

Spotlight

Thought leadership and policy

Sustainability: Securing a green future

Claire Coutinho
Kerry McCarthy
Chris Stark



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The doomism dilemma

When the Energy Secretary Claire Coutinho made her case for new North Sea oil and gas licences at a conference recently, protesters heckled her. Pitting action on climate change against growth, she warned that a “net zero leviathan” could “crush the nation’s brilliant enterprise”.

Indeed, in this *Spotlight* issue, the minister argues (page 4) that continuing to invest in fossil fuels is key to ensuring energy security and lower bills. Moving too fast on net zero could result in regular people “suffering”, she says. The government has used the same argument to delay the ban on petrol and diesel cars, and the phasing out of gas boilers.

There are legitimate conversations to be had around reducing the social cost of the green transition; ensuring the 200,000 people working in the oil and gas industries are appropriately reskilled, for instance, or finding ways to reduce costs for people who cannot afford a £14,000 heat pump (see page 26).

But is Coutinho’s stance sympathetic realism or shrewd pessimism? The government’s level of empathy towards cost-of-living pressures is somewhat

undermined by the £420bn it has allowed energy giants to pocket over the past four years. The Energy Profits Levy raised £2.6bn in its first year – tiny by comparison to overall revenues.

The shadow climate change minister Kerry McCarthy tells *Spotlight* the government is “opting for culture wars over climate consensus” (page 6). A rise in climate defeatism is also highlighted by Michael Mann, the climatologist and scientist (page 16), who says this approach is as much of a threat to action as “outright denial”.

But if the Conservatives are doom and gloom, Labour is not a well of optimism. Having dropped the £28bn pledge on its Green Prosperity Plan, the party is opting for fiscal caution over bold action. A large question mark remains over whether it can achieve its ambitious plan without the hefty cost. The government’s proposals are equally implausible – the High Court has ruled its Carbon Budget Delivery Plan (CBDP) is unlawful because its policies aren’t sufficient to meet emission reduction targets.

There’s no doubt the road to net zero will be bumpy. But if politicians advocate giving up at the first obstacle, little progress will be made. Urgent and immediate action is required to meet the aims of the Paris Agreement. Rather than a lack of expertise or resources, the real blocker could be political apathy and resignation. ●

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The view from government



Claire Coutinho MP
Secretary of State for
Energy Security and Net Zero

“We’ve cut our emissions faster than any other major economy”

Look around at what other countries are doing to tackle climate change. Are you a fan of the US’s Inflation Reduction Act? It is, in part, funded by an explosion in the US’s production of shale gas. Do you like Norwegian subsidy schemes for electric vehicles? Those are partly funded by Norway’s oil and gas exports. Can you name one of our biggest competitors in developing carbon capture technology? One of the largest is Saudi Arabia.

All around the world, there are oil-and gas-producing countries that are leading on the energy transition too. We can, and will, do the same.

I strongly believe we have a duty to protect nature and the environment for future generations. That was the subject of my maiden speech in parliament.

But our record speaks for itself – it’s under the Conservatives that Britain has become the first major economy to halve its emissions since 1990. They are now at their lowest level since Victorian times. This hasn’t happened by chance, and it’s entirely compatible with the UK as a site of oil and gas production in the North Sea. Of the world’s 20 largest economies, seven haven’t reduced emissions at all since 2010, and none have cut as fast as Britain.

We’ve built more offshore wind – the most efficient form of renewable energy – than anyone else bar China, and almost half of our electricity now comes from renewables, up from just 7 per cent in

2010. Later this year we’ll be one of a handful of countries to eliminate coal from our power systems entirely. Almost half of our homes are now well insulated, including 70 per cent of social homes, up from just 14 per cent in 2010.

I’m proud of our record on clean energy, and we are going further with the jobs and green industries of the future – including carbon capture, hydrogen, fusion energy and offshore wind. But what I won’t do is offshore our industries to countries with higher carbon emissions. I won’t risk blackouts at a time of heightened national security. And I won’t force families to make choices that they can’t afford.

When it affects the cost of living – for example families replacing their boilers or their cars – I stand by our decision to give people more time to transition, with more generous support. Keeping people’s bills down remains my priority in this post. The UK represents less than 1 per cent of global emissions. Making people here poorer while China approves two new coal power stations a week cannot be the right approach.

If we hike up energy bills, see our industries move abroad or have protests on our streets, then we will have done the climate change cause a disservice. There is no point in being world-leading in cutting carbon if your people’s suffering means no one else wants to follow your lead.

That’s why we are backing British oil and gas and new extraction licences. The independent Climate Change Committee acknowledges we’ll still need oil and gas for decades to come. My choice is between British energy made here, or less secure imports from abroad. It’s between getting billions of investment into clean energy, or leaving 200,000 British workers and families in the sector stranded between technologies. The choice, to me, is pretty clear.

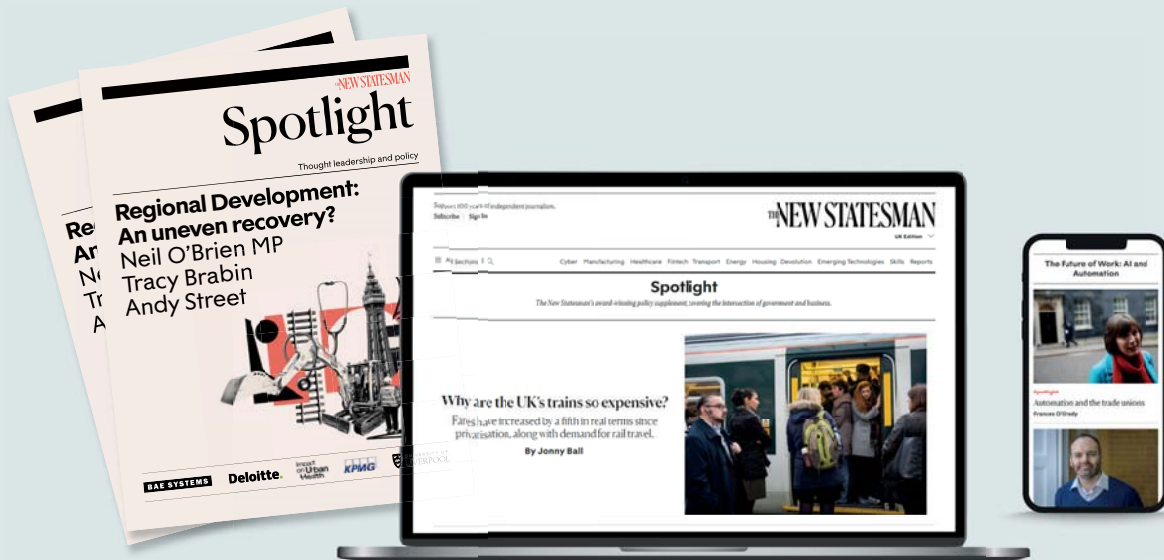
Ed Miliband’s approach is to decarbonise the electricity grid in just six years’ time and ban North Sea oil and gas licences. The industry trade body, Offshore Energies UK, has warned his plans would leave the country “uninvestable”, deterring hundreds of billions in investment – including money we need for the green transition.

Dieter Helm, one of the country’s leading energy experts, has called Labour’s 2030 net zero target “simply implausible”. The head of the GMB Union, Gary Smith, has said Labour’s plan is “naive” and the party had “got it wrong”. And the general secretary of Unite, Sharon Graham, has said it is “reckless in the extreme” to approach net zero without a concrete plan to replace jobs. Labour was once adamant its proposals would cost £28bn a year, but now says it can keep the policies but ditch the price tag.

I’m not just the Secretary of State for Net Zero. I have to consider our energy security and energy affordability too. I will get the balance right for the UK’s families and businesses. If we don’t, we not only risk damaging the public’s support for tackling climate change, but also risk damaging the foundations of our economic success. ●

Spotlight

Economic Growth ● AI ● Sustainability
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The *New Statesman's* award-winning policy supplement, providing the latest insight from government ministers, parliamentarians and business leaders

The view from the opposition



Kerry McCarthy MP
Shadow minister for climate change

“The government doubles down on fossil fuels while Labour focuses on clean energy”

The coming general election, whenever it is called, will be the most crucial yet when it comes to climate change. The time to act is running out. The choice is between Conservative climate delayers and deniers and a Labour government which can deliver the biggest investment in home-grown clean energy in British history. Labour's aim is to cut energy bills for good and make our country energy-secure, all while supporting good jobs, restoring nature and making sure Britain becomes a climate leader at home and abroad.

