in climate change-related work. Internationally these include the work of the United Nations (UN) Intergovernmental Panel on Climate Change (IPCC) - including their Assessment Reports; the IMF and the OECD's work on the economic and fiscal impacts of climate change and net zero; the Coalition of Finance Ministers for Climate Action (of which the UK's HM Treasury is a member); the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) climate scenarios; and the International Energy Agency's (IEA) reports on energy trends and net zero consistent power-sector transition pathways. In the UK, these include the Climate Change Committee's (CCC) work estimating whole economy costs of transition alongside their Climate Change Risk Assessment's; the Bank of England's climate scenarios (and as part of their leading role within the NGFS); the National Infrastructure Committee's (NIC) national infrastructure assessments; a body of DESNZ work - including their energy and emissions projections (EEP), the Net Zero Strategy (NZS), British Energy Security Strategy (BESS) and their Carbon Budget Delivery Plan (CBDP); HM Treasury's (HMT) work on the Net Zero Review (NZR); and Defra's National Adaptation Programmes. Our further work to deepen and broaden our understanding the fiscal implications of climate change will need to continue to be done in close partnership with these bodies.
- 1.7 Against that background, this discussion paper sets out the plans for our future analytical work on the fiscal implications of climate change. It aims to help inform the work plans of, seek feedback from, and facilitate collaboration with other bodies working on the economics of climate change. It also aims to gather input from government, business and industry, and other bodies for whom this analysis may be helpful in informing their own climate change-related strategies. We welcome feedback from all interested parties on these plans.

2 Our climate change work to date

2.1 The OBR's work on climate change to date has taken the form of three different types of output:

- efforts to understand the **long-run fiscal implications** of climate change and related changes in global energy markets via a series of chapters in our annual *Fiscal risks and sustainability reports*;
- increasingly detailed estimates of the **medium-term impact** of climate change-related trends and policies in our biannual *Economic and fiscal outlooks*; and
- **in-depth analysis** of the impact of climate change on individual tax and spending items through periodic *Working papers and Articles*.

Fiscal risks and sustainability analysis

2.2 Our most systematic analysis of the potential long-run fiscal implications of climate change has been in our *Fiscal risks and sustainability reports*. Our 2017 *FRR* first identified climate change as a major risk to public finances which we should try and assess. Our 2019 *FRR* dedicated, for the first time, a full chapter on the potential fiscal risks associated with climate change. Published shortly after the Government put its commitment to achieve net zero by 2050 in legislation, the chapter provided a qualitative mapping of the range of potential channels through which climate change could affect the economy and public finances. It also set out proposed next steps in our analysis, including the aim of producing more quantitative estimates of the fiscal risks posed by climate change, building on work underway at the Bank, CCC, and in international organisations.

