Grantham Research Institute on Climate Change and the Environment

Grantham Institute
Climate Change and the Environment
An institute of Imperial College London

The truth about climate action in the UK

Dispelling common myths to underline the importance of acting on net zero

Written by independent experts from UK universities

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About this publication

This publication is an edited collection of essays from leading academic experts from UK universities on matters related to climate change and climate change policy. The essays were commissioned by the two Grantham Institutes as a way to bring together clear evidence that sets out the reality of the climate challenge for the UK and how and why we need to act, while dispelling common myths.

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Further Explainers and FAQs on climate change

Versions of these essays are also available as Explainers and Background briefings on the LSE and Imperial websites. To view these and others across topics ranging from adaptation to climate change, through to climate and the economy, climate change science, international action on climate change and more, visit:

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Contents

Introduction

From more intense heatwaves to heavier rainfall, from damage to domestic agricultural yields to impacts on supply chains for the goods and services we all depend on, the UK is already experiencing significant impacts from climate change. These impacts are only expected to worsen if the world fails to take action to rapidly eliminate greenhouse gas emissions and build up resilience.

Through its Climate Change Act of 2008 the UK was the first country to set a legally binding climate change mitigation target and among the first, in 2019, to sign net zero into law. Over the past two decades it has made significant progress in cutting emissions, especially through reducing the country's reliance on coal. But much more is needed to tackle the climate challenge. All parts of the economy must become cleaner, greener and more resilient. Not only will this transition help limit the negative impacts of climate change: it will also deliver widespread economic, social and health benefits.

To make the transitiown reality, decision-makers across the political spectrum need to understand and engage with the nuances and practicalities, and effectively communicate the objectives, rationale and benefits of action to the public. It is vital to ensure that the discussion and proposals for action are informed by the best available evidence on the climate science and solutions.

This is particularly important given the misinformation and intentional disinformation affecting the discourse on why we should act, the implications for our economy and society, and the efficacy of specific interventions. Muddying the waters with this misinformation risks unnecessary polarisation of opinion and, crucially, may result in poor decision-making, negatively impacting the UK's communities, economy and environment now and in the long term. While disagreement and debate are an essential and healthy element of a diverse, democratic society, it is important that discussion is informed by facts.

To help unpack the evidence and provide greater clarity about what is fact and what is false, this collection of essays authored by academics from across the UK explores a range of topics that are often featured in public and policy discussion on climate change. The essays outline the key evidence on climate science, the economic implications of climate action, the performance and costs of technologies and infrastructure to reduce emissions, and public attitudes to net zero. We hope this collection can support better understanding of these topics and advance evidence-based decision-making to accelerate the UK's progress on addressing climate change.

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Why is achieving net zero necessary?

Joeri Rogelj, Professor of Climate Science and Policy, Imperial College London

Myth: Net zero is an arbitrary target and even if we did reduce emissions to that level, climate change impacts would continue anyway. Our money and efforts would be better focused on adapting to the impacts instead.

Fact: Reducing emissions to net zero as fast as possible to cap temperature rise is the only way to avoid the most dangerous impacts from climate change on both our own and future generations. We will have to live with some impacts even when we reach net zero, but they will be significantly less than if we do not cut emissions to this level.

"Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming." This quote is not from Greta Thunberg or Al Gore: it is the conclusion of the most recent Intergovernmental Panel on Climate Change (IPCC) assessment of the science[1] related to climate change – an exercise that took four years, considered more than 14,000 scientific publications, was reviewed by 1,891 experts and finally approved by 195 countries.

Despite this well-established consensus, climate change is still sometimes incorrectly and misleadingly portrayed as being subject to debate; for example, by giving people who do not accept the evidence for the link between human activity and climate change as much airtime as climate scientists.

"Climate change brings with it some very serious risks, including to human health, food production, livelihoods, culture and ways of life, homes and infrastructure, and ecosystems."

We need to limit global warming to avoid dangerous impacts

Climate change brings with it some very serious risks, including to human health, food production, livelihoods, culture and ways of life, homes and infrastructure, and ecosystems. It also heightens the risk of abrupt or irreversible changes to physical systems such as the Atlantic Meridional Overturning Circulation (AMOC), a system of ocean currents that affects our climate in the UK,[2] and of triggering dangerous feedback loops, such as the release of methane trapped in permafrost which would lock us into further warming. What is more, these risks are not distributed equally: some people and places face particularly acute risks.

The science is very clear: the level of risk escalates with every increment of global warming.[3] Even at just 1.5°C above the pre-industrial average, some impacts are set to become widespread and persistent. At higher levels of warming, impacts will further intensify.

Meeting the temperature goals depends on how fast we reduce emissions

Under the United Nations Framework Convention on Climate Change (UNFCCC), countries come together with the objective of preventing dangerous human-caused interference with the climate system. The Paris Agreement, agreed under the UNFCCC, is a legally binding international treaty with an overarching goal to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C". The 1.5°C and 2°C figures are not arbitrary: they are informed by scientific understanding of the levels of risk associated with different levels of warming and indicate where a 'defence line' should be drawn.[4]

To meet the Paris targets, we need to stop adding greenhouse gases to the atmosphere, carbon dioxide in particular. Only when we reach 'net zero' will the risks stop growing; this is the point at which emissions are reduced as much as possible and remaining emissions are compensated for by actively removing carbon dioxide from the atmosphere.

Scientists build 'scenarios', or emission reduction 'pathways', to understand how quickly we need to reduce emissions to cap temperature rise at 1.5°C. This is what underpins the Paris Agreement's aim to "reach global peaking of greenhouse gas emissions as soon as possible" and "to undertake rapid reductions thereafter", ultimately achieving a balance between human-caused emissions and removals of greenhouse gases from the atmosphere in the second half of this century.

The UK's own net zero target, to bring all territorial greenhouse gas emissions to net zero by 2050, was based on the scientific advice of the independent Climate Change Committee and represents an "appropriate contribution" from the UK to meeting the Paris Agreement goal.[5]

We will have to live with some climate impacts but can reduce further risk by moving away from fossil fuels

Because our emissions increase carbon dioxide in the atmosphere for thousands of years, historic emissions have already locked in some climate impacts. This means that even if we reached net zero tomorrow, we would still have to adapt to impacts already committed to. Nevertheless, when net zero greenhouse gas emissions are achieved, scientists predict that global temperature increases will peak and then slowly decline, over a period of hundreds of years. In the meantime, climate impacts — such as sea level rise from melting ice sheets — may be slowed down, but will continue to occur for many centuries.

Some argue that since some impacts of climate change (like sea level rise) cannot be stopped immediately, we should not bother reducing emissions and instead should focus on adaptation. The problem with this perspective is that it ignores the fact that by continuing to emit greenhouse gases, impacts will become *more and more extreme* and the cost of adapting also increasingly greater. At a certain point, the impacts may become so extreme that it is not physically possible to adapt. For example, water scarcity could mean people can no longer continue living in certain places. Reducing emissions will not only slow down these impacts: it will also limit their ultimate magnitude. Furthermore, it will reduce the risk of triggering reinforcing feedback loops, the consequences of which could be very serious indeed.

"Reducing emissions will not only slow down the impacts: it will also limit their ultimate magnitude – and it will reduce the risk of triggering feedback loops, the consequences of which could be very serious indeed."