Fourteen years of failed energy policy from the Tories, set against a backdrop of low growth, high taxes and crumbling public services, has left us beholden to dictators like Vladimir Putin for our energy needs, and exposed us to sky-high bills. It is shocking but unsurprising that at the start of this year 3.1 million households found themselves in fuel poverty.

Labour has been clear that tackling the climate crisis is the best route to tackling the energy bills crisis, because it is our reliance on fossil fuels that is driving both. This means, as one of Keir Starmer's five missions, we are committed to clean power by 2030, which would make the UK the first major economy in the world to decarbonise its energy grid.

Our green prosperity plan promises green growth, energy independence, enhanced biodiversity, average savings of up to £300 on annual household energy bills, and over 650,000 new jobs in our industrial heartlands and coastal communities.

It will include a warm home plan to upgrade cold, draughty homes and cut energy bills; a National Wealth Fund to invest in British industries such as electric vehicle production, ports, clean steel, hydrogen, and carbon capture and storage; and a plan to rewire Britain, unlocking billions of private investment by reforming the planning system and the grid, accelerating stalled energy projects and expediting grid connections for industry.

We already have publicly-owned energy in the UK – it's just not owned by the UK. According to the Common Wealth think tank, 44 per cent of our offshore wind assets are owned by state-led companies, from countries such as Denmark and Norway. Labour plans to switch on Great British Energy, a publicly-owned energy company that will invest in clean homegrown power, capitalised with £8.3bn. With our local power plan we will support community-owned and community-led energy projects: a place-based approach that puts real power back in the hands of local people.

These plans will be part-funded by a proper windfall tax on oil and gas giants, many of whom are currently earning record profits.

With Labour, economic prosperity will also mean prosperity for the environment as we improve the well-being of people and the planet. Our green prosperity plan embodies this idea, integrating economic growth with environmental sustainability, an industrial strategy with social equity.

I've been incredibly disappointed by the Conservatives' decision to opt for culture wars over climate consensus. Cross-party collaboration is crucial, as the Conservatives' net zero tsar Chris Skidmore noted when he resigned as an MP in January: “We should be taking the long-term decisions for the future of our country that protect our citizens, our economy and our planet, not playing short-term politics with legislation that achieves so little but does so much to destroy the reputation of the UK as a climate

The Conservative Party has chosen culture wars over climate consensus

leader,” he wrote in his resignation letter.

Yet as we see a global commitment at Cop28 to “transition away from fossil fuels”, the UK government has doubled down, committing instead to drilling every last drop of oil in the North Sea, watering down climate targets and blocking the roll-out of home-grown solar and onshore wind projects: the cheapest, cleanest forms of new energy. What message does this send to countries looking to the UK for leadership?

This government has consistently talked down Britain in an effort to minimise or absolve our responsibility on the world stage. It’s time to change that. We want to make London the green finance capital of the world and Britain a clean energy superpower, and to work with the most vulnerable and the most ambitious nations to pressure the most polluting countries to act.

This is the message Labour has been sending to communities, to businesses and to other nations around the world – Labour is ready to work with you, to support you on your journey to net zero.

This is the thinking behind our ambition to establish a Clean Power Alliance: a global alliance of countries at the forefront of climate ambition.

Any discussion on net zero is incomplete without mentioning the natural environment. My colleagues in the shadow environment, food and rural affairs team have been setting out Labour’s plans to protect and enhance nature for future generations: whether that involves clearing up after the government’s sewage scandal, or targeting a zero-waste economy by 2050 that will end the scourge of plastic pollution and the depletion of our precious natural resources. Together we are looking at nature-based solutions to climate change. Our peatlands, wetlands and woodlands are crucial carbon sinks, but also part of helping us combat domestic climate consequences such as flooding and food insecurity, and providing essential habitats for flora and fauna.

I’ve been an MP for 19 years now but have never been so excited by an opportunity such as the one we have before us to put climate and nature at the heart of government. Never have I been so enthused by the potential social, economic and climate benefits that this scale of green investment in clean energy could deliver. The world is at a critical juncture and the time for complacency has long passed. Labour is ready to deliver change, and it’s time we got the chance to do it. ●

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The expert view



Christiana Figueres
Former UNFCCC executive secretary

“At Cop29, Azerbaijan must anchor us to 1.5°C”

This week, representatives of Azerbaijan, Brazil and the United Arab Emirates will gather in Copenhagen for the first key meeting of climate ministers since Cop28 in Dubai. These past, present and future Cop presidencies recently established a troika to rally international collaboration to keep the world on track to meet 1.5°C.

Just over 200 days stand between us and Cop29 in Baku. Between now and then we know the world will experience worsening climate impacts. We have had the warmest January on record. The Panama Canal and the Amazon rainforest are drying out. Hundreds are dead from wildfires in Latin America,

and millions continue to suffer drought and food insecurity across the Horn of Africa. Last year was the first in which the average temperature on Earth – over 12 consecutive months – breached 1.5°C. This is not a permanent breach, but it’s highly concerning and is the backdrop to a litany of horrifying impacts.

As Azerbaijan takes the helm for delivering climate action this year, its president, Ilham Aliyev, must know the main driver of this temperature increase is the historical and continued burning of fossil fuels. Emissions reached a record high in 2023; this year the world cannot afford yet another peak.

Baku has a lot to grasp. Within the next seven months it must face some challenging issues. How will it rally countries to accelerate the global energy transition to renewables? What will it do to help unlock the flow of public and private finance that’s urgently required by vulnerable countries? Where does it stand on adaptation measures that need to be put in place to buffer the worst impacts?

Hosting a Cop is a huge opportunity. The world will be watching Baku make its every move. We know it is not an easy task. Building trust takes time. The Azerbaijan presidency must seize this opportunity – and do so fast – by gathering support from parties, businesses and civil society to achieve its vision of keeping climate action anchored to meeting 1.5°C.

I used to sail, and I can’t tell you how unsettling it is to wake up in the morning and realise that the currents have dragged the anchor. You are adrift and have no idea where you are. It is a terrifying feeling, and one the world cannot afford on climate. Keeping 1.5°C as the scientific guardrail in the Paris Agreement, and therefore as the political anchor for all climate action, remains fundamental.

There is no guarantee we will be able to permanently keep below the globally agreed, necessary ceiling of temperature rise. The only guarantee we have is that giving up on 1.5°C now means we will lose this critical chance to rectify our course, with severe consequences for all. Cop29 is a key moment for helping to secure this, alongside adequate finance for countries who need it the most.

Presidencies who find common ground and make the effort to achieve a successful Cop are rewarded. France helped secure the historic Paris Agreement in 2015. Egypt championed the first loss and damage fund in 2022, and the UAE is widely praised for championing an agreement last year to move us beyond a future of fossil fuels.

These are not just diplomatic wins but economic ones too. Investments in new energy are now outstripping fossil fuels. They are projected to hit \$4.5trn a year in the 2030s. These are the kinds of insurance policies we need, because the loss and damage from climate disasters will otherwise become impossible to bear.

Azerbaijan and the Cop29 president can keep us from drifting away from the destination we agreed to as a global society: a 1.5°C-aligned future. Azerbaijan must help us anchor a safe, just future at Cop29. ●

Flying high to destination zero

The UK can be a leader in pushing the aerospace sector to a sustainable future

By Gary Elliott

In association with



For decades, aviation has brought a broad range of benefits to the world. Air transport lets people travel and interact; it allows goods and services to reach market faster and it connects remote places with the rest of the world. In countries such as the UK it supports hundreds of thousands of highly skilled workers, returning significant economic value back to the country.

But there is no question that the sector must urgently address its environmental impact and decarbonise. Research published in the journal *Atmospheric Environment* found that aviation contributes around 3.5 per cent to global warming through carbon dioxide, nitrogen oxides and contrails. Without the adoption of lower-carbon technologies, aviation will contribute up to 38 gigatonnes of carbon dioxide emissions to 2050, which will represent an increasing percentage of overall emissions as other sectors decarbonise.

In 2021, the International Air Transport Association (IATA), the trade association for the world's airlines, passed a resolution that committed its member airlines to achieve net zero carbon emissions from their operations by 2050. While each new aircraft is more efficient than its predecessor, this target will not be reached by incremental improvements. Compounding this, global demand for air travel is expected to continue to grow; between them, Airbus and Boeing have order backlogs of over 13,000 aircraft.