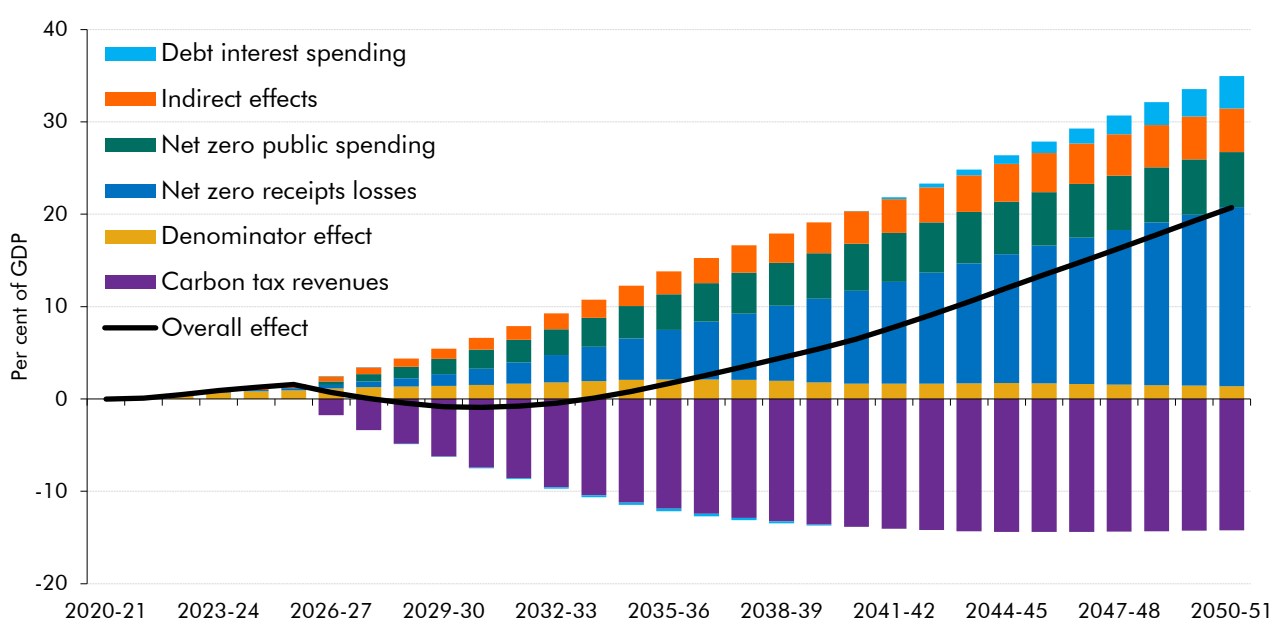
Fiscal risks report 2021

2.3 Our first in depth, and, so far, most comprehensive, analysis of the economic and fiscal implications of climate change was in Chapter 3 of our 2021 *FRR*. That chapter focused on economic and fiscal costs of climate change *mitigation* and was the first, and we believe remains to date the only, estimate of what are the public finance costs of meeting the UK Government's net zero target by 2050. To do this we built upon the work of the *Climate Change Committee's (CCC) Sixth Carbon Budget*, which set out (by year and by sector) the capital and operational costs at a whole of economy level for decarbonising under a variety of scenarios over the next 30 years.⁶ To estimate their implications for public spending, we made a set of assumptions regarding what the government's share of these costs for each sector might be. To capture the implications for public sector receipts, we estimated the loss

⁶ We used the CCC's Sixth Carbon Budget 'balanced pathway' scenario as a base for our analysis.

of some existing sources of revenue (mainly fuel duty) associated with the net zero transition, which were partly offset by the levying of a (hypothetical) comprehensive carbon tax which generated the necessary incentives to decarbonise. The indirect effects of the net zero transition on the public finances via its impact on the economy, other receipts, and debt interest spending were captured using the Bank’s CBES scenario for GDP.⁷ To illustrate the sensitivity of these estimates of the fiscal cost of net zero to changes in key assumptions, we also provided a range of scenarios based on alternative estimates for the timing of the transition, its consequences for economy-wide productivity, the share of transition costs borne by the public sector, and potential offsetting action in tax and spending policies.