It is clear that there is not a choice between mitigation and adaptation: we must do both. To avoid dangerous levels of climate change we must move away from burning fossil fuels and bring down emissions to net zero as quickly as possible. At the same time, it is essential that we protect our societies by adapting to the warming and impacts that are already locked in because of emissions from the past.

References

1. IPCC, 2021
2. Met Office, n.d.
3. IPCC, 2021, op. cit.
4. UNFCCC, 2015
5. Climate Change Committee, 2020

Why should the UK take action on climate when it is responsible for only a relatively small fraction of today's global emissions?

Nicholas Stern, IG Patel Professor of Economics and Government, London School of Economics and Political Science

Myth: The UK is responsible for such a small proportion of greenhouse gas emissions that it will make very little difference whether we decarbonise and reach net zero or not.

Fact: The UK can show other countries how cutting emissions has widespread economic and other benefits, and can develop low-carbon solutions that can be deployed in other countries.

The UK is responsible for less than 1% of annual global emissions of greenhouse gases.[1] That means more than 99% of the annual emissions that are driving the growing impacts of climate change in the UK, such as sea level rise and increases in the intensity and frequency of heavy rainfall and heatwaves, originate from beyond our borders. The UK therefore has a critical interest in other countries cutting their emissions to net zero as soon as possible and can advance this interest by advocating for strong action and leading by example.

The UK has successfully cut emissions while achieving economic growth

The UK has a relatively good track record of cutting its annual emissions, which have fallen by 52.7% since 1990.[2] During this period, the size of the UK's economy, as measured through gross domestic product, has increased by 79.6%.[3] This provides an important demonstration that cutting emissions can accompany economic growth. Indeed, there are strong arguments that investing in the new, clean and efficient technologies of the 21st century can drive growth forward.[4]

"The UK has a critical interest in other countries cutting their emissions to net zero as soon as possible and can advance this interest by advocating for strong action and leading by example."

Most of the UK's cut in emissions has been achieved by reducing the use of fossil fuels, particularly coal, for electricity generation. In 2023, just 36.3% of the country's electricity was generated by fossil fuels, while the proportion of power from renewables reached a record 47.3%.[5] Overall coal consumption for all uses has fallen by 97.3% since 2012.

The growth of renewables has been rapid. Wind provided a record 28.7% of UK electricity in 2023, despite an unfavourable policy and planning environment for the construction of new onshore turbines. In contrast, the growth of offshore wind has been impressive, increasing its contribution to electricity generation from just 2.1% in 2012 to 17.3% in 2023. This growth was accompanied by a fall in the auction price from £57.50 per megawatt-hour in 2017 to £37.35 per megawatt-hour in 2022, in 2012 prices.[6]

The UK has built an international reputation on climate – but this has been undermined recently

The UK has demonstrated the importance of introducing framework legislation, through the Climate Change Act, the setting of carbon budgets, and creation of an expert and independent advisory body, the Climate Change Committee. This gives confidence in the direction of travel that can encourage investment, and it shows that investment in dirty technologies will be ever more risky.

This track record means that the UK has had a reputation as a climate leader. This is particularly important given that the Industrial Revolution that precipitated the upsurge in fossil fuel combustion and carbon emissions started here: other nations, particularly developing countries, expect the UK to demonstrate that an alternative path to economic development and growth, which is not dependent on fossil fuels, is feasible.

The UK's climate leadership was also visible through the country's role, until 2019, on behalf of the European Union in the negotiations at the annual sessions of the Conference of the Parties to the United Nations Framework Convention on Climate Change. Its leadership in Paris in 2015 at the 21st session (COP21) was of particular importance. The UK also hosted a successful 26th session (COP26) in Glasgow in 2021, which led to, inter alia, a major expansion in the participation of the private sector in international action.

This leadership means that the UK can credibly engage with other countries to explore ways of increasing climate action. Other countries are unlikely to respond positively to the UK threatening to drag its feet on climate action until others do more. And UK investments in technologies such as offshore wind help to demonstrate opportunities and to reduce the costs worldwide.

Unfortunately, this leadership has been undermined by several recent mis-steps, including an unsuccessful auction for offshore wind, and a speech by the Prime Minister, Rishi Sunak, in September 2023, during which he announced the weakening of key targets for domestic climate policy.[7] It is now common to hear decision-makers overseas ask the question, 'Why has the UK gone flaky on climate policy?', followed up with 'Perhaps we should slow down too.'

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There are many other co-benefits to climate action that will be enjoyed by the UK

Many of the actions to reduce emissions have broad benefits for the economy, environment and health. Apart from the impacts of climate change, the use of fossil fuels is also a major contributor to air pollution, which the Government estimates is responsible for roughly the equivalent of between 28,000 and 36,000 deaths every year in the UK.[8] This compares with about 1,800 deaths from road collisions. The electrification of the economy through technologies such as heat pumps and electric vehicles not only reduces these health impacts, but is also making the UK less reliant on imports of fossil fuels and their associated price volatility and insecure supplies. The UK's dependence on natural gas was a central element in our energy crisis following Russia's invasion of Ukraine. The steep rise in the wholesale price led to very high consumer prices for electricity and heating, which required the Government to introduce the Energy Price Guarantee and other subsidies that cost UK taxpayers about £78 billion, according to the Office for Budget Responsibility.[9]

There is abundant evidence that investments in the net zero economy will not only avoid losses from climate change impacts, but will also boost growth and productivity in the UK, while creating many new jobs to replace those lost in high-carbon businesses.[10]

References

1. Our World in Data, 2023
2. Department for Energy Security & Net Zero, 2023a
3. Office for National Statistics, 2021
4. Zenghelis et al., 2024
5. Department for Energy Security & Net Zero, 2024
6. Department for Energy Security & Net Zero, 2023b
7. Ward, 2023
8. Office for Health Improvement & Disparities, 2022
9. Office for Budgetary Responsibility, 2023
10. Grantham Research Institute on Climate Change and the Environment, 2024

How will the transition to net zero affect the UK economy?

Dimitri Zenghelis, Special Advisor, Cambridge Institute for Sustainability Leadership, University of Cambridge

Myth: Achieving the UK's net zero target will undermine the economy.

Fact: The transition to net zero emissions is a prerequisite for making the UK economy resilient, productive and competitive in the long term. The alternative is likely to be continued stagnation in productivity and living standards, along with a loss of competitiveness in global markets for the technologies and services of the future.

As well as creating environmental benefits, the transition to a clean economy aligned with net zero is a route to addressing the UK's lagging productivity, while strengthening its long-term resilience.

The upfront investment needed will deliver long-term benefits

The rapid roll out of clean energy and energy efficiency measures needed to deliver the net zero transition will be capital-intensive upfront. In 2020, the Government's independent climate advisers estimated that additional annual investment of more than £40 billion would be needed as early as 2025, combining both private and public investment, increasing to about £50 billion between 2030 and 2050.[1] But ensuring the UK can maximise economic and social opportunities from the transition means going beyond bringing emissions to net zero: it will also require designing policy and investments to make up for decades of underinvestment in key assets like public buildings and skills, tackling biodiversity loss and environmental degradation, and developing domestic capabilities in markets of the future. Achieving these objectives together will require additional annual investment equivalent to at least 3% of GDP (or £77 billion, at current prices), with at least 1% of GDP (or £26 billion) coming from the public sector, according to a recent estimate.[2]

Crucially, investment into a clean economy can have long-term benefits for growth and productivity, as international examples demonstrate.[3] Examples from the UK also highlight the opportunity for investment in clean technologies to induce creativity and innovation across the whole economy and generate new learning and experience along the way.[4] For example, the Government's investment in offshore wind, which started in the early 2010s when its cost was several times that of existing generation sources, has since supported cost reductions through economies of scale and further technological innovation. As a result, offshore wind now produces almost 15%[5] of the UK's electricity and has become one of the cheapest forms of energy generation, while also providing new jobs and export opportunities.