Decarbonising air transport is difficult. Aircraft and their systems are complex and must meet exceptionally high safety standards, meaning technologies take a long time to de-risk and deploy. In the first instance, fleet renewal is the most impactful way of increasing sustainability. Choosing to fly on newer aircraft today will support this process. In the immediate future, Sustainable Aviation Fuels (SAF) and efficiency improvements will drive emissions down further but by themselves will not achieve the net zero target. In the longer term, newer technologies utilising different propulsion systems such as hydrogen-powered gas turbines, batteries and fuel cell technologies offer the potential for genuine zero-carbon emission flights at scale, but this will take time and investment to achieve.

Investment needs to be geared

towards maximising the potential of both zero-carbon emission technologies and technologies that help aircraft to be more efficient. These ultra-efficient aircraft technologies – for example, maximising aerodynamics, improving thermal efficiency and using lightweight materials – reduce in-flight energy usage and will remain critical for zero-carbon platforms.

However, it is not just carbon emissions that aviation needs to address. The UK government's Jet Zero Strategy launched in 2022 outlined its approach to achieving Net Zero 2050 aviation and rightly focused on minimising the carbon dioxide emitted by aircraft, but it also acknowledged other atmospheric emissions. Non-carbon dioxide (non-CO₂) emissions is a collective term for all emissions other than carbon that are emitted by aircraft in flight that contribute to climate impact. The array of emissions that are not carbon dioxide have varying and complex interactions, meaning significant coordinated research is required to help inform sustainable aircraft technology development.

Through our Destination Zero strategy, the Aerospace Technology Institute (ATI) has set out a direction for the UK aerospace industry to rise to the challenge of Net Zero 2050

and at the same time secure an opportunity to lead the world in advanced next-generation aircraft technologies.

Since the ATI Programme started in 2014, we have been a living example of a green industrial policy in the UK. The ATI Programme has facilitated over £3.5bn of research and development investment to date, reflecting a combination of UK government and industry funding, and has unlocked investment from over 400 organisations across the UK. Last year the UK Government confirmed an additional £975m funding for the ATI Programme to 2030. This will enable the programme to go even further in helping make the UK the world's most vibrant ecosystem for the development and deployment of aerospace technology.

The ATI Programme has invested in a wide range of zero-carbon emission and ultra-efficient technologies, as well as the technology enablers that make these technologies and their manufacture possible – and most recently we have begun investing in non-carbon dioxide focused research too.

We have seen many notable successes over the past ten years. The ATI-funded UltraFan project from Rolls-Royce is 25 per cent more efficient than the previous generation of engines and also offers 40 per cent less nitrogen oxide and almost zero non-volatile

particulate matter at cruise. These next generation engines are designed to be 100 per cent SAF compatible from day one.

In 2023, as part of another project supported by the ATI, ZeroAvia successfully completed the world's first flight-test programme for a sub-regional hydrogen-electric aircraft. They conducted a range of critical rig testing, ground testing and flight testing of a first generation hydrogen fuel cell electric powertrain offering zero-carbon emissions.

The ATI portfolio of funded research includes support for Airbus and its Wing of Tomorrow programme, led from the UK with a new innovation centre in Bristol. A new manufacturing centre for Boeing is being built in partnership with the University of Sheffield in South Yorkshire, while His Majesty the King officially broke ground for a new facility at the Whittle Lab at the University of Cambridge. Safran's Gloucester site has also established itself as a centre of excellence in landing gear with support from the ATI.

These projects and many more demonstrate that the UK is in a strong position to accelerate the development of sustainable aircraft technologies, and capitalise on the market opportunity this brings. The UK aerospace sector has a rich history of innovation and is rising to the challenge of reaching net zero flight. The roots of the UK's success include an enduring presence of global companies like Airbus and Rolls-Royce, an excellent research base and skills pipeline, an effective regulatory environment and strong partnership between industry and government. Working across the sector to deliver a long-term strategy, investment and world-leading technologies will put the UK at the forefront of a globally competitive and sustainable industry.

The greatest need for the global aerospace sector now is to increase the pace of investing and technology development. Now is the time to accelerate the development and adoption of new fuels and novel technologies. The sector still has enormous challenges ahead and the timescales are very tight; we cannot afford to take this slowly. ●

Gary Elliott is CEO of the Aerospace Technology Institute



ROLLS-ROYCE

The Rolls-Royce UltraFan project was funded by the ATI

“New oil and gas licences are a total waste of time”

Chris Stark on the urgency of the climate crisis

By Megan Kenyon

When the Prime Minister gave a speech announcing he would be rolling back several of the UK's net zero policies, Chris Stark wasn't watching. The former chief executive of the Independent Committee on Climate Change (CCC) was delivering a speech at the Francis Crick Institute in central London to an audience that included David Attenborough. He had to read a transcript of Rishi Sunak's announcement instead.

“I have regrets that he made that speech,” Stark says, speaking to *New Statesman Spotlight* in an interview prior to stepping down as head of the government's climate watchdog. Stark has only two days left in the role when we meet at the CCC's offices in Westminster on 24 April. Sunak's speech on 20 September last year fell during New York Climate Week. It included the watering down of several key climate policies, such as a delay to the ban on the sale of new petrol and diesel cars.

“It was really damaging because there were literally UK folk in climate discussions trying to push others to go faster,” Stark says. The biggest impact of the Prime Minister's speech was the impact it had on the UK's standing as a climate leader, he adds. “The message that was taken back to every country in Europe was that the UK had stepped off its ambition on climate... It's so hard to recover that growth after you've made it a matter of policy.”

Less than two months later, another key speech opened the floodgates for further climate controversy. In the King's Speech on 3 November, the government announced new legislation – the Offshore Petroleum Licensing Bill – which will grant new licences for the extraction of oil and gas.

Stark describes new oil and gas licences as a “total waste of time”. In a technical sense, he explains that if we were to extract the world's remaining reserves and burn them, then we would completely override the targets set by the 2015 Paris Agreement. Instead, the UK should be reducing demand for oil and gas in the first place, he says. “Every country in the world has some duty and obligation to keep supply to as low a level as possible. Otherwise, we're going to have unchecked climate change.”

Indeed, he remains cynical as to the prominence this topic has been given in climate politics and policy in the UK.

“British politics has been completely transfixed for nearly two years on this issue of oil and gas licences,” he says, “and it has sucked all the oxygen out of the debate around what to do about climate change.” Analysis from the Energy and Climate Change Intelligence Unit found that oil from the proposed new licences would do little to support the UK’s energy independence and security, and will contribute less than 1 per cent of the petrol used by UK cars over the next seven years. “The fact that we’re licensing more is not going to allow us to extract that much more,” Stark adds.

“It makes me think that this was by design,” he says. “Because all the oxygen has been sucked out of the debate, it means we haven’t got the political capital to deploy on the heat pump story, or the electric vehicle story. That’s where the action needs to be.”

Hailing from Glasgow, Stark began his career working for the Treasury on Whitehall, before returning north of the border to head up the Scottish government’s strategy unit. It was here that he cut his teeth as an expert in climate policy, moving up the ranks to become director of energy and climate change before joining the CCC as chief executive in 2018. A month prior to our interview, the CCC had delivered a damning verdict of the Scottish government’s progress towards its target to reach net zero by 2030, dubbing it “no longer credible”. This goal was then scrapped, which eventually led to a succession crisis at the heart of government. After our interview, the power-sharing agreement between the SNP and the Scottish Green Party broke down, and the First Minister Humza Yousaf resigned.

Owing to his background, Stark says the situation in Scotland “hits home” for him. “[The climate target] was one of the ways in which the new Scottish government [under Nicola Sturgeon] was trying to demonstrate how bold it was,” he says. But he is stoic about how things have panned out. “It’s a cautionary tale – this is what happens when politics gets ahead of what’s possible.”

Considering this development, are ambitious targets such as Scotland’s initial plan to reach net zero by 2030 actually useful? “Absolutely,” Stark says,



Chris Stark was chief executive of the Climate Change Committee from 2018 to 2024

“but not in all areas of policy.” A crucial part of the CCC’s work is to prepare the UK’s carbon budgets, which place a legal restriction on the total amount of greenhouse gases the UK can emit over a five-year period in order to keep it aligned with its commitments under the 2015 Paris Agreement.

The CCC is currently preparing the UK’s seventh carbon budget, which will cover the period from 2038-42. Stark explains that tracking emissions with precise targets is crucial given how “pervasive” carbon is in the economy. “You’ve got to focus on all the ways in which we use carbon in the economy,” he says. “You can measure it.”