Chart 2.1: Fiscal risks report 2021: early action scenario

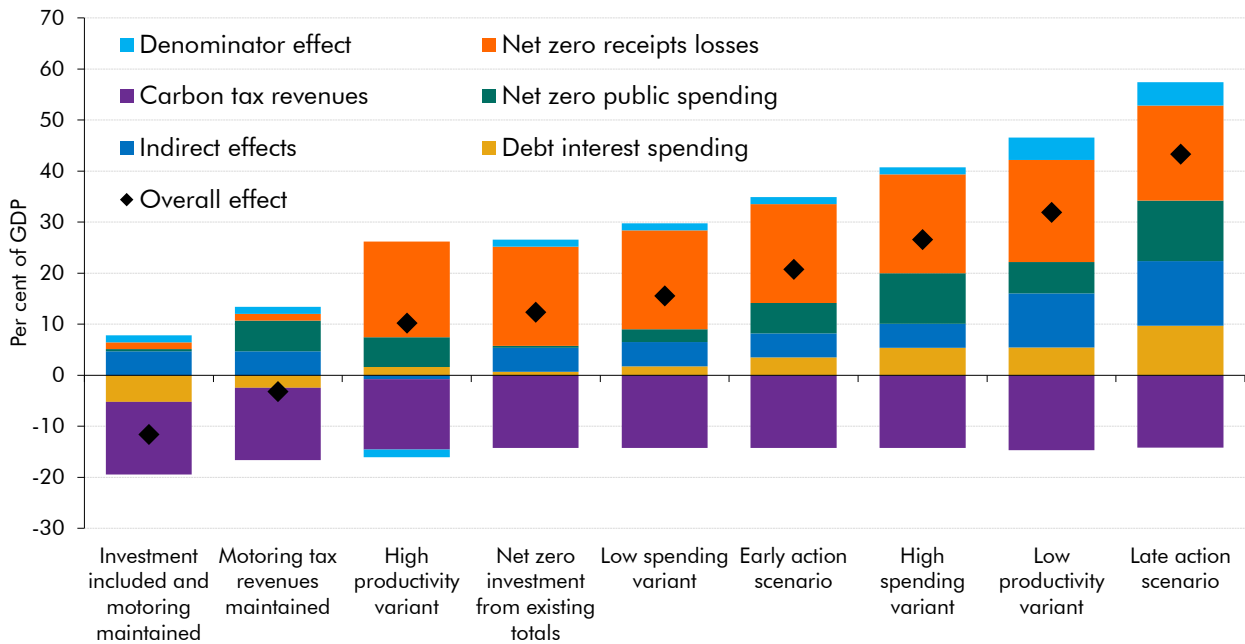


Source: OBR

2.4 Through this work, we estimated that in a central ‘early action’ scenario in which the Government (i) takes policy action (starting in 2020-21), (ii) bears around one quarter of the economy-wide cost of transition, and (iii) levies a comprehensive carbon tax, the total fiscal cost of reaching net zero would add 21% of GDP to public debt by 2050 (Chart 2.1). To illustrate how much the fiscal costs of getting to net zero varied depending upon conditioning assumptions, we explored four alternative scenarios with different assumptions about the timing and nature of policy action (Chart 2.2). At one extreme, if policy action on the transition was delayed until 2030 (the ‘late action’ scenario), the total cost in debt terms would double to 43 per cent of debt to GDP by 2050. At the other extreme, in which the government absorbed its share of whole economy transition costs within its existing investment plans and found a replacement for lost fuel duty and other emissions-related revenues, getting to net zero actually delivers a net fiscal benefit of 12 per cent of GDP in debt terms by 2050.

⁷ Bank of England, 2021 *Biennial Exploratory Scenario (CBES)*, 2021. The CBES was built from the second phase of NGFS scenarios. Our work built upon the ‘early action’ and ‘late action’ scenarios.

Chart 2.2: FRR21 net zero scenarios for public sector net debt in 2050-51



Source: OBR

Fiscal risks and sustainability reports 2022 and 2023

2.5 Following the Russian invasion of Ukraine and the European energy crisis in 2022, subsequent *Fiscal risks and sustainability* (FRS) reports have looked in more depth at the fiscal implications of the energy aspect of the transition.

- Our 2022 FRS devoted a chapter to the evolving energy crisis, focusing on the immediate economic and fiscal risks associated with higher fossil fuel prices. It explored alternative scenarios for the evolution of gas and oil prices and their implications for the economy and public finances over the medium-term. It also considered the implications of higher fossil fuel prices for the relative costs and benefits of reaching net zero, and found that, based on elevated prices prevailing at the time, the marginal cost of net zero would be reduced by £116 billion over the period to 2050 in a world with higher fossil fuel prices. Looking at the long-term implications for the UK’s energy mix, the chapter also discussed the energy policy trilemma – the need for energy to be cheap, secure and clean, and considered the implications of higher fossil fuel prices for the trade-off between these objectives.
- Our 2023 FRS also dedicated a chapter to energy. Eighteen months into the energy crisis, we looked at the demand and supply side responses to higher gas prices. In the context of the transition to net zero, we found that higher gas prices had elicited a significant reduction in domestic demand for gas and an increase in the international supply of gas, especially in the form of liquified natural gas (LNG). By contrast to some other major European economies, there was little evidence that higher gas prices had triggered an increase in the UK’s domestic supply of renewable energy despite the reduction in its relative costs at the time. The Government’s own net zero investment

plans, set out in the 2021 *Spending Review* for the period 2022-25 were somewhat below the amounts we had assumed in the central scenario of our 2021 *FRR*. The Government's plans also placed greater emphasis on major projects such as new nuclear power stations and carbon capture and storage facilities, and less on more incremental (though no less significant overall) investments such as improving insulation and the replacement of gas-fired heating systems in residential and commercial buildings. To illustrate the fiscal risks associated with continued gas dependence, we presented a scenario in which the UK's reliance on gas remained unchanged, prices remained as volatile as observed in recent years, and the Government provided equivalent support to households and businesses to cope with future energy price spikes as observed in 2022-23. In this scenario, periodic spikes in gas prices cost the Exchequer the equivalent of round 13 per cent of GDP in debt terms by 2050, more than twice our 6 per cent of GDP central estimate of the public *investment* cost of completing the transition to net zero by that date.

