

Getting to zero

*A practical policy commission
to deliver decarbonisation in the UK*



Ted Christie-Miller

ONWARD >

About Onward

Onward is a campaigning thinktank whose mission is to develop new ideas for the next generation of centre right thinkers and leaders. We exist to make Britain fairer, more prosperous and more united, by generating a new wave of modernising ideas and a fresh kind of politics that reaches out to new groups of people. We believe in a mainstream conservatism – one that recognises the value of markets and supports the good that government can do, is unapologetic about standing up to vested interests, and assiduous in supporting the hardworking, aspirational and those left behind.

Our goal is to address the needs of the whole country: young as well as old; urban as well as rural; and for all parts of the UK – particularly places that feel neglected or ignored in Westminster. We will achieve this by developing practical policies that work. Our team has worked both at a high level in government and for successful thinktanks. We know how to produce big ideas that resonate with policymakers, the media and the public. We will engage ordinary people across the country and work with them to make our ideas a reality.

Onward is an independent, not-for-profit thinktank, registered in England and Wales (Company Registration no. 11326052).

Thanks

Onward is a small non-profit that relies on the generosity of our donors and patrons to do our work. We are particularly grateful to our partners for the *Getting to zero* programme - the European Climate Foundation, the Purpose Foundation and the Quadrature Climate Foundation.

We would like to thank Milo Boyd and James Blagden for their research support and Jess Hopwood for her help with design. We also would like to thank the co-chairs and steering group for the *Getting to zero* programme for their thoughtful comments and challenge.

About the programme

This year-long programme of work, culminating at COP26 in November 2021, will explore the practical challenges to net zero and set out a series of bold, deliverable and politically possible policies to achieve it.

It will be framed around how the green transition can be aligned to the economic recovery, turbocharging green growth and levelling up productivity rates and employment levels across the whole of the UK. It will focus on three core components: a large-scale analysis of key incumbent industries; research on the green skills and jobs opportunity; and an exploration of the possibility for future innovation to materially drive down or capture emissions at the pace required.

The programme follows on from Onward's 2019 report, *Costing the Earth*, which set out the case for decarbonisation through innovation and greater government accountability. This, combined with Onward's work on levelling up and political strategy ahead of the 2019 election, puts Onward in an ideal position to be a bold voice for practical and politically possible decarbonisation policy.

About the author

Ted Christie-Miller joined Onward in January 2019 and has since authored a number of research reports including Onward's first report on net zero policy, *Costing the Earth*. He is now the Programme Manager for the *Getting to zero* programme at Onward. During his time at Onward he has had articles published in *The Telegraph*, *CityAM*, *ConservativeHome*, *Reaction* and *BusinessGreen*.

Before joining Onward he worked on energy policy in the Central Government team at Instinctif Partners. He graduated from the University of Edinburgh in 2018 with a Masters degree in History.

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Foreword



Twenty-nine years is not a long time. It took longer for politicians to approve a third runway at Heathrow and will take nearly as long to complete HS2. But twenty-nine years is the timescale we have set ourselves and the rest of the world to reduce net carbon emissions to zero.

It is a breakneck pace made necessary by our own past failures to regulate and moderate environmentally damaging behaviour. We have a moral responsibility as well as an ecological imperative to act - and with the international climate summit COP26 being held in Glasgow in 2021, the UK has an opportunity to lead.

But in doing so we must not be naive about the changes in industrial and human behaviour needed to decarbonise the economy, and the political trade offs that will follow. Yes, there are huge opportunities for a more sustainable, resilient and prosperous society. And we share the optimism of many that scientific innovation, responsible business investment and enlightened political leadership will help achieve this phenomenal feat.

But it is undeniable, too, that many jobs will be lost, totemic industries will become unviable and the prices for some goods may rise. And perhaps most notably, given divisions in Britain today, these changes will affect different places in markedly different ways - as the South Yorkshire industries and Midlands auto manufacturers we used to represent in Parliament will testify.

Analysis for Onward released today [in this report] suggests there will be as many as 10 million high emitting jobs disrupted by the transition to net zero over the next three decades. More than half (52%) are concentrated in the North, Midlands or Scotland. In some of Britain's poorest regions more than two in five jobs are in a high-emitting industry, compared to less than one in four in London.

In the last two decades, climate policy has gone from one of the most contested areas of policy to an area of genuine cross party consensus. All major parties at the 2019 General Election had net zero targets in their manifestos. Recent polling suggests that all regions, age groups and ethnicities now support decarbonisation. As we make difficult choices, we must preserve this coalition of support by ensuring there is no-one and nowhere left behind.

This is why we are delighted to co-chair Onward's *Getting to zero* programme, which will spend the next twelve months developing policies that will not only help to achieve net zero, but do so in a way that is sensitive to what is politically possible and practical to deliver. We will examine three distinct challenges, each of which are prerequisites for success.

The first is the vexed question of how to decarbonise incumbent industries. Four industries are responsible for three quarters of the UK's emissions (Manufacturing; Transport and Storage, Electricity, gas, steam and air conditioning supply; and consumer expenditure). Many of the most carbon intensive industries are made up of deeply-rooted businesses that have sustained communities and supply chains for generations: farming, steel, oil and gas, auto and aerospace, chemicals. We must sensitively but urgently tenable adaption, easing any friction and anticipating the fallout that can accompany wholesale industrial change.

Second, we will examine the labour market implications of net zero. The transition to net zero may well create millions of new jobs to replace those it disrupts, but it is far from clear that they will be in the same places - like North Wales of the North Sea Basin -or available to the same workers as before. What are we doing to support people to retrain or progress into the new economy, rather than being left despondent in the old?

Last, we need to create the conditions for inventors and innovators to overcome some of the constraints that currently limit our ability to act. Government has a poor record in picking winners but it does set the rules of the game. Whether batteries, carbon capture and reduction, use of different fuel sources like hydrogen, policymakers must develop new regulatory, tax and policy incentives to encourage change.

We will conclude ahead of COP26 in November this year, when the UK will be the stage for the most important international climate summit to date. The current pandemic has shown us that nature still holds the power to transform our lives - and the vaccine reveals that with scientific endeavour, political will and international action we can wrestle back control. In the next year, ahead of COP26, we must do so again - once again with the UK leading the way.



Dame Caroline Spelman

Co-Chair & Former Secretary of State for Environment,
Food and Rural Affairs



Rt Hon Caroline Flint

Co-Chair & Former Shadow Secretary of State for Energy
and Climate Change

Summary of the argument



The UK has less than a year to go until it hosts the UN Climate Change Summit (COP26) in Glasgow and under three decades to achieve a net zero emission economy. The clock is ticking on our moral and legal obligations to the environment and to future generations.

We have made considerable progress since the first UN Climate Change Summit in 1995. In the last 30 years, the UK has decarbonised at the fastest rate in the G7, and faster than many other OECD countries. In 2018, the UK was the first major economy to legislate for Net zero emissions by 2050, prompting China, Japan, France and South Korea to follow suit. With the USA expected to join the club in 2021, more than three fifths of global CO2 emissions, and three quarters of global GDP, will shortly be subject to legally binding net zero targets. On current distribution, 73% of coal, 58% of oil and 49% of gas will be covered.¹

But we have a long, long way to go. Over the last three decades global emissions have risen sharply, despite broad knowledge of the risks. Some of the reductions in the West have been as a consequence of moving highly emitting manufacturing and heavy industry from the West into the developing world, often resulting in higher - not lower - overall emissions. Others have only recently begun to pay off, such as policies to encourage the development and use of clean technologies like offshore wind and battery technology.

The environment will be one of the defining policy challenges of this generation of policymakers, voters and industry leaders. We have the target but not the policy or political playbook to get there. The changes that politicians describe - the wholesale shift to electric vehicles, the decarbonisation of housing, or the introduction of effective carbon pricing and taxes, for example - will all demand enormous behavioural changes on the part of workers, consumers, shareholders and businesses. If the next three decades are to undo the limited progress of the last three, we urgently need a practical, politically tested plan for action.

This is why Onward is delighted to launch *Getting to zero*, a practical policy programme designed to develop our understanding of what is required to deliver net zero and to generate the policies that can get us there. The programme of work is a serious endeavour, co-chaired by Dame Caroline Spelman, the former Secretary of State for Environment, Food and Rural Affairs, and Rt Hon Caroline Flint, former Shadow Secretary of State for Energy and Climate Change. We are thrilled that it also includes a wealth of experience in the form of policy thinkers, business leaders and representatives of different political parties.

This launch report sets out the state of play: where we are and where are the risks. We explore specifically the labour market risks from decarbonisation and the density of carbon intensive jobs, revealing a strong overlap between areas that are reliant on emitting industries for jobs and the areas who are economically vulnerable - and politically volatile - in other ways. This speaks to the central challenge we are trying to address: how can we successfully decarbonise the economy without leaving already vulnerable people and places further behind? How can we make net zero an opportunity, rather than a threat?

In the following year, we will explore that question in a number of contexts, looking at how to decarbonise incumbent industries, what we could do to retrain and upskill those whose jobs are linked to emissions, and how to better leverage the UK's research and technological expertise by creating a conditions for innovation. We look forward to working with you as we do that.

The state of play



Since Margaret Thatcher became the first world leader to call for climate change mitigation in 1989, global emissions have remained on a consistent upward trajectory. There have been dozens of international agreements and commitments, including 25 Conference of the Parties (COP) meetings since the first UN Climate Change Summit in 1995, but overall collective action has failed to halt the global rise in greenhouse gas emissions.

