

Review of Energy Policy 2021

DOI: 10.5286/ukerc.edc.000951



Is the UK a world leader in policies for decarbonisation?

Rob Gross, UKERC Director

When we look back 2021 will undoubtedly be remembered as an eventful year in the UK energy and climate domain. The year abounded with bold statements from government ministers, building on the 10 point plan for a Green Industrial Revolution¹ announced by the Prime Minister at the end of 2020. Plans and strategies were announced across many sectors, from offshore wind to industry, electric vehicles and how we heat our homes. The UK hosted the global climate talks in Glasgow (COP26) and pressed hard for greater ambition, with some success. Meanwhile global oil and gas prices skyrocketed to all-time highs, pushing up bills and driving energy suppliers out of business. We even had queues at the petrol pumps – not seen since fuel price protestors blockaded oil refineries in the early 2000s.

In this issue we consider the UK approach to both fossil fuel security and the low carbon transition. We ask whether the UK is a leader, and try to look beyond aspiration and strategy to consider policies and progress.

A climate leader?

The UK government has been keen to promote the UK as a climate leader and it can point to considerable progress. Greenhouse gas emissions are down 48% on 1990 levels, dropping 3% between 2018-2019,² driven in large part by expanding renewable power generation and a dramatic reduction in coal use. The UK also benefits from a strong institutional framework for climate commitments in the form of the Climate Change Act.

The Act pushes the government to action. Having adopted a net zero target for 2050 and accepted the Climate Change Committee's 6th Carbon Budget for 2035 it was incumbent on government to come up with effective plans to turn commitments into reality. There has been a plethora of new policies within specific sectors and the publication of an over-arching Net Zero Strategy.³

New policies in areas such as transport, home heating and industry will be essential if the UK is to meet net zero targets.



This was given more urgency in 2021, because as the hosts of the Conference of the Parties to the United Nations Framework Convention on Climate Change (known as COP26) the UK government needed to show that domestic policies ‘walk the talk.’ Now that the spotlight has moved on it is important to consider whether plans will be adequate to deliver results.

Fuel prices not protests

The year has also seen a dramatic reversal in fossil fuel prices, from the record lows during the first wave of Covid to record highs at the time of writing. High prices for gas, power and road fuels have created affordability issues and triggered unexpected supply chain problems in fertiliser manufacture and the food and drinks industry. A significant number of energy suppliers have gone bust, unable to pass through fuel price increases because of the energy price cap introduced by government to protect consumers.

For a few weeks in October the UK also experienced physical supply problems. Panic buying triggered by fears of a lorry driver shortage led to queues at petrol stations. The last experience of queues at the pump was a result of protests about the price of fuel, it may only be a matter of time before high prices lead to protests about affordability rather than climate change.

A strategic approach to the transition is essential

It is important to consider fossil fuel markets and their impacts on consumers, alongside aspirations to reduce dependence on fossil fuel. Both affect affordability for households and businesses.

The role of gas in the power sector is changing as low carbon technologies expand, but it is still the largest single source of primary energy, and the price of gas remains the main driver of electricity prices. Outside the power sector, the use of gas still dominates and alternatives are in their infancy. Gas prices are driven by international factors. The current problems for suppliers under the price cap reflect the challenge of applying domestic policies to a globally traded commodity.

We therefore consider two key aspects of fossil fuel supply in the UK: the importance of a strategic approach to managing the transition away from gas in heating and industry, and the approach to extracting oil and gas from the North Sea as reserves deplete. In both instances we ask whether the UK is taking a sufficiently strategic approach that is consistent with both low carbon aspirations and shorter-term concerns about the price and availability of fuel. We then turn our attention to sector-specific decarbonisation policies in industry, heating and road transport. Finally, we consider how best to manage and reduce decarbonisation impacts on the environment.

In both low carbon and conventional policy domains the UK can indeed point to successes and clear examples of leadership. However, there are also inconsistencies and areas where stronger action is needed. Commitments alone do not deliver carbon reductions. Overall, we argue that policies in some areas need to be bolder if decarbonisation is to continue to proceed, or indeed to get started in areas where progress to date has been limited. We also argue for a more strategic and carefully managed approach to the transition. For as long as gas plays a role in our energy supply there is likely to be a role for government in ensuring affordable and reliable supplies.