Stark’s departure from the CCC also falls during a period in which the

committee lacks a permanent chair. Piers Forster replaced Lord Deben (John Gummer) as interim chair in 2022, but the government has yet to make a proper replacement. “We absolutely should have a permanent chair by today,” Stark says. “I don’t think it speaks well of the priority that the government gives climate change that in two years we haven’t been able to replace John.”

With a general election looming, finding a permanent climate watchdog representative is unlikely to be at the top of Sunak’s priorities. “Replacing the chair in the run-up to the election is always going to be difficult and we’ve left it too long,” Stark says. “We should have filled that post two years ago.”

Stark is clear that in order to make real progress in the race to net zero, discussions around climate policy must be detoxified. “We haven’t seen the same brand of positive leadership that we had at the start of my time at the CCC [in 2018] from anyone on the political spectrum,” he says. “It was exciting [then] – it’s not exciting now.” ●

“The oxygen has been sucked out of the debate”

Power solving

Tackling challenges to accelerate our progress to net zero

In association with



VPI is a leading power company in the UK and Ireland. Its role in the energy system is to anticipate and tackle challenges that emerge as the energy transition unfolds. Jorge Pikunic, CEO at VPI, runs through the work the organisation is doing.

How do you work towards net zero?

We work with customers, grid owners and operators, and governments to strengthen energy security and grid stability while we transition to net zero. Our portfolio includes reliable thermal power and battery storage across seven sites in the UK and Ireland. We are already one of the largest power generators in the UK and the largest battery storage operator in Ireland. We have three projects under construction and more in development. This includes one of the world's largest carbon capture projects, which we can start building as soon as next year if we get the greenlight from government this year.

Can you offer an example of how you are solving problems within the energy transition?

We are constantly looking across the whole energy landscape, spotting problems that need solutions, then working to solve them. Opportunities for new, more sustainable sources and technologies will continue to emerge – there is no magic bullet. Moving from today's mixed energy landscape to a greener, more sustainable future will require joined up thinking and flexibility on the part of producers, providers, users, and regulators.

Following Cop28, we have a global ambition to triple the level of renewables in the energy system. This is an important target. One of the biggest challenges in making it a reality is overcoming intermittency – ensuring we have adequate supply when the weather doesn't deliver the power we need. Over the next few years and decades, this challenge will be compounded by increased demand, which is expected to double by 2050 according to the Climate Change Committee – think about electrification and additional power needs from technologies like artificial intelligence.

Reliable and flexible power is therefore needed to support more renewables. In the future, this could be

delivered by technologies such as hydrogen, small modular reactors, or long-duration batteries. Today, batteries or power from neighbouring markets (when available) are good for short-term energy gaps. But for longer periods, the most economical, cleanest, and technically viable option available to deliver flexible power is gas-fired generation. That's why the government has recently committed to supporting the building of new gas power stations to maintain a safe and reliable energy source – and hasn't faced much opposition.

Can you decarbonise gas-fired generation?

The exciting thing is that there are ways to decarbonise gas-fired generation. Switching to alternative fuels like hydrogen is one of those ways. All our gas turbines have a pathway to use hydrogen once it becomes viable. Another way to decarbonise is via carbon capture technology. For power, this technology works well when the site is located near a transport and storage network. That's why we are pioneering one of the largest carbon capture projects in the world at our site in Immingham, which is located within the Viking CCS cluster in the Humber.

Tell us about your carbon capture project in the Humber region

The Humber region contributes £18bn to the UK economy every year. It also emits more carbon dioxide than any other UK industrial cluster. An ecosystem of companies with sites in the Humber region, including VPI, is working to develop a carbon capture and storage network in the area to help the region decarbonise without deindustrialising. At the heart of this cluster is the Viking carbon store, which has been awarded Track 2 status by the UK government.

Our Immingham combined heat and power plant, is one of the largest in Europe and supplies power and steam to nearby industry. It is located very close to the Viking transport and storage pipeline and is one of the first emitter projects for the store. By capturing our carbon, we will not only deliver low-carbon flexible power to the country and steam to adjacent industries; we'll kickstart the abatement of the industrial cluster.



VPI delivers reliable and flexible power to support renewables in the energy system

How will it work?

Using a post-combustion solution, we plan to capture the carbon dioxide before it is emitted to the atmosphere, compress it, and then inject it safely and permanently into a depleted gas field in the North Sea, the Viking field. Our ambition is to capture up to 3.3 million tonnes of carbon per year by 2028. This is nearly a fifth of the government's annual 20 million tonne-per-annum carbon capture target for 2030. What makes this project stand out is that we are ready to go. We have completed the engineering design. We could begin construction next year if we get the go ahead from government. It's one of the easiest ways to launch the carbon capture industry in the UK.

What's next for VPI?

We are always scanning for challenges to solve through the energy transition to accelerate our progress to net zero. We continue to invest in our existing fleet of thermal generation and battery storage to ensure reliable power. We are also working to find abatement routes for our assets. And we are developing additional solutions – for example, providing expert trading services to help renewables and small-scale developers get the most out of their assets.

All of this means that VPI is growing, its portfolio of technologies is diversifying, its customer base is broadening, and it is expanding internationally. The company will look different in a few years' time. ●

“Defeatism is as much of a threat as climate denial”

Renowned scientist Michael Mann on net zero and the fight for democracy

By Megan Kenyon

Michael E Mann is a climatologist and geophysicist, and is currently the director of the Centre for Science, Sustainability, and the Media at the University of Pennsylvania. His most recent book, *Our Fragile Moment*, was published last year and looks at the lessons we can learn from the Earth's geological history in the fight against climate change.

Are we making enough progress on the path to tackling climate change?

We are making progress, but not enough progress. Right now, if every country meets its commitments under the Cop26 agreement, and does so on time, it could limit warming to 2°C. But that's still too much warming, and as yet, many countries are not meeting their obligations.

In light of rising temperatures, are you confident that we will meet the goals we need to limit warming?

I'm confident we're on a better trajectory than we were ten years ago, when we were looking at potentially as much as 4°C warming of the planet – truly devastating, potentially civilisation-ending amounts of warming.

Current policies now likely hold warming under 3°C, and Cop26 obligations potentially bring warming below 2°C. So we're making progress, but not yet enough progress.

How do you stay positive as someone working in this field?

Being immersed in the science, and knowing the numbers, I know that it's still possible to avert the worst consequences of climate change. The obstacles to keeping warming below 1.5°C – as yet – are not physical or technological. They remain political – and political obstacles can be overcome.

I am especially inspired by young folks – they get it. And they are working to change the world for the better. I have faith that they will lead us forward, but we can't wait for them to be in positions of power and influence to take the needed actions. We need to act now on their behalf, elect climate champions and throw out fossil fuel industry apologists.

What lessons can we take from history to help us to tackle climate change?

That happens to be the subject of [my most recent book] *Our Fragile Moment*. My review of the Earth's history reveals both the urgency in acting now to preserve a liveable planet and the agency we have in doing so.

Past climate episodes document the sensitivity of the climate to carbon dioxide levels, and we're increasing those levels at an unprecedented rate – that's the threat, and that's the urgency. But those same episodes validate the models we use today to predict future climate change. And those models tell us that we can avert catastrophic warming by lowering carbon emissions substantially in the decade ahead.

How well do you think the UK is doing on tackling climate change?

Unfortunately, the current Prime Minister [Rishi Sunak] has reversed the proactive climate policies that were in place before his tenure.

In particular, he has favoured increasing oil production and new natural gas plants, policies that are inconsistent with the UK's commitment to reach net zero carbon emissions by mid-century.

We have two major elections coming up in the next year, in the UK and the US. What would you like to see in terms of climate policies?

It would be good, of course, to see the UK elect a climate-forward government. But the US, as the world's largest cumulative carbon emitter, has an even greater obligation to the world. It must lead on climate if we are to expect other major emitters – such as China and India – to commit to substantial reductions in their carbon emissions.

“We’re making progress, but not enough progress”

JOSHUA YOSPIN



Michael Mann: “There is no path to global climate action without US leadership”

There is no path to global climate action without US leadership. And there is no path to US leadership that does not go through democratic governance. And that's literally what this next American election is about – whether we go down the path of democracy or autocracy. Everything rides on this election.

In terms of climate policies, here in the US, the Inflation Reduction Act gets us part of the way there, but it's only the carrot part. We also need the stick – disincentives for fossil fuels in the form of carbon pricing or clean energy portfolio standards, with penalties for non-compliance.