"The Government's investment in offshore wind, which started in the early 2010s, has since supported cost reductions through economies of scale and further technological innovation."

The economic gains are even greater when we take full account of the co-benefits that result from joined-up deployment of clean alternatives across sectors, such as reduced traffic congestion and air pollution from investment in compact cities connected by public transport and electric vehicles, powered by renewable energy. These problems currently threaten people's wellbeing and limit productivity, with air pollution costing the NHS and businesses more than £20 billion each year.[6]

The transition to clean technologies and infrastructure will improve productivity and efficiency

The majority of the economic activities involved in the transition towards net zero – such as investing in renewable energy and constructing more efficient buildings – have the potential to boost the UK's productivity.[7] This is achieved through improving energy and resource efficiency, shifting from low productivity sectors to the new, innovative, higher value-added sectors of the clean economy, and through process and product innovation in existing sectors.[8]

Many low-carbon technologies are more efficient, and thus cheaper, to run than their fossil fuel counterparts. For example, electric vehicle drive systems have 15–20% energy loss, compared with 64–75% for petrol cars.[9] Clean technology use will also shield the UK from the volatility of global fossil fuel markets. This means the uptake and joined up deployment of low-carbon technologies[10] will be essential to boost resilience and efficiency across the economy.

Even when upfront and running costs are incorporated, certain clean technologies have become almost exponentially cheaper in recent decades, while the real price of fossil fuels has remained roughly constant for more than a century.[11] These cost reductions were made possible by economies of scale and learning by doing, causing an upsurge in demand and encouraging further innovation and cost reductions.[12] In contrast, increased production of fossil fuels triggers the opposite effect, since it becomes necessary to extract a flow of resources that are ever more difficult and expensive to access, tying up expensive labour.[13]

The growing demand for clean technologies can further benefit the UK while inaction will be harmful

The UK is an innovative economy and can access growth benefits as a centre of finance and services such as consultancy, engineering and design – sectors which will be core to the green transition.[14] It is also specialised in the innovation of several clean technologies that are seeing rapid growth globally, such as offshore wind, carbon capture, usage and storage (CCUS), and tidal stream energy.[15] Further investment in these innovative technologies can unlock export opportunities as well as productivity-enhancing spillover effects into other sectors,[16] with potential for relevant investments to support local prosperity as well, particularly in less productive parts of the country.[17] UK policymakers risk the country falling behind if they delay making strategic choices here, as major economies like the US, EU, China and India have already introduced strong policy packages to develop the knowledge clusters and supply lines of the future.

Some have argued that ambitious climate policy may have inflationary impacts as it drives up demand for materials and labour while supply remains insufficient. Yet recent experience with the energy crisis suggests inaction could be even more inflationary, as continued reliance on fossil fuels would keep the UK vulnerable to inflationary price shocks in global markets. Locking into fossil fuel infrastructure such as new oil and gas fields in the North Sea, and the continued construction of energy-inefficient buildings, also creates the risk of stranded assets, future financial losses and costs for businesses and households that will likely fall back on taxpayers. The Office for Budget Responsibility has estimated that if the UK continues its dependence on gas at the current level, recurring gas price spikes could add around 13% of GDP to public debt by 2050.[18]

"Further investment in these innovative technologies can unlock export opportunities as well as productivity-enhancing spillover effects into other sectors."

The structural change required for net zero needs to be managed proactively to avoid a 'disorderly' transition (where there is a sudden, disruptive response) and a series of irreversible missed opportunities. The Government's role will be in driving the development of relevant supply chains, reskilling workers and providing support to households for the upfront costs of low-carbon technologies. The alternative scenario is likely to be one of continued stagnation in living standards, inefficiency, erosion of competitiveness and macroeconomic instability.

Notes and references

1. CCC, 2020
2. Zenghelis et al., 2024
3. World Bank, 2024; Brandily et al., 2023
4. Dechezleprêtre et al., 2017
5. Department for Energy Security and Net Zero, 2023
6. Royal College of Physicians, 2016
7. Alvis and Sissons, 2022
8. Geels et al., 2021
9. US Department of Energy Office of Energy Efficiency and Renewable Energy, n.d.
10. Complemented with digitisation and responsible use of artificial intelligence.
11. Way et al., 2022
12. Ibid.
13. Ibid.
14. Curran et al., 2022
15. Ibid.; Serin et al., 2021; Serin et al., 2023
16. Dechezleprêtre et al., 2017
17. Curran et al., 2022, op. cit.
18. Office for Budget Responsibility, 2023

What does the current cost of living crisis mean for our transition to net zero?

Anna Valero, Growth Programme Director, Centre for Economic Performance, London School of Economics and Political Science

Myth: Acting on net zero is too expensive during a cost of living crisis so it should be delayed.

Fact: The case for the UK to deliver the net zero transition remains as strong as ever if the country is to protect the wellbeing of its people and futureproof its economy, and the cost of living crisis means politicians need to take even more care to ensure the costs and benefits of the transition are distributed fairly across society.

The cost of living crisis has caused widescale hardship for UK households, further compounding the impacts of a stagnation in living standards since the global financial crisis and against a background of large and persistent inequalities. While additional pressures on household budget imply an even stronger need to ensure the costs and benefits of the net zero transition are distributed fairly, the fundamental arguments for why the UK must deliver a rapid transition remain unchanged and are in fact enhanced in the current context.

Climate action is a prerequisite for the future wellbeing of UK society

2023 was the warmest year on record[1] and if emissions continue at current levels, the world is set to exhaust its remaining carbon budget for limiting global warming to 1.5°C by the end of this decade.[2] Surpassing the 1.5°C threshold would mean an increased risk of climate-related damages affecting people's lives, including from extreme temperatures, flooding and disruption to infrastructure and supply chains. All in society will feel the impacts of climate change, but they will not feel it equally, due to differences in their exposure and/or ability to adapt.[3] For example, people on low incomes will find it most difficult to afford adaptive measures like air conditioning or flood insurance, and remote, low-income communities might find it most difficult to replace any losses in their income from climate impacts (e.g. due to a fall in agricultural production).[4] Therefore, inaction on climate change would risk exacerbating the challenges already faced by the less well off in society. Delay will also imply missing the opportunity to tackle other aspects of environmental degradation that could be addressed through climate action, such as air pollution or a lack of access to green space, which also affect lower income households disproportionately.

The UK needs to build a low-carbon, resilient economy to avoid higher costs in the future

The economic argument for the UK's net zero transition is well established.[5] One estimate has indicated a pathway consistent with net zero could boost the UK's GDP by about 2% by 2030, which would continue to grow before levelling off at around a 3% boost by 2050, reflecting – among other factors – an increase in economic multipliers as less UK spending goes on imported oil and gas.[6] In contrast, delaying necessary action would imply higher costs due to more disruptive and expensive changes that would be required later on,[7] as well as forgone growth opportunities from serving growing domestic and overseas demand in the global transition to clean technologies and practices (such as renewable energy and green finance).[8]

"Delaying necessary action would imply higher costs due to more disruptive and expensive changes that would be required later on."