1. Despite global climate change policies, greenhouse gas emissions have risen, not declined, since 1990.

- Concentrations of CO₂ in the atmosphere are higher today than at any time in three hundred thousand years of global history. CO₂ concentration in the atmosphere is now over 408 parts per million (ppm), up from 354 ppm in 1990 and 275 ppm before the Industrial Revolution. Before this, carbon concentration in the atmosphere had remained stable for two thousand years as Figure 2 shows. Not only is the trend going upward, but it is doing so in a fairly linear fashion. The financial crisis, which led to losses of over \$2 trillion worldwide, does not even feature in the relentless rise in global emissions.
- This has happened alongside rising public consciousness about the dangers of climate change, supported by growing political and media interest. Since 2004, world newspaper coverage of climate change or global warming has risen six-fold.² There is also clear public demand for action to tackle climate change. Onward research from 2019 found that every age group believes the Government should do more to tackle climate change.³ Despite a huge rise in awareness of the problem, the data shows we have categorically failed at finding adequate solutions so far.
- But, there are signs that the Paris Agreement marked a turning point in 2015. More than three fifths of global CO₂ emissions, and three quarters of global GDP, will shortly be subject to legally binding net zero targets.⁴ This is new and is a product of the Paris Accord. Only time will tell how much this reduces emissions in real terms.

Figure 1: Global CO2 atmospheric concentration: global annual mean concentration of CO2 (ppm).

Source: Our World in Data; Dieter Helm.

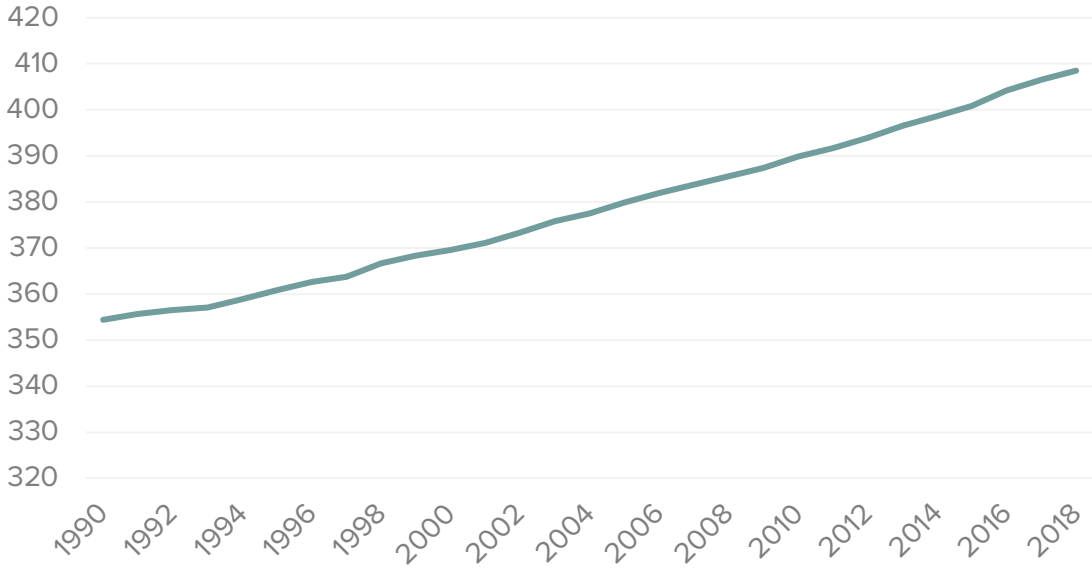
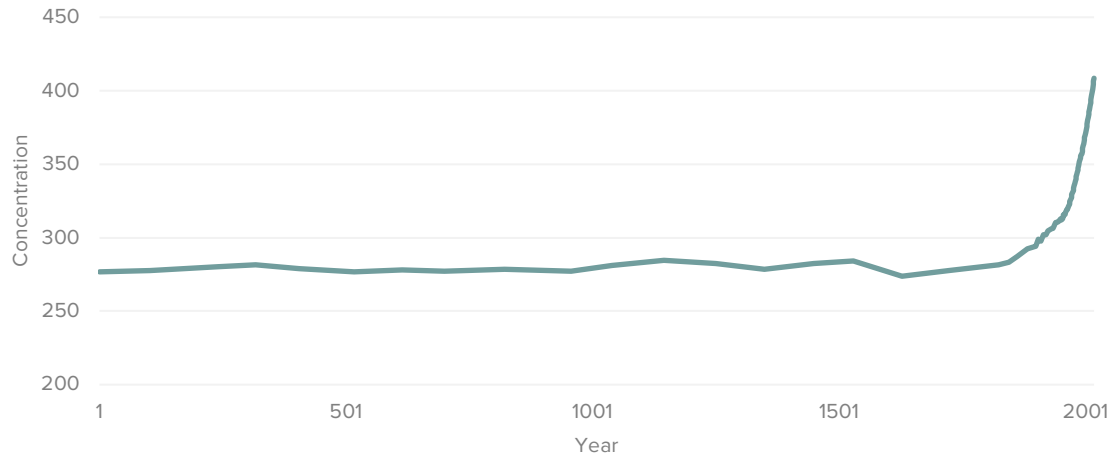


Figure 2: CO2 concentration since 01AD

Source: Our World in data; Dieter Helm.

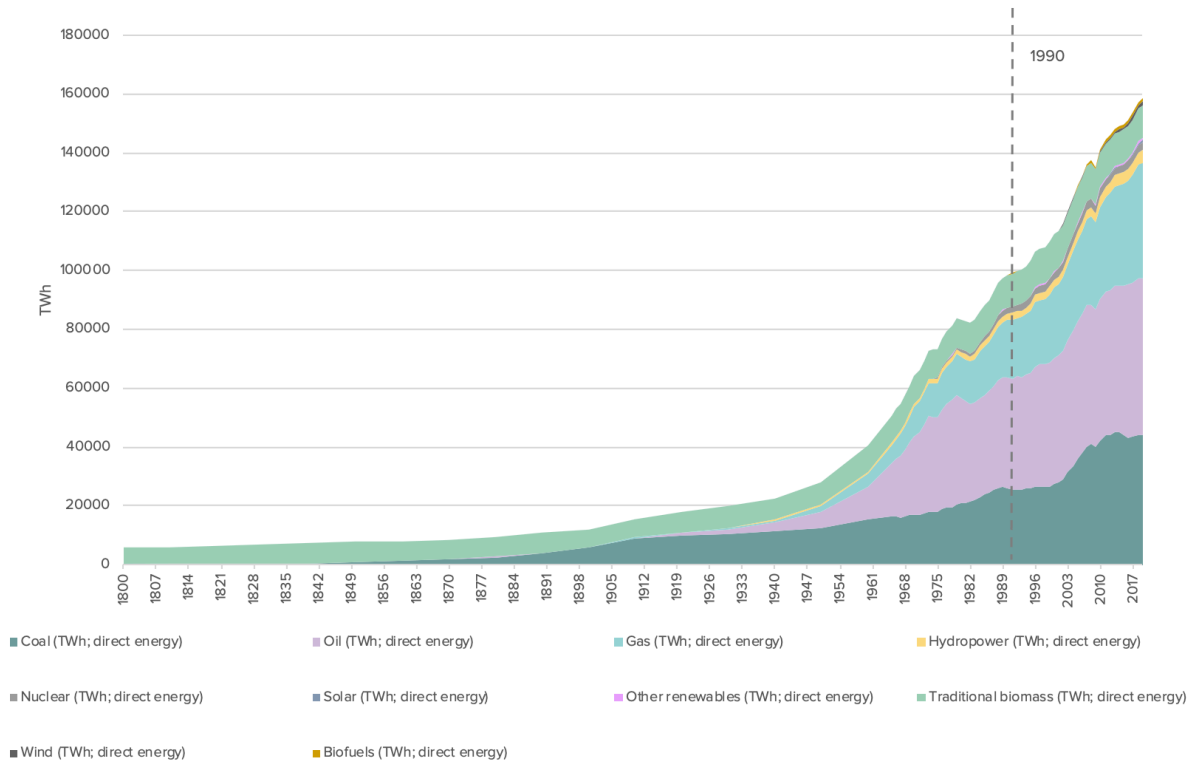


2. This rise has been mostly due to an increased demand in fossil fuels over the past thirty years

- Before 1990, coal and oil were dominant. Gas was illegal to burn in the US and Europe. Since then, gas use has risen by 64% in the US and by 30% in Europe.⁵ In that time, gas has replaced nuclear energy in many countries, especially in Western Europe and the United States. In 1990, the typical household in the US and Europe had an energy mix of 80% coal and 20% nuclear. The same household today is now more likely to be 40% gas and less than 40% coal, as Dieter Helm has noted.⁶ Despite the progress made in recent years, renewables are responsible for just 2.2% of global energy consumption.⁷ Gas has given the developed world a higher emitting and cheaper option than both renewables and nuclear for much of that period.
- This is not to say that coal and oil have not performed strongly over this period. Almost all of the world's cars and heavy goods vehicles (HGVs) still use internal combustion engines. Since 1990, the world has added 100 million vehicles to the existing fleet of 1.2 billion, of which 300 million were produced in highly emitting China.⁸ The number of aircraft worldwide has doubled roughly every 15 years from around 5,000 in 1990 to 26,000 today. Petrochemical demand has also grown significantly and is set to be the main driver of oil demand in coming years with projections of 10 million barrels per day (mdb) through to 2030.
- Coal has overseen a dramatic increase in usage too, largely due to developing countries such as China and India. China is responsible for over half (53%) the world's coal consumption today, up from 23% in 1990.⁹ To put this into perspective, the world's coal consumption has grown by 73% since 1990 and China has still managed to double their proportion of consumption in this time.¹⁰ The emissions saved by the UK's entire coal phase-out would be offset by just a few weeks of China's current coal usage. In 1990, China's GDP was just USD\$360 billion. By 2018 it had grown 38-fold, to \$13.6 trillion, in no small part due to coal.

