

Pricing Pollution Properly

How carbon pricing could decarbonise the UK

BY EAMONN IVES

WITH A FOREWORD FROM STANLEY JOHNSON





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Foreword

This is a timely and important report.

Way back in 1973, the United Kingdom signed up to the Polluter Pays Principle when as a new member of the European Economic Community (as it then was) it approved the first EEC Environmental Action Programme. As one of its five guiding principles, that programme included the statement: ‘the cost of preventing and eliminating substances must in principle be borne by the polluter.’

That principle was spelled out in more detail in 1975 when the Council formally adopted the Polluter Pays Principle and it was reconfirmed in subsequent EU Treaties, such as the Single Act (1986) and the Treaty on European Union (1992).

The UK was therefore legally bound to apply the PPP in a manner consistent with European law throughout the whole period of its EU membership (Jan 1, 1973, to Dec 30, 2019) though keen students of the period tend to the conclusion that, as a practical matter, the principle was honoured more in the breach than the observance.

Though virtually the whole of EU environmental law as it applied to different sectors or products was carried over post-Brexit into UK law, the five underlying principles (including the PPP) were deliberately omitted by Mrs May’s government, and it is not clear whether the ‘non-regression’ clauses in the environment section of the EU-UK Withdrawal Agreement (2019) can compensate for their absence.

The government anyway appears to be of the view that we are starting from scratch, since the Environment Bill currently being considered by Parliament lays a duty on the Secretary of State for the Environment to ‘prepare a policy statement on environmental principles’ including the PPP.

If anyone is in doubt as to the practical importance of applying the PPP, I suggest they read Eamonn Ives’ report for the CPS on Pricing Pollution Properly. Mr Ives outlines with great clarity the urgency of applying the polluter pays principle to the carbon sector and the immense potential carbon taxes have as a tool for ensuring that the UK meets its stated climate goals, including both near and longer-term objectives.

Mr Ives wisely points out that it will be ‘essential to couple the introduction of a carbon tax with complementary measures to mitigate any potentially regressive impacts it might have’.



Without wishing to make a 'party political' point, it seems to me that such complementary measures would be consistent with the 'levelling up' strategy espoused by the present government.

They will be crucial too at a global level. National carbon taxes are in my view not only one of the key tools for enabling countries to deliver on the commitments in their own; they will also – and crucially – help to generate the funds needed so that the rich and historically 'mega-polluting' countries can help less fortunate nations meet their own stated objectives.

Realistically, carbon taxes introduced at a national level will need to be supported by cross-border carbon taxes (as proposed by Dr Liam Fox MP in his recent essay, published by CPS). Indeed, the EU seems to be moving swiftly in that direction. This is one area, surely, where it makes sense to match in lockstep with our friends across the Channel.

Stanley Johnson is a former MEP, and International Ambassador for the Conservative Environment Network.



Executive Summary

A clear priority of the current Government is to rapidly decarbonise the economy. At the 2019 general election, cutting emissions to Net Zero was one of six guarantees Boris Johnson made to the British public, alongside getting Brexit done and levelling up the economy.¹ Since then, nearer term climate targets have also been agreed to – such as an ambition to reduce emissions by 68% relative to 1990 levels by 2030, and by 78% by 2035.^{2,3} Climate action is an integral focus for this Government.

‘Until 2019, the UK was committed only to an 80% cut in emissions relative to 1990 levels. The advent of Net Zero changed that, and policy has needed to keep up.’

Already, a series of plans and policies have been announced by the Government for how it intends to nudge Britain closer to being able to meet these objectives. In November 2020, the *Ten Point Plan for a Green Industrial Revolution* detailed both targets and policies for cleaning up the economy.⁴ We have also seen a new Energy White Paper,⁵ a Transport Decarbonisation Plan,⁶ and an Industrial Decarbonisation Strategy.⁷ Soon, the Government is due to publish an overarching Net Zero Strategy, which will tie many of these threads together, and explain in greater detail how the laudable targets for emissions reductions will be met.

The reason for the flurry of new strategies is perhaps best explained by the step-up in ambition on climate action under the current and previous government, which in turn reflects the findings of new climate science.^{8,9} Until 2019, the UK was committed only to an 80% cut in emissions relative to 1990 levels. The advent of Net Zero changed that, and policy has needed to keep up.

Indeed, the Climate Change Committee has noted that for all the encouraging rhetoric and ambitious target-setting, the UK is still lacking in terms of cold, hard policies which will do the job of actually cutting emissions.¹⁰

1 Conservative and Unionist Party, *Get Brexit Done: Unleash Britain's Potential*. [Link](#).

2 Department for Business, Energy and Industrial Strategy, *The UK's Nationally Determined Contribution under the Paris Agreement*. [Link](#).

3 Department for Business, Energy and Industrial Strategy and the Prime Minister's Office, 10 Downing Street, *UK enshrines new target in law to slash emissions by 78% by 2035*. [Link](#).

4 HM Government, *The Ten Point Plan for a Green Industrial Revolution: Building back better, supporting green jobs, and accelerating our path to net zero*. [Link](#).

5 HM Government, *Energy White Paper: Powering our Net Zero Future*. [Link](#).

6 Department for Transport, *Decarbonising Transport: A Better, Greener Britain*. [Link](#).

7 HM Government, *Industrial Decarbonisation Strategy*. [Link](#).

8 Intergovernmental Panel on Climate Change, *Global warming of 1.5°C*. [Link](#).

9 Intergovernmental Panel on Climate Change, *Climate Change 2021: The Physical Science Basis: Working Group I contribution to the Sixth Assessment report of the Intergovernmental Panel on Climate Change*. [Link](#).

10 Climate Change Committee, *Net Zero – The UK's contribution to stopping global warming*. [Link](#).



This state of affairs represents a risk, however. In the bid to devise policies to decarbonise the economy, politicians must tread carefully, and not go down pathways which make decarbonisation more expensive than it needs to be, or politically unpalatable for citizens, or inadequate in terms of progressing towards Net Zero. Policies to cut emissions must be effective, and they must be fair.

Understanding how to navigate this landscape is challenging, but the UK does start from a fortunate position. It has nearly halved its emissions since 1990, and has done so while growing its economy, and effectively decoupling the link between rising prosperity and rising pollution.¹¹

‘Carbon pricing can ensure that decarbonisation is done in a fair and responsible way, which does not harm the least well off in society – either directly or through inflicting damage on the economy’

Behind this feat are many different explanations, and different policy choices. Subsidies, regulations, technological progress and tax policy have all combined to decarbonise the economy. Yet some policies have been more successful than others. In particular, those which put a price on polluting activities have played an outsized role in decarbonising the sectors which they apply to. This can be seen in terms of how Britain’s electricity grid has been cleaned up in recent years, as well as in emissions reductions from the waste sector.¹²

Environmental economists should not be surprised by this. For decades, pricing pollution – for instance via carbon taxes – has been a favoured policy intervention for multiple reasons.^{13,14,15} It has demonstrably been successful at steering decision making, resulting in a greener economy – both in the UK and abroad.^{16,17} Much of the literature on the economic effects of carbon pricing finds little or nothing in the way of negative impacts on either GDP or employment growth rates – with some evidence even suggesting carbon pricing can have a positive impact.^{18,19} If designed properly, carbon pricing can ensure that decarbonisation is done in a fair and responsible way, which does not harm the least well off in society – either directly or through inflicting damage on the economy.

As the UK looks to close the Net Zero policy gap, giving greater attention to carbon pricing will be indispensable. Carbon pricing is a potent, market-based tool to drive decarbonisation. By embodying the ‘polluter pays’ principle, it is also an inherently conservative way to reduce emissions – as it places the burden to decarbonise on those who are directly responsible for climate change.

11 Office for National Statistics, *The decoupling of economic growth from carbon emissions: UK evidence*. [Link](#).

12 Eamonn Ives, *Bridging the Gap: The case for new nuclear investment*. [Link](#).

13 Nicholas Stern, *Stern Review on the Economics of Climate Change*. [Link](#).

14 David Klenert et al., *Making Carbon Pricing Work*. [Link](#).

15 Stephen J. DeCanio, *The Economics of Climate Change*. [Link](#).

16 Vivid Economics, *The Future of Carbon Pricing in the UK*. [Link](#).

17 Samuel Jonsson, Anders Ydstedt and Elke Asen, *Looking Back on 30 Years of Carbon Taxes in Sweden*. [Link](#).

18 Gilbert E. Metcalfe and James H. Stock, *The Macroeconomic Impact of Europe’s Carbon Taxes*. [Link](#).

19 Gilbert E. Metcalfe, *On the Economics of a Carbon Tax for the United States*. [Link](#).



But if the Government is to implement a comprehensive carbon tax, which covers emissions across more of the economy, how should it go about it? Such an intervention would have to be extremely carefully designed in order to command public acceptance and avoid negative economic impacts. We are already seeing this autumn and winter how the politics and economics of energy can affect millions of people's lives, and how bad decisions – or a failure to make decisions – can reverberate decades later.

‘In the bid to meet its future climate goals, it is imperative that the Government adopts policies that ensure that the transition towards Net Zero is as cost-effective and sure-footed as possible’

A particular objection to a carbon tax is that it would be regressive, since raising the costs of carbon-intensive goods would affect those lower down the income scale. This in turn would undermine public support for the shift to a greener economy.

Therefore, while we support the introduction of a comprehensive carbon tax, we believe it would be essential to couple its introduction with complementary measures to mitigate any potentially regressive impacts it would have. These could include a system of carbon dividends to rebate money back to citizens; a carbon border adjustment mechanism to safeguard against the possibility of carbon leakage; and support for British innovators and companies who are researching and developing the clean technological solutions to deliver a less carbon-intensive economy. Above all, it must be clear to the public that this represents a rebalancing of the tax base, in order to incentivise greener technologies and activities, and not simply a backdoor way of the Treasury taking more cash from their pockets.

In the bid to meet its future climate goals, it is imperative that the Government adopts policies that ensure that the transition towards Net Zero is as cost-effective and sure-footed as possible. Carbon pricing should be front and centre of that endeavour. As the Government prepares to host COP26 and publish its Net Zero Strategy, now is the perfect time to begin the move towards it.



I. Introduction – the current state of decarbonisation

Climate change is one of the most pressing threats facing society. Centuries of rising concentrations of atmospheric greenhouse gases have caused the planet to warm, and the climate to destabilise.^{20,21,22} Its effects are evidenced in terms of the increased frequency and severity of various different natural weather phenomena,²³ ecosystem collapse,²⁴ and the potential dawning of the ‘Sixth Mass Extinction’ as flora and fauna struggle to adapt to their rapidly changing surroundings.²⁵

‘At the 2019 General Election, Boris Johnson successfully stood on a manifesto which included getting to Net Zero by 2050 as one of his six main guarantees to the British public’

To prevent the worst long-run consequences of climate change from materialising, 196 countries agreed a set of measures to curb greenhouse gas emissions, at the 21st Conference of Parties to the United Nations Framework Convention on Climate Change (COP21) in 2015.²⁶ Under what became known as the Paris Agreement, signatories pledged to aim to keep global warming since pre-industrial times to well below 2C, and preferably to 1.5C.²⁷ Following COP21, the Intergovernmental Panel on Climate Change produced a seminal report in 2018 which stated that global greenhouse gas emissions would need to reach ‘Net Zero’ – where any remaining emissions are permanently sequestered – by around mid-century if humanity is to have a reasonable chance of limiting global warming to 1.5C.²⁸

In May 2019, the Climate Change Committee (CCC) – the independent body which advises Britain’s central and devolved governments on climate change – recommended the Government set a Net Zero target for 2050, arguing that such a goal was ‘necessary, feasible, and cost-effective’.²⁹ The following month, the Government accepted the CCC’s advice, and the United Kingdom became the first major economy to set a legally binding commitment to Net Zero greenhouse gas emissions by 2050.³⁰ At the 2019 General Election, Boris Johnson successfully stood on a manifesto which included getting to Net

20 NASA, *Vital signs: Carbon Dioxide*. [Link](#).

21 NASA, *Vital signs: Global Temperature*. [Link](#).

22 Intergovernmental Panel on Climate Change, *Climate Change 2021: The Physical Science Basis: Working Group I contribution to the Sixth Assessment report of the Intergovernmental Panel on Climate Change*. [Link](#).

23 Carbon Brief, *How climate change affects extreme weather around the world*. [Link](#).

24 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, *Global Assessment Report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. [Link](#).

25 Hannah Ritchie, *Extinctions*. [Link](#).

26 United Nations Climate Change, *The Paris Agreement*. [Link](#).

27 Ibid.

28 Intergovernmental Panel on Climate Change, *Global warming of 1.5°C*. [Link](#).

29 Climate Change Committee, *Net Zero – The UK’s contribution to stopping global warming*. [Link](#).

30 Department for Business, Energy and Industrial Strategy, *UK becomes first major economy to pass net zero emissions law*. [Link](#).



Zero by 2050 as one of his six main guarantees to the British public.³¹ Since then, the UK has also adopted nearer-term climate goals, such as a 68% and 78% cut to emissions by 2030 and 2035 respectively, relative to 1990 levels in both cases.³²

The UK did not enter into its Net Zero commitment from a standing start, however. The Climate Change Act 2008 – passed with overwhelming bipartisan support – already committed the UK to at least an 80% cut to greenhouse gas emissions by 2050 relative to 1990 levels.³³ Other climate policies can be traced back further³⁴ – and one can also point to a number of examples of legislation which positively influenced decarbonisation, without climate change necessarily being the operative focus.³⁵

‘The Climate Change Act 2008 – passed with overwhelming bipartisan support – already committed the UK to at least an 80% cut to greenhouse gas emissions by 2050 relative to 1990 levels’

In other words, even prior to Net Zero being adopted in 2019, the UK had been successfully shedding emissions from its economy for some time. Indeed, since 1990, emissions of greenhouse gases have reduced by 44%.³⁶ A key aspect of this progress, however, is that it has been made largely ‘behind the scenes’. While there certainly were some early adopters of electric vehicles, or vegan or vegetarian diets, these individuals remained – and still remain – the small minority. Instead, the bulk of the decarbonisation witnessed since 1990 has been achieved by greening supply chains, targeting emissions from niche sectors, and, critically, cleaning up the electricity supply.³⁷

This has allowed decarbonisation to go largely unnoticed by the ordinary public, and without a great deal of politicisation – some noticeable examples aside.³⁸ But it also means that when it comes to cutting emissions, a lot of the low-hanging fruit has already been picked.

The next phase of decarbonisation will almost inevitably be more disruptive. It will require more active changes to be made, with individuals needing to take more responsibility for lowering their own carbon footprints.^{39,40} This also poses challenges to the political consensus in favour of climate change, which has remained strong over the past decade or so.⁴¹ (Polling shows that the British public are the most in favour of action of any developed country, and that there is a strong cross-party consensus on the issue.)^{42,43}

31 Conservative and Unionist Party, *Get Brexit Done: Unleash Britain's Potential*. [Link](#).

32 Department for Business, Energy and Industrial Strategy and the Prime Minister's Office, 10 Downing Street, *UK enshrines new target in law to slash emissions by 78% by 2035*. [Link](#).

33 Climate Change Act 2008, c. 27. [Link](#).

34 Department for Transport and the Department for Environment, Food and Rural Affairs, *Our energy future – creating a low carbon economy*. [Link](#).