Greenhouse gas emissions are down 48% on 1990 levels

¹ HM Government. 2020. The ten point plan for a green industrial revolution. [Access here](#)

² BEIS. 2019 UK Greenhouse Gas Emissions. [Access here](#).

³ BEIS. 2021. Net Zero Strategy: Build Back Greener. [Access here](#).

‘Mind the gap:’ natural gas and net zero

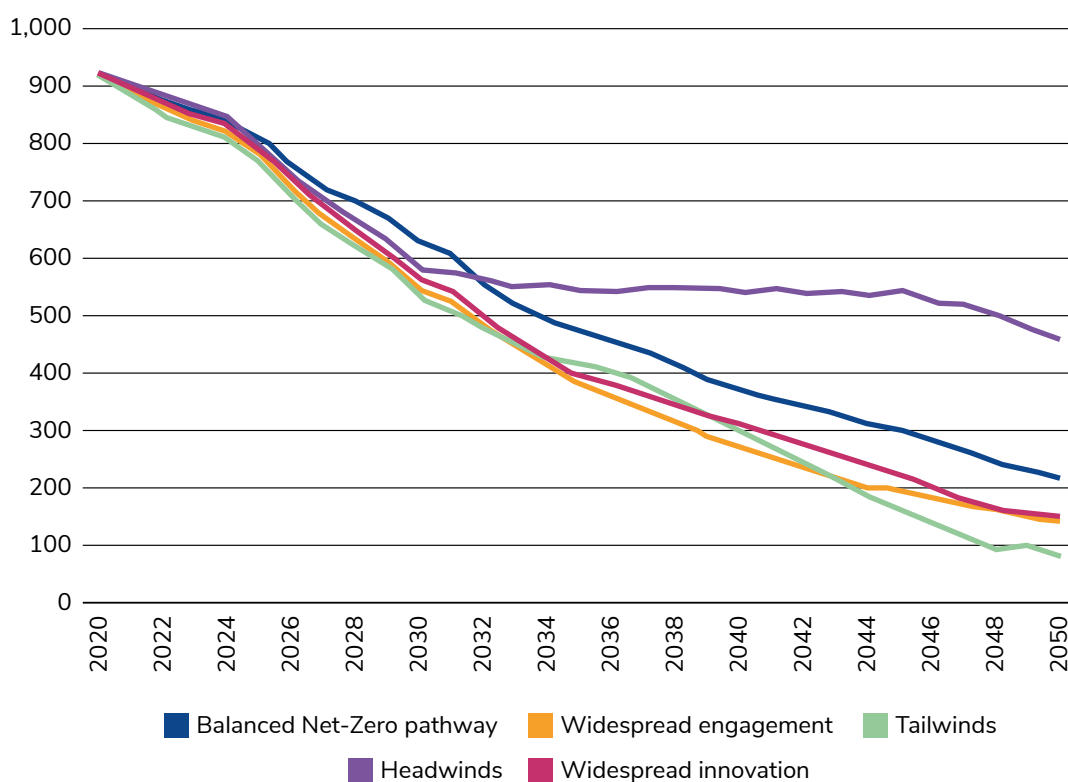
Mike Bradshaw, Warwick Business School

The UK and Europe are currently experiencing record gas prices. This is due to the cumulative consequence of a post-pandemic surge in demand, complicated by a variety of supply-side constraints and weather events creating a ‘perfect storm’, forcing some consumers to pay very high prices. The harsh reality is that there is very little the UK Government can do about the current situation and there are concerns a cold winter could drive prices even higher in 2022. Price rises of up to 40% are also expected in April when the current price cap period ends.