Action towards net zero can also deliver improved resilience to volatility in energy prices, as highlighted by the recent energy crisis. This resilience would come from diversifying the energy mix, thereby decreasing reliance on fossil fuel imports, and from reducing energy demand by boosting energy efficiency. The UK's heavy dependence on natural gas for electricity and heating, combined with its old and inefficient housing stock, meant that it was left vulnerable to the huge spike in energy costs after Russia's invasion of Ukraine. This played a large part in household budgets being hit harder in the UK than in any other country in Western Europe during the energy crisis that followed.[9] Between 2020 and 2023, the average fuel poverty gap – which reflects the difficulty for a household to move out of fuel poverty – increased by 66% due to rising energy prices, making the situation for those already in fuel poverty substantially harder.[10]

The Government rightly stepped in to shield consumers and businesses from rising energy costs through various support schemes, at an estimated combined cost of £78 billion.[11] It is clear that this cost would have been lower had the UK already invested more in key areas that are necessary for the net zero transition, including energy efficiency and zero carbon heating in buildings, and domestic low-carbon power. According to one estimate, households that had all the applicable net zero technologies (including insulation, a heat pump and an electric vehicle) could have saved up to £3,750 on energy bills over 2022 and 2023, the two years dominated by the energy crisis.[12] In contrast, if the UK continues its dependence on gas at the current level, recurring gas price spikes could add about 13% of GDP to public debt by 2050,[13] with households and businesses continuing to face substantial avoidable costs as well. The case for speeding up the transition to electric vehicles and reducing the UK's reliance on diesel and petrol, which are subject to similarly volatile pricing, is also supported by the resilience argument.

Together, investments in low-carbon heat, electricity and transport, combined with system-wide energy efficiency improvements, imply lower costs for households down the line, along with other co-benefits such as warmer homes and cleaner air.

Public support for climate policies is high, but costs and benefits need to be distributed fairly

The UK public remains consistently concerned about climate change[14] and continues to show strong support for climate policies.[15] The foundational legislation is there, with the UK being the first advanced economy to put a net zero emissions target into law (with a 2050 target date) and the country has traditionally been a global leader on climate policy, having halved its emissions between 1990 and 2022.[16]

The political question in light of the cost of living crisis is not one of 'whether or not' the UK should transition to net zero emissions on schedule, but of 'how' this can be done in the fairest way, given the pressures on UK households. Some households and particularly those on low incomes will struggle to afford the upfront costs of the technologies necessary for net zero.[17] While most of these technologies have the potential to deliver operational savings once initial investments have been made, currently high upfront costs mean that the savings (and other co-benefits) from low-carbon upgrades will only accrue to households that can afford them. Government therefore has a role in anticipating the various distributional aspects of the transition and providing targeted support, while making sure low-carbon policy costs more generally are passed on fairly.[18] Lessons can be learned from elsewhere; for example, from the relative success of other Northern European countries in decarbonising heating.[19]

Ultimately, what the UK needs is a rapid and fair transition to net zero. Some have argued that the country cannot afford to invest in this transition during a cost of living crisis and given the tight public finances, but in truth it is inaction that would risk the wellbeing of its people and the resilience of its economy in the future. It is true that delivering the transition will require navigating the new economic and political realities presented by the cost of living crisis, but it is the only way the UK will secure a stronger, sustainable and more resilient future.

References

1. Copernicus, 2024
2. Lamboll et al., 2023
3. Climate Change Committee, 2022
4. Ibid.
5. Zenghelis et al., 2024; Valero and Van Reenen, 2023; Skidmore, 2023; Stern and Valero, 2021
6. Cambridge Econometrics, 2020
7. Marshall and Valero, 2021
8. Curran et al., 2022; Valero and Van Reenen, 2023
9. Ari et al., 2022; Kranzl et al., 2022
10. Department for Energy Security and Net Zero, 2024
11. Office for Budgetary Responsibility, 2023a
12. Energy and Climate Intelligence Unit, 2024
13. Office for Budgetary Responsibility, 2023b
14. Department for Energy Security and Net Zero, 2023
15. PublicFirst, 2023
16. Department for Energy Security and Net Zero, 2024
17. Anis-Alavi et al., 2022; Corlett and Marshall, 2022
18. Owen and Barrett, 2020
19. Bruel and Rosenow, 2023

What does more North Sea oil and gas mean for UK energy supply and net zero?

Paul Ekins, Professor of Resources and Environmental Policy, University College London

Myth: 'Maxing out' North Sea reserves will help the UK secure affordable energy into the future and is compatible with reaching net zero.

Fact: Extracting more oil and gas will not improve the UK's energy security and it flouts the country's international and domestic climate commitments, whereas investing in low-carbon energy achieves sustainability, affordability and security aims.

The current UK Government has expressed its intention to 'max out' North Sea oil and gas reserves by granting hundreds of new licences. The policy, it says, will "unlock new projects, protect jobs, reduce emissions and boost UK energy independence",[1] with the emissions reduction enabled through additional deployment of carbon capture, usage and storage (CCUS).

The Government contends that this policy is compatible with its commitments to rapidly reduce its contribution to climate change at both the global level and domestically. The former refers to the Nationally Determined Contribution (NDC) the UK has set itself under the Paris Agreement, which requires the country to achieve a 68% reduction in its territorial greenhouse gas emissions by 2030. The latter is the UK's target to reach net zero territorial emissions by 2050 via a series of carbon budgets, the sixth of which, covering the period 2033–37, is now set in legislation. But is the Government's approach to North Sea oil and gas extraction really compatible with emission reduction targets and what impact will it have on energy security and bills?

Burning oil and gas from existing infrastructure is already expected to increase warming beyond 1.5°C

The main driver of the global warming that is causing climate change is the emissions of carbon dioxide (CO_2) from the combustion of fossil fuels. It is now well established that most of the world's remaining oil and gas reserves will need to remain unburned if there is to be any chance of meeting the Paris Agreement's objective of keeping average global warming to 'well below 2°C' and as close to 1.5°C as possible. To keep warming below 2°C globally, 33% of the oil reserves, 49% of the gas reserves and 82% of the coal reserves identified by 2015 (the year the estimation was made) would need to remain unburned up to 2050,[2] even with extensive use of CCUS technology. To keep warming to a maximum of 1.5°C, the proportions of reserves necessary that must remain unburned are higher still: 58% of oil, 56% of gas and 89% of coal identified by 2021 (the year the estimation was made).[3]

"Existing fossil fuel infrastructure alone, if used to its full extent, would cause three times the emissions as the global carbon budget consistent with a 50% chance of staying below 1.5°C."

Existing fossil fuel infrastructure alone, if used to its full extent, would cause three times the emissions as the global carbon budget consistent with a 50% chance of staying below 1.5°C.[4] This was the rationale used by the International Energy Agency (IEA) in its 2021 Net Zero Emissions by 2050 Scenario, which states "there are no new oil and gas fields approved for development in our pathway, and no new coal mines or mine extensions are required".[5] Production from new oil and gas fields in the UK runs contrary to this conclusion. To be compatible with the 1.5°C target requires the emissions from the burning of new fossil fuels to be offset by even greater removals of CO_2 later this century, but being able to remove CO_2 on this scale may not be possible to deliver, given the unproven capabilities of new and yet-to-be developed technologies and the potential excessive demands they may impose on resources such as land, biomass and energy.