Medium term forecasts

- 2.6 In addition to this work on the long-term fiscal implications of mitigation, climate change and the net zero transition has already begun having a material impact on our medium-term *Economic and fiscal outlooks* (EFOs). This is most evident in the decline in fuel duty receipts associated with accelerating take-up of electric vehicles (EV) in advance of the legislated ban on the sale of new petrol and diesel cars (ICE) from 2035.⁸ From just 1.6 per cent in 2019, EVs are expected to account for a minimum of 80 per cent of total new car sales by 2030.⁹ As existing petrol-driven cars leave the roads, the Government is set to lose an increasing amount of the £25 billion (1 per cent of GDP) in tax revenue raised from fuel duty in the long-term. Our medium-term fuel duty forecasts incorporate explicit assumptions regarding take-up of electric and hybrid vehicles, and analytical boxes in our 2021 *FRR* and March 2022 *EFO* have explored the performance of those assumptions relative to outturns.
- 2.7 A growing proportion of the Government's medium-term investment plans are also being devoted to net zero-related projects. Our October 2021 *EFO* included an analytical box highlighting both the emissions-reducing investments announced in the Government's 2021 Net Zero Strategy and Spending Review as well as other emissions-related fiscal policies (both positive and negative) announced in the accompanying Budget.¹⁰ However, as highlighted in the March 2022 Report of the Public Accounts Committee and January 2023 Independent Review of Net Zero, the lack of consistency, transparency, and rigour in public reporting on emissions-related tax, spending, and regulatory measures makes it virtually impossible to understand and track the contribution of Government policy to the delivery of its net zero ambitions.¹¹

⁸ On 20 September 2023 the Prime Minister announced that the ban on the sale of new petrol and diesel cars (ICE) from 2030 would be pushed back to 2035. The decline in fuel duty receipts we have seen to date (and our analysis for future EV uptake) was undertaken whilst the policy to ban new ICE car sales was set to come into force in 2030. This recent shift in policy may impact future fuel duty receipts and our assumptions on EV uptake.

⁹ As required by the UK Government's *Zero emissions vehicle (ZEV) mandate*, published on 28 September 2023.

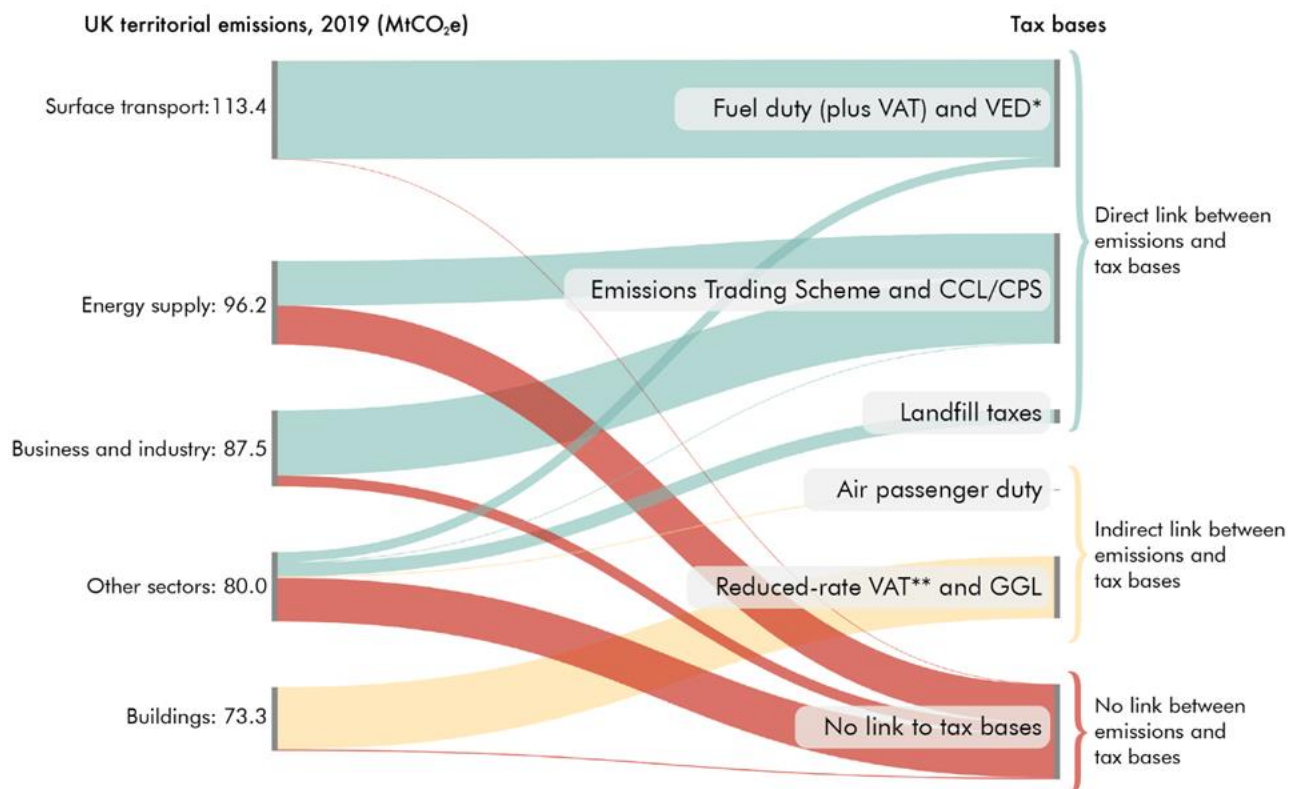
¹⁰ See Box 3.3 of our October 2021 *Economic and Fiscal Outlook*.