Do you think the urgency of climate change is being communicated? How can governments bring more people along with them?

One of the many threats, in my view, is that doomism and defeatism today pose as much of a threat to climate action as outright denial.

As the impacts of climate change become ever more obvious, it's very difficult to credibly deny the problem.

So, polluters have instead turned to other tactics in their efforts to block action. And among them is fanning the flames of doomism, for if we truly come to believe there is nothing we can do, then why try?

That's why I focus, in my outreach efforts, on both urgency and agency – and the science supports this. We must act now to avert catastrophic outcomes, but there is still time to act. As stated earlier, the only real obstacles at this point are political ones.

What will it take to overcome these political obstacles to climate action?

It will take collective action on our part. We must vote climate deniers and delayers, and fossil fuel lackeys, out of office and vote for climate champions instead. Many of the needed actions – economic incentives for clean energy and disincentives for fossil fuels – cannot be accomplished by us, but only by our elected leaders. They must represent our interests above special interests. ●

Harnessing Europe's green power plant

A hub of clean energy production is emerging in the North Sea

In association with



For thousands of years the North Sea has been a vital route for commerce and fishing. In the last century, with its oil and gas deposits, it became indispensable for Europe's energy supply. Now its strong winds and waves are making it a global pioneer in the energy transition.

The 2022 Esbjerg Declaration promised to make the North Sea "the Green Power Plant of Europe". Politicians at last year's North Sea Summit in Ostend, Belgium, pledged to fast-track this commitment. The UK, along with eight other European countries, committed to dramatically boost offshore wind and support a mix of green technologies in the waters and on the shores of the region. This included increasing offshore wind targets – from 76 gigawatts (GW) to 120GW by 2030 and 260GW to 300GW by 2050.

The next five years are going to be absolutely critical if we want to transform the region's energy system at the rates required. Many important green projects are already underway in the region and those responsible for them are clear on the impact they will have.

"In the North Sea, we're seeing lots of low-carbon technologies working together, side by side, and offshore wind is certainly an important part of that," says Andy Sykes, plant director at Siemens Gamesa's Hull Blade Factory. The Hull site, which employs more than 1,000 people, has manufactured blades for offshore wind farms in the UK and globally. The team is working on the UK's first 108-metre-long wind turbine blades for the 882MW Moray West windfarm, 22.5km off the coast of Scotland in the blustery North Sea. When complete, the wind farm will provide the equivalent of 1.3 million homes worth of power to the grid.

In the wind sector, as well as increasing the number of turbines at sea, maximising the effectiveness of operations is key. "More than 30 years ago, the first turbines were installed offshore in Vindeby, Denmark. The blades were 17 metres in length. We're now at 108 metres, which has meant huge advancements in the technology and increased electricity production as the longer blades can harvest more wind," adds Sykes.

The North Seas – the North Sea, Atlantic Ocean and the Irish and Celtic Seas – provide ample opportunity for development, but there is a global race to

net zero and regulations and market conditions in the region need to work to support the supply chain. The EU's Wind Power Package looks to address deployment issues, including simplifying auction design, streamlining permitting, derisking offshore wind investments and addressing market competitiveness. Importantly, this enables a European supply chain to meet customer demands locally.

"The blades turning is one part of the equation, the other is transferring that power efficiently to shore," says Lottie Edwards, platform package manager for Siemens Energy, who has been responsible for the fabrication of the two Offshore Transformer Modules (OTM) for the Moray West project. Each weighing the same as 12 blue whales, the solutions are around a third smaller in size than conventional power assets and use a modular design, to drive efficiency, speed, and approvals. In Europe, teams need to comply with 27 national implementations of European Grid codes, so solutions like this help to speed up a complex process.

"I feel a real sense of pride when we get to this stage in a project. Watching the OTMs transported by vessel, destined for the construction site is a great feeling," Edwards says. "I sometimes imagine that one day I'll fly over the North Sea, look out of the plane window, and see the solutions I've worked on out in the water. It makes you feel like you're leaving a real legacy [which is] part of the UK's energy network."

As well as expanding established technologies in the North Sea, newer solutions have appeared on its shores. Green hydrogen (produced through electrolysis using renewable sources) is essential to reduce emissions in sectors which cannot rely on pure electrification. In Kassø, Denmark, European Energy is building the world's largest e-Methanol production facility. The plant will produce 42,000 tonnes of e-methanol each year and provide the majority of the offtake to shipping giant Maersk to power one of their container ships.

"Worldwide, there are more than 50,000 vessels running on fossil fuels, and shipping accounts for nearly 3 per cent of global greenhouse gas emissions. If we looked to convert the whole maritime industry, we'd need millions of tonnes per year," says Holger Riess, project manager for Siemens Energy at



Siemens Energy offshore transformer modules ready for the Moray West wind farm

Kassø. A 2018 study by the European Commission's Monitoring, Reporting and Verification Scheme considered the ability of low-carbon fuels, produced from renewable energy, as a key power source. The findings showed 93 per cent of transport work could be covered by e-fuels with minimal reduction in capacity.

Right now, clear enabling conditions are needed to drive demand for cleaner fuels and support the scaling up of a green hydrogen market. By 2030, Europe will need 20 million tonnes of renewable hydrogen to meet market requirements.

"Projects like Kassø show us that green hydrogen is ready to go; we have ambitious targets, and we have the technology ready to deploy," says Riess.

"What we need now are the enabling conditions, the wider market demand and adoption to deliver at pace, so many more Kassøs can come online to meet our green hydrogen needs."

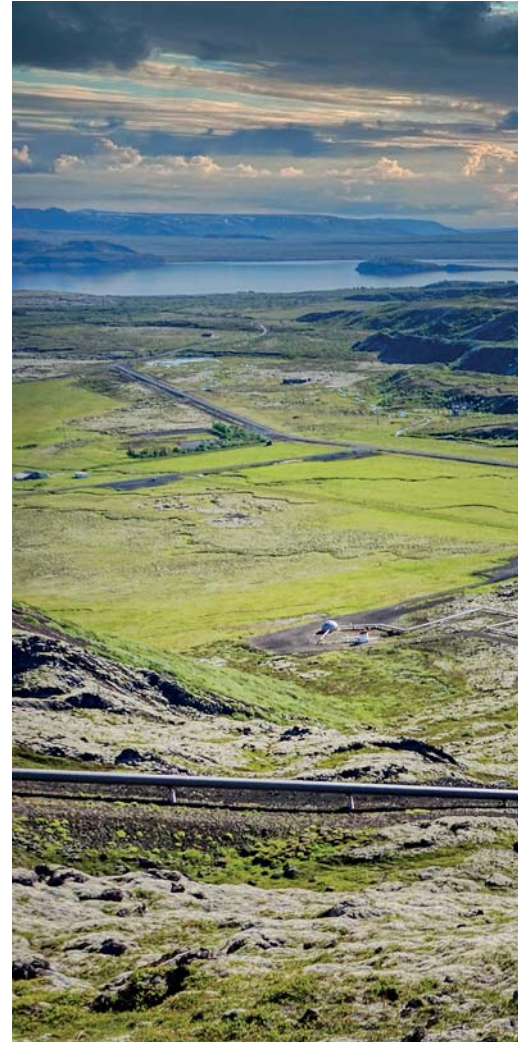
With a diverse green technology mix and innovative projects underway, the North Sea demonstrates what a multi-technology energy mix working in harmony looks like. The benefits are clear: cleaner energy and more green jobs. But more needs to be done to realise the opportunity.

If pragmatic, delivery-focused policy is implemented, and the supply chain can respond, the green power plant that will emerge in the North Seas will be the blueprint for a sustainable future energy mix that could be deployed worldwide. ●

Iceland's energy triumph holds lessons for Britain

Firm power can reduce UK electricity prices, as it does in the Nordic state

By Rian Whitton



Limited access to cheap, firm electricity supply – supply that is expected to be available nearly all of the time – exacerbates Britain's industrial stagnation. From 2000 to 2021, electricity prices grew by 210 per cent, outstripping wages and general inflation. This preceded the recent rises brought on by Russia's invasion of Ukraine in 2022.

The situation is even worse when compared to those of our peers. Electricity prices for industry are higher in Britain than in any comparably rich country. Expensive power acts as a blocker for growth; there is a clear correlation between automation and cheap industrial electricity.