The high cost of ‘gas by default’

Early editions of this Review covered natural gas.⁴ The message was clear; the Government is relying on a policy of ‘gas by default’ which assumes there will always be a secure and affordable supply of natural gas to meet demand. This is guaranteed by sufficient physical infrastructure, diversity of supply and a reliance on market forces. At present, reliance on the market is coming at a very high price.⁵

Figure 1 Role of Natural Gas in UK Energy Mix: CCC 6th Carbon Budget Scenarios (TWh)⁶



An uncertain role for gas

Our research suggests at least three challenges demand a different approach.⁷ First, although domestic demand has fallen in recent years, production from the North Sea has fallen faster and import dependence has increased making the UK evermore reliant on pipeline gas and Liquefied Natural Gas (LNG). Second, the rapid growth of renewable power generation has changed the role of gas, being now a key source of flexibility as the output of wind and solar varies within each day and across the year. Third, ambitious plans to decarbonise domestic heating could result in a significant reduction in gas demand, raising questions about maintaining the integrity of the pipeline networks and the possibility of repurposing them to support a future hydrogen economy. The Climate Change Committee's 'Balanced Net Zero Pathway' would see gas demand fall 27% by 2030 and 57% by 2040 (Figure 1). All this uncertainty requires an approach of 'gas by design' that ensures energy security in the short-term and in the medium-term maintains the integrity of critical infrastructures while managing down the role of gas in line with the net zero target.

A promise to consult on gas by design

There is still no sign of 'gas by design.' However, the confluence of the current global gas crisis⁸ and the publication of the Government's Net Zero Strategy³ have focused minds on the need to pay attention to managing the gap. Moving from where

natural gas is the most important element in the UK's energy mix – 41.9%⁹ of total inland consumption in 2020 – to a world in 2050 where it may play a modest role in supporting renewable generation and as a feedstock for industry and hydrogen production. The Government's Net Zero Strategy promised a call for evidence this autumn seeking views from stakeholders on the future of the gas system with a focus on infrastructure and markets, to determine how the gas market will need to evolve to ensure the necessary investment and maintenance throughout the transition. However, there are more pressing issues that also need attention.

Seeking short term fixes

Most immediately, the Government must try and deal with the current global gas crisis. There are reports in the media of discussions with Centrica to re-establish the Rough offshore gas storage facility, first to store methane and later hydrogen.¹⁰ The Government is also reported to be in discussions with the Qatari state to become the 'supplier of last resort.' Qatari companies operate the South Hook LNG terminal in South Wales and are also taking up capacity at the National Grid Terminal at Grain in Kent. Downing Street insisted that it had not 'requested or secured any additional shipments from the Qatari government.'¹¹ Whatever the situation, such measures are only a short-term fix and no substitute for a clear strategy to manage the role of gas through the current volatility and beyond.



The CCC's balanced pathway would see gas demand fall 57% by 2040

⁴ Bradshaw, M and Ekins, P. 2017. Review of Energy Policy 2017. [Access here.](#)

⁵ UKERC. 2021. Talking Energy Episode 3: the rising price of gas. [Access here.](#)

⁶ Climate Change Committee. 2020. Charts and Data in the Report. [Access here.](#)

⁷ Bradshaw, M. 2018. Future UK Gas Security: a position paper. UKERC & WBS. [Access here.](#)

⁸ Bradshaw, M. 2021. 'UK consumers pay for the cost of 'Gas by Default'. [Access here.](#)

⁹ BEIS. 2021. UK Energy in Brief. [Access here.](#)

¹⁰ Oliver, M. 2021. Rough gas storage site may be reopened to bolster strategic reserves. [Access here.](#)

¹¹ England, Sheppard and Parker. (2021) "UK asks Qatar to become 'supplier of last resort.'" The Financial Times, [Access here.](#)

Offshore oil and gas: reconciling hydrocarbon extraction with net zero

Gavin Bridge, Durham University; Gisa Weszkalnys, London School of Economics & Mike Bradshaw, Warwick Business School

The offshore oil and gas sector has seen a flurry of policy activity this year. The Energy White Paper¹² aims to establish the UK Continental Shelf (UKCS) as a 'net zero basin' by 2050. A revised Strategy from the Oil and Gas Authority (OGA)¹³ obligates offshore producers to assist in meeting the UK's net zero target. In addition, an unprecedented sectoral agreement – the North Sea Transition Deal (NSTD)¹⁴ – pivots the sector towards renewables and carbon management, while supporting continued investment in oil and gas production in exchange for reducing emissions.