Figure 3: Global primary energy consumption, measured in TWh per year.

Source: Vaclav Smil (2017); *Energy Transitions: Global and National Perspectives*; & BP Statistical Review of World Energy; Our World In Data



3. This increased demand for fossil fuels has been driven by an expansion of industrial and manufacturing sectors in developing countries.

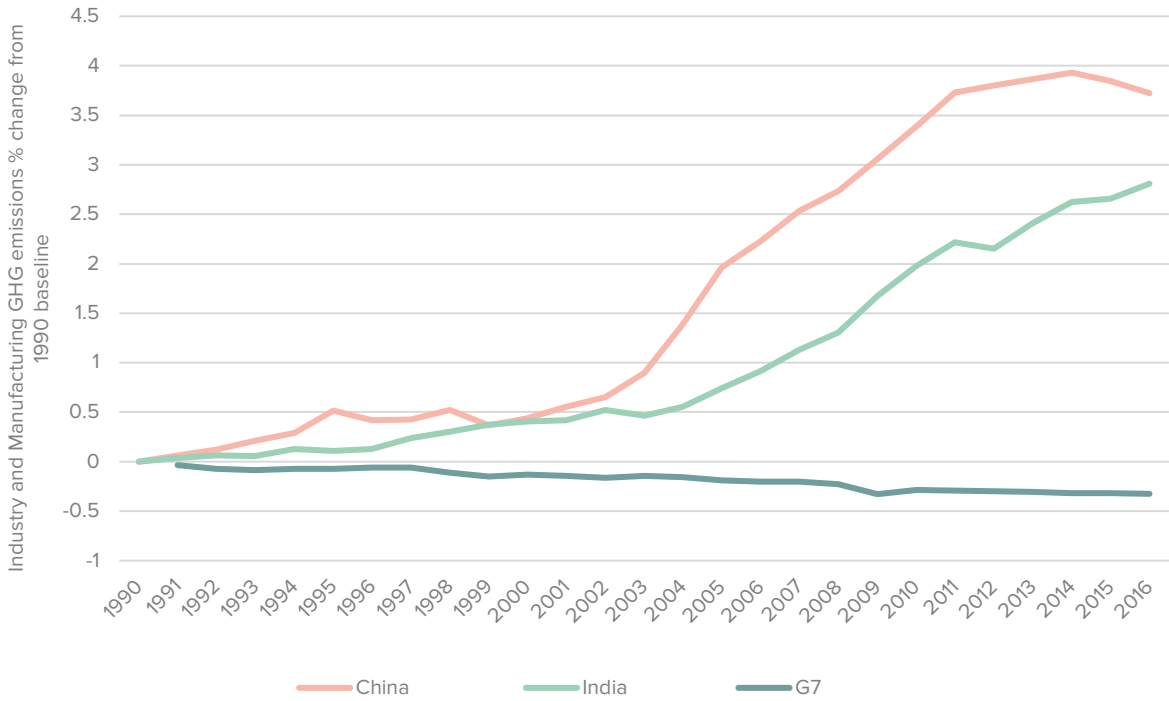
- The UK manufacturing industry has decarbonised industry and manufacturing by 54% since 1990, the highest rate in the G7.¹¹ This may be due in part to the decline of this sector relative to the service economy. Since 1990, manufacturing has seen the amount of jobs plummet by 47%¹², with many of these industries opting to move operations overseas where labour, materials and land is cheaper.
- The long term collapse of manufacturing and industry has been a common feature across the whole G7 and historically there has been a strong correlation between de-industrialisation and a declining rate of emissions. More recently, this has started to change: as the Climate Change Committee has noted, increased industrial output in the UK over the last ten years has mostly come from

restructuring for reasons unrelated to climate policy. This suggests that arising industrial output does not always have to coincide with a rise in emissions¹³

- While the West has deindustrialised however, the developing world has been rapidly developing. Over the same period, China and India have seen their manufacturing and industrial emissions grow by 370% and 280% respectively. It is no coincidence that these industries have been key turbochargers of growth in these nations as they developed, with China growing its GDP by 1400% and India by 580% since 1990.¹⁴

Figure 4: Industry and Manufacturing GHG emissions % change from 1990 baseline (G7 average Vs India & China).

Source: CAIT Climate Data Explorer; Our World in data



4. Climate change policies have been useful drivers of technological innovation and the phase out of coal

- There have been a number of major technological breakthroughs over the last thirty years, most notably in the form of electric vehicles and offshore wind. Since 2005, the first time energy from offshore wind came on to the grid in the UK, offshore wind as an energy source by thousand tonnes of oil equivalent has increased by more than a million per cent (1,111,000%). In the last ten years the use of offshore wind as an energy source has soared by 250%.¹⁵ In the UK, this has been driven by both the mobilisation of private capital under the Green Investment Bank and the policy of Contracts for Difference.
- The same can be said of the more recent growth in electric vehicle (EV) use. EV ownership has risen by 815230% since 1990, and by 900% in the last ten years.¹⁶ While private sector innovation was pivotal in driving this rise - notably the development of long range, consumer-ready vehicles such as Tesla - the wider framing of international climate action and awareness provided important political cover to make this possible.
- The phase-out of coal can also be accredited to international climate campaigners. Since the Paris Agreement in 2015, the global pipeline of new coal-fired power stations has fallen by 75%.¹⁷ Global agreements have been a driver in the decline of emissions from power in Europe and the US. Since 2000, power emissions have declined by 15% in Europe and 23% in the US. We have the decline of coal to thank for much of this.¹⁸

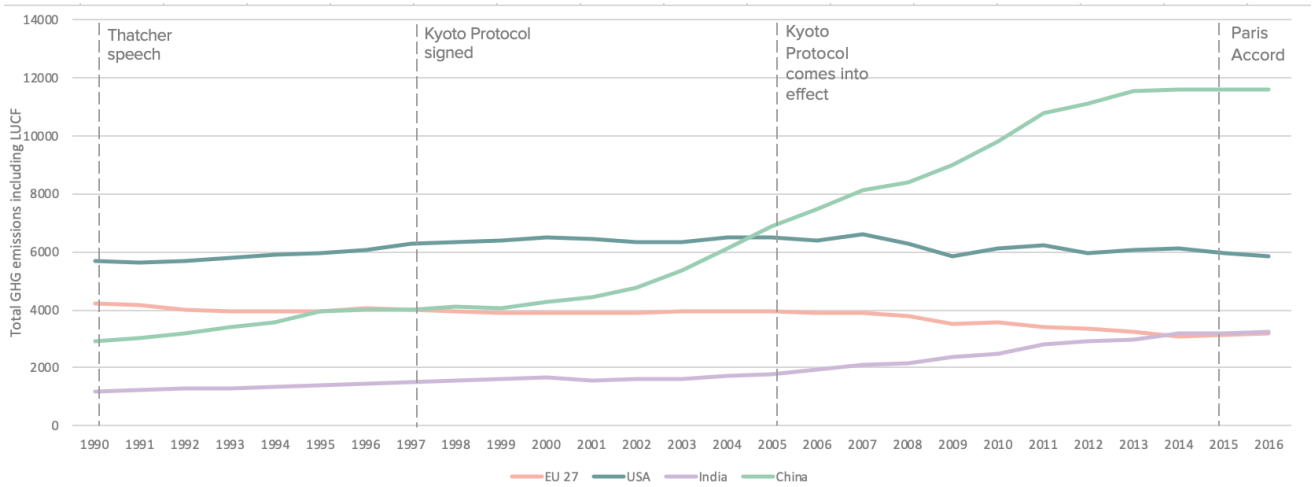
5. While these policies have been effective in the West, they have been less successful at decarbonising developing economies

- Since the 1990s, the UN has sought to deal with the climate problem through a top-down approach of collective action and diplomatic agreements. This came in the form of an annual Climate Change Conference (COP) and a set of multilateral protocols such as Kyoto and Paris. This included the original target of limiting global warming to 2°C, later followed by 1.5°C at Paris in 2015. The intention was that targets would trigger economy-wide decarbonisation among the signatories.

- While these conferences and agreements did encourage targets - notably Paris - these agreements did not stop emerging economies increasing their use of fossil fuels dramatically. The agreements created structural allowances for greater emissions growth in emerging economies but less so in industrialised advanced economies. This was to reflect the lesser historical responsibility of these economies in causing climate change. This has caused heavier relative cuts in the West, but in turn it has not held back industrialisation - largely through fossil fuels - in the developing world. It should be noted that developing countries have in turn agreed to peak their emissions and ultimately eliminate them later this century, most notably in the form of China's 2060 target.
- Since 1990 high emitting activity like manufacturing has moved to countries with lower labour, regulatory or capital costs. This offshoring of emissions was not caused by multilateral agreements, but not discouraged either. Evidence from the Sustainability Research Institute finds that offshoring was instrumental in the decline in industrial emissions in the West, even more so than efficiency improvements.¹⁹
- This movement of industry has been reflected in the change in emissions worldwide. Since the Protocol was signed in 1997, the EU bloc has overseen a 21% fall in greenhouse gas emissions. Meanwhile, China's emissions have nearly trebled. India's emissions have more than doubled during this time.