¹¹ See the House of Commons Committee of Public Accounts, *Achieving Net Zero: Follow up, March 2022*; and Skidmore, C. (2023), *Mission Zero: Independent Review of Net Zero*.

Working papers and articles

2.8 We also use our *Working papers* and new *Articles* series to explore specific climate change-related issues in more depth. To improve our understanding of the impacts of decarbonisation on our receipts forecast in more detail, we produced *Working paper 18 on Emissions and our tax forecasts* in May 2023. This paper presented the first comprehensive mapping of the linkages between emissions and our tax bases.¹² Over half of the UK’s territorial emissions have a reasonably clear link to one or more of our tax bases, with an additional 16 per cent having an indirect link (Chart 2.3). These emissions-associated receipts were worth over £50 billion, or around 5 per cent, of receipts in 2022-23. As these sectors decarbonise, the associated tax bases will erode without alternative taxes in their stead. In fact, this loss of receipts (in the absence of any replacement tax), would nearly double the cost of net zero – and is significantly more than the investment costs that may be required by the government.

Chart 2.3: The relationship between emissions and tax bases



Note: Made with SankeyMATIC.

*While fuel duty directly links to tax revenues, we judge that VED has only an indirect link.

**Reduced-rate VAT receipts also relate to those emissions from the energy supply sector used in domestic electricity (which are also covered by the ETS).

Source: ONS, OBR

¹² Todd, A. et al., (2023), OBR Working paper No. 18: Emissions and our tax forecasts.

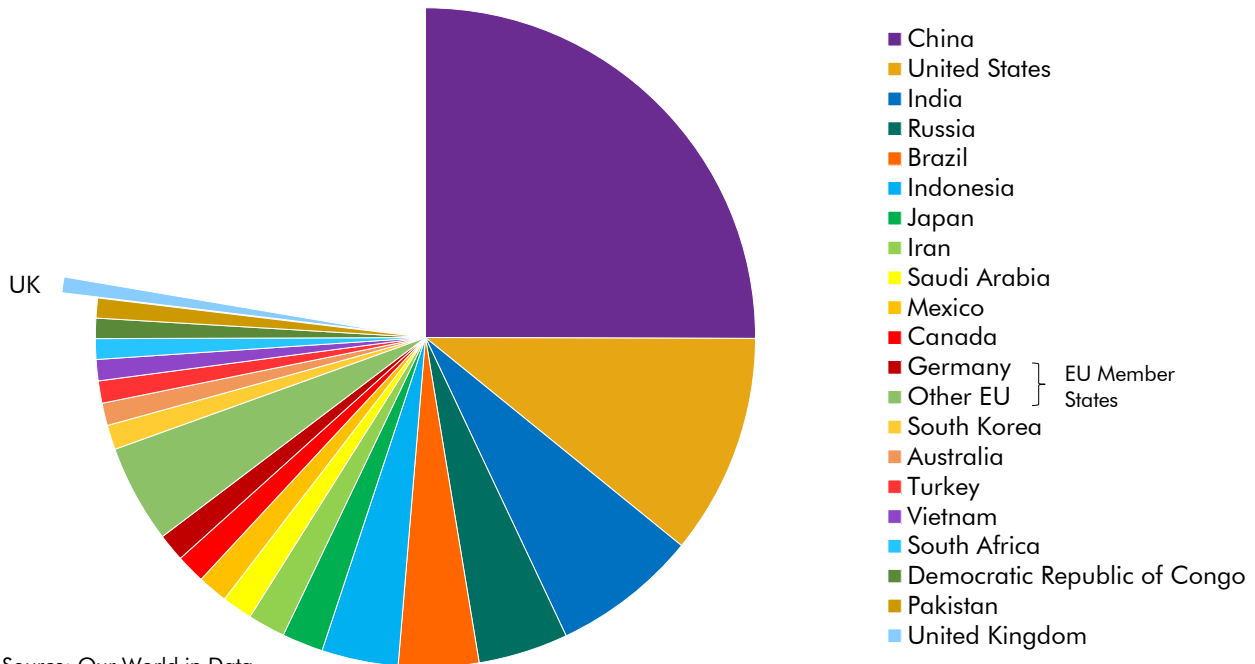
3 Future directions for our climate change work