These initiatives are significant for what they seek to change. The Transition Deal's 50% emissions reduction target by 2030 will require a substantial and accelerated reinvention of UK offshore practice. Most notably, however, the UK's net zero policy for oil and gas leaves unchallenged the objective of maximising the economic recovery of hydrocarbons from the UKCS. Initiatives like the Beyond Oil and Gas Alliance launched at COP26, which focus on curtailing oil and gas production, highlight the distinctiveness and limits of the UK's approach.

Changing of the guard in a mature basin

Production of oil and gas from the UKCS peaked around 20 years ago. Successive governments have continued promoting

offshore development underlining its contribution to UK energy security, balance of payments and retention of skilled jobs. The composition of the sector, however, has changed against a backdrop of growing import dependency, ageing infrastructure, and global competition for hydrocarbon investment.

The international oil companies that built the North Sea have divested many of their mature assets to pursue opportunities elsewhere. Today these firms account for only a third of UKCS output, down from three-quarters at production's peak. Smaller independents and state-owned firms from outside the UK have moved in, drawn by attractive fiscal terms and the UK's formal strategy of maximising economic recovery. The commercial strategies of this diverse group of companies will shape the endgame for the UKCS.

A distinctive approach, yet to be tested

The NSTD outlines a diversified future for the UKCS, encompassing carbon capture and storage (CCS), hydrogen production and renewable electricity generation, alongside extraction. Both industry and regulator consider the deal a significant achievement. It is at odds, however, with decisions taken by other European countries to stop future licensing rounds, and the International Energy Agency's

¹² BEIS. 2020. The Energy White Paper: Powering our Net Zero Future. [Access here](#).

¹³ Oil and Gas Authority. 2021. The OGA Strategy. [Access here](#).

¹⁴ BEIS. 2021. The North Sea Transition Deal. [Access here](#).

recent net zero scenario suggests reduced demand will make further exploration activity obsolete.¹⁵ By contrast, the OGA Strategy and NSTD support new hydrocarbon exploration and development without a target end date. They also regard the capital, skills, and technology of a (lower emission) hydrocarbon industry as central to reducing the nation's carbon footprint.

Much about this remains to be tested. Proposals to reduce emissions by electrifying power will require substantial new investment. There may not be a business case to upgrade ageing infrastructure. Even if there is, the resulting emissions reduction may be insufficient. The Climate Change Committee has criticised the emissions-reduction target for being less ambitious than its 6th Carbon Budget advice. Similarly, the reuse and repurposing of infrastructure and personnel is likely to encounter material challenges. As the OGA's own pilot framework suggests, not everything can be repurposed. Decommissioning will likely remain a primary focus with annual spend removing platforms shortly expected to exceed new field development.¹⁶ The push to decarbonise assets will pull some of these costs forward in time.

Whether offshore production can contribute to maintaining energy security while decarbonising supply depends on several factors. UKCS gas production currently meets around half of UK gas demand, with nearly all offshore production consumed in the UK. But over 80% of oil production is exported and UK refineries process mainly imported crudes. Operators can sell into international markets as they wish; there is no requirement to provide domestic supply.

Challenging, but bolder action required

BEIS and the regulators are where many of the tensions of creating a 'net zero basin' while maintaining hydrocarbon production will be worked through. Regulatory guidelines have been expanded, incorporating net zero into the OGA's stewardship expectations. But a proposed 'climate compatibility check point' for future licensing rounds remains a work in progress.¹⁷ A proper test will need to take account of the full lifecycle of emissions, including those embodied in the oil and gas extracted and sold into UK and overseas markets (so-called 'Scope 3' emissions).

The growing integration of offshore activities into the UK's energy system beyond oil and gas introduces new planning and regulatory pressures, requiring careful negotiation. Critical elements of onshore industrial strategy rely on access to CCS offshore, and aligning the interests, financial capacities and time horizons of actors poses a formidable challenge. There are wider pressures too... Climate emergency, an inadequate pace of decarbonisation, and concern about the ability of the market to deliver a socially 'just' transformation of the UKCS suggest a need for more active policy and regulatory frameworks. The deal struck between industry and the regulator to reduce emissions may be challenging in its own terms, but it locks in future hydrocarbon production and excludes from consideration the fate of oil and gas when combusted. Implementing the deal relies on new offshore actors whose capacity and willingness to respond to net zero obligations remain to be seen.