Figure 5: Total GHG Emissions including LCAF (CAIT)

Source: CAIT Climate Data Explorer; Our World in data

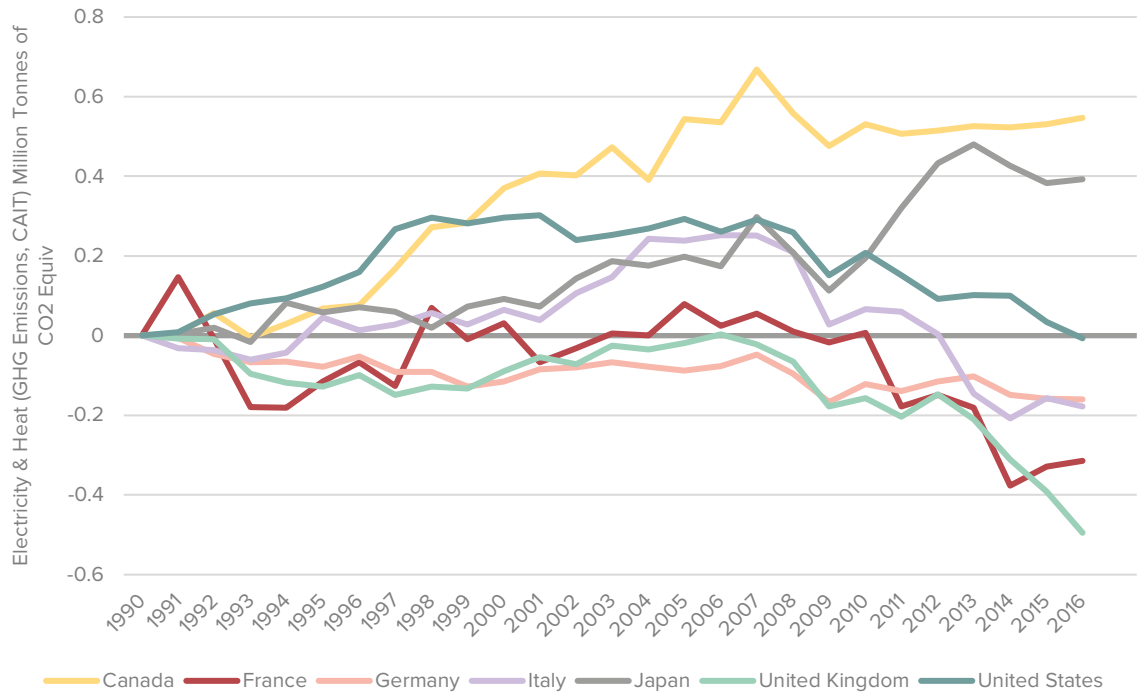


6. The UK has an increasingly impressive record on decarbonisation, particularly in Heat, Electricity, Industry and Manufacturing

- The UK has decarbonised heat and electricity by roughly half since 1990, the fastest rate in the G7.²⁰ This was mostly due to the decarbonisation of the power sector, through substantial reduction in coal-fired generation and a corresponding increase in the share of renewables in the energy mix, and because the improved energy efficiency of products has reduced demand for power. Since 1990, the UK has reduced territorial carbon emissions for coal by 95% (218.8 MtCO₂ to 11.7 MtCO₂). If coal was still at 1990 levels in the UK, the UK's carbon emissions would be 63% higher than they are today.
- To put this in perspective, China has overseen a 540% increase in emissions from these sectors in the same amount of time, mostly as a result of a reliance on coal to fuel rapid economic growth. Similarly, India saw a 370% increase in emissions from these sectors. Similar increases in emissions have been seen in the G7 countries as well. As Figure 6 shows, Canada and Japan have seen increases of 55% and 39% respectively in combined Heat and Electricity emissions.

Figure 6: Electricity & Heat (GHG Emissions, CAIT) Million Tonnes of CO2 Equivalent.

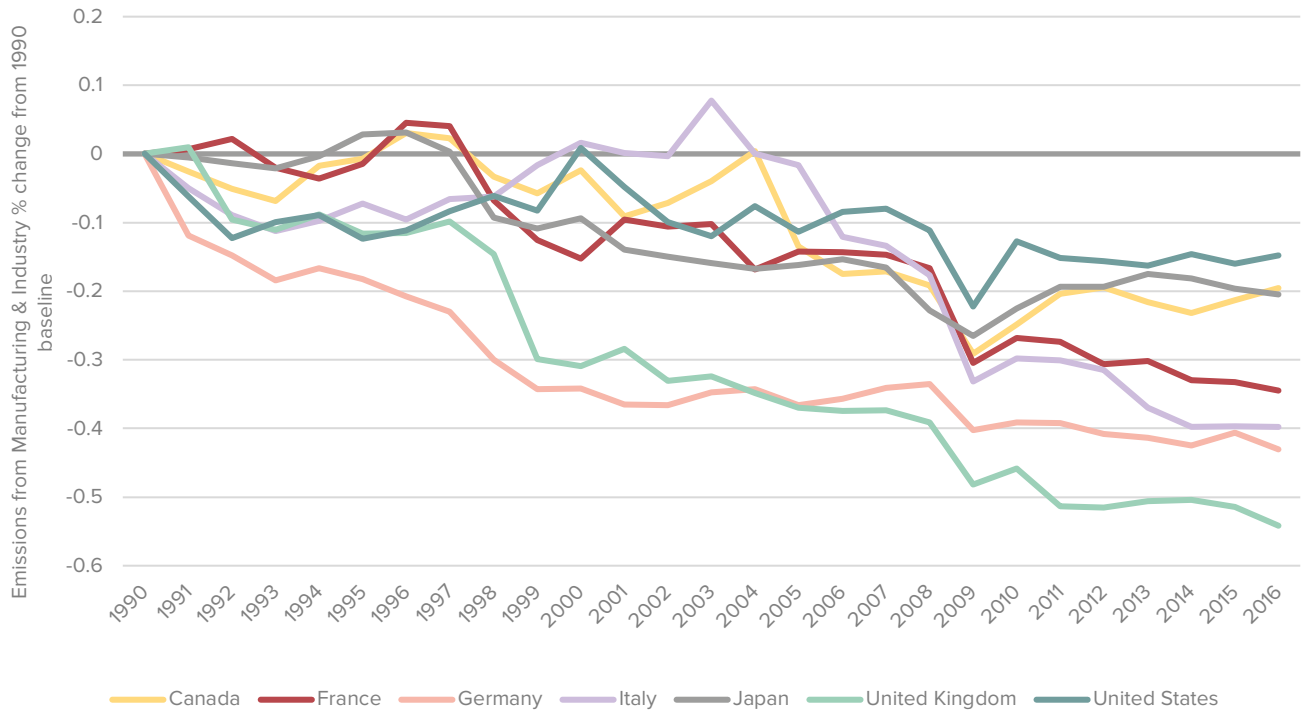
Source: World in data



- The UK has decarbonised manufacturing and industry by 54% since 1990, again the highest rate in the G7. This has been driven by deindustrialisation and the movement of much of this industry to China and India, where industrial and manufacturing emissions have risen by 370% and 280% respectively. This trend is repeated across the developed world: the G7 has experienced a fall in emissions from manufacturing and industry by a third since 1990.

Figure 7: Emissions from Manufacturing & Industry % change from 1990 baseline (G7 Countries)

Source: CAIT Climate Data Explorer; Our World in data



7. The UK have been less successful at decarbonising surface transport and aviation but are still leading the majority of other countries.

- The UK has failed to decarbonise the transport sector in recent decades. Emissions from this sector fell by just 0.0001% between 1990 and 2019, largely due to any efficiency and tech improvements being offset by traffic growth.²¹ However the UK still leads most of our competitors in Transport emissions, and we are set to further this lead with the landmark pledge to phase out petrol and diesel cars by 2030. Looking at all OECD countries and large non-OECD economies, the only countries to have successfully reduced emissions from surface transport between 1990 and 2016 are Russia and Lithuania. China’s transport emissions have grown by eight-fold, and India and Indonesia each by three-fold. In the G7 all countries have experienced an increase in emissions from transport, with emissions rising in Canada and the United States the fastest, by 38% and 20% respectively. The UK is the 7th most successful country at limiting emissions from

Transport in the OECD, beaten only by Russia, Lithuania, Estonia, Latvia, Sweden, Germany and Japan.

- In Aviation, the picture is less positive. The UK has witnessed a 86% rise in greenhouse gas emissions in this sector since 1990. While country specific time-series data is not available for aviation emissions, 2018 data for CO2 (MMT) reveals that the USA is responsible for a quarter (24.4%) of the world's aviation emissions and China responsible for an eighth (12.7%). The UK accounts for a far lower proportion of global aviation emissions (4%), but is still the third highest emitter in this sector. Close behind the UK are Japan (3.1%), Germany (3%) and the UAE (2.8%).²²

Figure 8: UK Greenhouse Gas Emissions % change from 1990 baseline to 2019

Source: Committee on Climate Change, Provisional Statistics.