Updating our estimates of the cost of climate change mitigation

- 3.1 As highlighted above, much of our analysis to date has focused on the economic and fiscal impacts of climate change *mitigation*. Centred on our 2021 *FRR* chapter, we have built up a relatively comprehensive picture of the fiscal implications of decarbonising the UK economy, building on the foundations laid by the CCC in their five-yearly Carbon Budgets. These estimates of the fiscal cost of getting to net zero can be updated, but this can most usefully be done after the CCC has published their next Carbon Budget, likely in 2025. In the meantime, our analytical efforts in the area of mitigation are likely to focus on comparing planned or outturn levels of net zero-related receipts and spending to our 2021 *FRR* assumptions to assess progress and test their reliability.
- 3.2 However, even if the UK is successful in meeting its net zero targets, we are only responsible for around 1 per cent of global emissions (Chart 3.1). Therefore, we will still have to contend with the economic and fiscal implications of further rises in global temperatures, even in a best-case scenario where global ambitions are met. This is because of the additional near 1 degree Celsius warming that is already due to happen between now and 2050), even if the UK and other countries who have made pledges meet their existing commitments to reduce or eliminate their emissions by this date. On top of this, there is the not immaterial risk that the UK or, more importantly, other countries fail to meet their decarbonisation targets on time and global temperatures rise even further than the around 2 degrees Celsius predicted on current commitments, perhaps significantly higher; and/or that any number of many ‘tipping points’ are triggered.¹ Therefore, to build a more complete picture of the fiscal implications of climate change and put our estimates of the costs of *mitigation* in context, we could focus the next phase of our analytical work on the two other major sources of fiscal risk from climate change: *damage* and *adaptation*.

¹ A tipping point is a when an event is triggered due to higher temperatures which causes large and irreversible changes to the Earth’s climatic system, which may induce and perpetuate a chain reaction of further extreme climatic events, facilitating rapid rises in global temperatures. There are thought to be several tipping points, for example the thawing of the Russian permafrost, the melting of the Greenland and West Antarctic ice sheets, Amazon Rainforest and Boreal Forest dieback, or the die-off of coral reefs, to name a few.