Continued drilling in the North Sea risks contributing to a further oversupply of fossil fuels globally

There is no evidence that new UK production will displace other oil and gas production from elsewhere. Rather, it will just add to what is already a very large over-supply of oil and gas in relation to the Paris Agreement targets. If all oil- and gas-producing countries were to follow the UK's example and 'max out' their production, the temperature targets of the Paris Agreement would be missed by a very large margin.

Until recently, the UK could credibly claim to be a global leader on climate policy and was able to announce in early 2024 that it is the first major economy to have cut its greenhouse gas emissions by 50% since 1990.[6] This leadership claim is contradicted by the North Sea 'max out' policy: but more than that, it is setting an example of global irresponsibility, which, coming from a wealthy nation with large historical emissions, undermines international efforts, as agreed at COP28, to transition away from fossil fuels. Unsurprisingly, Climate Action Tracker (CAT) – an organisation that rates countries on the compatibility of their climate policies with their commitments under the Paris Agreement – recently reduced its rating of the UK's climate change policies and projections from 'almost sufficient' to 'insufficient', describing the Government's support for new oil and gas extraction, along with other policy changes, as "short-sighted moves that make a mockery of the UK's claim to climate leadership".[7]

North Sea oil and gas will not materially help UK energy bills, energy security or public finances either

It is likely that the policy to 'max out' North Sea oil and gas is largely driven by economic considerations – i.e. the revenue the UK will receive (although the Government cites energy security[8] as the reason behind approving the new licensing). However, examination of data from the North Sea Transition Authority (NSTA)[9] shows just how little the development of new North Sea oil and gas fields – including both identified but undeveloped fields and future discoveries – will slow down the overall decline in extraction from this location. Given that oil and gas prices are likely to fall, perhaps dramatically, as the world decarbonises, the monetary gain from these marginal increases in the production of oil and gas in future years will not be large.

On security of supply, it is now widely understood that increasing North Sea oil and gas extraction will make no contribution to UK energy security, with parliamentary research stating baldly: "Additional North Sea oil production would not have a substantial effect on energy security because 83% of UK oil is exported."[10] The new oil production from the North Sea will be sold into world markets, and the new gas into European markets, and the UK will need to buy back what it needs at prevailing market prices. North Sea production is much too small to influence these prices, so the new production will not even cut energy bills. A much more effective approach to energy security would be to increase the efficiency with which it is used, thereby reducing energy demand, and increase renewables and storage capacity.[11]

"North Sea production is much too small to influence world market prices, so the new production will not even cut energy bills."

A managed transition away from North Sea oil and gas is needed while scaling up alternatives

These facts suggest that 'maxing out' oil and gas extraction from the North Sea does nothing for energy affordability or security in the UK, detracts from its domestic emission reduction commitments, and undermines its reputation for climate action both at home and abroad. All these objectives would be better served by a rapid and carefully managed transition of the North Sea away from oil and gas alongside investment into energy efficiency and scaling up low-carbon energy production, including abundant offshore wind and marine energy, and long-term energy storage.

References

1. PM's Office and DESNZ, 2023
2. McGlade and Ekins, 2015
3. Welsby et al., 2021
4. Forster et al., 2022
5. International Energy Agency, 2021
6. Department for Energy Security and Net Zero, 2024
7. Climate Action Tracker, 2023
8. North Sea Transition Authority, n.d.
9. North Sea Transition Authority, 2023
10. UK Parliament POST, 2022
11. Watson and Page, 2023

How reliable is a renewables-dominated electricity system in comparison to one based on fossil fuels?

Keith Bell, Holder of the Scottish Power Chair in Future Power Systems, University of Strathclyde

Myth: A reliable supply of electricity depends on having a large proportion of fossil fuels in the energy mix.

Fact: Great Britain can achieve a clean and reliable power sector by ramping up the deployment of renewables, coupled with a range of flexible resources. This will also increase energy security, thanks to reduced dependence on imported fossil fuels.

Once the largest emitter in Britain, the electricity sector has achieved a remarkable reduction in greenhouse gas emissions since the early 1990s, initially by making greater use of natural gas in place of coal, and latterly, particularly over the last 10 years, through the growth of wind and solar energy. Delivering a fully decarbonised power sector will be vital to tackling climate change and must be achieved in such a way as to guarantee a reliable supply of electricity to sustain our society and economy.

A decarbonised power system will require a range of flexible resources to balance the system

For the power system to operate in a stable manner, the rate of production of electricity must closely match the rate of use. The System Operator[1] is responsible for ensuring that supply and demand match on a second-by-second basis. Historically, doing so has depended on the ability to store fuel – which, in Britain, has primarily meant fossil fuels – until needed to meet demand for electricity. When demand increases, additional power generation is switched on; when demand falls – overnight, at weekends and over the summer – any generation plant that is not required can have its output reduced or be shut down. To cover the risk that demand is higher than normal or some generation plant is unavailable due to technical problems, a certain minimum total generation capacity is maintained, providing a capacity margin over the peak demand.

"In 2023, 28% of Britain's electricity production was from wind and 5% from solar, up from 10% for wind and solar combined in 2013."

As we move to a power system with a greater share of renewables – in 2023, 28% of Britain's electricity production was from wind and 5% from solar,[2] up from 10% for wind and solar combined in 2013[3] – the variability of energy from renewables must be considered within system planning and operation. Residual demand for electricity – the difference between demand at a particular time and the power generated at that time from wind and solar – can change quite quickly, requiring what is known as system 'flexibility' to ensure supply and demand match on a second-by-second basis. Achieving system flexibility to ensure supply meets demand is possible through changing demand for energy, modulating the output of generators or managing flows of energy across interconnections with other countries. System operators are learning how to make use of flexibility without depending on fossil fuels, such as through smart charging of electric vehicles (which can be managed to match times of high renewable energy availability) or use of 'grid scale' batteries.[4]

Clean technologies can help manage periods of limited and excess renewable power generation

A low-carbon electricity system requires low-carbon sources of energy to meet demand when wind speeds and solar irradiation are low, potentially over days or weeks of a relative 'wind drought'. Conversely, the large total capacity of wind and solar generation expected in the system in the future will also result in periods when the available power from renewables will exceed demand, providing the opportunity to either export the excess power or store it for future use.

Many studies are now showing that production, storage and use of hydrogen provide a viable means of dealing with these two scenarios – in effect, moving energy between periods of surplus renewable power, when hydrogen might be produced via electrolysis, and periods of low renewable output, when stored hydrogen could be used to generate electricity.

There are also other options for 'schedulable' low-carbon sources of power to complement renewables, e.g. nuclear power and natural gas with carbon capture and storage (CCS). Interconnections with other countries will also play an important role, especially when the natural resources fit well with each other. For example, Norway can make use of Britain's surplus wind power instead of using its hydropower reservoirs, allowing the water to be stored and the power it generates to be used at times of low wind speeds for its domestic consumption plus for export to Britain.

"We do not have to use fossil fuels as part of our electricity production mix to have a reliable energy system, as clean alternatives can help balance the system on short as well as longer time scales."

All of this means that we do not have to use fossil fuels as part of our electricity production mix to have a reliable energy system, as clean alternatives can help balance the system on short as well as longer time scales. Furthermore, boosting both renewables and replenishable energy storage capacity as part of our power system will reduce our dependence on fossil fuel imports, strengthening the country's energy security and resilience.