35 Clean Air Act 1993, c. 11. [Link](#).

36 Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).

37 Department for Business, Energy and Industrial Strategy, *Energy Trends: UK electricity: Fuel used in electricity generation and electricity supplied (ET 5.1 – quarterly)*. [Link](#).

38 Rowena Mason, *David Cameron at centre of 'get rid of all the green crap' storm*. [Link](#).

39 Richard Carmichael, *Behaviour change, public engagement and Net Zero*. [Link](#).

40 Brett Meyer and Tim Lord, *Planes, Homes and Automobiles: The Role of Behaviour Change in Delivering Net Zero*. [Link](#).

41 Climate Assembly UK, *The path to net zero*. [Link](#).

42 United Nations Development Programme and the University of Oxford, *The Peoples' Climate Vote*. [Link](#).

43 Tim Lord, Brett Meyer and Ian Mulheirn, *Polls apart? Mapping the Politics of Net Zero*. [Link](#).



Here, one concern reigns supreme: the potential costs of further climate action to the poorest in society. Without careful consideration, forthcoming decarbonisation efforts could penalise those who are less able to react to new policies, regulations or taxes. Some existing green policies already weigh more heavily on the shoulders of individuals and households in lower income deciles than they on those of their more affluent counterparts.⁴⁴ There is also significant concern among businesses, who have already seen energy costs rise and fear the push for stronger climate action could render them less competitive relative to their foreign counterparts.

The longer-term impacts of ill-thought-through climate policy should also be taken into consideration. Policies which hamper economic growth, or create unemployment, or result in other unwelcome economic consequences, pose threats to the living standards of all.

‘Making the wrong decisions at the wrong time risks jeopardising Net Zero – either by failing to act quickly enough, or by acting in such a way which leads to the current climate consensus fracturing’

In short, decarbonisation has the potential to be regressive, and so thought must be given to how this can be mitigated, so that the costs are both minimised and fairly apportioned. It must also be kept in mind that the costs of decarbonising the economy can be bigger or smaller, depending on which policy decisions are made, and when. In July 2021, the Office for Budget Responsibility published its *Fiscal risks report*, which modelled a ‘delayed action’ scenario to combating climate change, and found that to defer decisive steps until 2030 would ultimately leave gross domestic product 3% lower than taking action early on, and need public spending to increase on climate by around a half.⁴⁵

Making the wrong decisions at the wrong time risks jeopardising Net Zero – either by failing to act quickly enough so as to meet it by 2050, or by acting in such a way which leads to the current climate consensus fracturing, and political support for further decarbonisation evaporating. While climate sceptics in the UK have been unsuccessful in stopping the overall direction of climate policy, various actors now seem intent on using Net Zero as a political flashpoint, in such a way which could undermine it as an overall objective.⁴⁶

In this report, we examine how the current Government can avoid such a scenario transpiring. In Chapter III, we make the case for comprehensive carbon pricing coupled with a system of carbon dividend payments – which we believe to be the most market-friendly approach to delivering effective climate action without excessively penalising or coercing individuals or businesses. Adopting such a policy would, we argue, negate the need for as much government intervention in the economy as the case would be otherwise.

Before that, however, we start with an examination of the British economy in terms of which sectors are most polluting, and how this has changed since 1990 – in order to demonstrate that it is market mechanisms which have generally proved the most effective at promoting decarbonisation.

44 Anne Owen and John Barrett, *Reducing inequality resulting from UK low-carbon policy*. [Link](#).

45 Office for Budget Responsibility, *Fiscal risks report: July 2021*. [Link](#).

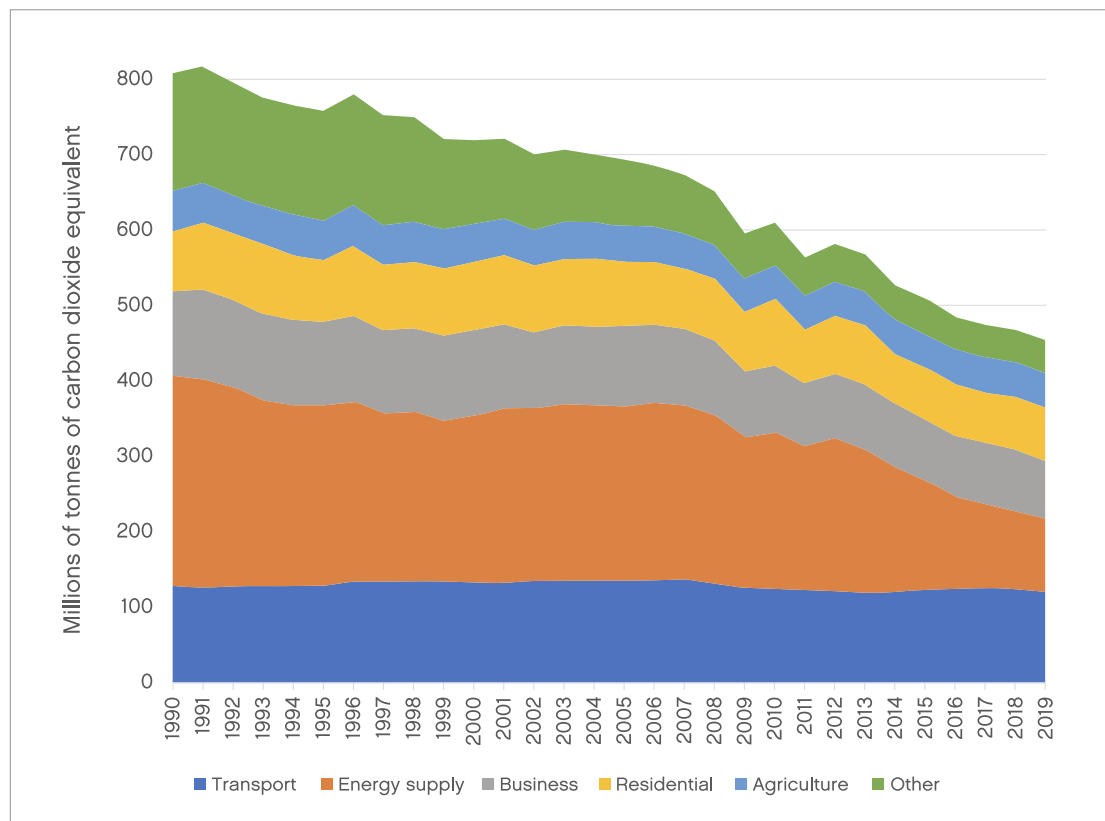
46 Bob Ward, *MP joins climate deniers’ ‘Project Fear’ on net zero*. [Link](#).



II. A sectoral assessment of British decarbonisation

The Department for Business, Energy and Industrial Strategy (BEIS) publishes annual data tables of greenhouse gas emissions in the UK. The most recently published data covered the period 1990 to 2019. As mentioned in the previous section, the UK has been successfully shedding emissions from its economy for decades. Chart 1, below, shows how the UK has managed to reduce its net greenhouse gas emissions from over 809 million tonnes of carbon dioxide equivalent (MtCO₂e) in 1990 to just under 455 MtCO₂e in 2019 – a reduction of 44%. This is despite a growing population (up 17%) and a growing economy (up 78%).^{48,49}

Chart 1. UK greenhouse gas emissions (1990-2019)



Source: Author's analysis of Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).⁵⁰

47 Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).

48 World Bank, *Population, total – United Kingdom*. [Link](#).

49 World Bank, *GDP (constant 2010 US\$) – United Kingdom*. [Link](#).

50 Other includes emissions from Waste management, Industrial processes, Public and Land use, land use change and forestry (LULUCF).



For reporting purposes, BEIS splits the whole economy into nine distinct 'National communication sectors'. Table 1, below, details what each sector comprises of, with its net greenhouse gas emissions totals from 2019.

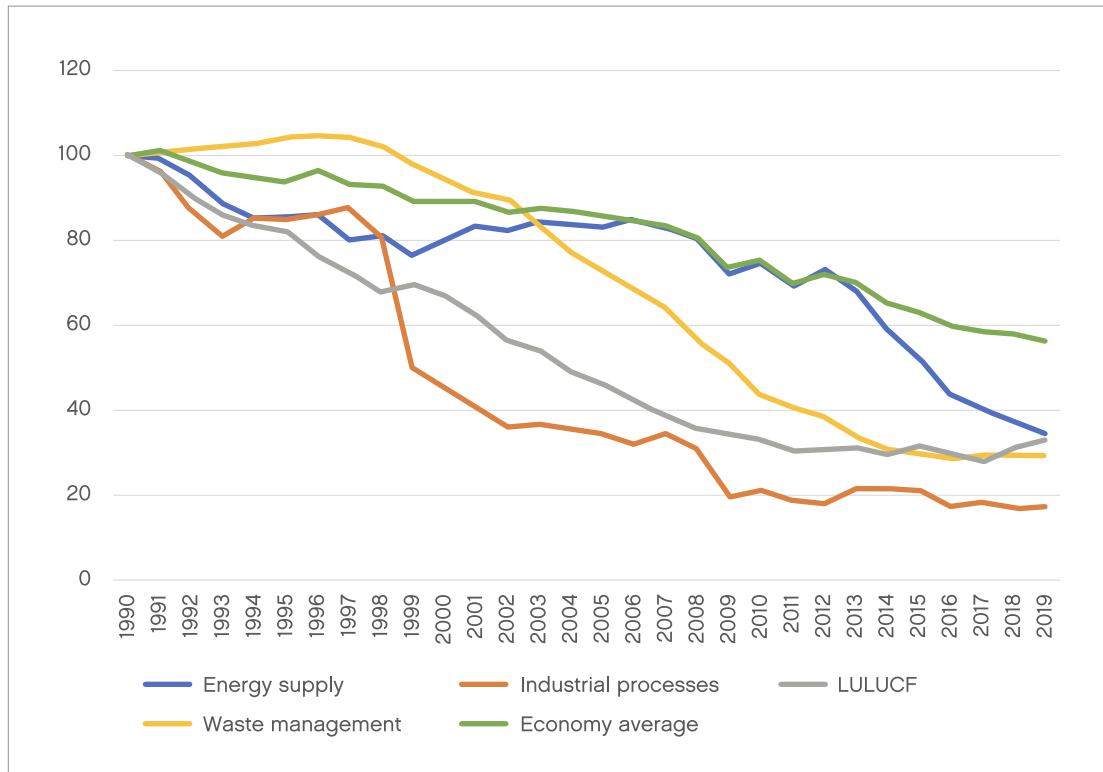
Table 1. UK greenhouse gas emissions by sector (2019)		
Sector	Definition	Emissions (MtCO ₂ e)
Transport	Road transport, domestic aviation, railways and domestic shipping. Transport only covers emissions from vehicles and not from transport related infrastructure, and international aviation and shipping are also excluded from national totals.	122.2
Energy supply	Electricity generation and other energy production activities, such as mining, refining and manufacturing fuels.	95.8
Business	Combustion in industrial and commercial sectors, industrial off-road machinery, and refrigeration and air conditioning.	77.9
Residential	Residential properties, including consumer product use. Residential emissions primarily consist of fuel combustion for heating and cooking, garden machinery, and fluorinated gases from aerosols and metered dose inhalers.	69.2
Agriculture	Livestock, agricultural soils, and agricultural machinery.	46.3
Waste management	Treatment and disposal of solid and liquid waste, for example from landfill, incineration and composting. Emissions from incineration with energy recovery are reported in the energy supply sector and emissions from residential composting are reported in the residential sector.	19.0
Industrial processes	Industrial processes, except those associated with fuel combustion, which are included within the business sector.	10.4
Public	Combustion of fuel in public sector buildings, such as hospitals and schools. Emissions from public transport are included within the transport sector.	7.9
Land use, land use change and forestry (LULUCF)	Changes in the carbon stock of forestland, cropland, grassland, wetlands, and so forth.	5.9

Source: Author's analysis of Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).



While the UK has been remarkably good at reducing emissions, this progress masks how different sectors of the economy have enjoyed vastly different levels of success in terms of decarbonisation. Despite every sector having lower emissions today than was the case in 1990, Charts 2 and 3 show how some sectors have witnessed considerable emissions reductions, while reductions in others have been decidedly less emphatic.

Chart 2. Sectors with above average decarbonisation (1990 = 100)

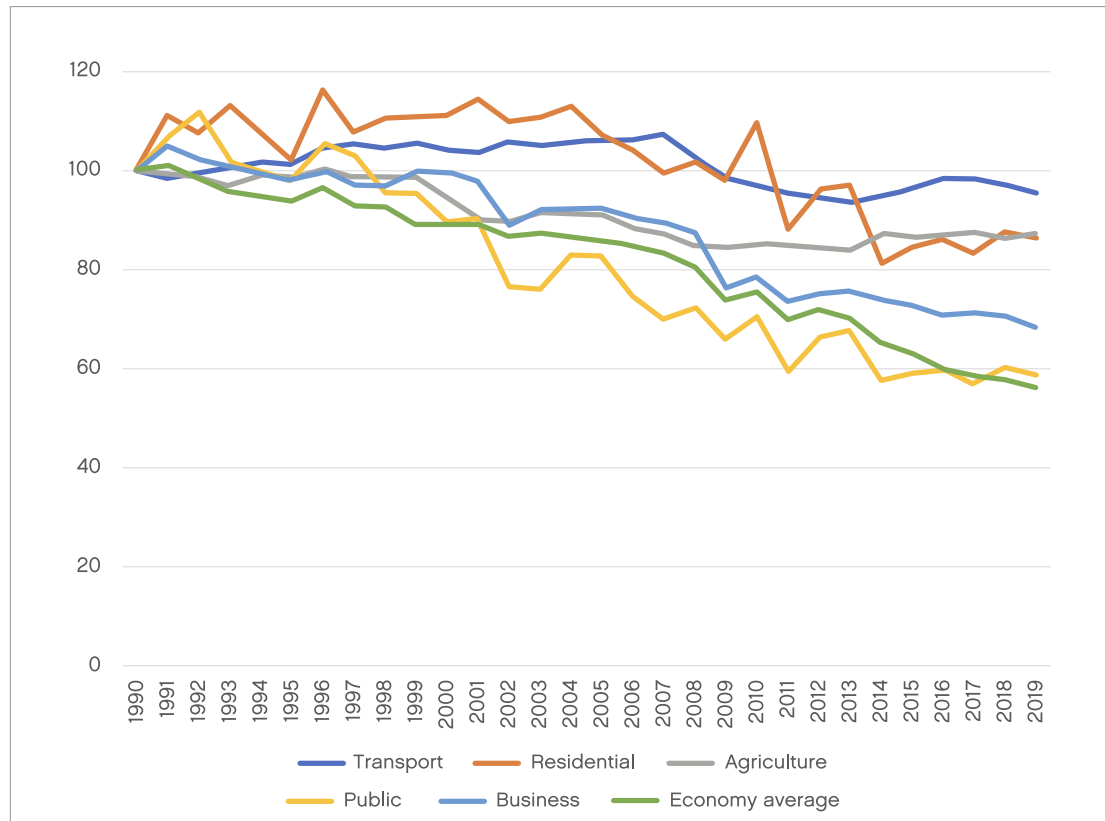


Source: Author's analysis of Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).