UKCS gas production meets around half of UK gas demand

¹⁵ IEA. 2021. Net Zero by 2050: A Roadmap for the Global Energy Sector. [Access here.](#)

¹⁶ Wood Mackenzie. 2020. UK North Sea Decommissioning: the £17 billion challenge. [Access here.](#)

¹⁷ BEIS 2021. North Sea deal to protect jobs in green energy transition. [Access here.](#)

Action speaks louder than words. Assessing the UK's performance on industrial decarbonisation

Imogen Rattle & Peter Taylor, University of Leeds

The UK government is seeking to provide climate leadership in the international sphere. The presidency of COP26 and the G7 provided significant opportunities to push forward with these ambitions. A number of initiatives were launched to address the climate impacts of industry including an Industrial Decarbonisation Strategy¹⁸ which, in setting out a sector-wide approach achieved a first for a major economy. Strategy, however, does not substitute for consistent support. As COP26 made clear, the focus of efforts must now move from designing frameworks to implementing them.

To date, action on industrial decarbonisation has been limited, but it has gained prominence as narratives of a green recovery gather momentum. We focus here upon recent activity of G20 members since this group generates almost 80% of global greenhouse gas emissions.¹⁹ Three indicators serve to provide a snapshot of developments: the publication of industrial decarbonisation strategies; support for low carbon hydrogen; and support for carbon capture utilisation and storage (CCUS). These are not the only actions required for industrial decarbonisation, but all fall within the remit of federal governments and so provide a useful measure to assess the UK's performance.

Strategy

Strategies are no substitute for action, but they set the goals and enabling frameworks within which action occurs. In 2021 important national developments amongst the G20 included Germany's Development and Resilience Plan²⁰ which incorporated €449m for industrial decarbonisation, and France's Decarbonisation Roadmap for the Chemicals Sector.²¹ The UK's Industrial Decarbonisation Strategy¹⁹ arguably took a more ambitious approach, setting out a cross-sector, cross-technology framework to mitigate industrial emissions, including actions on resource efficiency, product standards and skills. At the transnational level, UK presidency of the G7 saw Climate and Environment Ministers launch an Industrial Decarbonisation Agenda²² to support markets for green industrial products, and commit to collaborate on decarbonising industry. In terms of setting out cross-cutting initiatives, the UK can therefore rightfully claim to have demonstrated a significant degree of international leadership.

¹⁸ HM Government. 2021. Industrial Decarbonisation Strategy. [Access here.](#)

¹⁹ UNEP. Emissions Gap Report 2021. [Access here.](#)

²⁰ Bundesfinanzministerium. German Development and Resilience Plan (DARP). 2021. [Access here.](#)

²¹ Conseil National de l'industrie. Decarbonisation roadmap for the chemicals sector. 2021. [Access here.](#)

²² BEIS DEFRA. G7 Climate and Environment: Ministers' Communiqué. 2021. [Access here.](#)

Hydrogen

There has been significant movement on hydrogen amongst the G20. The majority of members now have hydrogen strategies either published or in development, although not all focus exclusively on low carbon production. In March, China signalled support in its latest Five Year Plan²³ which named hydrogen as one of six industries of the future. In August, the UK became the eighth G20 member to publish its national hydrogen strategy.²⁴ In the United States, the Infrastructure Investment and Jobs Act (IIJA) signed into law in November, commits to publishing a clean hydrogen strategy within six months and earmarks \$8bn of funding to establish four or more regional clean hydrogen hubs.²⁵ Further indications of support came during COP26 when over 40 countries signed up to the Prime Minister's Breakthrough Agenda, committing to work together on making affordable, renewable and low carbon hydrogen globally available by 2030.²⁶ With hydrogen on the cusp of becoming a mainstream fuel, the UK appears to be moving with the majority with its deployment plans. How quickly these plans can become a reality, however, remains an open question.