Notes and references

1. The Electricity System Operator in Britain is part of National Grid up to July 2024, after which it will become an independent, state-owned body.
2. National Grid Electricity System Operator, 2023
3. Department for Energy Security and Net Zero, 2024
4. National Grid Electricity System Operator, n.d.

How cost-effective is a renewables-dominated electricity system in comparison to one based on fossil fuels?

Keith Bell, Holder of the Scottish Power Chair in Future Power Systems, University of Strathclyde

Myth: The cost of providing backup for variable renewables will result in a more expensive energy system than one based on fossil fuels; continued use of fossil fuels will help keep energy costs down for consumers.

Fact: Not only is electrical energy from renewables cheaper than from gas, but by limiting dependency on gas, a power system dominated by renewables is expected to reduce costs overall in comparison to the average electricity wholesale market price over the last year.

Delivering a clean power sector is essential to meet Britain's decarbonisation commitments and strengthen the country's energy security. But, at a time when high energy prices are putting pressure on businesses and households across the country, how does the cost of a clean power sector compare with the cost of a fossil fuel-based system? Below, costs are reviewed and compared, both technology by technology and on the basis of an electricity system that delivers a reliable supply.

Renewable energy production costs are lower than fossil-based alternatives

The 'levelised cost of electricity' (LCOE) provides a simple means of comparing different technologies for the production of electricity, taking account of capital costs and costs of operation, including maintenance and the purchase of any fuel needed.

The Government's assessments of the LCOE of generation technologies since 2012 show striking reductions in the LCOE of wind turbines and solar PV panels over time, which fell to between £41 per megawatt hour (MWh) and £48/MWh respectively for new developments in 2023.[1] In comparison, the cost of new conventional gas-fired generation (without carbon capture) rose from £103/MWh (including a carbon price of £25/MWh) in 2012[2] to £124/MWh (including a carbon price of £65/MWh) in 2023.

"Studies have found that the future decarbonised power system will have a lower cost per unit of electricity than the average price in Britain's wholesale electricity market in 2023."

Inflationary pressures in international supply chains have led to a recent increase in the maximum price (known as the 'reserve price') that may be paid for offshore wind in the next Contract for Difference auction, to £94/MWh.[3] However, this price is significantly lower than the prices for offshore wind of £147–£155/MWh awarded in the first round of auctions in 2015[4] – a remarkable cost reduction driven by innovation and economies of scale. And importantly, this does not change the reality that the LCOE of renewables is now much lower than that of electricity produced from gas.

The 'system cost' of a renewables-dominated system is lower than the average price paid in the electricity wholesale market in 2023

When assessing the cost of reliably meeting demand for electricity, it is not enough only to look at the LCOE of a particular technology. We need to consider the overall mix needed in the system and work out the total 'system cost'.

Crucially, studies that have looked at the total system cost, including the cost of backups to handle the variability of renewables, have found that the future decarbonised power system will have a lower cost per unit of electricity than the average price in Britain's wholesale electricity market in 2023 of £127/MWh.[5]

The Climate Change Committee's assessment of the potential technology mix and cost of a fully decarbonised British electricity system in 2035 considered a system based on a large share of renewable technologies that reliably meets demand for electricity, including in a four-week 'wind drought'.[6] It found the average system cost of electricity production in 2035 to lie between £55/MWh and £73/MWh.[7]

A study by the Royal Society on energy storage estimated the system cost of electricity in 2050 using only wind and solar power and 'green' hydrogen to reliably meet demand across a wide variety of conditions to be in the range of £56–£100/MWh.[8]

The lower cost of a renewables-dominated system relative to one based on fossil fuels stems primarily from a reduced dependency on gas. Flexible use of electricity is a further factor as this reduces the infrastructure needed and limits our reliance on more expensive sources of power (particularly gas) during periods of high energy demand. Finally, large-scale energy storage allows us to stock up on renewable energy at times of surplus relative to demand.

As well as new generation capacity, delivering a fully decarbonised electricity system will require significant investment in the network to connect electricity users to the most cost-effective sources of low-carbon power. The network needs investment whatever the dominant sources of power as component parts are reaching their end-of-life and need to be replaced but the opportunity will need to be taken to expand capacity. How much that would all cost in comparison with a system based on a similar generation mix to today's is uncertain. One estimate for the transmission network comes from the Royal Society's report, of £4/MWh in 2050, which would be in addition to the system cost outlined above.

"The estimated 'system cost' of a renewables-dominated system is much lower than the average price paid on the electricity wholesale market over the last year."

To conclude, while it is sometimes claimed that the cost of providing backup for variable renewables will result in a more expensive energy system than one based on fossil fuels, such a claim is incorrect. The LCOE of wind and solar energy are lower than for gas whose emissions have not been captured, and much lower than for gas that deploys carbon capture and storage. And the estimated 'system cost' of a renewables-dominated system is much lower than the average price paid on the electricity wholesale market over the last year.

Note: all costs are quoted in 2023 prices using GDP deflators in accordance with the Treasury's 'Green Book' approach to assessing social value.

Notes and references

1. Department for Energy Security and Net Zero, 2023
2. Department of Energy & Climate Change, 2012
3. Department for Energy Security and Net Zero, 2023
4. Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, 2015
5. www.ofgem.gov.uk/energy-data-and-research/data-portal/wholesale-market-indicators, accessed 05/02/24. £127/MWh was, according to Ofgem data, the average price paid in advance – the 'forward price' – for electricity in Britain's wholesale market across 2023. Prices paid by traders vary according to demand. The prices offered by producers include the costs recovered by the System Operator to operate the system and by the transmission network owners. Thus, the average wholesale price provides a good basis for comparison with a future 'system cost'.
6. Climate Change Committee, 2023
7. The cost range reflects the inclusion or exclusion of the costs associated with hydrogen production, transport and storage (including for non-electricity related uses).
8. Royal Society, 2023

How well suited are heat pumps to UK homes and how economical are they?

Meysam Qadrdan, Professor in Energy Networks and Systems, Cardiff University

Myth: Heat pumps do not function well in colder climates or less efficient homes and will continue to be significantly more expensive than gas boilers.

Fact: Heat pumps work effectively in cold weather and have great potential to be a cost-competitive option for decarbonising the heat sector in the UK.

Space heating and hot water in UK homes account for more than 20% of the country's total carbon emissions. This has prompted efforts to encourage a move away from high carbon natural gas boilers, which are currently the predominant choice, towards heat pumps. As with any consumer technology, building trust and confidence in this alternative to home heating, including widening knowledge of how heat pumps work, will be essential to increase their uptake. It is also important to understand how policy can enable their cost-effective rollout.

Heat pumps work well in cold climates

A heat pump uses technology similar to that used in a refrigerator, to transfer heat from a heat source (usually at a lower temperature, such as from the outside air or ground) to where the heat is needed –for example, inside a building. Extracting heat from cooler outside air is possible because heat energy is available when the temperature is above what is known as 'absolute zero', i.e. -273°C.

"Because heat pumps do not themselves generate heat, they are more efficient than conventional heating technologies."