The UK's production industries, measured by the index of production, are just 95 per cent of what they were in 2019. For the energy sector, it is 68 per cent, while for mining and quarrying it is



A geothermal power station in Nesjavellir, southern Iceland, which has reduced consumer energy bills amid cost-of-living pressures

67 per cent. Britain's energy-intensive industries used less electricity in 2023 than in any other recent year, indicating lower demand is outlasting recent price spikes. Though not as affected by energy prices, discrete manufacturing is flat. Motor vehicle and aerospace vehicle sales peaked in 2017 and have not recovered since.

This has undoubtedly been affected by Brexit-linked trade restrictions. But the simultaneous poor performance of European manufacturing suggests the more significant issue is the high cost of electricity. This is driven mainly by energy price increases. Large German chemical manufacturers have seen electricity prices double from 9 cents per kWh to 19 cents per kWh between 2019 and 2022.

Amid these increases there has been a marked expansion in variable wind and solar generation. Given that factories

require predictable, dispatchable generation, however, an intermittent grid is not well suited for satisfying increasing industrial demand. The Royal Society's proposed solution to this is large-scale electricity storage through hydrogen, which is prohibitively expensive to store and transport.

If the story of electricity prices from 2022 to 2050 is the same as 2000 to 2021, British industry will suffer. The country's ambitions to lead in artificial intelligence, an increasingly energy-intensive industry, will be hindered. Competing nations like Ireland envisage data centres taking up 23 per cent of all electricity demand by 2030.

The solution is expanding sufficient zero-carbon firm power – meaning always available and not dependent on the weather – to reduce industrial electricity prices.

This is no pipe dream. Unlike the idyll

of a fully renewable and flexible storage grid, such a system has already been achieved successfully in Iceland, though on a limited scale.

With 70 per cent hydroelectric power and 30 per cent geothermal electricity, Iceland has a 100 per cent renewable and carbon-neutral electricity grid, which provides over ten times more electricity per capita than Britain. This bounty has allowed the country – which has a population of less than 400,000 – to become the tenth-largest smelter of aluminium globally, producing more than any EU country in 2022. Electricity is so cheap in Iceland that US aluminium producers have shifted production there.

If Iceland, which has to import bauxite for aluminium production, can build a heavy industry out of nothing more than cheap firm power, the potential value of low-cost energy to the UK could be seismic. ▶

◀ One option is geothermal electricity, which is produced by extracting steam from heated water in subterranean wells and converting it into electricity. Up until recently this was seen as location-dependent. In Iceland, for instance, the geothermal gradient (a reference to the relative increase with depth in the Earth) is very steep. More heat means greater thermal efficiency and thus more power potential. This means that natural geothermal energy can be sourced relatively cheaply there. This is not the case in much of the world. Variance in the gradient dramatically changes the maximum temperature of a well, which affects how much electricity can be produced.

If water reaches 374°C and 220 bars of pressure, it becomes supercritical, drastically improving its thermal efficiency. Though such wells have not been commercialised, they represent potentially limitless energy if made accessible globally.

The problem is that, for most of the world, to reach such temperatures would require drilling up to 12 miles into the Earth, far beyond the capability of mechanical drilling. Quaise Energy, an American geothermal start-up, proposes using gyrotrons, millimetre-wave emitting machines used in fusion reactors, to vaporise rock with extreme temperatures rather than bore through it. This could allow for drilling depths far beyond today's limits.

While speculative, if artificial geothermal energy became viable across the world it would upend our understanding of energy scarcity. The Earth's crust holds far more power than all the world's uranium, thorium and fossil fuel reserves. While governments and utilities spend trillions of dollars for build-outs of renewables and hydrogen, global capital expenditure for geothermal energy only breached \$1bn in 2021, an industry record. The rate of investment reflects how new this technology is, and the fact that it is yet to get the exposure of wind and solar energy, which are far more mature.

While geothermal power holds considerable theoretical potential, any firm power strategy for the UK must also consider nuclear fission for the medium term. Nuclear power is proven and maintains critical industrial, scientific, and military expertise pertinent to

Britain's defence. Geothermal energy requires little initial cost and has enormous potential pay-off. Prioritising these two technologies simultaneously makes sense.

When it comes to large-scale reactors, Britain must rely on foreign suppliers. South Korea's Kepco is currently the only viable supplier of large-scale nuclear power. Domestic British excellence exists in small modular reactors (SMRs), produced by Rolls-Royce. Unfortunately, the government's SMR competition, announced last year, is slowing down initial work. The Rolls-Royce model is the most advanced in the generic design approval process, and other countries will prioritise their national champions.

One necessary step is to prioritise SMRs and fission over speculative attempts to commercialise nuclear fusion – the process in which two light atomic nuclei combine to form a heavier nucleus, releasing energy. Fusion is touted as a cleaner, less problematic alternative to nuclear fission, which refers to the splitting of atoms, creating radioactive waste in the process. While fusion is a domain in which Britain should maintain its expertise, inadequate supply of tritium, a necessary feedstock for the fusion process, is a severe bottleneck to commercialisation, and there is no indication supply can be secured quickly.

Any expanded fusion research must not be to the detriment of investment in fission or geothermal energy, which have more immediate prospects. There are a number of measures that the UK government could take to achieve this vision of cheap, zero-carbon electricity. First, geothermal power should be prioritised in government subsidies alongside existing efforts to rejuvenate nuclear fission, particularly over hydrogen. Great British Nuclear, the body delivering the government's long-term nuclear programme, and an analogous "Great British Geothermal" should be empowered.

Geothermal energy requires little initial cost

But current research spending on geothermal energy by governments is tiny; the 2021 US Infrastructure Act, totalling \$1.2trn in spending, earmarked a mere \$84m for geothermal research over three years. With the British government already funding geothermal heating, even a commitment of £300m for novel drilling techniques could be transformative at the global level.

Further, Britain is a leader in fusion research. High-powered microwave systems known as gyrotrons, a potential drilling technology for deep geothermal wells, are already being procured for use in British fusion reactors. Efforts should be made to repurpose this technology for drilling. A government task force should be set up to engage researchers in state-of-the-art geothermal projects, particularly from the US and Iceland. This should be centred around a new drilling project to reach supercritical temperatures in a British well by 2035. This could be a major goal of the UK's net zero transition.

Beyond research and development, any commercial generation from new geothermal or SMR-based fission should be managed by a new public utility, which will be specifically targeted to energy-intensive industries. This could be a subsidiary of Labour's proposed Great British Energy. It would supply baseload energy to industrial users rather than households.

And finally, the six-company-strong SMR competition, run by the government, should be split up. Rolls-Royce, being more advanced than other competition entrants, should get its own contract while other entrants compete for a smaller investment.

Without addressing the jump in electricity prices, Britain's current energy strategy does not allow for significant growth in industry. All major parties assert that they can bring back growth – a prioritisation of clean, stable electricity is a prerequisite to achieving this. ●

This article was the winning entry in the TxP Progress Prize, an essay prize in partnership with Civic Future and New Statesman Spotlight. It encouraged responses to the question: "Britain is stuck. How can we get it moving again?"

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Off the grid

We need a holistic approach to decarbonise heating in Britain's rural homes

By Duncan Carter

In association with



Both the government and the opposition have set out how they intend to progress decarbonising the UK's energy system, including how we heat our homes and businesses. The Conservatives rowed back the 2026 boiler ban for off-grid homes (those not connected to the gas grid). The party's reasoning was the high cost this could have imposed on some households, particularly during a cost-of-living crisis. The Labour Party has also reined back its commitment to spend £28bn a year on green investment as it seeks to convince the electorate of its fiscal responsibility.

Both parties remain committed to reaching net zero by 2050. Both recognise that achieving this will happen within a constrained funding envelope, and that a large proportion of the burden will fall on household budgets and businesses. A key challenge remains finding solutions that are acceptable and affordable to the public without too much disruption or cost to ordinary families and businesses.

We welcomed the government's decision last September to drop plans to ban the replacement of oil and gas boilers in rural, off-gas-grid homes from 2026, instead aligning this with plans to ban fossil-fuel boilers in homes on the gas grid by 2035. Many rural MPs were persuasive in exposing the difficulty some of their constituents would face if this unfair "rural-first" boiler ban had gone ahead as originally planned without sufficient financial support.

The National Audit Office (NAO) said the Prime Minister's assessment that up to 20 per cent of all homes won't be suitable for heat pumps needs greater clarity. It is likely that a large proportion of these homes will be hard-to-treat rural homes, require high heat-demand solutions and may be unsuitable for heat pumps. Low carbon, high heat-demand solutions, including standalone boilers running green gas or hybrid heat pumps (that use existing gas boilers), are not supported by existing grants such as the Boiler Upgrade Scheme (BUS), which offers funding towards the cost of a heat pump. The government position on hybrids seems increasingly untenable following Energy Systems Catapult's report, *Innovating to Net Zero 2024*, which identified that hybrid heating systems could reduce total energy system costs by 7 per cent (£200bn) compared to heating systems without hybrids.