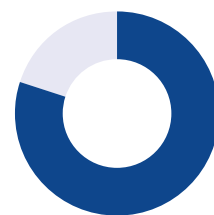
CCUS

After years of limited progress, the Paris Agreement targets appear to have given new impetus to efforts to deploy CCUS technology at scale. The American IIJA earmarks \$3.5bn of funding for regional direct air carbon capture and storage projects, while China has committed to undertaking major demonstration projects. Further signs of progress came during COP26 when the two countries published a joint declaration to cooperate on deployment

and application of the technology.²⁷ In the UK, the first two Track-1 clusters for CCUS deployment were announced in October, following the 2020 commitment of £1bn funding to support projects at four sites.¹ However, the government's performance on carbon capture has been patchy. Demonstration projects were cancelled in 2011 and 2015 bringing a sudden halt to development. Deployment in the UK will require integration of infrastructure into offshore oil and gas fields, a process which is neither simple nor rapid. With the world's two largest economies now forging ahead, the UK's previous hesitancy risks it being left playing catch up.

Global leader or back of the pack?

2021 has been a landmark year for the UK in terms of launching industrial decarbonisation initiatives. However, as its record on carbon capture shows, strategy does not substitute for consistent support. Now the frameworks are in place, the hard work of implementation must accelerate. At home, this will require developing a range of relatively immature technologies while balancing the competing needs of industry across sectors on and offshore. Abroad, this will require developing international standards while ensuring national competitiveness and maintaining domestic supply chains. Ultimately, the UK's success in industrial decarbonisation will be determined not by its number of world firsts but by the willingness of its politicians to grapple with these thorny issues once the spotlight moves on.



G20 members generate almost 80% of global emissions

²³ National People's Congress. 2021. Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035. [Access here.](#)

²⁴ HM Government. UK Hydrogen Strategy. 2021. [Access here.](#)

²⁵ 117th Congress (2021-2022). H.R.3684 - Infrastructure Investment and Jobs Act. [Access here.](#)

²⁶ Prime Ministers Office. World leaders join UK's Glasgow Breakthroughs to speed up affordable clean tech worldwide. 2021. [Access here.](#)

²⁷ US Department of State. U.S.-China Joint Glasgow Declaration on Enhancing Climate Action in the 2020s. 2021. [Access here.](#)

Heat and buildings

Richard Lowes, Regulatory Assistance Project; Meysam Qardran & Jianzhong Wu, Cardiff University

The long awaited and much needed strategy for decarbonising heat and buildings in the UK was published in October. This is an important step towards reducing emissions from heating which accounts for 21% of the UK total, and has remained roughly static for the last decade.²⁸

The Heat and Buildings Strategy (HABS) has created cautious optimism about the potential to overcome the limited progress on UK energy efficiency and heat decarbonisation relative to similar countries.²⁹ The proposed measures, if enacted, could close some of the policy gaps, but reform is still needed around energy efficiency policy and to drive heat networks and other local area based solutions. The proposed market-based mechanism to support heat pump deployment is intriguing and potentially transformative, but significant delivery risk remains.

As a result, the only significant support for low carbon heat is the Domestic Renewable Heat Incentive – which closes in March 2022. The non-domestic element closed in March 2021 leaving another policy gap. With limited deployment of key low-carbon heat technologies, the Climate Change Committee's annual progress report put heat in existing buildings policy in their 'None, very limited, or clearly ineffective policy' category.²⁹

Learning from others

Progress has been made on low carbon heat in some countries suggesting the UK could learn from the experience of others. Scandinavian countries have been particularly successful at heat decarbonisation, reflecting a long-standing commitment to transition from oil and solid fuels to heat pumps and district heating.³¹

International experience suggests that deploying heat pumps at scale requires a combination of measures, which include pricing incentives, grant support and regulatory measures alongside supportive and responsive governance.³⁰ Reaching the Government's target of 600,000 heat pumps per year, as well as deploying energy efficiency measures at scale, requires a coordinated and equitable package of policies at a scale not seen before for UK buildings.

Similarly, the ten-fold growth of heat networks deployment by 2050, suggested by BEIS, requires a combination of policies alongside the devolution of responsibilities and powers to local authorities who will need to make decisions around geographical heat zoning.