As Chart 2 shows, impressive emissions reductions have been made in energy supply; industrial processes; land use, land use change and forestry; and waste management. Altogether, decarbonisation in these four sectors alone has eradicated nearly 290 MtCO₂e from the British economy – representing 82% of all decarbonisation since 1990.



Chart 3. Sectors with below average decarbonisation (1990 = 100)



Source: Author's analysis of Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).

Chart 3 shows the sectors which have seen more sluggish emissions reductions. In fairness, some sectors, notably the public sector – and to a lesser extent business – are approaching average rates.⁵¹ But others – chiefly transport – have hardly decarbonised at all.

It must be stressed that the above analysis also masks intra-sector emissions data. Transport offers a good case in point. Overall, emissions fell by 5.92 MtCO₂e between 1990 and 2019 – a decrease of a little over 4.6%. But some elements of the sector have fallen far more than this, while others have increased. Emissions from 'railways – stationary combustion', for example, have all but been eliminated, plummeting by 99.4% between 1990 and 2019. Meanwhile, emissions from 'military aircraft and shipping' have contracted by 67.6%, and emissions from fishing vessels are down by 40.1%.

Yet emissions elsewhere in the sector have gone up – perhaps most notably among light duty vehicles, where emissions have increased in gross terms by 7.6 MtCO₂e, and in percentage terms by 65.4%. The sub-sector where emissions rose the most in percentage terms was actually aircraft support vehicles (up 169.3%), although this is more due to the fact it started from such a low base.

There is nothing to say that all sectors should decarbonise in perfect lock step with each other. For a start, how the data is collated will have a large impact on any final

⁵¹ In fact, emissions reductions from public actually outpaced the average decarbonisation rate for most of the last two decades, and has only lately fallen behind thanks to a small rise in emission in recent years.



analyses. The time frame you choose to observe, and how sectors are categorised, will have similar consequences. As noted above, moderate rises from low bases can also create all sorts of statistical confusion.

Moreover, some sectors that have hitherto been relatively poor at decarbonising may soon speed up. Consider waste management – one of the most rapidly decarbonising sectors of the economy in recent decades. Emissions were actually rising year on year for most of the 1990s, before quickly going into reverse. We should not dismiss the likelihood of similar progress transpiring elsewhere, perhaps even in the transport sector, where non-fossil-fuelled vehicles should start to reduce the sector's emissions as they are steadily adopted by more and more people and businesses.

**‘Emissions from ‘military aircraft and shipping’
have contracted by 67.6%, and emissions from
fishing vessels are down by 40.1%’**

On the other side of the same coin, some sectors which have hitherto been relatively successful at decarbonising may find that cutting their residual emissions is harder than anticipated. Various industrial processes, for instance, might struggle to find zero-emission alternatives to currently fossil-fuelled processes. Since even those sectors with above average decarbonisation rates account for over 131 MtCO₂e – or 29% of total emissions – there is no room to rest our laurels when it comes to the need for further emissions cuts even in praiseworthy sectors.

Despite all of this, however, the above charts still serve as useful illustrations of the divergence in how different sectors have decarbonised over recent decades. They highlight both where the UK has enjoyed success, and where more attention needs to be focused.

Indeed, being able to identify where the most progress has been made should be instructive for determining future action in sectors where emissions reductions have been less readily forthcoming. Though attributing all of the decarbonisation witnessed in a given sector to specific policy interventions would be rather simplistic, it should still be possible to pinpoint the key policy levers which were pulled in order to hasten decarbonisation. If they can be identified, and subsequently applied to those sectors where decarbonisation has been slower, it might help to allow such sectors to catch up, and accelerate the whole of the UK's economy in the race to Net Zero.

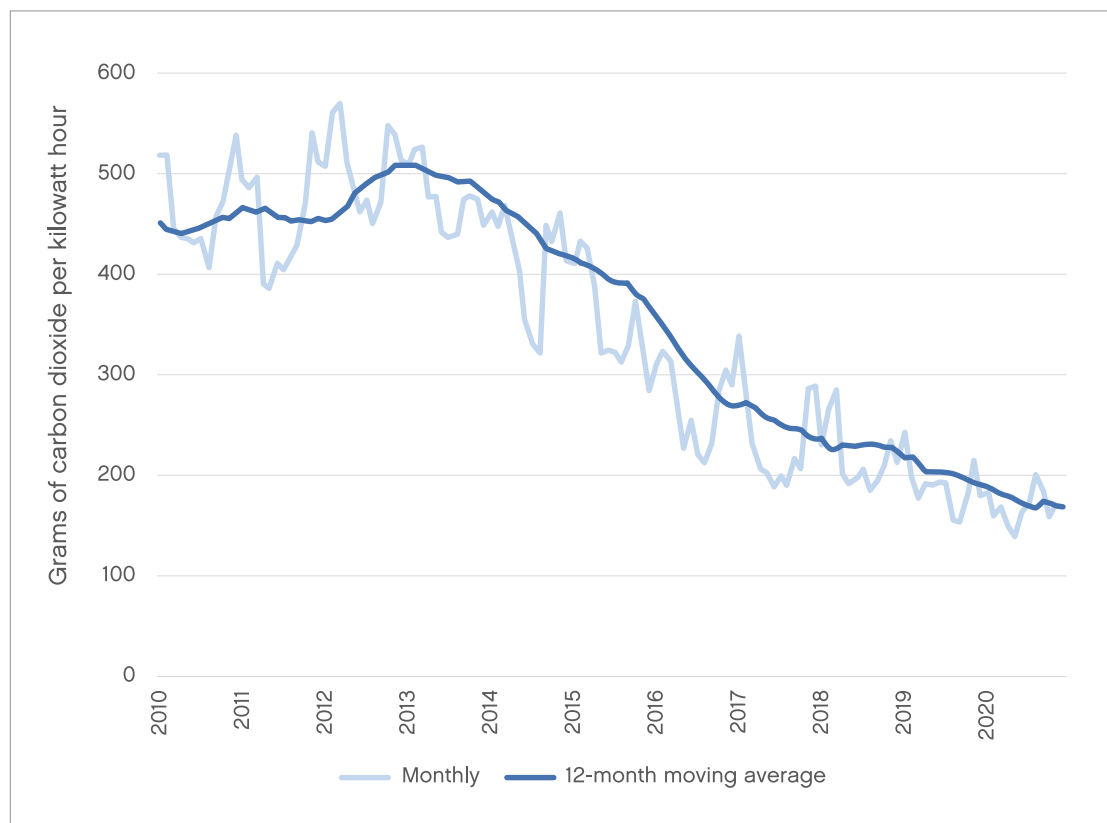


III. Delivering the next phase of decarbonisation in a fair and effective manner

Earlier, we noted how successful the UK has been in decarbonising its economy in recent decades – with emissions in 2019 a staggering 44% lower than in 1990.⁵² But we also noted that a lot of the decarbonisation witnessed in that period has taken place behind the scenes. To the ordinary citizen, emissions reductions have been largely imperceptible, with policies not requiring much, if any, action on their part.

The decarbonisation of Great Britain’s electricity grid – illustrated in Chart 4 – provides an example par excellence. Emissions of CO₂ per kilowatt hour of electricity produced in Britain averaged 508.3 grammes for 2012.⁵³ Just eight years later, that had fallen to 169.2g/kWh – a decrease of over two-thirds (67%).⁵⁴

Chart 4. Carbon intensity of Great Britain’s electricity (2010-2020)



Source: Author’s analysis of Drax, Drax Electric Insights. [Link](#).

52 Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).

53 Drax, *Drax Electric Insights*. [Link](#).

54 Ibid.



The primary reason for the reduction was the demise of coal-fired power stations, coupled with the rise of renewable generators – with wind and solar power generating 28% of all the electricity supplied to the grid in 2020.⁵⁵ And yet, this remarkable revolution in the electricity market was scarcely noticed by most consumers. They can still turn on their lights and charge their mobile phones – it is just that the electrons which allow them to do so are far greener than they once were.

Future decarbonisation efforts, however, will almost inevitably be more disruptive than those which have happened to date. The journey to Net Zero will, in all likelihood, require a much more active level of participation from consumers and businesses. With this comes a danger that, faced with new demands to do more to cut emissions, individuals will withdraw their strong existing levels of support for decarbonisation, and the UK lag or even default on its climate goals.⁵⁶

‘Future decarbonisation efforts will almost inevitably be more disruptive than those which have happened to date’

Potential policy flashpoints could come in two forms. First, exorbitant costs foisted upon anyone – particularly the least well off in society – may lead many to believe the green transition simply is not worth it. Sacrificing economic growth, incurring higher unemployment or other macroeconomic problems caused by – or even simply perceived to have been caused by – climate policies could have the same effect.

Second, policy interventions which are deemed to excessively curtail personal freedom or impose intolerable disruption in individuals’ everyday lives also risk jeopardising the current widespread – yet fragile – climate consensus. For months, some of the biggest climate policy battles have centred on stories (of varying accuracy) about how gas boilers will be ‘ripped out’ of Britain’s homes,⁵⁷ while phase-out dates for the sale of new petrol and diesel cars have generated equal levels of ire from certain quarters.⁵⁸

And yet, recent polling from Opinium found 55% of UK adults – with no difference between ‘Red Wall’ and non-Red Wall voters – agreeing with the statement: ‘We [cannot] afford not to implement policies intended to address climate change’.⁵⁹ It is precisely because of this appetite for robust climate action why we assert that there is the potential, but not certainty, for such policy flashpoints to arise.

Nevertheless, it is in this broad context that decarbonisation policies must be formulated. Policymakers need to be sensitive to such concerns. Even among those who believe in climate action, continuing support cannot be taken for granted. For the journey to Net Zero to be successful, it must have ongoing and informed consent from the vast majority of society.

55 Department for Business, Energy and Industrial Strategy, *Energy Trends: UK electricity: Fuel used in electricity generation and electricity supplied (ET 5.1 – quarterly)*. [Link](#).

56 Department for Business, Energy and Industrial Strategy, *BEIS Public Attitudes Tracker (March 2021, Wave 37, UK)*. [Link](#).

57 Sascha O’Sullivan, *Millions of homes need gas boilers ripped out within 8 years as Boris vows to cut emissions by 68% by 2030*. [Link](#).

58 Allister Heath, *This rushed electric car revolution will backfire disastrously on Boris*. [Link](#).

59 Opinium, *Opinium and the European Climate Foundation*. [Link](#).



With this in mind, we believe that future decarbonisation policy should at a minimum adhere to two tests:

- i) **Policies to decarbonise the economy must be effective.** If decarbonisation policies are not cutting emissions for a sufficient quantity at a sufficient rate, they cannot be regarded as adequate for meeting objectives such as Net Zero.
- ii) **Policies to decarbonise the economy must be fair.** Decarbonisation policies must be tolerable to virtually everyone in society. We should not expect some groups to do more than their fair share, and we should absolutely not allow others to abdicate responsibility for the consequences of their actions.

There are, of course, other tests that can and should be applied. As believers in the virtues of limited government, personal liberty, and free-market economics, we at the Centre for Policy Studies would insist that policies should be as respectful as possible of these concepts. But policies which fall short of the initial two tests will be either practically futile or politically intolerable – meaning that the chance of them helping the UK to get to Net Zero will be particularly slim.

‘The sheer mass of different measures which the UK has adopted in recent decades to lower emissions have formed a nebulous web of regulations, schemes, initiatives, regulators, taxes, subsidies and so on’

It is therefore vital to examine how well past and current decarbonisation policy lives up to our tests. This is, of course, a tricky exercise. The sheer mass of different measures which the UK has adopted in recent decades to lower emissions have formed a nebulous web of regulations, schemes, initiatives, regulators, taxes, subsidies and so on. Arriving at a conclusive judgement is challenging, if not absolutely impossible.

But it is still possible – using the data in the chapter above – to isolate the broad types of policies which appear to have been relatively successful, and, conversely, those which have not.

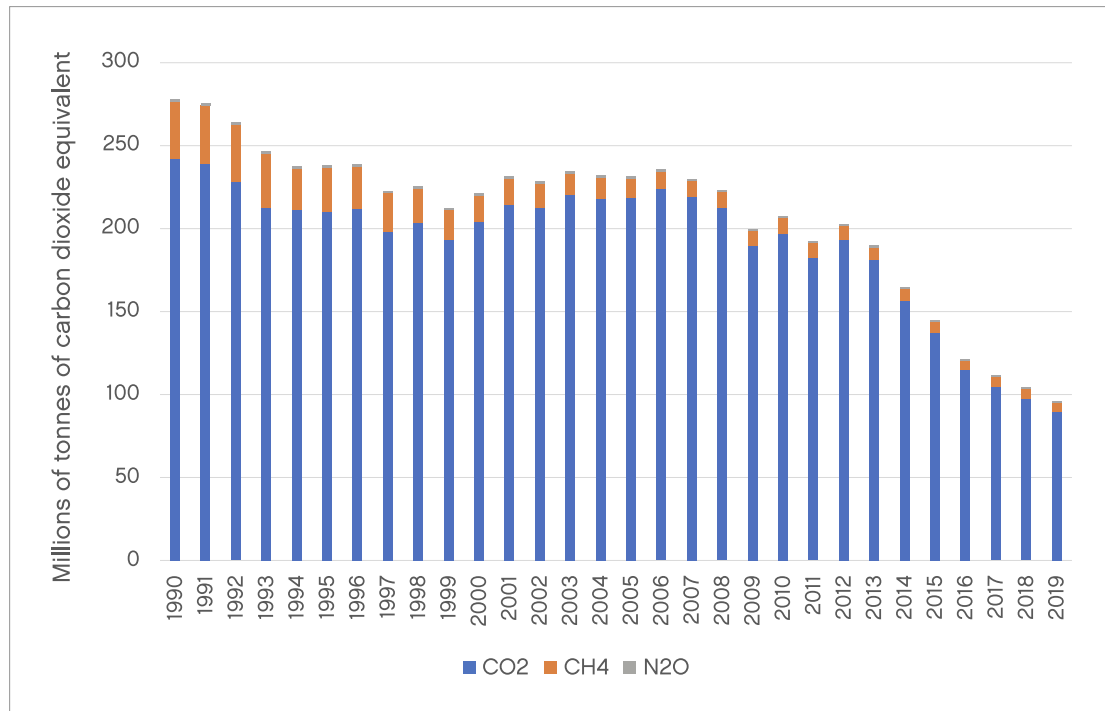
Chart 2 showed those sectors of the economy which have enjoyed above average success in terms of decarbonising since 1990. Here, we unpack those sectors and assess whether particular policies introduced for them were effective or not in prompting decarbonisation.

Energy supply – dramatic emissions reductions since 2012

Energy supply is currently the second biggest contributor to greenhouse gas emissions in the UK, accounting for 95.8 MtCO₂e in 2019 (21% of the total). Most emissions within this sector come from the combustion of fossil fuels for electricity generation, but other significant sources include emissions incurred during fuel refining and the manufacture of solid fuels.



Chart 5. Energy supply emissions (1990-2019)



Source: Author's analysis of Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).

As can be seen from Chart 5, emissions from energy supply have fallen dramatically since 1990 – down from 278 MtCO₂e to 95.8 MtCO₂e. Indeed, more than half of the decarbonisation witnessed across the economy at large has come through emissions reductions the energy supply.

But this was not a smooth process. Energy emissions were cut by nearly a quarter during the 1990s, by less than a tenth throughout the 2000s, and then by a staggering 54% in the 2010s.