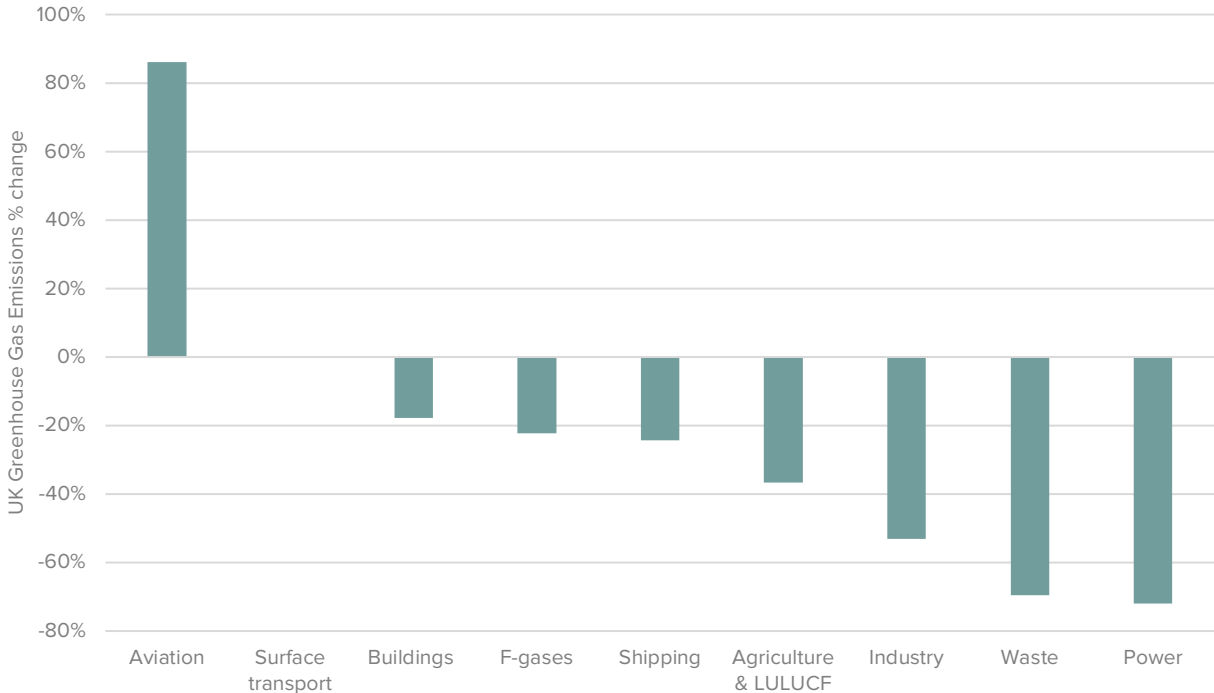
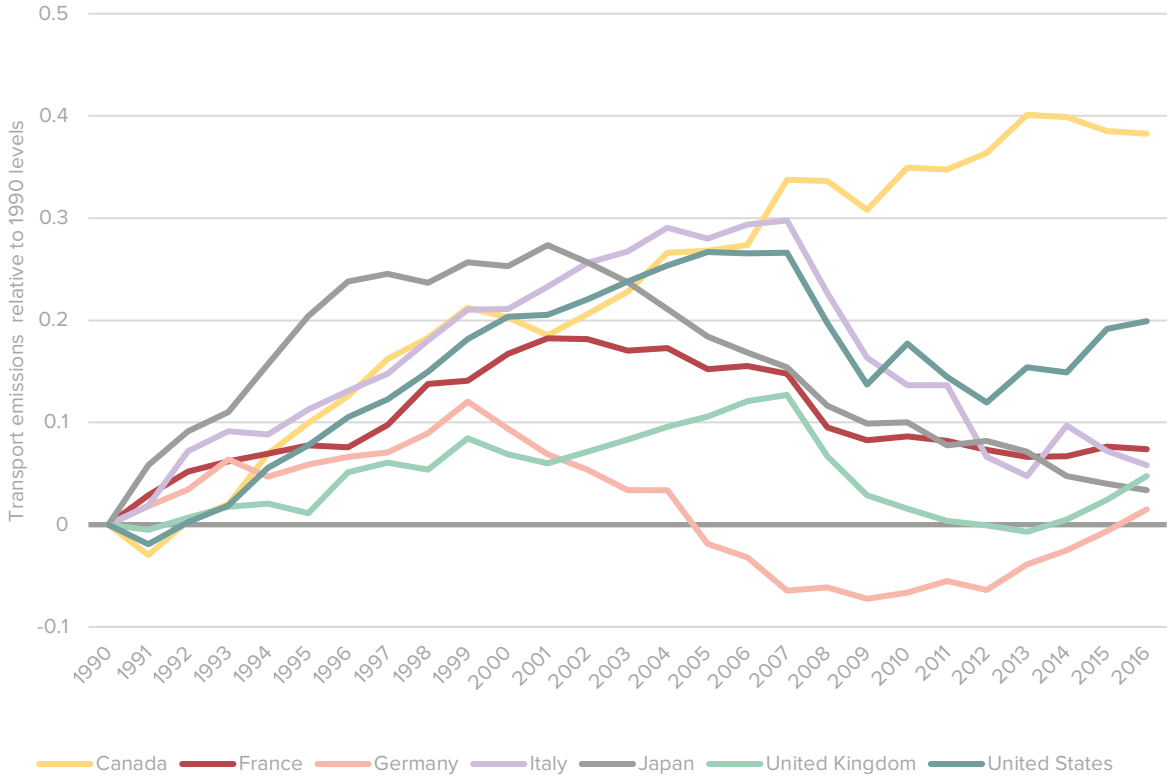


Figure 9: Emissions from Transport % change from 1990 baseline (G7 Countries)

Source: CAIT Climate Data Explorer; Our World in data
 NB: Data unavailable for selected countries after 2016.



The net zero challenge



In 2018, Onward set out principles that should frame the UK's approach to Net Zero. We argued the UK should strive to foster innovation, use the market where possible, maximise the synergies of decarbonisation and most importantly ensure that Britain continues to lead the way on the world stage, taking more heavily emitting countries with them. We now need to build a consensus for climate and decarbonisation policy that goes beyond party allegiance and looks at the practicalities of the net zero transition.

To do this, policymakers and legislators need to focus on the three great challenges of the net zero transition: supporting incumbent industries to adapt to a net zero future; re-skilling and retraining workers who may lose out from the transition into new, green jobs; and providing the conditions that can foster technological innovation in the years ahead. With creative and thoughtful policy, the UK can not only decarbonise its own economy by 2050, but develop a blueprint for other nations around the world to follow.

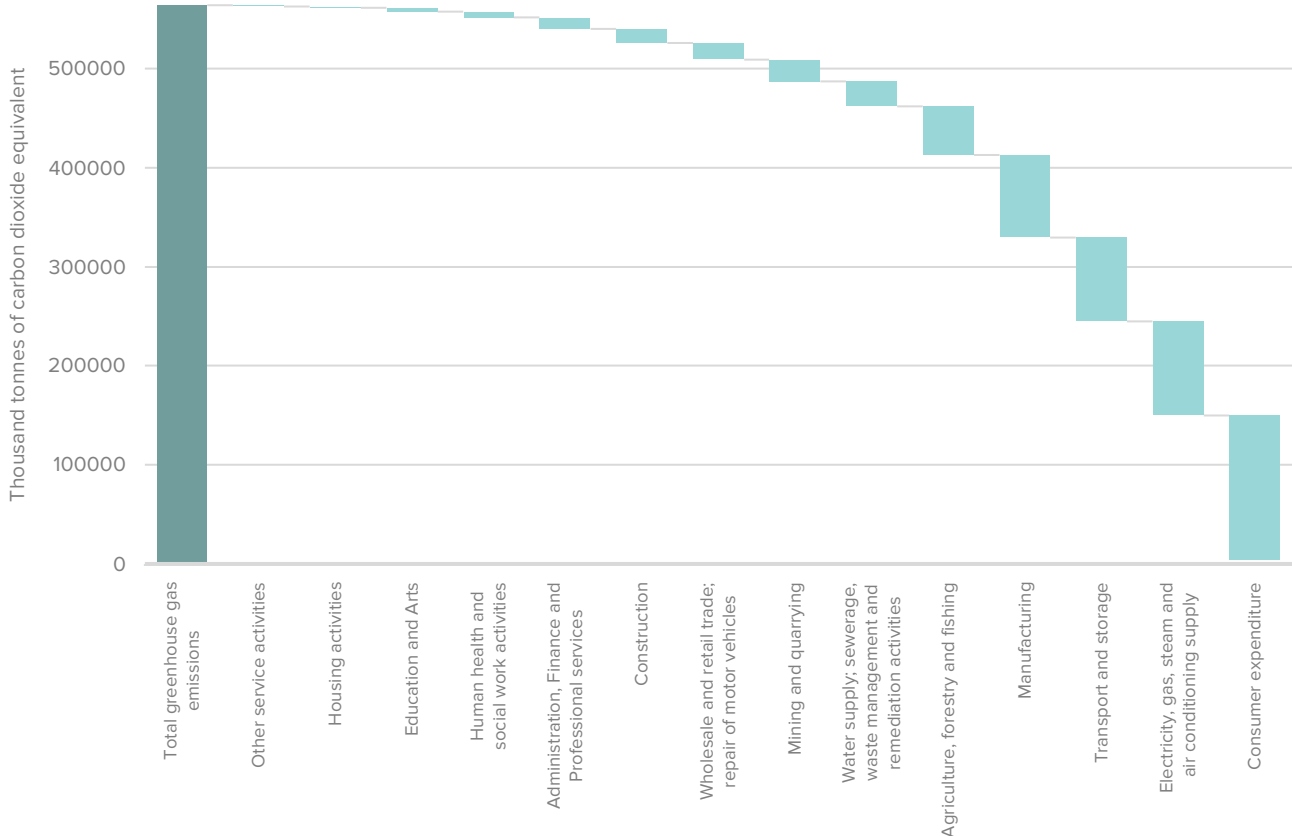
1. There are huge challenges ahead for incumbent industries, but there are also opportunities to be grasped