Labour must also recognise the need for heat pump alternatives in addition to its plans to green the grid and insulate five million homes by 2030. A significant number of rural properties may not be reached by grid and energy efficiency upgrades, due to high costs. The incoming government of any party should also support alternative low-carbon solutions, including renewable liquid gases (RLGs) that will help rural homes and businesses to decarbonise without a high upfront cost.

RLGs can be a direct, drop-in replacement for conventional liquid petroleum gas (often known simply as “Calor gas”) and can be used either in standalone boilers or in combination with a heat pump in a hybrid heating system. According to Liquid Gas UK, a typical pre-1918 detached home would face 40 per cent higher costs from a heat pump from now to 2050 rather than from switching onto Calor gas. We have access to an innovation and research and development (R&D) pipeline, run by our parent company, SHV Holdings. We have used it to bring these new fuels to the market, but we need greater policy clarity to make these investments.

A future government should support a mixed-technology approach to clean heat and recognise other low-carbon heating solutions available for homes unsuitable for heat pumps. The latest statistics show the average cost of installing an air source heat pump via BUS is £13,333. But this does not include the energy efficiency retrofit sometimes needed for the heat pump to run efficiently in these homes. Our evidence shows that with a retrofit, the installation cost could be as high as £31,000 for a typical rural off-grid property. The BUS grant of £7,500 only covers a small part of this, with households expected to pay the difference. The NAO also found the cost of heat pump installation has not fallen as rapidly as the government had previously predicted.

A simple solution for an incoming government would be to tweak existing support programmes such as the BUS to include other low-carbon technologies. It seems inconsistent that the scheme allows consumers to upgrade to a biomass boiler but not a hybrid heat pump. Biomass boilers burn wood pellets, which can have a negative impact on rural air quality. A hybrid heat pump is also lower-carbon and has much lower



Decarbonising homes in more rural areas will require targeted policy interventions

particulate emissions. The Scottish government already provides grant and low-interest loans that include hybrid heat pumps via its Home Energy Scotland Scheme.

We welcome the Labour Party’s focus on insulation: improving the fabric efficiency of our buildings is the most efficient way to reduce our total energy demand, reduce consumer bills and reduce our emissions. The current Labour proposal to insulate five million homes by 2030 should target those most in need, including rural and low-income households, not just those in towns and cities. An incoming Labour government should also make the necessary reforms to the Energy Performance Certificates (EPCs) and recognise RLGs in the new

Home Energy Model that will replace the current way the energy performance of our buildings is measured.

Whatever the election outcome, a new government should take a holistic, inclusive approach to decarbonising home heating. A fair transition to net zero shouldn’t mandate a certain technology; it should acknowledge the evidence that shows varying property types require a range of approaches and should support all low-carbon technologies. As we move towards net zero, we need government policy to support low-carbon heating solutions which are suitable for every home. ●

Duncan Carter is corporate affairs manager at Calor

Juliet Phillips

UK energy team programme leader, E3G

Retrofit revolution

The UK has the leakiest housing stock in Europe – how do we fix it?

Ask any installer, manufacturer, energy company or financier what they're looking for to accelerate progress on home retrofits, and the number one response you'll receive is long-term certainty. This will not come as a surprise when the sector has been exposed to perhaps the highest rate of policy chopping and changing of any industry.

In the decade between 2012 and 2022, Westminster and the devolved governments introduced at least 30 retrofit schemes. The proliferation of short-term and sometimes conflicting public schemes has damaged supply chains and ultimately reduced the number of homes upgraded. The priority of the next government should be to develop coherent, consistent, and long-term support for home upgrades.

In 2021, the government set out its landmark Heat and Buildings Strategy: providing the direction of travel for energy efficiency and heat decarbonisation policies. This now lies in tatters, subject to delays and derailment. Regulatory timelines to upgrade leaky private-rented homes have been scrapped. Legislation for the clean heat market mechanism has been kicked into the long grass. There is no sign of the measures needed to lower the running costs of heat pumps, removing the levies which are disproportionately loaded onto electricity bills – and not gas.

Post general election, the UK needs a Heat and Buildings Strategy 2.0. There are several low-hanging fruits which could boost the consumer appeal of home retrofits. This includes removing the levies from electric heat running costs, and reintroducing and reconfirming the regulations the Conservatives have faltered on. Targeted support to local authorities should be combined with a national energy efficiency skills plan.

The UK hasn't always been such a laggard on energy efficiency: in 2005, industry delivered one million loft insulations. With the right long-term plan and funding in place, Britain can once again gear up towards the scale it has achieved previously. ●

SOCIAL HOUSING PROVIDERS WANT CERTAINTY

Kate Henderson

Chief executive, National Housing Federation

Homes in England produce more carbon each year than all the country's cars, making retrofit an essential part of meeting net zero by 2050. Decarbonising social housing is central to achieving this, and the sector is already leading the way in retrofitting existing properties and building new energy-efficient homes. However, a number of challenges are preventing housing associations from retrofitting all their homes at the scale and pace that's needed.

Firstly, retrofitting is expensive. Housing associations plan to invest £70bn by 2050 in upgrading the fabric, heating systems and components of their existing homes. However, analysis by Savills estimates that at least an additional £36bn is needed. Recent "top ups" to the government's Social Housing Decarbonisation Fund are welcome, but funding commitments to date only take us to 2028. Long term funding is crucial to providing the certainty needed to plan large-scale retrofit projects.

In addition to funding, we need clarity. The current roadmap to net zero is unclear due to an absence of necessary policy interventions. This is making it hard for housing associations to plan effectively and with confidence. The sector is currently working towards ensuring all homes reach a minimum energy efficiency standard of energy performance certificate (EPC) rating C by 2030; delays in government policy are making it challenging to meet this target. There is also a lack of capacity and skills shortages in supply chains, and no national policy or strategy to address it. To join all this together we need a national retrofit strategy, which sets out clear standards, and aims to boost green skills and green supply chains.

Helping the country reach its net-zero target by 2050 is a complex task, but one we are committed to. However, a strategic plan and long-term funding are essential. Decarbonising our homes is a win-win, saving residents money, boosting our economy, and helping protect the environment. ●

WE SHOULD SUPPORT CONSUMERS TO TRANSITION

Annabel Rice

Political adviser, Green Alliance

Insulating homes doesn't need to be hard, but since the early 2010s the UK has struggled to maintain momentum, and rates of installation have plummeted.

We used to think that to improve leaky homes, structural upgrades were most cost-effective. Improvements like loft and cavity wall insulation were often the priority for traditional retrofit, but these techniques have stayed stubbornly expensive.

At the same time, innovation in heat pump technology means they are now at least three times more efficient than gas boilers.

But support is still needed to ensure investment in high-quality production and installation, not least through the recently delayed Clean Heat Market Mechanism.

The energy crisis is not over, however, and while heat pumps themselves are increasingly affordable, current electricity prices (which are linked to gas) drive up average running costs.

To combat this, the government needs to provide targeted support for households using electric heating to reduce energy costs.

In the short term this could be through a clean heat discount or the use of smart tariffs.

The government also needs to provide long-term clarity, as a lack of consistency in policy has left installers and consumers unclear on their options. This includes boosting delivery under existing schemes such as the Great British Insulation Scheme, an initiative launched by the government last year to enhance insulation in residential properties across England.

Meanwhile, private landlords have little incentive to upgrade leaky housing thanks to a lack of regulation, including a failure to revise minimum energy efficiency standards.

But there are no downsides to scaling up the adoption of heat pumps alongside small-scale home improvements, and focusing on this will benefit households across the UK. ●

"In addition to funding, we need clarity – the current road map to net zero is unclear"

The other side of net zero

If the UK is to reach climate targets, carbon removal is essential

By Richard Gwilliam

In association with



The UK, and the world, are at a crossroads on climate. New records on global temperatures are being broken with alarming regularity. The Paris Agreement of 2015, which committed the world to limiting temperature increases to 1.5°C above pre-industrial levels, appears increasingly unattainable, and it's clear that decisive and continual action from governments, the private sector and individuals will be required to minimise any overshoot and mitigate the worst impacts. Part of this seismic effort is further decarbonising our energy grid, one of the largest sources of emissions. As a country, we have made huge strides in weaning ourselves off dependency on the dirtiest of fuels, coal, and transitioning to renewable power.