There are many explanations for the rapid decarbonisation seen during the 2010s. But a package of measures known collectively as 'Electricity Market Reform' (EMR) are widely regarded to have been key. EMR was first mapped out in the *Planning our electric future* white paper, published in July 2011, and was gradually phased in over the following years.^{60,61} At the heart of EMR was the creation of the Capacity Market (which provides a regular retainer payment to forms of electricity capacity – both on the demand and supply-side – to guard against blackouts) and Contracts for Difference (otherwise known as CfDs, which provide long-term price stabilisation to low-carbon generators, which promotes more investment in them). EMR also had supporting measures to drive decarbonisation, perhaps the most important of which was the Carbon Price Support (CPS).

60 Department of Energy and Climate Change, *Planning our electric future: a White Paper for secure, affordable and low-carbon electricity*. [Link](#).

61 Department of Energy and Climate Change, *Implementing Electricity Market Reform (EMR)*. [Link](#).



The Coalition Government began consulting on the CPS in 2010,⁶² and at the 2011 Budget announced that it would be introducing the tax from April 1 2013.⁶³ The CPS works by levying a price per tonne of CO₂ emitted by electricity generators, which currently stands at £18.08 per tonne.⁶⁴ For very carbon-intensive forms of electricity generation, namely burning coal, the CPS therefore acts as a major economic disincentive. Analysis from Aurora Energy Research suggests that the CPS alone was responsible for 73% of the reduction in coal-fired power generation between 2013 and 2017.⁶⁵ Other data show the impact of the CPS. When its rate doubled in April 2015, the amount of power generated from coal over the following year fell by 36%, relative to the previous year.⁶⁶ In terms of rates of decarbonisation, from 1990 to 2012, CO₂ emissions from power stations reduced by 22%.⁶⁷ But between 2013 and 2019 – in other words, years since the UK has had the CPS – CO₂ emissions fell by a staggering 61%.⁶⁸

Many factors can explain Britain's recent success in power decarbonisation. But to failure to acknowledge the powerful impact of the CPS would be conspicuously remiss. It radically altered the fundamental economics of power generation. Burning coal became increasingly illogical, to the point where it has now been all but driven off the grid (at least in terms of Britain's domestic supply). Meanwhile, renewables became a much sounder financial bet – and more investment has flowed towards them.

Waste management – steady emissions reduction since 1996

Waste management is currently the sixth biggest contributor to greenhouse gas emissions in the UK, accounting for 19 MtCO₂e in 2019 (4% of the total). Around three-quarters of emissions within the sector come from landfill, with waste-water handling accounting for a further 14%.

As Chart 6 shows, steady and sustained emissions reductions were made in waste management from the mid-1990s through to the mid-2010s. As with the decarbonisation of electricity generation, no single policy can explain the entirety of this fall – but one obvious candidate stands out as deserving of particular recognition.⁶⁹

62 HM Treasury and HM Revenue and Customs, *Carbon price floor: support and certainty for low-carbon investment*. [Link](#).

63 HM Treasury, *Budget 2011*. [Link](#).

64 House of Commons Library, *Carbon Price Floor (CPF) and the price support mechanism*. [Link](#).

65 Aurora Energy Research, *The carbon price thaw: Post-freeze future of the GB carbon price*. [Link](#).

66 Department for Business, Energy and Industrial Strategy, *Energy Trends: UK electricity*. [Link](#).

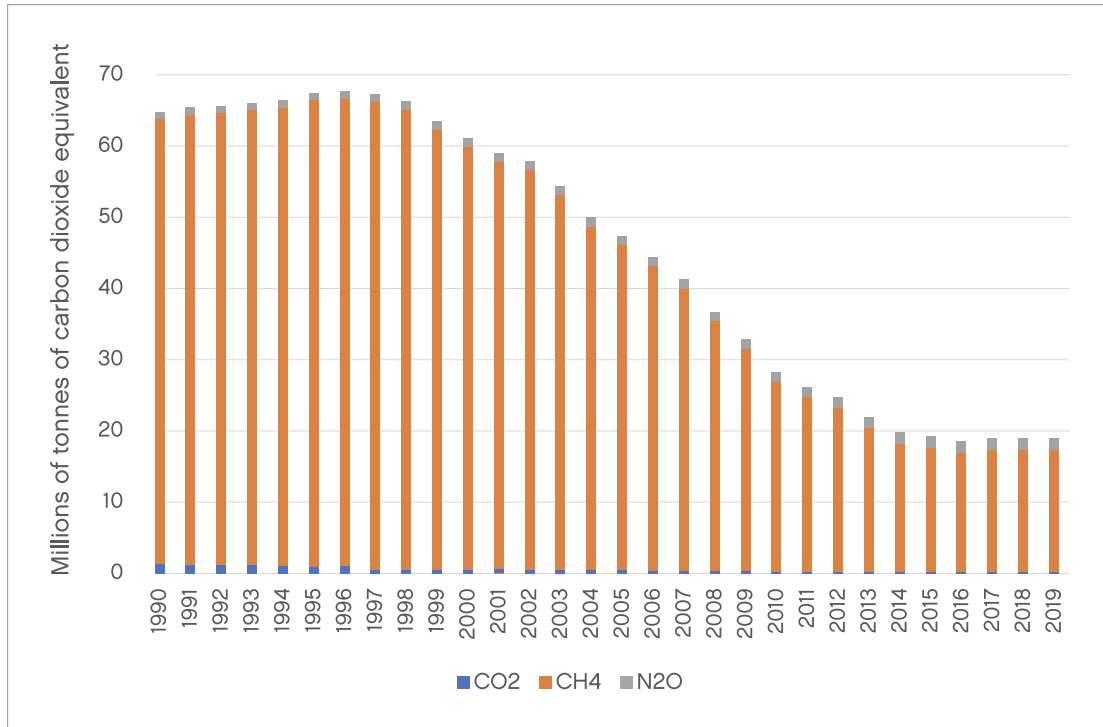
67 Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).

68 Ibid.

69 Climate Change Committee, *Policies for the Sixth Carbon Budget and Net Zero*. [Link](#).



Chart 6. Waste management emissions (1990-2019)



Source: Author's analysis of Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).

The Landfill Tax was introduced in 1996, and is often regarded as the UK's first explicitly environmental tax.⁷⁰ It levies a charge on businesses to dispose of their waste, which encourages better conservation of resources and more sustainable methods of disposal. Currently, there are two bands to the tax – a lower rate, set at £3.10 per tonne, which is levied on inert waste, such as rocks and rubble, and a standard rate, set at £96.70 per tonne, which is levied on non-inert waste, such as plastic packaging.⁷¹

Referring back to Chart 6, the impact of the Landfill Tax is extraordinarily clear. Prior to its introduction, emissions from landfill – the primary component of total emissions from waste management – were creeping upwards, by around half a million tonnes each year. After its introduction, this trend swiftly went into reverse – with emissions falling year on year for two decades straight (contracting overall by 78%).

⁷⁰ Tim Elliott, *Landfill Tax in the United Kingdom*. [Link](#).

⁷¹ GOV.UK, *Environmental taxes, reliefs and schemes for businesses*. [Link](#).



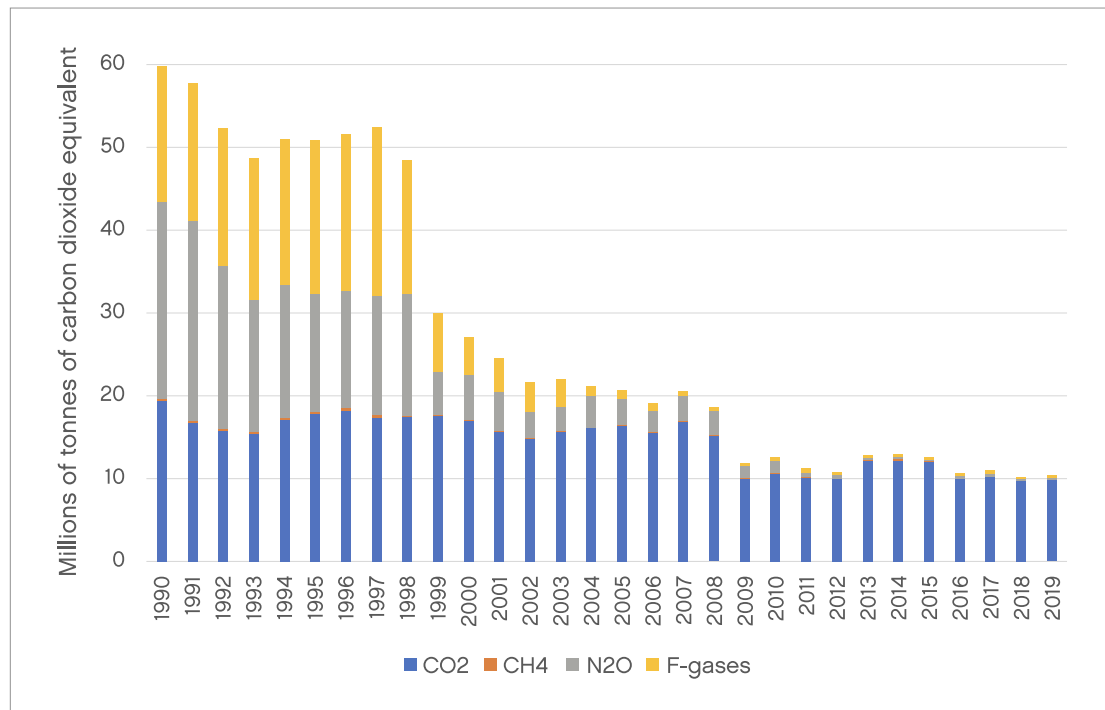
Of course, the story of these statistics may not be as straightforward as it appears. The amount of plastic waste being exported from the UK grew hugely in the 2000s, suggesting that some of the emissions gains from the Landfill Tax may have been the product of offshoring.⁷² And despite the progress made since the commencement of the Landfill Tax, emissions reductions associated with waste management have flatlined in recent years. This could suggest that either entirely new policies are needed to address the residual emissions, or that current policies need to be strengthened – for instance, reforming how the Landfill Tax is levied, perhaps broadening its scope out to a general ‘Waste Tax’, which would cover emissions from other waste treatment operations.⁷³

That being said, even with emissions reductions stalling of late, the waste management sector provides yet more strong evidence for the power of taxation to alter behaviour, and drive decarbonisation.

Industrial processes – dramatic emissions reductions at points but with periods of stagnation

The industrial processes category is currently the seventh biggest contributor to greenhouse gas emissions in the UK, accounting for 10.4 MtCO₂e in 2019 (2% of the total). Cement production stands out as the single biggest emitting sub-sector, accounting for 42% of emissions, after which sinter production, lime production, ammonia production, and iron and steel production each contribute roughly 10% of emissions.

Chart 7. Industrial processes emissions (1990-2019)



Source: Author's analysis of Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).

72 House of Commons Library, *Plastic waste*. [Link](#).

73 Tim Elliott, *Landfill Tax in the United Kingdom*. [Link](#).



Despite being incredibly successful, decarbonisation of industrial processes since 1990 has been rather erratic – marked by occasional big year-on-year falls, followed by periods of general stagnation. Emissions since 2010 have hovered around the 10 MtCO₂e to 13 MtCO₂e mark, in contrast to around 50 MtCO₂e or more for much of the 1990s.

Some of the decarbonisation in industrial processes has come as a result of the changing structure of the UK economy – typically away from carbon-intensive industries and towards the services sector, or simply other industries which are less carbon-intensive. Indeed, the Climate Change Committee attributes 20% of the decarbonisation of UK industry between 2012 and 2017 to the country's changing economic makeup.⁷⁴ The other 80% of decarbonisation was split evenly between changing fuel mixes and improvements in energy intensity.

‘Despite being incredibly successful, decarbonisation of industrial processes since 1990 has been rather erratic – marked by occasional big year-on-year falls, followed by periods of general stagnation’

Many of the biggest contributing sub-sectors to overall emissions in the sector have been covered by the European Union's Emissions Trading System (EU ETS), which is a cap-and-trade system for carbon emissions, and therefore a form of carbon pricing. These sub-sectors include cement production, iron and steel production, glass production, aluminium production, and adipic acid production. While by no means perfect,⁷⁵ the EU ETS acts as a carbon tax proxy, and incentivises firms subject to it to switch to cleaner modes of production.⁷⁶

The evidence for the EU ETS being a significant driver of decarbonisation of energy-intensive industries is not as strong as was the case for the Landfill Tax or Carbon Price Support driving emissions reductions in waste management or energy supply respectively, but its impact should not be discounted. Emissions in the sub-sectors covered by it are generally down by a considerable quantity today compared to its introduction in 2005.

One of the most striking changes in emissions – which clearly stands out in Chart 7 – is of how emissions of fluorinated greenhouse gases (F-gases) have collapsed, particularly between the end of the 1990s and the start of the new millennium.⁷⁷ Having peaked at 20.4 MtCO₂e in 1997, emissions of F-gases were down to 4.6 MtCO₂e by 2000, 1 MtCO₂e by 2005, and now stand at just 0.3 MtCO₂e. In a report for the Sixth Carbon Budget, the Climate Change Committee noted how emissions reductions at this time were made possible by mitigation measures, facilitated by new technologies which allowed industries to transition away from polluting methods.⁷⁸ It also notes how emissions of perfluorocarbons – a type of F-gas – from aluminium production are priced under the EU ETS.⁷⁹

74 Climate Change Committee, *Progress in reducing emissions: 2021 Report to Parliament*. [Link](#).

75 Dieter Helm, *Caps and Floors for the EU ETS: a practical carbon price*. [Link](#).

76 European Commission, *EU Emissions Trading System (EU ETS)*. [Link](#).

77 F-gases are long-lived greenhouse gases, and include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃). They are commonly used in refrigeration and air conditioning, or occur as a by-product of certain industrial processes, such as aluminium smelting.