- Since the industrial revolution, the UK economy has been built on heavy industry, manufacturing, and fossil fuel extraction. Before 1750, the economy would have taken around 6,000 years to double in size.²³ But the advent of the Industrial Revolution propelled growth at a faster rate than it had ever before experienced. Since 1750, our economy has grown on average by 1.5% per year, meaning it has on average doubled in size every 50 years. We can thank carbon - mostly coal - for this meteoric rise in GDP growth.
- Since the 1980s, the way in which we rely on fossil fuels has evolved. The UK has deindustrialised, with a shift from a productive economy to one more focused on services. As Chapter One set out, this has allowed us to decarbonise faster than our competitors, removing 44% of our emissions in just thirty years.
- Despite deindustrialisation, the UK continues to rely on production and construction for 20% - £373 billion - of output.²⁴ Breaking down emissions data by sector, nearly three quarters of UK emissions come from just four sectors: Manufacturing; Transport and Storage; Electricity, gas, steam and air conditioning supply; and consumer expenditure. If the Government are serious about their net zero ambitions, paving the way for these industries to decarbonise must be a priority.

The first paper of the *Getting to zero* programme will look at each incumbent industry in turn and consider what more can be done to help them to decarbonise, quickly and efficiently. In some of these industries, it will be possible to find a cleaner, more sustainable future. In others, it may not and policymakers will need to consider ways to facilitate new activity to take its place. The purpose of the piece will be to outline the huge economic opportunities that are there to be grasped throughout the net zero transition, as well as uncovering the people and places where industry, jobs and livelihoods are currently tied to carbon emissions.

Figure 10: Industries by CO2 emissions: thousands of Carbon Dioxide equivalent

Source: Greenhouse gas emissions in the United Kingdom, 1990-2018, ONS

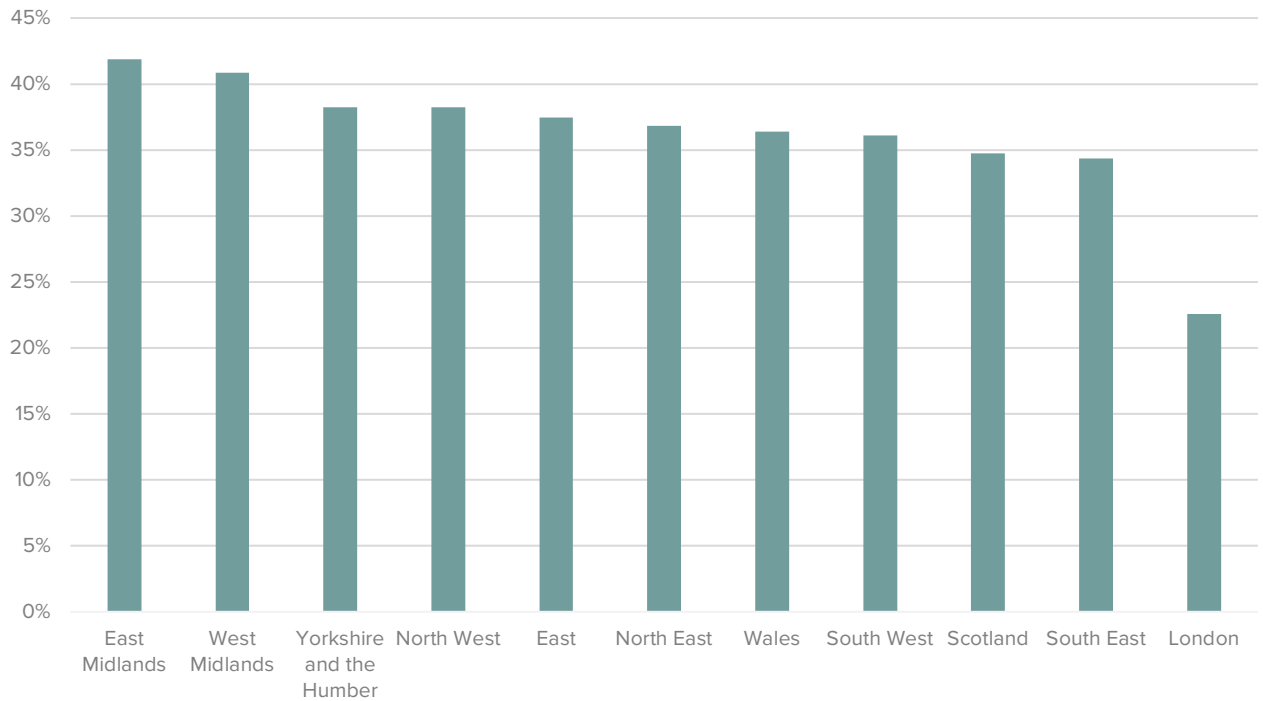


2. The people and places who will face the most change are concentrated in the same places that have been politically volatile in recent years

- The highest emitting industries by the scale of greenhouse gas emission per job are Electricity, gas, steam and air conditioning supply (0.7 MtCO₂ per job); Mining and quarrying (0.5 MtCO₂ per job); and Agriculture, forestry and fishing (0.2 MtCO₂ per job). Together these industries employ 401,000 people, just 4% of the British workforce but are responsible for nearly a third (30%) of the country's emissions. These will unsurprisingly be the industries that will face the biggest transformation.
- If we look collectively at all the industries responsible for more than 2% of annual greenhouse gas emissions in the UK, we see that these industries are concentrated more in some parts of the UK than others. On a regional level, East Midlands, West Midlands and Yorkshire and the Humber, have the highest proportion of jobs in high emitting industries: 42%, 41% and 38% respectively. As Figure 11 shows, the industrial and manufacturing heartlands in the Midlands and North are far more likely to experience economic disruption during the net zero transition than the South East and London. This may be positive - in the form of new green jobs, or it may be negative through job losses - but the fact remains some places will be affected more than others.

Figure 11: Percentage of jobs in high emitting industries.

Source: Business Register and Employment Survey; ONS; Onward analysis



- To unpick and understand what the effects of the net zero transition will be on a more granular level, we have created an index of high emitting jobs by parliamentary constituency. This is created by multiplying the emissions of each industry by the proportion of people employed in that industry in each constituency of the UK. This number is then put on an index scale of 1-100. The table below shows the scores with the highest and lowest jobs-related emissions scores. The Map on figure 12 shows how this translates geographically across the UK.
- As figure 11 shows there is a steep incline in emissions relating to the jobs profile of different places, with the areas at the top end of the scale characterised by constituencies with large industry, manufacturing and aviation employers. There is a considerable overlay between these constituencies and regions that were identified in Onward’s Repairing our Social Fabric and Levelling Up research as particularly at need of social regeneration and economic development. The two main agendas of this Government, the net zero transition and levelling up the

regions, have a risk of clashing, as the very regions that need levelling up are also the regions that face huge change during the net zero transition. The constituencies at the other end of the scale tend to be more metropolitan, well off and rooted in the service economy. This speaks to the political importance of retraining and upskilling workers who stand to lose out from the transition to a net zero economy.

The effects of the transition will not be uniform, and especially low skilled workers in higher emitting sectors will need support to keep their place in the labour market or to move on to the opportunities that will undoubtedly arise in the years ahead. That many of these places were worst hit from the deindustrialisation of the 1980s and 1990s reinforces this problem. The second paper of the *Getting to zero* programme will explicitly consider this question, and propose policies that can improve the human capital stock of workers whose jobs may be about to be lost and ensure they have a bright future in a green economy.