Heating accounts for 21% of UK emissions

Historic failure must not be repeated

The closure of historic energy efficiency schemes alongside the failure of the pay-as-you-save scheme, expected to dovetail with the still ongoing Energy Company Obligation programme, led to a significant gap in the Government's energy efficiency deployment programme. Although it is more than six years since the end of the Green Deal, the failure of the Green Homes Grant³⁰ introduced in 2020 means that the gap in policies to support energy efficiency in 'able to pay' households has still not been filled. While the government has a goal to increase all existing homes to EPC band C by 2035, there is little policy support for privately owned households, which make up the bulk of the stock.

Whether heat pumps or heat networks, it is crucial that the deployment of low carbon technologies be coordinated with that of energy efficiency and the expansion of a flexible power sector to minimise costs and realise rapid decarbonisation.

HABS is here but the detail is not

The HABS outlines an increased level of funding for heat pumps, with grants available between 2022 and 2024. From 2024 a new heat pump deployment scheme, placing an obligation on appliance manufacturers, will support the government's 2028 heat pump target. This is positive, but the novelty of this policy for heating and the requirement of new legislation presents a significant element of delivery risk.

The HABS strategy has placed much less emphasis on heat networks and energy efficiency, despite the centrality of these options. Proposals seem unambitious on local area energy planning, and it is unclear who will deliver heat networks and potential local energy efficiency schemes. Significant questions also remain over the future of the gas grid and whether and to what extent hydrogen for heating³² will be pursued. A decision on the future of the gas grid is not expected until 2026, which coupled with the aspiration for the end of fossil fuel heating system sales by 2033, rather than an outright ban, gives the appearance of hesitation by policy makers when tough decisions are needed.

The proposed funding in the HABS is limited and implies that the use of regulation, such as that on landlords or minimum performance standards for owner-occupiers may need to do much of the heavy lifting for energy efficiency. Similarly, the need for greatly enhanced public engagement around heat is not recognised in the strategy. An approach based around regulation and financial levers appears to have emerged over concerns around public spending. It is likely that it will move the financial burden from the tax system directly onto households which could have significant equity implications.³³



²⁸ CCC. 2021. 2021 Progress Report to Parliament. [Access here.](#)

²⁹ Hanna et al. 2016. Best practice in heat decarbonisation policy. [Access here.](#)

³⁰ BEIS. 2020. Green Homes Grant: make energy improvements to your home. [Access here.](#)

³¹ Gross and Hanna. 2019. Path dependency in provision of domestic heating. [Access here.](#)

³² Rosenow et al. 2020. The pathway to net zero heating in the UK. [Access here.](#)

³³ Barrett et al. 2018. Funding a Low Carbon Energy System: a fairer approach? [Access here.](#)

A transport decarbonisation plan without any near-term decarbonisation?