78 Climate Change Committee, *The Sixth Carbon Budget: F-gases*. [Link](#).

79 Ibid.



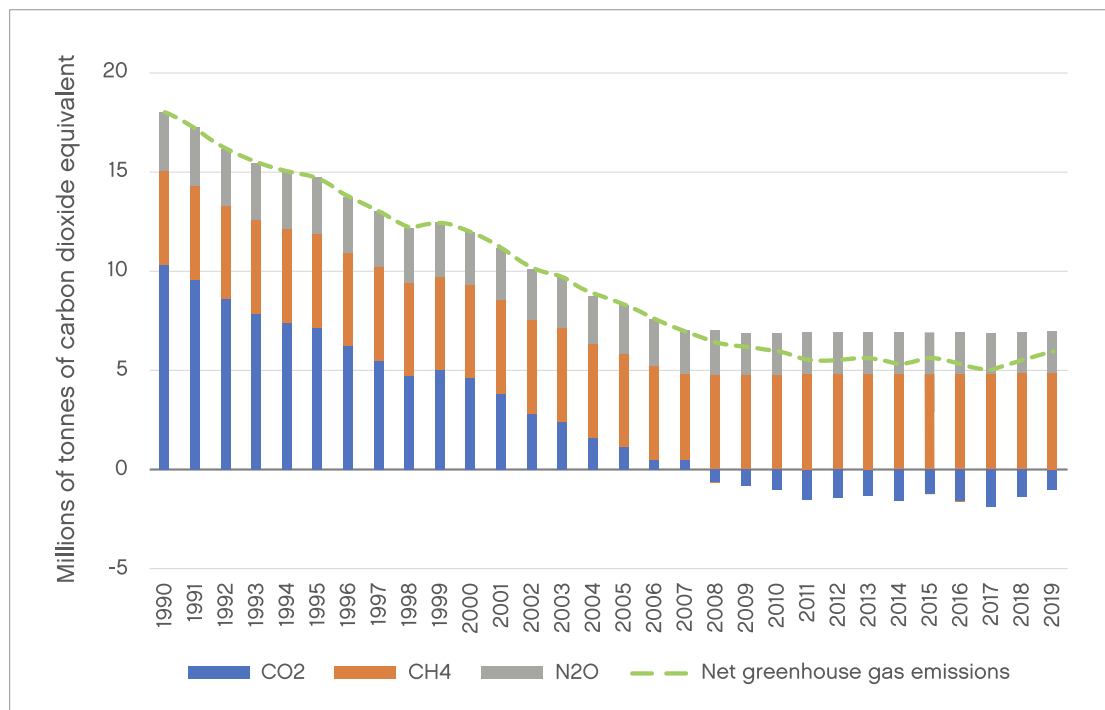
Relative to the emissions reductions seen in waste management or energy supply, it is harder to pinpoint standout policy measures which have had an obvious impact on emissions in industrial processes. Regulations in the form of cleaner minimum production standards do appear to have played a bigger role than tax policy, and, as we shall discuss later, this shows the importance of having alternative technologies on hand to pivot towards.

Other than that, industrial processes has been a sector where, perhaps due to its relatively low starting base, and industry makeup, sudden changes can occur more readily. The closure of one steel plant, for instance, will have a bigger impact on the sector's emissions than demand for electricity reducing slightly.

Land use – steady emissions reductions but with recent stagnation

Land use, land use change and forestry (LULUCF) is currently the ninth biggest contributor to greenhouse gas emissions in the UK, and accounted for 5.9 MtCO₂e in 2019 (1% of the total). LULUCF is interesting in that it is the only sector of the UK economy which contains sub-sectors that sequester greenhouse gas emissions – such as 'forest remaining forest land' (sequestering 17.6 MtCO₂e in 2019) and 'harvested wood' (sequestering 2.6 MtCO₂e in 2019). As can be seen from Chart 8, LULUCF CO₂ emissions have actually been negative since 2007, which has helped partially offset emissions in the form of methane (CH₄) and nitrous oxide (N₂O).

Chart 8. LULUCF emissions (1990-2019)



Source: Author's analysis of Department for Business, Energy and Industrial Strategy, Final UK greenhouse gas emissions national statistics: 1990 to 2019. [Link](#).



Decarbonisation in LULUCF has been driven by a 110% decrease in CO₂ emissions – achieved by conventional decarbonisation from some sub-sectors, and increased sequestration from others. Emissions of N₂O have fallen by nearly 30%, while emissions of CH₄ have actually increased by a little over 3%.

The single biggest reduction in emissions from LULUCF came through ‘land converted to cropland’, where emissions fell from 12.4 MtCO₂e to 5.3 MtCO₂e. Next was ‘grassland remaining grassland’ (4.3 MtCO₂e to 0.6 MtCO₂e) and ‘forest land remaining forest land’ (-13.9 MtCO₂e to -17.2 MtCO₂e).

In a similar vein to the industrial processes category, explaining how LULUCF managed to cut greenhouse gas emissions over recent decades is more challenging than the case was for waste management and energy supply. Indeed, from conversations with relevant experts we held during our research, there was not an obvious consensus in terms of identifying particular policies which have had outsized effects in terms of lowering net emissions from LULUCF. Rather, the general impression we found was that a diverse range of initiatives from local and central government – and prior to Brexit, the EU – have all incrementally caused emissions to fall since 1990.⁸⁰ We also heard of how civil society and private sector organisations – such as the National Trust – have played an important role in taking actions which have resulted in emissions cuts in LULUCF, without necessarily coming at the behest of a particular tier of government.

‘From conversations we held during our research, there was not an obvious consensus in terms of identifying particular policies which have had outsized effects in terms of lowering net emissions from LULUCF’

For the time period referenced in Chart 8, the UK was an EU member state, and thus subject to the Common Agricultural Policy (CAP) – the overarching framework of rules and support schemes which govern agriculture and land use in the EU.⁸¹ Much has been written about the shortcomings of CAP in terms of its environmental efficacy, particularly during its early years of operation.⁸² But in 2005, the CAP underwent major reform, the upshot of which saw payments for farmers and land managers recast along new lines, or ‘Pillars’.⁸³ Pillar I is largely focused with providing direct financial support to farmers and land managers, while Pillar II provides aid to ‘support rural areas [...] meet the wide range of economic, environmental and societal challenges of the 21st century’.⁸⁴

While still far from being a remotely well-designed policy, the reformed CAP nonetheless ensured that billions of pounds were allotted to farmers each year, specifically to engage in environmental activities – such as peatland restoration or afforestation – which should have helped reduce greenhouse gas emissions.⁸⁵

80 Climate Change Committee, *Land use: Policies for a Net Zero UK*. [Link](#).

81 European Parliament, *The common agricultural policy (CAP) and the Treaty*. [Link](#).

82 Ben Caldecott, Sam Hall and Eamonn Ives, *A greener, more pleasant land: A new market-based commissioning scheme for rural payments*. [Link](#).

83 European Parliament, *The common agricultural policy (CAP) and the Treaty*. [Link](#).

84 Ibid.

85 Ben Caldecott, Sam Hall and Eamonn Ives, *A greener, more pleasant land: A new market-based commissioning scheme for rural payments*. [Link](#).



Whether or not that money was particularly cost-effective – in terms of pounds spent per tonne of CO₂ avoided – is another question.⁸⁶

Indeed, this provides a lesson in its own right. We do not deny that one route to Net Zero could be to enormously expand state involvement in the economy, with vast sums awarded to businesses and other groups via subsidy in order to cut emissions. However, after comparing this approach to others, it might be possible to conclude (in fact, it would be very definitely possible to conclude) that doing so might not be the best path to go down. Indeed, as Chart 8 shows, annual emissions have not changed all that much in the ten years to 2019, despite the significant financial incentives on offer for farmers and land managers to undertake nature restoration projects and other schemes which, at least partly, aim to lower and or sequester greenhouse gas emissions.

Implications for decarbonisation

From the above analysis of decarbonisation in the UK since 1990, various lessons can be drawn. The first and most obvious one is that incentives matter. The staggering domestic emissions reductions made in the energy supply and waste management sectors were driven in large part due to Pigouvian taxes (namely the Landfill Tax and the Carbon Price Support), which made polluting activities relatively more expensive, and less polluting alternatives relatively more economic. This changed behaviour on an individual and system level – which is the ultimate reason why greenhouse gases have been shed.

‘One of the key advantages of using Pigouvian taxes to spur decarbonisation is that they work ‘dynamically’, in that they act as a constant incentive to further reduce emissions’

Pigouvian taxes – named after British economist Arthur Cecil Pigou – are taxes on market transactions that create negative externalities. They work by shifting the marginal private cost curve upwards, therefore moving the price-quantity equilibrium to where marginal social costs and marginal revenue intersect.

The merits of Pigouvian taxes to reduce emissions in a cost-effective fashion have long been understood.^{87,88,89} One of the key advantages of using Pigouvian taxes to spur decarbonisation is that they work ‘dynamically’, in that they act as a constant incentive to further reduce emissions (and thus tax liability), in a way that regulations typically do not (as there is generally no further incentive to reduce emissions above and beyond what regulations dictate, once that regulatory standard has been met).⁹⁰

Another advantage of Pigouvian taxes is that they lower the need for government involvement in the economy. This is desirable in and of itself – but it also reduces

86 Josh Gabbatiss and Giuliana Viglione, *Will EU Common Agricultural Policy reforms help tackle climate change?* [Link](#).

87 Andrew Leicester, *Environmental taxes: economic principles and the UK experience*. [Link](#).

88 Donald B. Marron and Adele C. Morris, *How should government use revenue from corrective taxes?* [Link](#).

89 Shuting Pomerleau and Ed Dolan, *Carbon Pricing and Regulations Compared: An Economic Explainer*. [Link](#).

90 Donald B. Marron, Eric Toder and Lydia Austin, *Taxing carbon: what, why, and how*. [Link](#).



the risk of unwanted regulatory capture, because there will typically be an information asymmetry between the government and firms subject to pollution regulations regarding pollution abatement costs. A Pigouvian tax on emissions makes firms reveal what their marginal abatement costs are more clearly, in terms of whether they invest in abatement technologies or pay the tax.

It is true that Pigouvian taxes are not without drawbacks. Uniform taxes on certain activities may be inefficient, because the negative externalities an activity generates may differ depending on where and when it is taking place. A flat tax targeting air pollution created by driving, for instance, might be set too low in urban areas where lots of people live, but too high in rural areas where fewer people are exposed to the pollution. This will not be true for all environmental challenges we might wish to subject to a Pigouvian tax, however. When taxing emissions of greenhouse gases on the basis of the damage they do to the climate, it does not matter how, when or where said emissions were produced – for a tonne of CO₂ going into the atmosphere inflicts the same damage regardless.

‘Uniform taxes on certain activities may be inefficient, because the negative externalities an activity generates may differ depending on where and when it is taking place’

Pigouvian taxes may also have unintended consequences we should be mindful of. Christopher Snowdon of the Institute of Economic Affairs has noted how countries with relatively high taxes on tobacco and alcohol invariably have significant black markets for those goods, as illicit buyers and sellers try to evade the tax.⁹¹ And as we saw above, higher taxes on landfill may have contributed to a boom in the export of plastic waste.

In the case of carbon taxes, the ability for polluters to avoid paying the tax may be smaller (because emissions associated with, say, oil and gas extraction are clearly much easier to monitor), though this does not mean it should be disregarded.

An interesting and related angle to consider here is whether the effectiveness of a carbon tax is lowered if it simply incentivises emissions to be produced elsewhere – in a process of so-called ‘carbon leakage’. While evidence of significant carbon leakage is sparse, that is not to say that it will not become more apparent as climate action ramps up between now and the journey to Net Zero.^{92,93}

Yet it is worth pointing out that many of the unintended consequences cited above are equally applicable to regulatory interventions, if not more so.

It is also true that Pigouvian taxes have by no means been the only intervention which has hastened decarbonisation in the UK in recent decades. Countless overlapping subsidy schemes and regulations have been introduced by successive governments in a bid to reduce emissions, with varying levels of efficacy. Some

91 Christopher Snowdon, *Killjoys: A Critique of Paternalism*. [Link](#).

92 Eamonn Ives, *Clean Free Trade: Championing free trade, economic growth and the environment*. [Link](#).

93 Though other policy mechanisms, such as carbon border adjustment mechanisms, offer a solution to this problem should it ever transpire.



have resulted in prominent wins, others in notable failure.^{94,95} Few believe that carbon pricing on its own will be sufficient to deliver cuts to emissions on the scale required to meet Net Zero – although placing more faith in carbon taxes to drive decarbonisation could certainly reduce the need to rely on other, perhaps less palatable, policies.⁹⁶

A huge factor to consider here is the importance of technological innovation in actually permitting decarbonisation. Emissions reductions do not just happen as if by magic – they are generally predicated on switching to cleaner alternatives (such as generating electricity via wind turbines rather than combusting coal), or the adoption of less energy-intensive products. When examining emissions from industrial processes, for example, the near-total reduction of F-gas emissions was critically dependent on there being alternatives which businesses could draw upon to deliver the same results. Without these alternatives readily being in place, government regulations limiting F-gas use might have been less stringent or less timely.

‘As the Government sets about trying to decarbonise other elements of the economy, particularly those sectors in which progress has been lacking, it should be minded to learn the lessons of the past’

As the Government sets about trying to decarbonise other elements of the economy, particularly those sectors in which progress has been lacking, it should be minded to learn the lessons of the past. It should acknowledge the role that Pigouvian taxes could play in intrinsically embedding incentives into businesses’ and individuals’ everyday decision-making processes, throughout the economy. But it should also ensure that it is providing the conditions and support necessary for innovation in zero-carbon technologies to flourish.

94 National Audit Office, *Green Deal and Energy Company Obligation*. [Link](#).

95 Rory Carroll, *Cash-for-ash inquiry delivers damning indictment of Stormont incompetence*. [Link](#).

96 Ed Dolan, *The Role of Carbon Pricing in Deep Decarbonization*. [Link](#).



IV. Pricing pollution properly – the key to fair and effective decarbonisation

Each year the Climate Change Committee provides a ‘Report to Parliament’ which documents progress on emissions reductions. A theme running through the latest report, published in June 2021, was that while recent rhetoric and target-setting (namely the 2030 NDC and Sixth Carbon Budget)^{97,98} has been welcome, a significant policy gap remains in terms of how such ambitions will, realistically, be delivered on.⁹⁹

‘Given the consequences which even ‘moderate’ additional climate change could entail, one might be forgiven for thinking that any policy which nudges emissions towards Net Zero should be welcome’

In the race to Net Zero and earlier climate goals, a suite of policies will be required to hasten decarbonisation. Given the consequences which even ‘moderate’ additional climate change could entail, one might be forgiven for thinking that any policy which nudges emissions towards Net Zero should be welcome.¹⁰⁰ However, as we have maintained throughout this report, this approach is not without risk. Badly designed policies may either fail to deliver the rate of decarbonisation necessary, or prove so objectionable as to turn people off climate action altogether. It must be understood that there is no single pathway to Net Zero which must be taken – different routes exist, with some being cheaper, more effective, and more acceptable than others.^{101,102}

In Chapter III, we saw how market-based mechanisms such as Pigouvian taxes have enjoyed a large degree of success in terms of decarbonising parts of the UK economy – most visibly in the cuts to emissions from electricity generation and from landfill sites. Based on this analysis, plus decades of evidence from abroad and in other policy domains our headline recommendation is that the UK recasts the bulk of its decarbonisation policy along these lines.^{103,104}

Specifically, we argue that the time has never been better to introduce a comprehensive carbon tax. As we will explore later, this should be accompanied by

97 NDC is the acronym for Nationally Determined Contributions, which are plans countries make to cut greenhouse gas emissions. In December 2020, the UK announced its new NDC, which commits the country to cut greenhouse gas emissions by at least 68% by 2030, compared to 1990 levels.

98 Department for Business, Energy and Industrial Strategy, *The UK’s Nationally Determined Contribution under the Paris Agreement*. [Link](#).

99 Climate Change Committee, *Progress in reducing emissions: 2021 Report to Parliament*. [Link](#).

100 Intergovernmental Panel on Climate Change, *Climate Change 2021: The Physical Science Basis: Working Group I contribution to the Sixth Assessment report of the Intergovernmental Panel on Climate Change*. [Link](#).

101 Ed Dolan, *Getting to Zero: Carbon Pricing and its Green Critics*. [Link](#).

102 Shuting Pomerleau and Ed Dolan, *Carbon Pricing and Regulations Compared: An Economic Explainer*. [Link](#).

103 Carbon Tax Center, *Where Carbon Is Taxed (Some Individual Countries)*. [Link](#).

104 Peter Scarborough et al., *Impact of the announcement and implementation of the UK Soft Drinks Industry Levy on sugar content, price, product size and number of available soft drinks in the UK, 2015-19: A controlled interrupted time series analysis*. [Link](#).



other measures – not least policies to mitigate any cost rises the tax might entail, which would otherwise be regressive.