Chart 3.1: Global greenhouse gas emissions in 2021



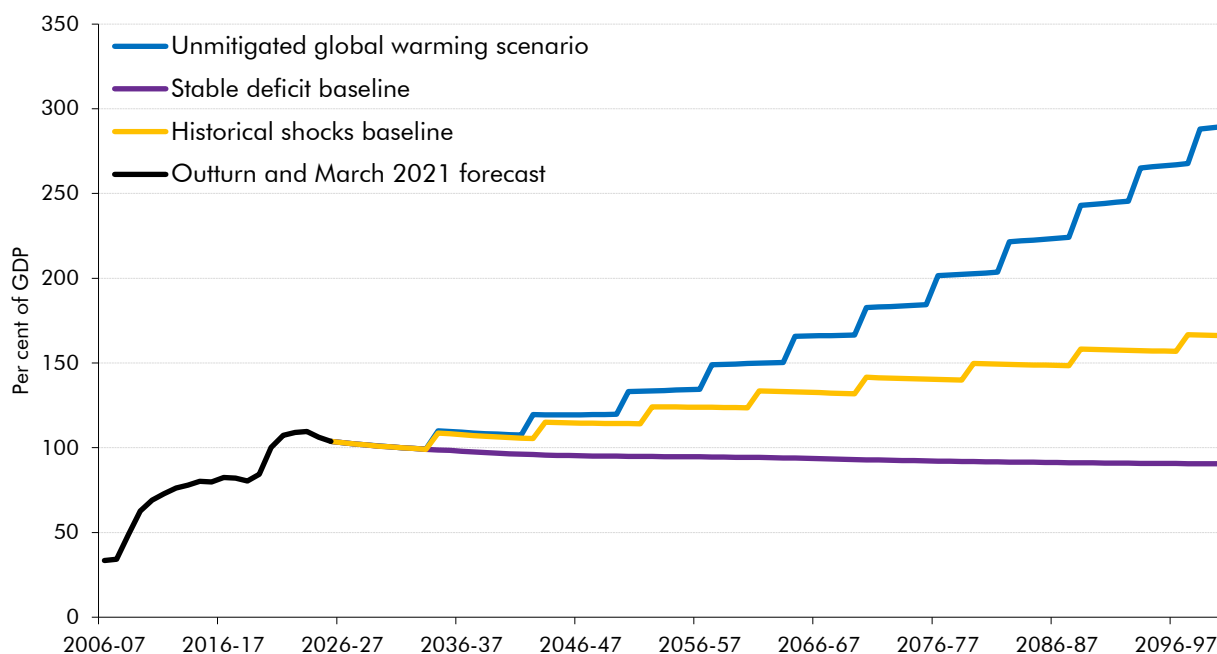
Source: Our World in Data

Developing more sophisticated estimates of climate change damage

3.3 In this light, we propose that our immediate next step be the development of a more sophisticated estimate of the potential economic damage and possible range of fiscal costs from climate change. Our 2021 *FRR* chapter included a highly stylised illustration of the potential GDP impact from climate change (reproduced in Chart 3.2 below), which assumed that it would result in economic shocks that are twice as frequent and twice as severe as in the past. However, more elaborate spatial and sectoral models of the potential economic damage from rising temperatures, higher sea and river levels, and more severe weather events are under development. This includes the work of private sector bodies, such as re-insurance, consulting, asset management companies, academia and think tanks, as well as public entities such as the Bank of England.² To provide a more robust counterfactual for our estimates of the fiscal costs of reaching net zero and halting the rise in global temperatures, we propose to draw on these ‘climate damage’ models to develop a more sophisticated estimate of the potential cost of climate change on the UK economy and public finances, both if the UK takes policy decisions to adapt in advance to reduce the costs of climate damage, and if the UK does not.

² For example, re-insurance companies Swiss Re and Munich Re have built modelling to assess climate change and natural catastrophe risk, while institutions such as KPMG, PWC, Deloitte, Oxford Economics, and other consultancy firms are building up their climate risk modelling work.

Chart 3.2: Public sector net debt: a global warming scenario



Source: ONS, OBR

Estimating the fiscal implications of adapting to climate change

3.4 The overall economic and fiscal costs of climate change also depend on the extent to which governments, firms, and households adapt to rising global temperatures, water levels, and extreme weather events. The above estimate from our 2021 *FRR* of the fiscal cost of adaptation was based on the stylised assumption that each degree of warming required an additional 0.3 percent of GDP per year in public spending on adaption and damage.³ A more sophisticated estimate of adaptation costs could draw on evidence and methods from a growing number of domestic and international sources. In the UK, the NIC investigate the risk to and resilience of the UK’s national infrastructure in the face of adverse climate and weather events, while Flood Re (a public re-insurer) produce analysis on the risks and requirements for flood insurance.⁴ Overseas, in the United States, the Council of Economic Advisors and the Office of Management and Budget has produced assessments on the Federal government budget’s exposure to climate risks and a white paper in March 2023 on methodologies for integrating physical and transition risks into their budgetary macroeconomic forecasts.⁵ In Canada, in November 2022, their Parliamentary Budget Office (PBO) produced a report on the impact of greenhouse gas emissions and Canadian GDP.⁶ And the Australian Treasury has made its first estimates of the impacts of climate change on productivity in its latest intergenerational report.⁷ We would propose to build on

³ See Chapter 3 of our 2021 *Fiscal risks report* which sets out the estimates behind this number.

⁴ National Infrastructure Commission, *Second National Infrastructure Assessment: Baseline Report*, November 2021.

⁵ Office of Management and Budget, *Federal Budget Exposure to Climate Risks*, April 2022, and the Council of Economic Advisers & Office of Management and Budget, *Methodologies and Considerations for Integrating the Physical and Transition Risks of Climate Change into Macroeconomic Forecasting for the President’s Budget*, March 2023.

⁶ Office of the Parliamentary Budget Officer, *Global greenhouse gas emissions and Canadian GDP*, November 2022.

⁷ Australian Government, *Intergenerational Report 2023: Australia’s future to 2063*, August 2023.

these pieces of analysis and methodologies to develop more comprehensive estimates of the cost of adapting to differing degrees of climate change in the UK.

Exploring alternative climate change scenarios

3.5 Of course, the overall long-run fiscal cost of climate change will depend on what action is taken in both the UK and the rest of the world. The UK is a relatively small contributor to direct current and future global carbon emissions but has a considerable degree of control over how much and how quickly it adapts to rising global temperatures.⁸ As illustrated in Table 3.1 below, the highest costs to the UK are likely to come from a situation in which the world fails to reach net zero (which is what is likely to happen based on current national policy settings) and the UK fails to adapt to the resulting rise in global temperatures. The best outcome economically and fiscally is likely to be one in which the world puts in place the policies needed to reach net zero *and* the UK makes the investments needed to adapt to the more modest associated rise in global temperatures.