Figure 12: Index of high emitting jobs, by constituency

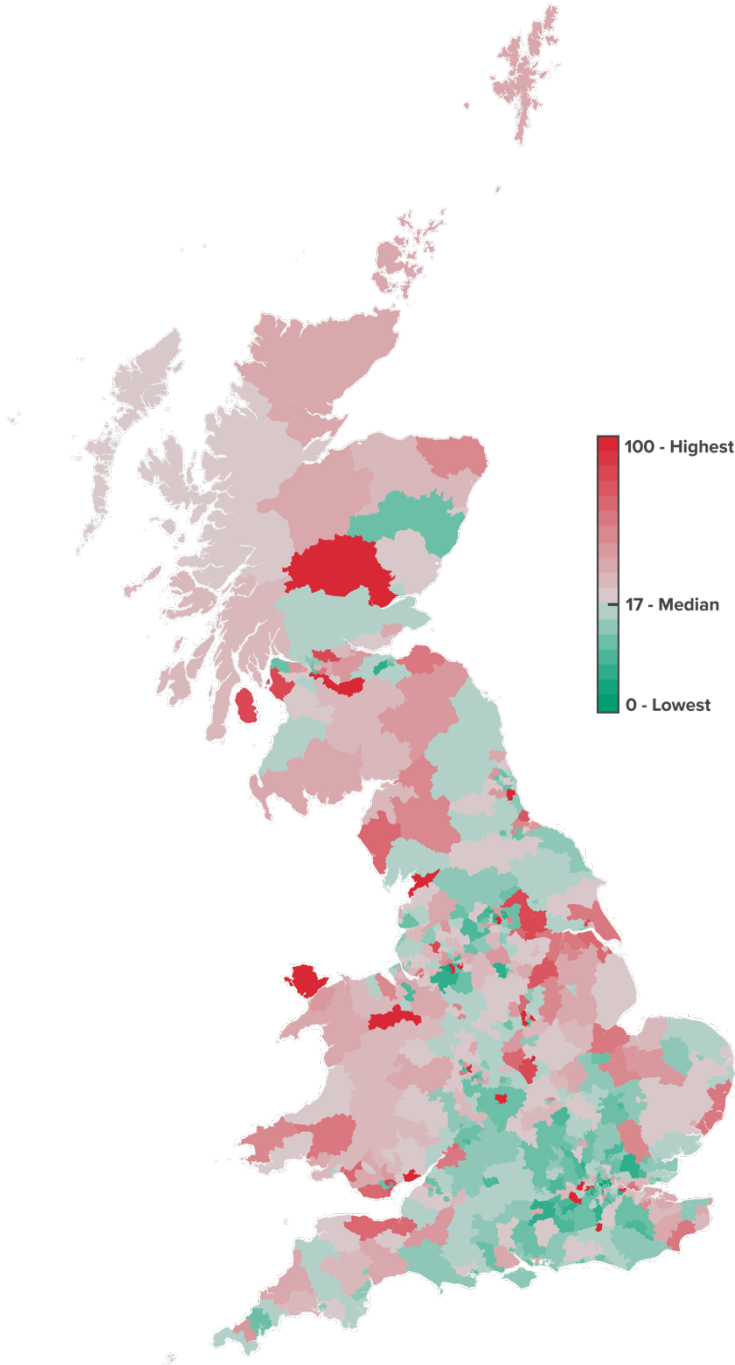


Table 1: Top and bottom 10 constituencies by high emitting jobs

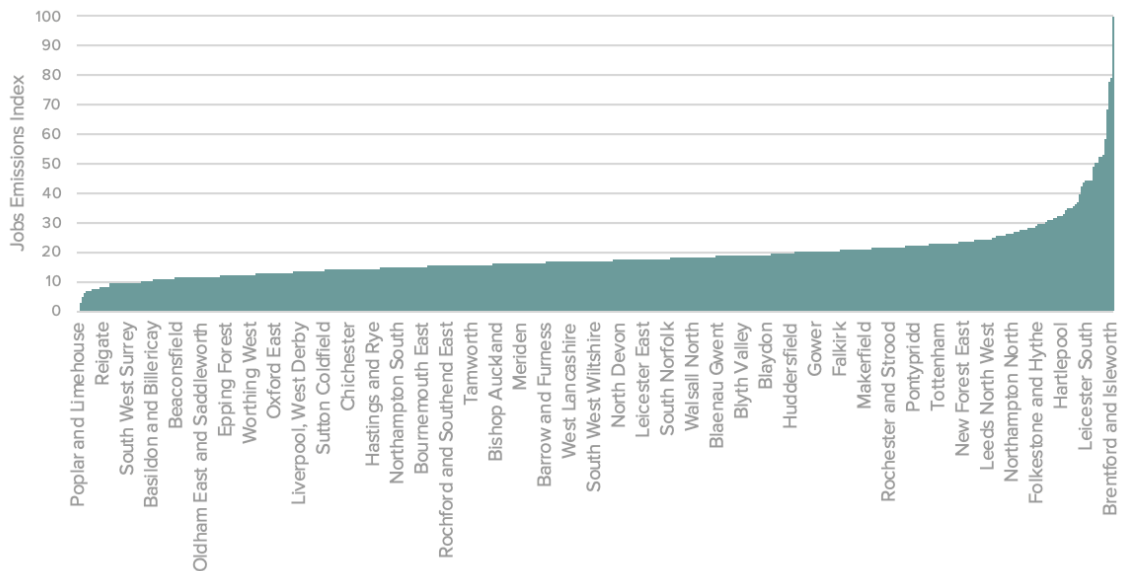
Top 10 constituencies by high emitting jobs

Bottom 10 constituencies by high emitting jobs

Constituency	Employment emissions score	Party	Constituency	Employment emissions score	Party
Houghton & Sunderland South	100.0	Lab	Poplar and Limehouse	0.0	Lab
Brentford and Isleworth	79.1	Lab	Islington South and Finsbury	1.4	Lab
West Bromwich West	77.4	Con	Cities of London & Westminster	2.4	Con
Lanark & Hamilton East	68.5	SNP	Altrincham and Sale West	5.0	Con
Leeds West	58.1	Lab	Hackney South & Shoreditch	5.9	Lab
Runnymede & Weybridge	53.1	Con	Watford	6.5	Con
Stockport	52.4	Lab	Edinburgh South West	6.6	SNP
Warwick & Leamington	52.3	Lab	North East Hampshire	6.9	Con
Morecambe & Lunesdale	52.1	Con	Richmond Park	7.0	LD
Crawley	50.4	Con	Old Bexley and Sidcup	7.1	Con

Figure 13: Index of high emitting jobs by constituency

Source: Business Register and Employment Survey; ONS; Onward analysis



- Looking at another measure of carbon intensity, we measure the transport emissions per capita in each Local Authority and then rank them on a scale of 1-100 to create a comparable index. As figure 12 and Table 2 display, there is considerable overlap between the areas across the country which rely on high emitting jobs, and those that have high transport emissions.
- In both indexes, urban areas have the lowest reliance on high emitting jobs and transport. Notable examples are Islington and Hackney, both of which are areas in the bottom ten for both high emitting employment and transport emissions. This is likely due to the high reliance on the service economy over a production economy and superior public transport links in dense urban areas like London.
- The top ten areas are mostly in road-reliant industrial and commuter belts outside major cities, such as South Northamptonshire, Daventry and North Warwickshire. Outliers in the data are Central Business Districts (CBDs) such as the City of London, which has one of the highest Transport Emissions scores in the country.

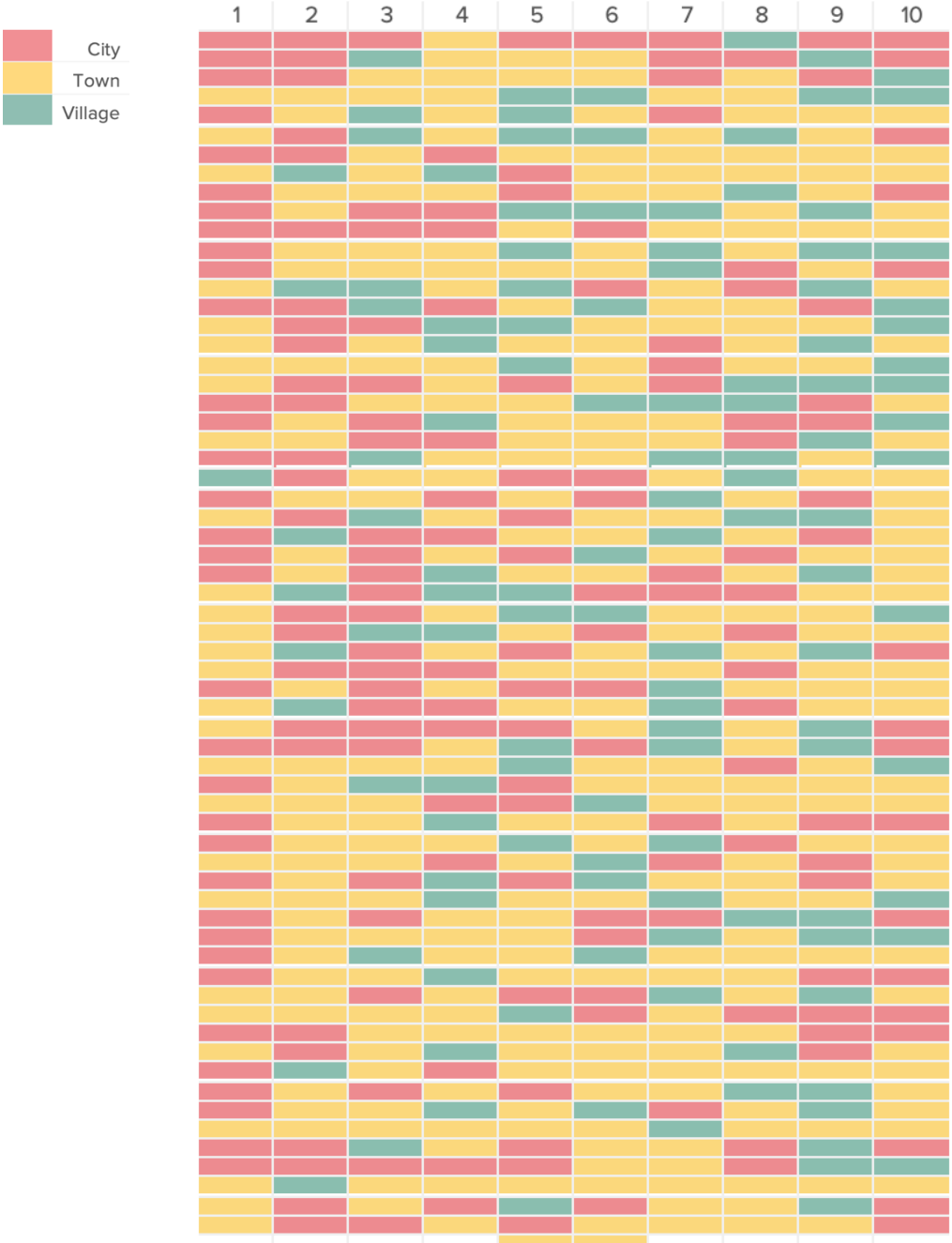
Table 2: Top and bottom 10 constituencies by transport emission score

Top 10 Local Authorities by Transport Emissions score		Bottom 10 Local Authorities by Transport Emissions score	
LA	Transport Emissions score	LA	Transport Emissions score
North Warwickshire	100.0	Islington	0.0
Eden	91.0	Hackney	0.4
Daventry	60.7	Harrow	0.5
South Northamptonshire	60.6	Camden	0.5
Uttlesford	56.7	Barrow-in-Furness	0.8
City of London	46.2	Haringey	1.2
Epping Forest	45.8	Brent	1.7
North West Leicestershire	44.9	Southwark	1.8
Hambleton	44.2	Wandsworth	1.8
West Berkshire	44.1	Merton	1.9

3. The more rural a constituency, the more disruption its local economy is likely to face over the transition to net zero.