We shall begin, however, by mapping out how more of the UK's emissions could be priced by the introduction of a comprehensive carbon tax.

Introducing a comprehensive carbon tax

Carbon taxes work by ensuring that polluters are made to pay for the damage their emissions cause to society in terms of exacerbating climate change. By including these externalities, demand for goods which cause them should decrease. Indeed, as noted in a previous Centre for Policy Studies report:

It is a well-worn adage that if you want less of something, you should tax it. Most conservatives intuitively appreciate the discouraging effect of taxes – whether applied to earnings, consumption or investment. The impacts of taxation are equally applicable to environmental pollution.¹⁰⁵

By increasing the cost of engaging in activities which contribute towards climate change, such as burning fossil fuels, businesses and consumers are incentivised to reduce their demand for them, and – ultimately – switch to zero-emission alternatives. Alternatively, they will be incentivised to invest in activities which compensate for any emissions they produce, for example via carbon capture or sequestration. This is the primary way in which a carbon tax cuts emissions from the economy.

‘The most important point to make is that, given the scale of the existing tax burden, any carbon tax should be revenue-neutral’

But how would a carbon tax work in practice? In truth, there is no single blueprint to follow.^{106,107} Below, however, we sketch out what we believe would be the fairest, most economically efficient, and environmentally effective way to implement a carbon tax to reduce emissions from the economy.

The most important point to make is that, given the scale of the existing tax burden (and the recent decision to increase taxes on both workers and companies), any carbon tax should be revenue-neutral. The point is to change the balance of incentives within the economy, not to create a new funding stream for government. Likewise, the aim should be to limit any impact on growth – and if at all possible, to increase it.

A carbon tax should also, ideally, be a strong and simple intervention. It should aim to shift the balance of incentives, and then leave the market to adjust. The fiddlier and more technocratic it gets, the more regulators and administrators are involved, the fuzzier that price signal gets. Indeed, one of the attractions of a carbon tax is that it would supersede a very great deal of existing environmental regulation, enabling this particularly tangled thicket to be appropriately pruned.

105 Eamonn Ives, *Bridging the Gap: The case for new nuclear investment*. [Link](#).

106 Gilbert E. Metcalf and David A. Weisbach, *Design of a Carbon Tax*. [Link](#).

107 Kyle Pomerleau and Elke Asen, *Carbon Tax and Revenue Recycling: Revenue, Economic, and Distributional Implications*. [Link](#).



This is why, in our view, a comprehensive carbon tax should be applied as far ‘upstream’ as possible in the economy. What we mean by this is that it should be levied as close as possible to the point at which carbon enters the economy – for instance, when a lump of coal is mined from the ground, or a barrel of oil is imported into the UK. Whichever company is directly responsible for that happening should be subject to the carbon tax. In practice, therefore, the carbon tax will be levied primarily on fossil fuel producers or importers.

The amount of carbon tax a good will attract in gross terms should be determined by how much of the good is in question (by weight or volume), multiplied by the amount of CO₂e per tonne (or equivalent) the good will generate, multiplied by the price at which the carbon tax is set.

Box 1. What price should the carbon tax be set at?

There is considerable debate about how high or low a carbon tax ought to be.^{108,109} But most estimates bunch around similar figures. In 2017, a high-level commission on carbon pricing led by economists Lord Nicholas Stern and Joseph Stiglitz concluded that a carbon tax set at \$40-80 per tonne of CO₂ by 2020, rising to \$50-100/tCO₂ by 2030, would be consistent with meeting the temperature targets set out in the Paris Agreement.¹¹⁰ In 2019, the International Monetary Fund argued that a tax of \$75/tCO₂ would be needed by 2030 to keep warming with the 1.5C to 2C range.¹¹¹ In 2020, the Zero Carbon Commission published a report which suggested the UK Government should aim introduce a carbon tax of at least £75/tCO₂ by 2030.¹¹²

If we were to crudely apply a figure of around £50/tCO₂ to all emissions in the UK in 2019, a carbon tax could have raised as much as £27.6 billion.¹¹³ This would have been approximately 1.27% of GDP.¹¹⁴

Of course, each of these figures assumes the highly unlikely scenario of consumers making no changes whatsoever to their behaviour and purchasing patterns in response to the carbon tax. Furthermore, since total emissions are trending down year on year, you would expect revenues to be lower if a carbon tax of the type we envisage were to be introduced in the near future (although this could be offset by the fact that the carbon tax rate might be higher by the time it comes into effect).

Nevertheless, the figures above still serve as a broadly useful indication of the sort of magnitude of tax receipts a carbon tax could raise.

108 Joshua Burke, Rebecca Byrnes and Sam Fankhauser, *How to price carbon to reach net-zero emissions in the UK*. [Link](#).

109 Joshua Burke, *How to price carbon to reach net-zero emissions in the UK*. [Link](#).

110 Carbon Pricing Leadership Coalition, *Report of the High-Level Commission on Carbon Prices*. [Link](#).

111 International Monetary Fund, *Fiscal Monitor: How to Mitigate Climate Change*. [Link](#).

112 Zero Carbon Commission, *How carbon pricing can help Britain achieve Net Zero by 2050*. [Link](#).

113 Office for National Statistics, *Atmospheric emissions: greenhouse gases by industry and gas*. [Link](#).

114 Office for National Statistics, *Gross Domestic Product: chained volume measures: Seasonally adjusted £m*. [Link](#).



The question of who should decide at what price the carbon tax should be set at is another matter. An obvious starting place would be the Chancellor – although this would come with attendant risks of politicising the tax, plus making it subject to the whims of whoever the Chancellor of the day is. It would not be unimaginable to think that future rises to a carbon tax would be resisted by a Government looking to make politically expedient short-term tax savings. Alternatively, a carbon tax controlled by HM Treasury could be hiked up above and beyond what is strictly needed to cut emissions sufficiently by a Chancellor looking to fill a fiscal hole. It may therefore be in the long-term interest of a comprehensive carbon tax to establish an independent body to advise the Government on how it should be set, similar to the Migration Advisory Committee or Low Pay Commission.

Applying the tax upstream has a number of advantages. First, it makes it radically easier to administer. The number of sources which are the main contributors towards emissions in the economy is relatively small (petroleum, fossil gas and coal collectively account for over 70% of total emissions in the UK).¹¹⁵ Identifying which companies are responsible for producing or importing these commodities should therefore not be prohibitively difficult for a body such as HM Revenue and Customs, who might be expected to manage the tax. This ensures that the majority of emissions can be taxed uniformly, and that the administrative costs needed to oversee the collection of the carbon tax are kept to a minimum.

The rationale for a levying the carbon tax upstream is perhaps even better understood when contrasted to the alternative method of levying it ‘downstream’ – for example, at the point at which individual consumers purchase individual goods and services. With a downstream carbon tax, we would need to work out how much carbon is ‘embedded’ within the good or service in question – covering literally everything in the economy, from plant pots, to toothbrushes, and helicopters to bookcases. The idea any government could accurately (and continually) calculate the carbon-intensity of a near infinite number of specific goods is risible. This is also before we consider the impacts it would have on businesses themselves, who may be expected to complete reams of administrative bureaucracy to explain how, exactly, each of the goods they are selling have been produced at any given time.

Finally, a downstream carbon tax is much more likely to end up ‘double counting’ emissions, which would make the cost of the tax more expensive than it ought to be. While the costs of an upstream carbon tax would be initially higher for the company it is directly levied on, once paid, there would be no need to levy any further carbon taxes at any stage thereafter.

Levying a carbon tax on companies which bring fossil fuels into the economy – or on climate change inducing pollution of other sorts – will of course drive up their operating costs. But the key thing to understand is that this is not a tax raid on those companies. How a firm chose to react to the carbon tax would obviously be entirely at their discretion, but we would expect them to pass on most, if not all, of

115 Department for Business, Energy and Industrial Strategy, *Final UK greenhouse gas emissions national statistics: 1990 to 2019*. [Link](#).



the cost of the tax to those who purchase their products. Electricity procured from power stations which burn fossil gas would go up in price, for instance, as would steel which has been produced with coking coal.

Thus, the carbon tax – while being levied upstream initially – would slowly begin to trickle downstream on its own accord, influencing decision making throughout every facet of the economy. Eventually, this process would gradually reach ordinary consumers, who will be faced with a new set of prices, which fully account for the emissions which were generated in the production of the products they wish to buy (and the products which produced the products they wish to buy, as so on, right back until we get to the fossil fuels on which the carbon tax was originally levied).

‘Crucially, consumers need not know themselves whether one product has fewer embodied emissions than another; rather, they will spontaneously opt for cleaner products as they rationally react to the relative changes in price, triggered by the carbon tax’

It is with this new information that consumers will make their purchasing decisions. We would expect them to begin to start buying more products which were produced with ‘cleaner’ inputs, and fewer products which were produced with ‘dirtier’ ones – as the latter will now be relatively more expensive having been subject to the carbon tax. Crucially, consumers need not know themselves whether one product has fewer embodied emissions than another; rather, they will spontaneously opt for cleaner products as they rationally react to the relative changes in price, triggered by the carbon tax.

A carbon tax would also, as mentioned above, promote not just the reduction of carbon emissions but investment in their removal and sequestration. There will still be areas of the economy, for years to come, where emissions are unavoidable – but the prospect of paying a tax for their generation may well incentivise the firms involved to develop cheaper ways to compensate for those emissions. For example, as recent events have made clear, Britain is heavily dependent on gas for heat and electricity – even with the remarkable rise in wind and other renewables. Meanwhile, a combination of favourable geology, infrastructure and expertise means that the North Sea is one of the most attractive places to develop carbon capture and underground storage (CCUS).¹¹⁶ The Government is currently seeking to incentivise the energy industry to develop this capacity via subsidy.¹¹⁷ But a carbon tax would provide a much more powerful and reliable signal to investors.

Of course, this would not be a politically painless process. As the events of this autumn show, a dramatic increase in customers’ energy bills is hardly a popular phenomenon. There is also the inflationary impact to consider – and indeed the impact on the competitiveness of those companies. That is why any carbon tax would probably have to be introduced gradually; would be the subject of careful consultation; and, as set out extensively below, would involve much of the revenue being recycled to compensate people for any increase in their bills.

116 Will Nicolle, Benedict McAleenan and Ed Birkett, *The Future of the North Sea: Maximising the contribution of the North Sea to Net Zero and Levelling Up*. [Link](#).

117 Department for Business, Energy and Industrial Strategy, *North Sea Transition Deal*. [Link](#).



We would also need to consider the effects of a carbon tax on businesses who are playing a part (or seeking to play a part) in the transition to a greener economy. Thanks to technological advances, many clean alternatives to conventionally dirty elements of the economy are now cost-competitive, or even cheaper. Yet in other instances, a cost disparity still exists, in favour of more polluting options. As a result, clean businesses are put at a disadvantage – as there is less demand for their products, and thus they face a harder time. It also makes less economic sense to develop clean alternatives, because the expected payoffs will be lower.

A carbon tax would change that state of affairs, by reducing the price gap between clean and dirty products once the latter have to take their emissions into account. This might be decisive in terms of prompting more businesses to look at what they can do to research, develop and manufacture clean solutions to polluting activities – and, in all likelihood, this process of green entrepreneurialism will make it easier and cheaper to meet our climate goals. Indeed, academic research suggests that increasing energy prices have a strongly significant effect on innovation.¹¹⁸ Similar findings can also be seen in the automotive sector, with evidence suggesting that firms tend to innovate more in clean technologies when they face higher tax-inclusive fuel prices.¹¹⁹

Applying a carbon border adjustment mechanism to prevent carbon leakage

One of the most common arguments against stronger action on climate change has long been that unilateral measures to decarbonise the economy in Britain may end up being ineffective, because they will result only in domestic businesses being rendered less competitive relative to foreign ones. The argument typically runs that as domestic businesses are forced to comply with environmental regulations or pay green taxes, consumers will simply import goods and services from firms based overseas, which may not have been subject to the same burden of climate policies in their own countries.

As mentioned earlier, there is little evidence that this phenomenon – often referred to as ‘carbon leakage’ – exists on a grand scale.^{120,121} However, that is not to say that it could not become a genuine issue as action on climate change ramps up in order to meet new targets such as Net Zero.¹²² Indeed, most carbon pricing schemes – such as the EU ETS – have been designed with provisions specifically aimed at preventing carbon leakage, such as free allowances for liable firms.¹²³

118 David Popp, *Induced Innovation and Energy Prices*. [Link](#).

119 Philippe Aghion et al., *Carbon Taxes, Path Dependency, and Directed Technical Change: Evidence from the Auto Industry*. [Link](#).

120 Samuela Bassi and Chris Duffy, *UK climate change policy: how does it affect competitiveness?* [Link](#).

121 Antoine Dechezleprêtre et al., *Searching for carbon leaks in multinational companies*. [Link](#).

122 Department for Business, Energy and Industrial Strategy, *UK Business Competitiveness and the Role of Carbon Pricing: An assessment of the determinants of business competitiveness and the role of carbon pricing policy in the UK*. [Link](#).

123 William Acworth, *Carbon Leakage and Deep Decarbonization*. [Link](#).



Fortunately, other policy options exist for mitigating carbon leakage should it ever transpire on a significant scale. One which has been particularly successful at capturing the imagination of politicians, economists, and wider civil society of late is known as a carbon border adjustment mechanism (CBAM).^{124,125}

If the UK were to enact a CBAM, it would effectively stipulate that an import coming into the country would need to prove it had accounted for the social costs of the pollution generated when it was produced, up to a level that the Government would expect of a British firm to do. Box 2 provides a simplified overview of this process.

Box 2. Administering a hypothetical CBAM on imported goods from China to the UK.

- Average climate costs of producing Good A in the UK = £X.
- Average climate costs of producing Good A in China = £Y.
- When Good A is imported into UK from China, £Y is deducted from £X.
- If $£Y < £X$, the difference between £Y and £X is paid by the importer to HM Treasury.
- If $£Y > £X$, the difference between £Y and £X can be claimed by the importer from HM Treasury.

We have previously made the case for the UK introducing a CBAM or similar policies, most recently in our reports *Clean Free Trade*, and *The Great Carbon Swindle*.^{126,127} Liam Fox also made the same argument in a speech at the Centre for Policy Studies, which was subsequently published as a standalone report.¹²⁸

As we acknowledged, establishing a CBAM would be a bold undertaking, but there are ways to make adopting one easier. For instance, it could begin by applying to only the most carbon-intensive traded goods – such as steel, cement, or hydrocarbon fuels. By virtue of how these commodities are produced, it would be relatively straightforward to arrive at accurate approximations of their carbon-intensity.

In the above reports, we argued that the UK should act as a leader in the global conversation around CBAMs, and we reiterate that message here. In doing so, we can be confident that the UK will not simply ‘offshore’ production of carbon-intensive industries, only to then import the goods it would otherwise have produced domestically.

The UK enacting a CBAM would make a big difference in terms of persuading other nations to legislate for more ambitious climate policies, and it should also provide a useful defence against those in the UK who seek to undermine decarbonisation efforts by alleging that all it achieves is shifting emissions elsewhere on the planet.