The government has set a 2035 target for a decarbonised grid, while Labour has planned an even more rapid transition for our energy sector. At Drax Power Station, we provide power for up to four million homes and businesses. For 50 years, we have played a critical role in delivering UK energy security and served as a source of high-skilled jobs in North Yorkshire. But we're planning for the future by converting two of our generating units to the carbon removals technology Bioenergy with Carbon Capture and Storage (Beccs).

This is not the first transition we have managed. Drax Power Station started life in 1974 as the UK's largest coal-fired power station, reflecting the role of coal as the country's primary source of energy and domestic heating at the time. Since then, we have converted from coal to sustainably-sourced biomass. Because of the size of our site, and the sheer amount of energy we produce for the grid, that conversion was one of the principal reasons why the UK was able to start decarbonising its power system faster than any other European country. But to reach net zero and achieve interim targets, there's more we can do.

The UK's Climate Change Committee expects the country to still be generating at least 58 million tonnes of carbon dioxide a year in 2050, which will need to be offset by removing greenhouse gases from the atmosphere to hit net zero. We know there is already too much CO₂ in the atmosphere and it's no longer enough to just stop emitting it – we need to start removing what is already there.

When it comes to carbon removals



Carbon capture and storage technology has a crucial role to play in any successful net-zero transition

we'll need as many solutions as possible to tackle the climate crisis, and the options fall into two broad categories: nature-based solutions, like trees and forests, which of course take carbon out of the atmosphere; or technological or engineered solutions such as Beccs and direct air capture (DAC).

With nature-based solutions, carbon storage can often be short-term and can be quickly reversed in the event of a forest fire or forest degradation. DAC, which uses large-scale infrastructure to effectively suck CO₂ out of the air, is energy-intensive. This is because the concentration of CO₂ in the atmosphere is around 0.4 per cent, so a lot of air must be processed to deliver large removals.

Beccs takes the best of both of these options, combining them – using sustainably sourced materials from forests, which have absorbed CO₂ from the atmosphere, and carbon capture technology to extract the absorbed CO₂ and store it safely underground.

With Beccs at Drax Power Station we will capture CO₂, which is a by-product of biomass combustion, transport it through a pipeline and store it permanently deep under the North Sea. The process creates a large carbon-negative footprint, essentially helping to redress the impacts humans have had on the carbon cycle by burning fossil fuels.

Critically, Beccs technology is scalable and can make a sizable contribution to the UK's climate change targets. With this technology in place at Drax Power Station the site would become the world's largest carbon removals project.

Our Beccs plans already have planning consent and this will allow the conversion to Beccs, enabling us to capture 8 million tonnes of carbon a year – equivalent to stopping all the departing flights from Heathrow.

Our analysis shows that measures taking out that level of carbon would prove far more costly, and would require mass changes in consumer behaviour, or be logistically difficult and more expensive. This includes removing a further three million cars from the roads or insisting that every household in the UK should have 1.5 meat- and dairy-free days per week. Analysis by the consultancy Baringa shows that delivering our Beccs project in North Yorkshire would save £15bn in whole economy costs by 2050 when compared with the costs of reducing emissions by these other, more complex means.

Beccs is a process and a technology that requires long-term, stable support to reach its full potential. The UK government has an initial ambition of achieving 5 million tonnes of greenhouse gas removals by 2030, growing to 23

million tonnes by 2035. These targets, enshrined in the UK's fifth and sixth carbon budgets, will be immensely difficult to achieve if this project does not proceed.

We sit near the Humber, the UK's most carbon-intensive industrial cluster, which emits more CO₂ than any other area of the country. The region is home to a range of very productive, highly skilled and well-paid secure jobs in key sectors, not least at Drax, which itself contributes over £350m a year to regional GDP and 2,580 jobs in Yorkshire and the Humber. But transforming these sites, preparing them for a decarbonised future, is essential to reaching our net zero goals.

As well as finding ourselves at a crossroads in the fight against climate change, there is another sense in which this country faces crucial and historic decisions in the months and years ahead. The pandemic, war in Ukraine and instability in the Middle East have highlighted the need for action on energy security. The UK must not be left behind as global and national economies reorder themselves around net zero. Carbon removals can be at the centre of a new model that sets us up for the next, greener century, and even beyond that. ●

Richard Gwilliam is UK Beccs programme director at Drax Group

Lucy Yu: “It shouldn’t cost more for a household to run a heat pump than a boiler”



The CEO of the Centre for Net Zero on artificial intelligence, ethical pension funds and scrapping the heat pump tax

How do you start your working day?

I make a coffee, clear my head and write down my priorities for the day. They're not often the same things as the meetings in my diary! I don't tend to check my emails first thing, because they can be a distraction from the most important tasks.

What has been your career high?

I'm lucky because I've had so many: debating at the Cambridge Union, running Cabinet Office Briefing Rooms (COBR), or "Cobra" meetings, hosting a global top 20 podcast – there have been lots of giddy moments and I've rarely been bored.

What has been the most challenging moment of your career?

I've worked on emerging technologies a

lot. Tech transforms business models, industries, systems and societies, creating challenges and opposition. Starting up the Centre for Net Zero was pretty challenging too. I was building a research unit from scratch and simultaneously learning my way around a new sector during a Covid lockdown.

If you could give your younger self career advice, what would it be?

Don't be afraid of change. And people can't know what you don't tell or show them. If you want your work to have the highest global impact, it's not enough to just do it – you need to tell people about it too.

Which political figure inspires you?

A diplomat not a politician, but Kofi Annan was very influential for me in my early career. I started off working in the UK civil service and then moved to the UN while he was secretary-general. He didn't get everything right, but he was dedicated to public service and worked hard to make the UN a more effective organisation.

What UK policy or fund is the government getting right?

Our approach towards general purpose technologies such as artificial intelligence. These technologies will have important applications in many domains including energy, such as helping model demand and optimise consumption, but we should be mindful to develop them responsibly and safely. There's lots of work to do, but the government has taken a promising lead on these issues.

And what policy should the UK government scrap?

The "heat pump tax". Current levies on electricity bills mean it costs more for a household to run a heat pump than a gas boiler. A targeted tax exemption for homes using electric heating would reduce the cost of clean heat and help fuel-poor homes.

What upcoming UK policy or law are you most looking forward to?

The modernising of Energy Performance Certificates (EPCs) and how they are used. It might not be the most exciting area, but it has outsized potential for impact because of the scale of emissions generated from heating and cooling buildings. We can reduce some of these emissions through energy efficiency, and energy flexibility – consuming from the grid at times when energy is cleanest, and avoiding "dirtier" times.

What international government policy could the UK learn from?

We can't match the scale of the Inflation Reduction Act (IRA) but we can learn from it. Its focus on investment and subsidies (rather than taxation and prohibition), has stimulated important markets, driving costs down through learning, innovation and increasing consumer adoption of low-carbon technologies.

If you could pass one law this year, what would it be?

I'd make environmentally and socially responsible funds the default option for pension funds invested through auto-enrolment. We've already done the hard bit by introducing auto-enrolment. This would be a relatively simple change that could move the dial for net zero significantly. People would still be able to switch away from these investments, leaving agency with the individual. ●

DESTINATION ZERO



Developed by the Aerospace Technology Institute, Destination Zero is the aerospace technology strategy for the UK – setting a path towards achieving Net Zero carbon emissions for commercial aircraft by 2050 and supporting the competitiveness of UK industry.

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Tomorrow's Homes Today

Delivering Energy Efficient Homes and Buildings for All

General Election 2024 Manifesto

The UK can't afford another energy crisis or to let families waste hard-earned income on high energy bills in cold, draughty homes. But we can afford to help people transform their homes and businesses and reduce their energy costs, improving people's day-to-day lives.

Now is the time to put in place a 25-year national buildings renovation plan to be proud of. A plan which lays out how we will get the UK's 30 million buildings to net zero by 2050. A plan which reduces the UK's energy use in buildings by 20% or more by 2035, making the country significantly more energy secure.

The Energy Efficiency Infrastructure Group (EEIG) calls on the next UK government to put in place powerful tax incentives, alongside expanded green finance, to nudge and empower over 20 million building owners to improve the energy efficiency of their homes, and to increase support and funding for more than 7 million households in fuel poverty or on lower incomes.

Scan the QR code to find out more about our General Election 2024 Manifesto



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