- Looking at the urbanity of different constituencies we can see the effects based on whether places are primarily based around a City, Town or Rural. This is measured by where the majority of the constituency's population resides and we have assumed for this purpose that a village is 'Rural'. Cross referencing this by jobs related emissions, we find some interesting patterns.
- City constituencies are twice as likely to be in the bottom decile of areas for high emitting jobs (least reliant on emissions) than in the top decile. 16 out of the 63 constituencies in the most emitting decile are city constituencies. Whereas, 35 out of the constituencies in the least emitting decile have the majority of inhabitants residing in a city.
- A similar but opposite pattern is seen with rural constituencies. There is just one rural constituency in the decile with the lowest jobs emissions decile (Calder Valley). In contrast, there are 14 rural constituencies in the highest decile.
- As the chart below displays, town and rural constituencies have a higher concentration of jobs in high emitting industries than their urban counterparts. This presents a further elision of priorities for this Government, who have repeatedly made clear their desire to shift policy away from cities towards more provincial areas.

Figure 14: High emitting jobs by constituency and urbanity, decile analysis.



* 1= Lowest decile for high emitting jobs, 10= Highest decile for high emitting jobs

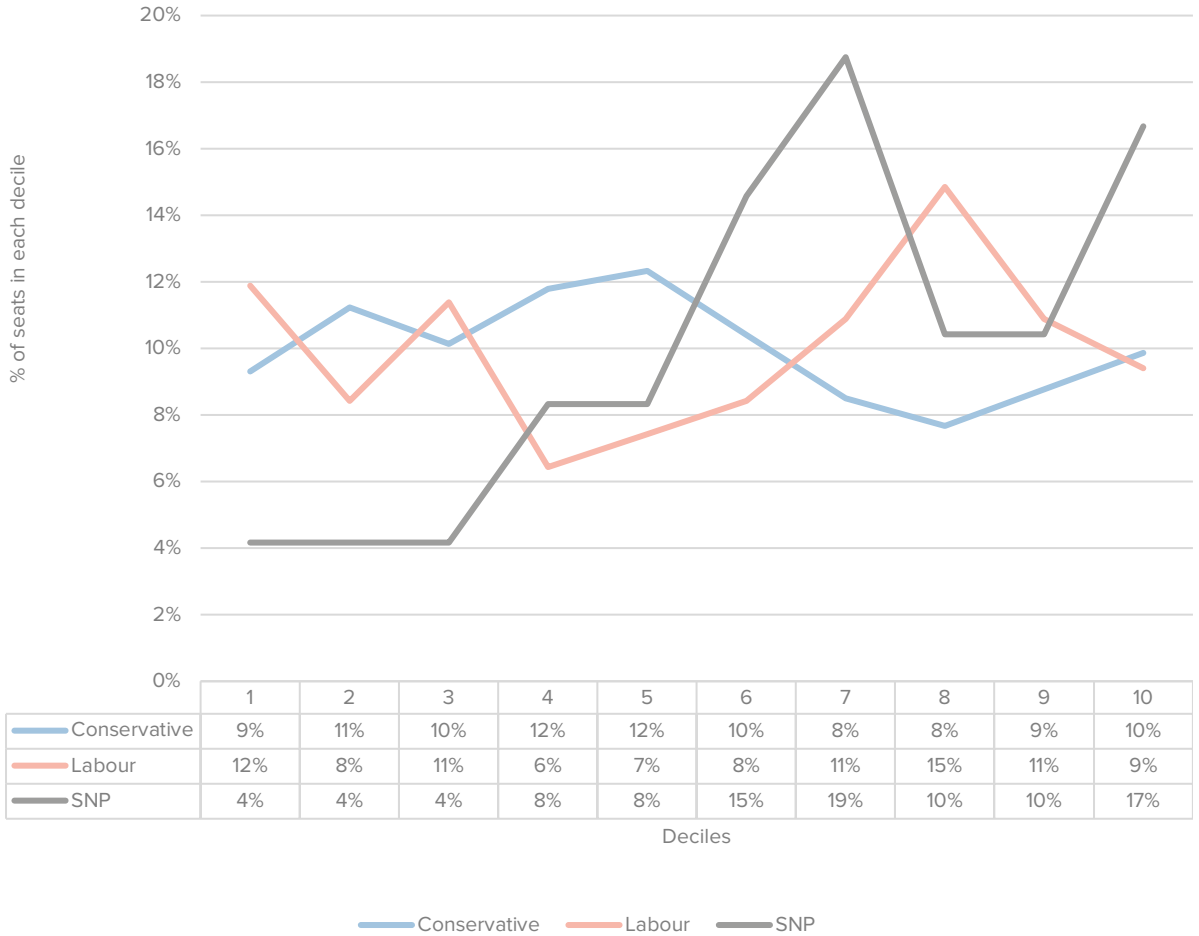
The third paper of the Getting to zero programme will consider the issue of innovation, and how the Government can create the regulatory, institutional and financial conditions for new products and technologies to emerge to support the net zero transition. This will include both domestic policies and international ambitions ahead of COP26, and also seek to consider the spread of environmental innovation to ensure that all parts of the UK - urban and rural, North and South, town and city - are contributing to the generational challenge we face.

4. The political challenge of delivering net zero is a challenge all parties must face up to

- Given the new political map following the 2019 election, with many traditional Labour seats in Wales, the Midlands, and the North of England falling to the Conservatives, the gap between the jobs emissions profile of constituencies by party is not as large as it once would have been. All parties thus have an interest in ensuring that those people and places who may be adversely affected by decarbonisation are helped appropriately as we make the transition.
- 55% of Conservative seats are in the bottom half of constituencies in our jobs emissions index. This compares to 44% of Labour seats and only 28% of SNP seats. This means that nearly three quarters (72%) of SNP's constituencies are in the top half of the index, and more than half (56%) of Labour constituencies are.
- Looking closer, Labour has the highest proportion of seats (12%) in the lowest decile of seats by high emitting jobs. On analysis, these seats are mostly Labour's metropolitan, liberal, wealthier base such as Islington South and Finsbury, Hackney South and Shoreditch, and Leeds North East. On the other end of the scale, SNP have nearly double (17%) the proportion of constituencies in the top decile than Labour and the Conservatives.
- This suggests that the policy framework of the past few decades, whereby policy was focused on behavioural taxes that disproportionately burdened regional businesses or subsidy regimes that were advantageous to some areas over others, will no longer be effective. Ministers and Shadow Ministers will need to consider how to best balance the costs of decarbonisation as well as the benefits. It is a problem that all parties face.

Figure 15: Jobs Emissions Index, by constituency and party

Source: Business Register and Employment Survey; ONS; Onward analysis



Conclusion



The UN Climate Conference in Glasgow, COP26, is under a year away. We cannot afford it to pass with little more than warm words and no action. Nor can the UK waste the opportunity it has to lead the world on the defining policy challenge of this generation. The challenge we have now set in statute is considerable on a global and national scale. We have set the target; we now need the plan.

The *Getting to zero* programme will over the next year set out a blueprint for decarbonisation that works for, not against, people and places who have lost out in the past, and who - if we are not careful - will lose out again. We will no doubt uncover uncomfortable truths and obstacles to be overcome. But the point is that only by going into this challenge with our eyes open and a clear appreciation of who stands to gain and who stands to lose, will policymakers be able to bring people, businesses and other countries with them in saving the environment.

We are delighted to be led by an expert steering group who collectively bring decades of experience in climate policy and - most importantly - a practical appreciation of what needs to be done. We look forward to engaging with you as we run up to COP26.

Our Steering Group





Dame Caroline Spelman

Co-Chair & Former Secretary of State for Environment,
Food and Rural Affairs



Rt Hon Caroline Flint

Co-Chair & Former Shadow Secretary of State for Energy
and Climate Change



Guy Newey

Strategy and Performance Director,
Energy Systems Catapult



Melanie Onn

Deputy Chief Exec RenewableUK,
formerly MP for Grimsby



Sam Hall

Director, Conservative Environment
Network



Ben Caldecott

Director, Oxford Sustainable Finance
Programme, Smith School, University
of Oxford



Michelle You

Venture Partner, LocalGlobe, co-
founder of SongKick



Daniel Hale

Campaigns Director, Purpose PBC



Joss Garman

UK Programme Director, European
Climate Foundation



Ruth Edwards MP

Member of Parliament for Rushcliffe



Richard Howard

Research Director, Aurora Energy
Research Ltd.



Will Tanner

Director of Onward

Endnotes



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