¹²⁴ European Commission, *Proposal for a regulation of the European Parliament and of the Council establishing a carbon border adjustment mechanism*. [Link](#).

¹²⁵ Amber Rudd and Andrea Leadsom, *We need a level playing field for UK manufacturers in the green revolution*. [Link](#).

¹²⁶ Tony Lodge, *The Great Carbon Swindle: How the UK hides its emissions abroad*. [Link](#).

¹²⁷ Eamonn Ives, *Clean Free Trade: Championing free trade, economic growth and the environment*. [Link](#).

¹²⁸ Liam Fox, *The Case for a Carbon Border Tax*. [Link](#).



Supporting investment in green innovation

As was noted in Chapter III, decarbonisation does not just happen as if by magic – it occurs when businesses and individuals switch from relatively polluting ways of doing things to relatively clean ones. In the power sector, for instance, ever more effective wind turbines and photovoltaic solar panels have allowed energy companies to source more of their electricity from these generators, and less from coal-fired power stations. In the transport sector, zero-emission vehicles powered by batteries or green hydrogen are slowly but surely eating into the market share once dominated by petrol and diesel internal combustion engines.

Yet while many of the technologies needed to get us from now to Net Zero do already exist, new innovations are still required to come to fruition to decarbonise many parts of the economy, alongside further refinement of existing technologies to make them cheaper and more accessible.¹²⁹ And just as continuing decarbonisation cannot be taken for granted, neither can continuing innovation.

‘Governments are not powerless to influence the rate at which innovation in an economy takes place. Through the policies they adopt, they can be a helping hand, or an active hindrance’

Much of this will happen according to market demand. But governments are not powerless to influence the rate at which innovation in an economy takes place. Through the policies they adopt, they can be a helping hand, or an active hindrance. If we are to have the best shot at successfully meeting our climate goals, we need to ensure that the Government is being the former rather than the latter with regards to climate innovation.

There are many ways in which the state can help to accelerate technological progress. Perhaps one of the most important, however, is in terms of investing in innovation. The case for state investment rests on the fact that research and development (R&D) has what economists might term ‘public goods characteristics’. This refers to the fact that a private company could spend lots of its own resources funding R&D, only for the results of it to become known to its competitors – who can then benefit from it without having financially contributed towards it.¹³⁰ The upshot is that under ‘pure’ market conditions, firms typically underinvest in R&D, and we as a society generate and benefit from fewer innovations than we might reasonably expect to see otherwise.

Due to this state of affairs, governments often directly support innovation – through grants, subsidies, and so on – to get it up to a more socially optimal level. This logic seems to be something which the current Government is well seized by. Since coming to power, there has been a fixation on improving support for innovators. In recent months we have seen the creation of the Advanced Research and Invention Agency (ARIA),¹³¹ the publication of the Research and Development Roadmap,¹³² and an increase in the generosity and scope of the Research and Development

¹²⁹ Nicholas Stern and Anna Valero, *Innovation, growth and the transition to net-zero emissions*. [Link](#).

¹³⁰ To use the economic jargon, successful R&D is ‘non-excludable’, at least to a certain extent.

¹³¹ Department for Business, Energy and Industrial Strategy, *UK to launch new research agency to support high risk, high reward science*. [Link](#).

¹³² HM Government, *UK Research and Development Roadmap*. [Link](#).



Expenditure Tax Credit.¹³³ (It should be noted that this is now an area of cross-party consensus. Sir Keir Starmer recently committed the Labour Party to driving up R&D spending to even higher levels than the Conservatives' already ambitious goals.)¹³⁴

To this end, our overarching recommendation here is simply that the Government continues the good work. It may wish to explore new approaches to administering public funds,¹³⁵ and it should of course ensure the UK is on track to meet the various aims it has set itself with regards to R&D – not least the commitment to raise total R&D investment to 2.4% by 2027.¹³⁶ But by and large, recent developments give us reason to be optimistic that the UK is heading in the right direction in this regard.

‘Supporting innovation does not simply end at providing public money for it, or even by taking steps to leverage in more private capital. Also of critical importance is ensuring that the general business landscape is fit for purpose’

However, supporting innovation does not simply end at providing public money for it, or even by taking steps to leverage in more private capital. Also of critical importance is ensuring that the general business landscape is fit for purpose. This is a bit more of a nebulous concept, but here we are referring to how conducive various policies are to innovators being able to develop ground-breaking technologies. This can manifest itself in obvious ways, such as whether there is red tape which prohibits opportunities for entrepreneurs to undertake R&D in cutting edge sectors.¹³⁷ But it can also take hold in more nuanced ways, for instance in the way that Britain's onerous planning system stifles agglomeration effects in and around some of the UK's most productive areas for innovation,^{138,139} or whether companies can access the talent they need, whether from overseas or via the domestic education system.¹⁴⁰

As mentioned above, the advent of new technologies will be essential if the UK is to meet its Net Zero target. Innovation will also help to improve existing technologies – making them better, and, crucially, cheaper. Without new technologies at our disposal, the only possibly way to achieve Net Zero will be to entirely upend our socio-economic system and deliberately engage in a radical programme of carbon austerity. This prospect may delight a handful of the most zealous activists in the climate debate, but for the many millions of ordinary individuals who care about stopping climate change, but want to retain their relatively comfortable standard of living, entertaining such an idea is fanciful.

The Government therefore needs to pull out all of the stops to ensure Britain is contributing as much as it can to advance the technologies which will allow the world to cut emissions without cutting living standards.

133 HM Treasury, *Budget 2020: Delivering on our promises to the British people*. [Link](#).

134 Keir Starmer, *Conference speech: Keir Starmer*. [Link](#).

135 The Entrepreneurs Network and the Tony Blair Institute for Global Change, *The Way of the Future: Supercharging UK science and innovation*. [Link](#).

136 House of Commons Library, *Research & Development spending*. [Link](#).

137 Eamonn Ives, *Green Entrepreneurship*. [Link](#).

138 Sam Bowman and Stian Westlake, *Reviving Economic Thinking on the Right: A short plan for the UK*. [Link](#).

139 Sam Bowman, John Myers and Ben Southwood, *The housing theory of everything*. [Link](#).

140 Ruchir Agarwal et al., *Why U.S. Immigration Matters for the Global Advancement of Science*. [Link](#).



Mitigating regressive impacts of a new carbon tax

As mentioned above, one of the most important aspects of any carbon tax will be ensuring that it is fair as well as effective – and, in particular, that we mitigate any regressive impacts which a new carbon tax might have.

In isolation, making it more expensive to consume most forms of energy or other emissions-intensive goods and services will weigh more heavily on those from lower income deciles than it would for those from higher income deciles.¹⁴¹ Not only would the consequences of this be objectionable in and of itself, but it could also damage the case for stronger action on climate change, if Net Zero and other climate goals start to become seen to be an endeavour which plunges the least well off into further economic difficulty. It is also the case, as mentioned above, that the tax burden on both businesses and companies is high enough that adding another levy to the mix is likely to be badly received, as well as hitting investment, entrepreneurship, living standards and growth.

‘One of the most important aspects of any carbon tax will be ensuring that it is fair as well as effective – and, in particular, that we mitigate any regressive impacts which a new carbon tax might have’

Many advocates for a wider use of carbon pricing in the economy have therefore called for compensatory measures to offset any cost rises, particularly for the least well off.^{142,143,144} The exact form these compensatory measures should take varies, but generally falls into one of three broad buckets:

- **Increased government spending** to ease the transition to a greener economy (for instance, by awarding grants for zero-emission vehicles, or to retrofit homes);
- **Tax reforms** to boost real incomes, lower the cost of living, or stimulate economic growth (for instance, by cutting personal, consumption or corporate taxes);
- **Cash transfers** to directly give any money raised back to citizens (for instance, in the form of so-called ‘carbon dividends’).

Obviously, as a think tank built on the principles of a small state, low taxes and free markets, we are philosophically attracted to the idea of reducing the burden of personal taxation. Cuts to Income Tax or National Insurance Contributions (NICs), or raising the thresholds at which they kick in, would boost take home pay, and ensure people had the means to afford any price rises for carbon-intensive goods triggered by a carbon tax.

On the other side of the same coin, we could cut consumption taxes – most notably VAT. This may be preferable to reducing Income Tax or NICs, as nearly a

141 Josh Burke et al., *Distributional impacts of a carbon tax in the UK: Report 2: Analysis by income decile*. [Link](#).

142 Josh Buckland, *Green money: A plan to reform UK carbon pricing*. [Link](#).

143 David Klenert et al., *Making Carbon Pricing Work*. [Link](#).

144 Rachel Wolf, *The Zero Carbon Commission: How carbon pricing can help Britain achieve Net Zero by 2050*. [Link](#).



quarter of UK households pay no Income Tax whatsoever, meaning they would not be able to benefit from a rate reduction.¹⁴⁵ Cutting VAT would also be progressive for precisely the same reasons that a carbon tax would be regressive: because poorer families tend to spend more of their income on buying things.

On the other hand, consumption taxes such as VAT are usually seen as relatively 'good' ways to raise revenue, as they are typically less economically distorting. Indeed, most tax experts would agree that it would be better for the economy, and for growth rates, for them to make up a greater rather than lesser percentage of the tax take.^{146,147}

An alternative approach would be to use the revenue from a carbon tax to fund cuts to the most economically damaging taxes. Doing so should make the economy more productive, which would raise earnings – especially in the long run. Depending on which taxes were reduced, there might also be a positive impact for job creation as employers sought to take on more staff.

‘Consumption taxes such as VAT are usually seen as relatively ‘good’ ways to raise revenue, as they are typically less economically distorting’

In a previous report by the Centre for Policy Studies and the Tax Foundation – *A Framework for the Future* – we identified how the tax system could be radically improved in order to boost the economy and create a more prosperous UK.¹⁴⁸

Having said all of this, extensive research into carbon pricing has found that using the revenue raised to fund tax reforms is generally not the most popular proposal.¹⁴⁹ While this is not to say that governments should shy away from doing anything which appears unpopular (there is, for example, plenty of evidence which that new environmental charges can see their popularity increase once implemented),^{150,151} the whole point of this exercise is to find ways to make carbon pricing as politically palatable as possible without diluting its ability to cut greenhouse gas emissions from the economy. On this score, it is notable that the evidence also suggests that carbon taxes will be more acceptable if phased in gradually than imposed at full strength overnight – which would also give businesses more time to adjust.¹⁵²

In terms of popularity, there is certainly evidence that carbon taxes are more popular if people see a direct connection between them and environmental measures – which also addresses the perennial suspicion that these are simply a way for the Government to increase the tax take. So an alternative approach

145 Office for National Statistics, *Proportion of UK households paying no income tax and direct taxes, financial year ending 2019*. [Link](#).

146 Tax Foundation, *Not All Taxes Are Created Equal*. [Link](#).

147 Daniel Bunn, Cristina Enache and Ulrik Boesen, *Consumption Tax Policies in OECD Countries*. [Link](#).

148 Tom Clougherty et al., *A Framework for the Future: Reforming the UK Tax System*. [Link](#).

149 Stefano Carattini, Maria Carvalho and Sam Fankhauser, *How to make carbon taxes more acceptable*. [Link](#).

150 Stefano Carattini, Andrea Baranzini and Rafael Lalive, *Is taxing waste a waste of time? Evidence from a supreme court decision*. [Link](#).

151 David A. Hensher and Zheng Li, *Referendum Voting in Road Pricing Reform: A Review of the Evidence*. [Link](#).

152 Stefano Carattini, Maria Carvalho and Sam Fankhauser, *How to make carbon taxes more acceptable*. [Link](#).



would be to use any revenues to go towards environmental schemes. These might include subsidies for public transport, or grants for zero-emission vehicles, or concessionary loans for green home improvements.

Fundamentally, we can think of these subsidies as ways for the government to attempt to lower the price of the things which consumers will need to transition towards in order to abide with Net Zero.

Yet while it would certainly help with decarbonisation, it is far from clear that this approach is the most efficient or effective way to go about it.

One of the biggest problems with green subsidies of this kind is that they struggle to help exactly the people who we would want to prioritise helping. A good example is the Plug-in Car, Van and Truck Grants – which since 2011 have cost taxpayers nearly £1.3 billion.¹⁵³ Were wealthier individuals simply getting a discount on a vehicle they would have bought anyway? Could more emissions have been saved by spending that £1.3 billion on something else? We do not have the evidence – although the fact that the Government recently withdrew the subsidy for higher priced vehicles suggests that the answer to the first question may well have been yes.¹⁵⁴

‘One of the biggest problems with green subsidies of this kind is that they struggle to help exactly the people who we would want to prioritise helping’

In a similar vein, how can we be sure subsidy schemes are really addressing the cost increases we would want them to be addressing? A comprehensive carbon tax would push up costs across the economy. But the Government might only set up subsidy schemes for a select few big-ticket items – vehicles, home improvements, and so on. How can we then be sure that everybody is insulated from cost rises? What about those who do not drive, or whose homes already have decent insulation?

There is also substantial evidence from green initiatives of the recent past to conclude that the subsidy approach does not always go to plan. The Green Deal for energy-saving home improvements was set up in 2012, yet was discontinued in 2015 after low-take up.¹⁵⁵ In 2021, the Green Homes Grant – a similar initiative – was closed down after administrative failures made it difficult for homeowners to access the money on offer.¹⁵⁶ Of course, this may be more of a comment about the individual schemes in question – but given the frequency of failure, it points to an inherent challenge in terms of ensuring such initiatives are rolled out effectively.

Fundamentally, this is a classic free-market critique to be made of a command-and-control approach to policy-making. Bureaucrats, by the very nature of bureaucracy, rarely possess the knowledge needed to make informed decisions about how best to allocate resources in an economy. They are also subject to

153 Department for Transport and the Office for Zero Emission Vehicles, *Plug-in car, van and truck grant to be targeted at more affordable models to allow more people to make the switch*. [Link](#).

154 Ibid.

155 Department of Energy and Climate Change and the Ministry of Housing, Communities and Local Government, *Green Deal Financing Company funding to end*. [Link](#).

156 House of Commons Library, *Green Homes Grant*. [Link](#).



lobbying from vested interests, which can steer decision making towards sub-optimal outcomes.

We should therefore be apprehensive about the ability of governments to cost-effectively bring about a greener economy through pure command-and-control methods, or picking particular technologies which appear to hold promise. Indeed, as this report has shown, market-based mechanisms have a track record of delivering meaningful decarbonisation in a way which is economically efficient and respectful of individual behaviour and business patterns. It is precisely why we argue for recasting Britain's climate policy more along these lines if we are to successfully meet our 2030, 2035 and 2050 climate goals.

‘As this report has shown, market-based mechanisms have a track record of delivering meaningful decarbonisation in a way which is economically efficient and respectful of individual behaviour and business patterns’

We therefore suggest that the best way to mitigate the regressivity of a carbon tax is via a system of carbon credits or dividends – in essence, using the revenue from carbon taxes to compensate those who would otherwise lose out. In fact, if engineered correctly, a new system of a carbon tax with dividends could decarbonise the economy faster, more fairly, and less expensively, while raising living standards for the least well off in society.