Table 3.1: Illustrative future grid: physical and adaptation costs of climate change

	UK adapts in advance of climate change	UK does not adapt
Per cent of GDP by 2050		
World achieves net zero (mitigated)	% of GDP by 2050	% of GDP by 2050
World doesn't achieve net zero (unmitigated)	% of GDP by 2050	% of GDP by 2050

3.6 A further step in our climate change analysis could therefore be to explore alternative scenarios for climate change mitigation, adaptation, and damage based on different paths of UK and global policy action (based upon the work of experts in the climate science field). By bringing together all three potential sources of climate-change related costs, this would provide a more comprehensive and accurate picture of the long-run economic and fiscal cost of rising global temperatures. It could help highlight to policymakers the choices and trade-offs involved in pursuing different climate change strategies.

Building climate change into our medium and long-run fiscal projections

3.7 Much of the above work would be published in future climate change-related chapters of our *Fiscal risks and sustainability* reports. But as our understanding of the economic and fiscal impacts of climate change develops, we could also look to integrate them more systematically into the models we use to make medium-term and long-run economic and fiscal projections.

- Our medium-term *EFOs* already incorporate an explicit assumption about take-up of EVs given its material impact on our fuel duty forecast. And we explicitly forecast the revenue from the Emissions Trading Scheme and Climate Change Levy. Going

⁸ While the UK is *directly* responsible for emitting a relatively small proportion of global emissions domestically, UK policy can cover and influence a much larger proportion of global emissions (our non-territorial emissions), for example via our dependence on the global supply chain, or through the UK banking and financial sector's global footprint.

forward, we could build on our recent *Working paper 18* to more systematically incorporate the impact of the net zero transition on other tax bases. On both the tax and spending policy side, we could work with HMT, DESNZ and CCC to more systematically identify and track the overall volume of public resources being committed to climate change mitigation and adaptation.

- Since *FRR 2021*, our long-term fiscal projections have also included the decline in fuel duty and other fuel taxes to zero by the mid 2030s as a consequence of the Government's net zero policies.⁹ As in our medium-term forecasts, we could also look to build in wider receipts effects on the more emissions-related taxes. Given the 50-year horizon of these projections, we could also consider incorporating the likely impact of rising temperatures and more severe weather events on the economy.

Working with our UK and international partners

3.8 As a global challenge that touches upon many aspects of our national life, we would look to continue to pursue this analysis in close collaboration with institutional partners in the UK and around the world.

- In the UK, we would look to build on our successful engagement with other public bodies including HMT, DESNZ, the CCC, and the NIC, proposing the creation of a cross-government climate change economics network. We would also look to work more closely with Defra, as the departmental owners of the UK's National Adaptation Programme, and to strengthen our links with academic and private sector experts in the science and economics of climate change, through the new 'energy and climate change' sub-group of our Advisory Panel.
- Internationally, the UK co-chairs the OECD network of independent fiscal institutions sub-group on climate change which provides a forum for fiscal councils around the world to share experience and insights in this area. Following publication of the climate change chapter of our 2021 *FRR*, we have helped two French government agencies to produce their own estimates of the fiscal costs of net zero in France, using our *FRR* chapter as a template for their own analysis¹⁰. Public agencies in other countries including the US, Canada, Ireland and Australia have also done pioneering work in the areas of climate damage and adaptation whose methods we could look to apply to the UK, as mentioned in paragraph 3.4.

⁹ Following the Prime Minister's announcement in September 2023 that the ban on new petrol and diesel car sales will be pushed back to 2035, we will update our assumptions on fuel duty receipts in our upcoming forecast.

¹⁰ Inspection générale des finances, *Enjeux macroéconomiques et budgétaires de la neutralité carbone*, November 2022. Pisani-Ferry, J., and S. Mahfouz, *Les incidences économiques de l'action pour le climat*, May 2023.

4 Feedback

4.1 In light of the above description of what we might cover in our future analytical work on climate change, we would welcome views on the following questions:

- 1 Are these the correct areas of focus, given our scope and mandate?
- 2 What work have you done that could help in this analysis?
- 3 What work do you have forthcoming in this space that we could draw upon in the coming years?
- 4 How would our analysis in these areas be of most use to you and your organisation?

Submitting your feedback

4.2 This discussion paper has outlined potential pathways for our work on the fiscal and economic impacts of climate change. We are now requesting responses to these questions and – given our limited expertise in this area – would also welcome responses that detail further areas of inquiry that may not have been mentioned in the paper.

4.3 While many institutions around the world are looking into the impacts of climate change, this remains a relatively new area for governments and independent fiscal institutions. We would therefore be particularly grateful for responses that detail credible research and evidence that we can draw on as we embark on this task. Responses will help inform our analytical agenda in this space going forward.

4.4 Please send all comments to Feedback@obr.uk – ideally by 20 December 2023. Please indicate whether you are happy for us to cite your submissions publicly.