This means that heat pumps can meet the heat demand of buildings even in very cold weather, with appropriate adjustments to their size and design. In Europe, the four coldest countries have the largest share of heat pumps: Norway (60% of households), Sweden (43% of households), Finland (41% of households) and Estonia (34% of households).[1] Crucially, while the efficiency of heat pumps is lower when the temperature of the heat source drops (i.e. the outside air or the ground), they are still more efficient than gas boilers and electric resistance heaters.[2] Because ground temperature varies less than air temperature across a year, ground-source heat pumps offer higher efficiency than air-source heat pumps in cold climates.

Heat pumps can be used in energy-inefficient buildings

In the same way that a gas boiler can be used to heat an energy-inefficient building, a heat pump can also be used in less efficient buildings, if sized correctly. However, as with all heating technologies, installing a heat pump in energy-efficient buildings offers maximal benefits in terms of reducing heating bills and avoiding energy wastage. Improving the energy efficiency of buildings should therefore be of utmost priority regardless of the type of heating system – be it heat pump, boiler or district heating network.

Heat pumps are more efficient and versatile than alternative heating technologies

Because heat pumps do not themselves generate heat (instead using energy to extract heat from a source such as the surrounding air or the ground, and then amplifying and transferring that heat to buildings), heat pumps are more efficient than conventional heating technologies. For comparison, the ratio of heat output to energy input for a typical heat pump on a winter's day in the UK could be around 3, while for a gas boiler and an electric resistance heater this ratio is 0.8 and 1 respectively, which means they need more energy to supply the same level of heat.

Heat pumps are also versatile in that they can be configured to cool buildings by extracting heat from the inside of buildings to the outside air or ground.

Economies of scale and effective policy design can make heat pumps more cost-competitive

It is helpful to understand what key cost elements contribute to the economic competitiveness of different heating systems. Upfront, there is the cost of buying the heating technology and any other components needed for the heating system, such as radiators, and the cost of installation. Running costs include the cost of energy needed by the heating system to operate, and the cost of maintenance.

Currently, the upfront cost of a heat pump ranges from about £9,000 for a flat to £13,000 or more for a larger house,[3] which is greater than that of a gas boiler (which costs between £1,500 and £4,500). The large-scale deployment of heat pumps is expected to reduce this upfront cost (mainly through reducing the installation cost). However, it is unlikely that this will bring down the cost to the level of a gas boiler[4] and the current higher upfront cost of heat pumps is recognised by the sector as a significant barrier to their large-scale deployment.[5] In recognition, the Government is providing a grant of £7,500 towards the cost and installation of a heat pump in England and Wales through its Boiler Upgrade Scheme.

"The key determinant in the cost competitiveness of heat pumps is ultimately the difference between electricity and gas prices available to consumers."

How much a heat pump costs to run depends mainly on its electricity consumption and the electricity price. While heat pumps are almost three times more efficient than gas boilers, consuming less energy to provide the same amount of heat, the key determinant in the cost competitiveness of heat pumps is ultimately the difference between electricity and gas prices available to consumers. Currently, the domestic gas price in the UK is below the EU median, while the domestic electricity price is above the EU median.[6] Increasing the cost-competitiveness of heat pumps therefore requires levelling the playing field between gas and electricity: for example, by reforming the electricity tariff and rebalancing electricity and gas taxes, which the Government has indicated it intends to do.

Overall, heat pumps are proven technologies that operate effectively even in cold weather. Policies that enable the large-scale uptake of heat pumps through supporting the development of a supply chain and reforming electricity and gas tariffs will help make this technology a cost-competitive option for decarbonising the heat sector in the UK.

References

1. Carbon Brief, 2022
2. Winkler and Ramaraj, 2023
3. Nesta, 2022
4. Hardy et al., 2016
5. International Energy Agency, 2022
6. Department for Business, Energy & Industrial Strategy, 2017

How well equipped is the UK charging infrastructure to support greater uptake of electric vehicles?

Liana Cipcigan, Professor of Transport Electrification and Smart Grids, Cardiff University

Myth: There are insufficient charging points to support a rapid transition to electric vehicles (EVs).

Fact: More charging points will undoubtedly be needed in future to support growth in EV ownership, but the current infrastructure is already able to meet the needs of many EV users and facilitate a rapid transition away from petrol and diesel.

The transition to electric vehicles is taking place gradually in the UK and is dependent on the parallel development of charging infrastructure. Fully electric vehicles accounted for more than 16% of the new UK car market in 2023.[1]

EV ownership is expected to grow significantly and will need a range of charging options

The Zero Emission Vehicle (ZEV) Mandate officially became law in Great Britain in January 2024. It states that by 2030 80% of all new cars and 70% of vans sold must be zero emission, increasing to 100% by 2035.

For charging infrastructure to effectively support the widespread uptake of EVs that is expected given this mandate, it needs to offer diverse options for charging. Charger technology must be placed in locations that will meet a variety of charging behaviours and be fit to serve all types of vehicles. This means looking beyond the total number of charging points installed to ensure the infrastructure is suitable for all users, which will encourage quicker uptake.

Home charging installation is on the increase

According to a Department for Transport (DfT) 2022 survey of electric and/or plug-in hybrid vehicle drivers, almost all respondents (93%) had access to home charging, with the majority of these charging their vehicle overnight.[2] The Government expects this behaviour to continue. DfT figures show that grants contributing to private residents' costs of installing EV chargers at home had resulted in the installation of more than 340,000 domestic charging devices by January 2024.[3]

"Grants contributing to private residents' costs of installing EV chargers at home had resulted in the installation of more than 340,000 domestic charging devices by January 2024."

Government is planning further support for the installation of charging points and other EV infrastructure, including offering grants to residential landlords, residential car parks (which could claim up to £30,000 or 75% off the cost), and owner-occupiers and renters of flats (grants of up to £350).[4]

Energy companies are also taking action to support the effective use of EV charging, by, for example offering attractive charging tariffs at home and on the road, plus low prices for installing an EV charger. Other support includes the first 'vehicle-to-grid' tariff, offered by energy supplier Octopus, which rewards users that sign up to smart charging and discharging to the grid.

Charging on-street and at work premises is increasing

For those not able to charge at home because they do not have a driveway, options include on-street charging or charging at public locations and places of work.

Alongside the more traditional on-street EV charging points, slower 5kW chargers can be installed directly onto street lampposts, suitable for rapid rollout to further increase access in residential areas. Some are

already embedded in the city landscape, but according to a recent estimate there are 300,000 lamp posts in the UK suitable for chargers that are not yet utilised in this way.[5] For businesses, the Government's Workplace Charging Scheme (WCS) contributes up to £350 to the upfront cost of purchasing and installing an EV charging point. As of January 2024, the WCS had funded the installation of more than 51,000 sockets in workplace carparks since the scheme started in 2016, with a significant increase in the installation rate over the past year.[6]

Current infrastructure will meet most drivers' needs, but distribution and usability of charging points will need to improve

As of April 2024, there were nearly 60,000 public EV charging devices available in the UK across nearly 33,000 locations. Nearly 12,000 of these are 50kW rapid chargers.[7] Over the year to 2024, there was a 47% increase in public charging points installed.[8]

While there is uneven geographical distribution of charging points, good progress is being made on addressing this issue. For example, Wales has lagged behind in installing public charging devices but as of April 2024 its rate of charging devices per 100,000 population, at 82, was only slightly lower than the UK average of 89. Wales exceeds the UK average for rapid chargers, with nearly 18 per 100,000 population versus around 17 on average.[9]

Currently, every class of vehicle has an electric option, and battery ranges reach almost 300 miles for the newest models. Innovations that have increased the energy density of batteries mean that EVs can now cover greater distances on a single charge. The average car journey in the UK is around just 8 miles and any EV with a range of 200 to 300 miles would easily fit most people's lifestyle and driving behaviour.