How exactly a carbon dividend system would work is, of course, also very much up for discussion. But under the simplest version, each individual would be rebated a sum of money which was raised by the carbon tax. If we use the figure of around £27.6 billion which we calculated earlier for a £50/tCO₂ carbon tax applied to 2019's total emissions, this would see around £413 returned to each individual citizen – assuming each received a perfectly equal share of the total revenue raised.¹⁵⁷

This is of course enormously oversimplified. There are many further considerations, which we will address in the remainder of this chapter.

An obvious challenge is finding a way of transferring the carbon dividend from government coffers to individuals' wallets. One option would be to set up an entirely bespoke system, dedicated to administering the carbon dividends. Individuals could be able to access a site, perhaps through a smartphone app, to provide relevant details in order to work out and collect the dividend they are entitled to. Dividends could be paid directly into a nominated bank account, and the site would allow for easy management of the dividend. Eligibility could be based on, for instance, having a National Insurance Number – which most people receive as they approach their 16th birthday.¹⁵⁸

157 Office for National Statistics, *Population estimates for the UK, England and Wales, Scotland and Northern Ireland: mid-2019*. [Link](#).

158 Josh Burke, *Why carbon dividends are having a moment*. [Link](#).



Going down this route offers a relatively simple, user-friendly method of rebating money to citizens. It would be wrong to suggest it is flawless, however. Various government IT projects of the past have gone badly awry – ending up overbudget, overschedule, or lacking the desired functionality.¹⁵⁹ Digital exclusion could also be a stumbling block to everybody being able to access their dividends. The possibility for people to defraud the system would need to be guarded against. Awareness of the dividends among all demographics will be paramount.

It might be simpler – as with the successful schemes set up during the pandemic – to link the carbon dividend to HMRC’s existing payment infrastructure, turning it into a bolt-on to the tax system, or PAYE, or Universal Credit. Obviously, there would be a need to ensure that people were not missed out, but the simpler the means of administration, the more likely Whitehall is to accept such a proposal.

There is also a point here that we do not want the carbon tax and dividend to become a sneaky way of politicians increasing taxes on companies in order to give handouts to favoured groups. The reason for suggesting it be set by a separate body from the Treasury was to ensure that it reflected, as best as could be calculated, the actual cost of carbon in the economy rather than acting as a revenue-raiser or distorting behaviour. Likewise, in the long-run we would hope that the carbon tax would effectively wither away – even if it were still in place, the bulk of the economy and industry would be running along zero-emission lines, meaning that the revenue received would naturally fall. It may be easier for that to happen if it is administered via existing systems, rather than a separate bureaucracy and delivery system being created that then takes on an institutional weight of its own.

‘We do not want the carbon tax and dividend to become a sneaky way of politicians increasing taxes on companies in order to give handouts to favoured groups’

Having said all this, none of the above necessarily fatally undermines the idea of setting up a carbon dividends system. Some government IT projects have not gone to plan, but many more function perfectly well on a daily basis. Not everyone is as digitally literate as we may like, but most would have the basic level of understanding needed to interact with the system we envisage, or will have carers or support networks who could help them to. Stopping fraud should be a concern, but that is true for all benefits – and safeguards could be designed to prevent it. Campaigns to raise awareness could begin well in advance of the dividends being made available, drawing on how public authorities managed to communicate messages during the coronavirus pandemic.

Indeed, the response to coronavirus provides a number of instructive lessons relevant to this. In addition to the public information messaging, we saw how entirely new systems could be created from scratch and in a relatively short period of time. We saw how financial support could be rapidly doled out to those in need. In light of the past 18 months or so, we should be encouraged about the ability of government to put ambitious ideas into practice with a reasonable degree of success.

¹⁵⁹ Committee of Public Accounts, *The dismantled National Programme for IT in the NHS*. [Link](#).



Beyond the rough contours of what a dividend system might look like, we should also consider some of the finer points around how it is administered. In no particular order, the bullet points below provide some discussion of other aspects which policymakers designing a dividend system may wish to contemplate:

- **Frequency of dividend payments.** Thought will have to be given to how regularly carbon dividends should be paid out. Ideally, they would be paid as frequently as possible. Under the constraints of the real world, however, this desire clashes with administrative simplicity and other considerations. That being said, it should not be prohibitively difficult to ensure dividends are paid out on a monthly, or even fortnightly, basis as is the case with many other benefits. That said, we also heard arguments during our research in favour of making the payments on a less frequent basis – perhaps annually, or bi-annually. If this was the case, the dividends would be individually larger, which could reduce complexity, and might do better to lock in support for the system, perhaps by playing on certain cognitive biases.¹⁶⁰
- **Dividend payments for children and dependents.** Thought should also be given to whether dividends should be paid to children as well as adults. Though younger people tend to have lower carbon footprints than older ones, they are still obviously responsible for some greenhouse gas emissions.^{161,162} The introduction of a comprehensive carbon tax would therefore increase children's living costs – or rather the costs borne by the parents or carers raising them. Clearly, it would be silly to argue the government should start sending cash transfers to two-year-olds. But it is perfectly reasonable to think the system could engineer a way for parents or carers to claim a partial dividend, perhaps via its incorporation into the child benefit system. Many carbon dividend advocates settling on children being entitled to half the value of a dividend for an adult.^{163,164}

In a similar vein, we may also wish to allow carers who look after dependents who are not young children – for instance elderly relatives, or those with disabilities – to claim on their behalf if they are part of the same household. In these instances, a full rather than partial dividend payment would be more appropriate, since Treasury analysis suggests that older individuals generally have a higher per capita carbon footprint than other age brackets.¹⁶⁵

- **Allowing individuals to bring forward future dividend payments.** The ultimate purpose of a comprehensive carbon tax is to incentivise individuals and businesses to adopt clean alternatives to polluting technologies, or make changes to their lives to reduce their carbon footprints. While many such alternatives are rapidly falling in price, some remain expensive and out of reach for sections of society. To help address this, policymakers could explore whether individuals could be allowed to bring forward future dividend payments – in other words, allowing individuals to get an advance on the expected value of their upcoming

160 Stefano Carattini et al., *Green taxes in a post-Paris world: are millions of nays inevitable?* [Link](#).

161 The Economist, *How to cut carbon emissions*. [Link](#).

162 Gary Haq et al., *Greening the Greys: Climate Change and the Over 50s*. [Link](#).

163 Paul Hartley et al., *The Case for Counting Children in a Carbon Tax Dividend Plan: Net Benefits and Poverty Implications for a Per Capita Dividend*. [Link](#).

164 Josh Burke, *Why carbon dividends are having a moment*. [Link](#).

165 HM Treasury, *Net Zero Review: Interim Report*. [Link](#).



dividend payment. They would then be ineligible for the next instalment of the dividend payment.

Having more cash at once might allow an individual to make their home more energy efficient, or invest in other measures to reduce their carbon footprint, and thus exposure to the carbon tax. Certainly, if this idea were to be included as part of the dividend system, it would need to be treated with caution, as it could increase government spending – perhaps in a very unpredictable way. It would also need to be considered whether the payments would simply be in the form of cash, or would have to be connected to specific emission-reducing projects, such as home insulation. Policymakers might therefore want to pilot such schemes to begin with, possibly focusing their attention on those on the lowest incomes first.

- **Automatically enrolling Universal Credit claimants in the system.** In an ideal world, everybody would either register for their dividends in time for the introduction of the comprehensive carbon tax, or be covered under HMRC's existing software. However, there remains a possibility that poorer individuals risk finding themselves in a world of higher prices without any support to meet them. Using the existing benefits system, we could seek to find ways to make registering as easy as possible – for example we could automatically ensure anyone in receipt of Universal Credit was registered for dividend payments by default. They would then not have to interact with the system at all for as long as they were receiving state support. This might not capture everybody, but it would certainly widen the net, and ensure that the majority of those most in need will get their dividends. If the dividend were also delivered via PAYE it would mean that they would retain the payment as they moved from welfare into work.
- **Using up any leftover revenue.** At its inception, the comprehensive carbon tax would raise significant quantities of revenue. As we have estimated before, a rate of £50/tCO₂ on 2019's emissions could raise a sum in the magnitude of around £27.6 billion.¹⁶⁶ In our system, we would expect the vast majority of it to go to individuals. However, if people had to actively claim the dividend, it is entirely possible that some would go unclaimed – witness the fact that many people do not claim existing benefits for which they are entitled.¹⁶⁷

One option for any unclaimed dividends would be for it to be released to the Treasury to spend however it saw fit – on public services, tax reforms, debt reduction, or something else entirely. Another would be for it to be rolled over until the next dividend instalment, and paid out then in the form of a higher individual dividend. Another option – and perhaps the most politically salient one – could be to invest it in purely environmental schemes, focused on helping the poorest in society to transition to lower carbon lifestyles.¹⁶⁸ This could include awarding grants for low-carbon heating systems, or subsidising public transport, all of which evidence suggests are very popular among citizens.¹⁶⁹

166 Though one must keep in mind the significant caveats to this analysis which we noted earlier.

167 Department for Work and Pensions, *Income-related benefits: estimates of take up: financial year 2018 to 2019*. [Link](#).

168 Andrea Baranzini, Metin Caliskan and Stefano Carattini, *Economic Prescriptions and Public Responses to Climate Policy*. [Link](#).

169 Stefano Carattini et al., *Green taxes in a post-Paris world: are millions of nays inevitable?* [Link](#).



- **Maximising public buy-in for the system.** The introduction of a carbon dividend system would be a major undertaking. To be successful, it will require a certain degree of active engagement from the general public. As mentioned earlier, a campaign to raise awareness should begin well in advance of the dividends being made available. The government should commission focus grouping to test different messages, not only to gauge which resonate most with the public, but also to find out whether there are any other changes to the ‘branding’ of the carbon tax and dividend which will ensure its robustness. For the purposes of this report, we have used the term ‘carbon tax’, but evidence suggests that other terms, for instance ‘carbon fees’, ‘carbon surcharges’, or ‘climate contributions’ could be more popular.^{170,171} One could imagine that something playing off the ‘National Health Service’ might increase support: perhaps a ‘National Climate Contribution’ being levied on ‘polluters’ would be especially attractive to the British public. Josh Burke of the LSE’s Grantham Research Institute on Climate Change and the Environment has previously suggested depositing revenues into a ‘UK Carbon Dividends Wealth Fund’, which might have the benefit of depoliticising the system and further bolstering support for it.¹⁷²

Having an explicitly delineated pot of money from which the carbon dividends are paid out would also provide a means with which to dispel any calls to retain dividend payments at a higher level than they ought to be, topped up with general Treasury cash. The danger of course – as with the new Health and Care Levy – is that this becomes seen as a more politically attractive form of revenue-raising, hence the need to explicitly and clearly separate the carbon tax and dividends from general taxation, and have them administered according to environmental rather than fiscal imperatives.

170 Steffen Kallbekken, Stephan Kroll and Todd L. Cherry, *Do you not like Pigou, or do you not understand him? Tax aversion and revenue recycling in the lab.* [Link](#).

171 Andrea Baranzini and Stefano Carattini, *Effectiveness, earmarking and labeling: testing the acceptability of carbon taxes with survey data.* [Link](#).

172 Josh Burke, *Why carbon dividends are having a moment.* [Link](#).



V. Conclusion

Alongside levelling up, decarbonising the economy is a core priority of the current Government. The Prime Minister has staked a considerable amount of his personal reputation on continuing the push towards Net Zero. And based on current polling, there is every chance that the Conservatives will still be the party of government by the time the interim targets, set last year, need be delivered upon.

Ensuring such targets are reached successfully will require a suite of new ideas and actions, across a range of policy areas. While by no means a silver bullet, this report sets out the case for enlarging the role of carbon pricing in terms of helping in that overall endeavour. From experience both domestically and abroad, the power of carbon pricing and similar mechanisms to achieve environmental goals has been demonstrated time and time again.

‘From experience both domestically and abroad, the power of carbon pricing and similar mechanisms to achieve environmental goals has been demonstrated time and time again’

Put simply, carbon pricing directly pushes the onus on to polluters to clean up their act, and levels the playing field for individuals and businesses taking it upon themselves to transition to a greener economy. By extending the reach of carbon pricing to more of the UK economy, sectors which have lagged behind those that have made an outsized contribution to decarbonisation in recent decades should begin to catch up, as they must if the UK is to meet Net Zero.

Importantly, carbon pricing can also lessen the need for government to take a more active responsibility in decarbonising the economy – whether through red tape, subsidies, or blunter taxes of other sorts. By trusting in market forces, carbon pricing can cut emissions in an efficient and cost-effective manner. Ultimately, this will make the transition to Net Zero more assured, less disruptive, and – critically – less expensive.

Getting to Net Zero will involve financial outlays, and carbon pricing does not shy away from that. In fact, it quite visibly highlights the cost side of the ledger when it comes to decarbonising. But that is precisely why it has proven to be so successful in the past and to this day. Prices are signals, and carbon pricing signals exactly where it is economical to switch to cleaner options. By putting a price on carbon, individuals and businesses can – consciously or not – identify where it makes sense to begin lowering their emissions, or to invest in carbon sequestration. At the same time, it also incentivises private sector innovation to reduce the costs where it is currently more expensive to switch.



Moreover, as this report has shown, the other available pathways to decarbonisation are by no means without costs of their own. Regulations will in all likelihood force up prices for businesses, perhaps by mandating the ways in which they can operate. Subsidies require taxpayer money, leading either to immediately higher general taxes, or piling on extra debt, which must eventually be paid back.

Whichever route we take to Net Zero, the cost of doing so should be a key consideration. But just as important as the overall price tag is how those costs are apportioned. If implemented on its own, carbon pricing could leave the poorest in society even less well off. Should this transpire, the current consensus on the need to tackle climate change could quickly fracture – and understandably so.

‘As the Government prepares to host COP26 and publish its Net Zero Strategy, now is the perfect time to begin the move towards carbon pricing’

That is why it is imperative to consider how to mitigate the impacts of carbon pricing. By rebating the revenue raised by a comprehensive carbon tax to everyone in society, the Government can protect the most vulnerable from any cost increases, and ensure that it is those who are most responsible for greenhouse gas emissions who shoulder the brunt of the burden. In doing so, decarbonisation will be made fairer – and hopefully locks in further support for the transition to a Net Zero economy.

Accompanying a system of carbon dividends should also be complementary measures. Carbon border adjustment mechanisms can ensure that future climate action does not simply result in polluting industries going offshore, while also allowing green businesses in the UK to compete on a level playing field with their foreign counterparts. Such a policy would protect British jobs while guaranteeing that climate action at home was making a meaningful difference to tackling what is fundamentally a global problem.

Investment in clean innovation, too, should help in terms of delivering the new technologies necessary to decarbonise parts of our lifestyles – so we can continue to enjoy our modern standards of living, without the environmental expense. The Government has already taken great strides towards improving the innovation landscape for British businesses, and with hope we will soon begin to see the fruits of that labour.

Few talk a better game on tackling climate change than the Prime Minister. The ambition set by his government is laudable, and lays down a marker for other countries to match. Already, detailed thinking has been outlined which will help the UK to deliver on the targets that have been set. Further plans and strategies will soon add to the arsenal of policies to hasten decarbonisation.

In the bid to meet its future climate goals, it is imperative that the Government adopts ideas which ensure that the transition towards Net Zero is as cost-effective and sure-footed as possible. Carbon pricing should be front and centre of that endeavour – and, as the Government prepares to host COP26 and publish its Net Zero Strategy, now is the perfect time to begin the move towards it.



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