Drivers with longer distances to travel require facilities to charge while they are on the road network. Ultra-rapid chargers are already installed at many motorway services, and people are used to stopping at these for 15 to 20 minutes when driving long distances. National Grid has identified that there is grid capacity to guarantee that no driver is further than 30 miles from ultra-rapid charging.[10]

"National Grid has identified that there is grid capacity to guarantee that no driver is further than 30 miles from ultra-rapid charging."

Some challenges remain, though proposals to address them are under discussion. These include the fact that currently VAT on electricity is charged at 20% for public charging but only at 5% for private charging, which penalises those who cannot charge at home. Further, there is a currently need to use specific apps to access preferential charges.

More charging public charging points will undoubtedly be needed in future to support growth in EVs. However, the number and diversity of existing installations show that the charging infrastructure will be able to support a rapid transition to EVs.

References

1. Department for Transport and Office for Zero Emission Vehicles, 2024
2. Department for Transport, 2024a
3. Department for Transport, 2024b
4. Ibid.
5. Local Council Roads Innovation Group, 2022
6. Department for Transport, 2024b, op. cit.
7. Department for Transport, 2024c
8. Department for Transport, 2024d
9. Department for Transport, 2024c, op. cit.
10. National Grid, 2023

How will climate policy impact the UK public and what do they really think about acting on climate change?

Sam Hampton, Acting Energy Programme Deputy Lead, Environmental Change Institute, Oxford University, Lorraine Whitmarsh, CAST Director, University of Bath and Hettie Moorcroft, University of Bath

Myth: Taking action on net zero will inevitably be draconian and unfair and is unpopular among the British public, who are concerned about disruption to lifestyles and cost.

Fact: Climate impacts will affect those on lower incomes much more than climate action, which can support poorer households and promote economic growth and resilience. The public shows widespread support for achieving net zero emissions where policies are guided by fairness, choice and democratic input.

The issue of climate change and the net zero agenda has emerged as a key battleground for competing political visions in the run-up to the UK general election. In the last year, the issue has been increasingly used with the intention of creating dividing lines. For example, the Conservative victory in the Uxbridge by-election was widely attributed[1] to the party's opposition to the expansion proposed by Labour Mayor Sadiq Khan of London's ultra-low emission zone (ULEZ), while Prime Minister Rishi Sunak's decision to grant new oil and gas drilling licences, one of several roll-backs on pro-climate policies, has been viewed as a way to create a divide between the Conservatives and the Opposition from opposition parties.

The argument for watering down climate policies is being framed around the need to address equity and fairness. In announcing the decision to push back the date by which no new fossil fuelled cars can be sold, from 2030 to 2035, the Prime Minister argued that the Government was moving away from a "default" approach that would "impose unacceptable costs on hard-pressed families".[2] In the same speech, Rishi Sunak presented the Government's change in tack on net zero as a step to avoid interventions being restrictive and invasive. For example, he told voters, "we'll never force anyone to rip out their existing boiler and replace it with a heat pump", the implication also being that other parties might, despite there being no proposals being tabled to do so.

"The impacts of climate change will certainly be unfair: the poorest and most marginalised groups in society often face higher exposure to climate impacts."

These apparent political dividing lines rely on the assumption that climate policies will inevitably be expensive, draconian and thus unpopular, particularly for those on lower incomes. Below we explore why this is not the case.

Climate impacts will affect those on lower incomes most, while climate action can support less affluent households, and promote growth and resilience

First, there is strong and well-established evidence that the costs of inaction far outweigh the costs of transition.[3] Furthermore, the impacts of climate change will certainly be unfair: the poorest and most marginalised groups in society often face higher exposure to climate impacts.[4] For instance, struggling households are more exposed to food price shocks, which can be brought about by extreme weather events.

Similarly, lack of action on energy efficiency would continue to leave lower income households living in poorly insulated properties, exposed to costly heating and electricity bills dependent on volatile gas prices. Tenants renting from private landlords are particularly affected, while those in social housing generally benefit from higher standards of energy efficiency.

The economic arguments for ambitious climate policy were strengthened in the 2023 Skidmore review,[5] which highlighted the significant employment opportunities and potential for export revenues associated with net zero innovation.

Recent analysis by CBI Economics showed that whereas the UK economy as a whole is struggling with low growth, net zero economic activity grew by 9% in 2023.[6] Notably, the report finds that constituencies classed as key electoral battlegrounds are more likely to have seen strong net zero growth.

There is strong public concern about climate change across income groups

Second, evidence does not support the idea that the public does not see climate action as important and that climate policies, particularly those that involve lifestyle changes, are widely unpopular. On the contrary, support for net zero policies is widespread across the British public, and three in four adults say they already make some or a lot of lifestyle changes to help tackle climate change.[7] Opinion polls have shown that public concern and support for action remained high during the COVID-19 pandemic[8] and the cost of living crisis.[9]

In our own research on the UK,[10] we found that in all income groups the majority of people (between 67% and 74%, depending on income bracket) agreed that climate change requires a high or extremely high level of urgency of response. Higher income groups show slightly stronger levels of concern, but not to a statistically significant extent. Political affiliation is in fact a more significant predictor of perceived urgency than many other socio-demographic variables, suggesting that political spin is generating division around climate policy. Given the need for consensus support for action on climate change, there is a need to counter ideology-driven narratives and information not backed by science or evidence.

Public support for climate policy hinges on fairness and provision of personal choices, alongside effective communication

The Government and parties preparing for the general election are right in thinking that fairness and choice are of vital importance to the public when it comes to climate action. The UK Climate Assembly, convened in 2019–20, emphasised these as the core principles,[11] and evidence from workshops we have conducted around the UK confirms that public support for net zero policies such as reducing car use rests on the need for personal choice, fairness and trust in those implementing the policies.[12] But fairness can mean different things to different people and narrative framing matters, as explained below.[13] This therefore suggests the need for policymakers not only to balance the need for rapid decarbonisation, equity and freedom of choice, but also to consider various dimensions of fairness, including income, age, gender and ethnicity.

"Political affiliation is a more significant predictor of perceived urgency than many other socio-demographic variables, suggesting that political spin is generating division around climate policy."

Research confirms the importance of narrative framing in building and maintaining public support for climate policies. For instance, while 68% support proposals for a frequent flyer levy, support falls to just 32% when information is provided about the cost implications for individuals.[14] Conversely, emphasising the effectiveness and multiple benefits that climate policies can deliver to individuals and communities, such as health and air quality improvements, improved community spirit and job creation, can boost support:[15] it is a question of providing the evidence that action on climate will help limit the unequal impacts of climate change and could play a pivotal role in supporting more vulnerable households.

References

1. BBC, 2023
2. UK Government, 2023
3. Stern, 2006
4. Munro et al., 2020
5. Skidmore, 2022
6. ECIU and CBI, 2024
7. Office for National Statistics, 2022
8. Evensen et al., 2021
9. CAST, 2022
10. Moorcroft et al., 2024
11. Climate Assembly UK, 2020
12. CAST, 2022
13. Climate Outreach, 2022
14. Ipsos and CAST, 2022
15. Bain et al., 2015