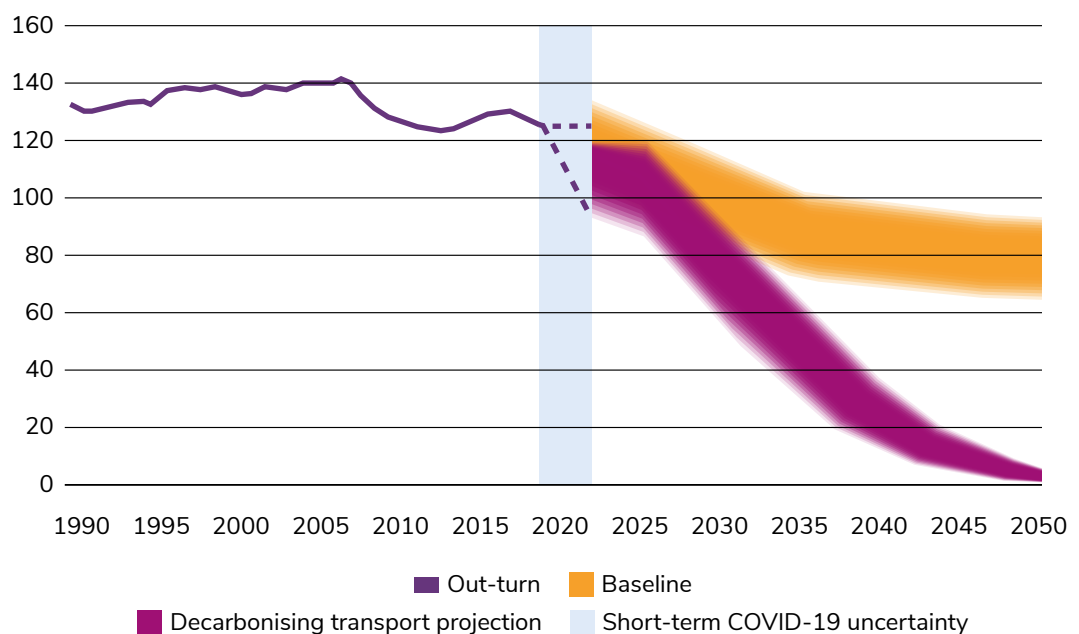
Jillian Anable, University of Leeds

2021 has been a busy year for UK transport decarbonisation policy. Most significant has been the publication of the Transport Decarbonisation Plan (TDP).³⁴ This is the first government strategy to cover the whole sector (surface, maritime and aviation) since the White Paper in 2004.³⁵ It addresses vehicle and fuel transitions as well as passenger and freight demand and associated infrastructural requirements. For passenger transport, the major emphasis is on electric vehicle uptake in line with targets to phase out new full or plug-in hybrid (PHEV) fossil fuel cars by 2035. Demand-side elements include ambitions to achieve a substantial mode shift to walking, cycling and public transport in towns, increasing car occupancy, improved

long-distance rail and coach services, and embedding decarbonisation in spatial planning.

The degree to which these ambitions achieve the Climate Change Committee (CCC)'s 6th Carbon Budget is difficult to ascertain, because the TDP was published without underpinning analysis and data. The only indication of the potential emissions reductions from the proposals is via the fuzzy pathway graphic (reproduced below) showing possible carbon trajectories with uncertainties against an unexplained baseline. Whilst this sets a transport carbon budget projection for the first time, it provides no information on policy trajectories of traffic growth, vehicle occupancy, fleet CO₂ emissions, and so on.

Figure 2 Decarbonising Transport – domestic transport GHG emission projections versus the baseline*



Source: DfT 2021. Decarbonising Transport. A Better, Greener Britain. Figure 2, p45⁴⁰

Extraction of figures from this graph suggests that at least 50% of the reductions achieved during 2020 due to reduced traffic during the Covid19 lockdowns, would have to be maintained. This is problematic as we know that car traffic is already 100% of its pre-Covid level, vans at 124% and HGVs at 120%.³⁶ The narrative in the text does not refer to this 'requirement'.

As Secretary of State, Grant Shapps, put it at the launch:

“It’s not about stopping people doing things: it’s about doing the same things differently... We will still drive, but increasingly in zero emission cars.”

This absence is significant is because the TDP reaches dramatically different conclusions compared to several recent studies. Analysis using the UKERC developed Transport, Energy and Air Pollution Model (TEAM)³⁷ has shown that a 30-50% reduction in car kilometres is needed by 2030, relative to 2020, to meet the UK’s 6th Carbon Budget.³⁸ Similarly, analysis by Element Energy for the Scottish Government has shown a 20% reduction in kilometres is needed by 2030, relative to 2019, to meet Scotland’s net zero target by 2045.³⁹

All these studies adopt the target to end the sale of new fully petrol and diesel cars and vans by 2030 and yet were still only able to achieve deep cuts by 2030 with large reductions in distance travelled. These reductions in car miles were also relative to a baseline year (ca.2020 in each study) and not relative to a growing baseline.

It is easy to understand how these studies reach these conclusions. Factors include the time it takes for the sales of electric cars to translate into a large proportion of 'electric miles'. In 2021 the proportion of electric cars (battery electric vehicles and PHEVs) was still less than 2% (675,000) of all cars on the road.⁴⁰ In addition, the majority of PHEV vehicle miles, which make up around half of sales and will continue to be sold until 2035, are completed using the fossil fuel tank.⁴¹

The Element Energy Study led the Scottish Government to announce a target to reduce car kilometres by 20% below 2019 levels by 2032.⁴² The Welsh Government have paused most of their local road projects whilst they review the case for road expansion.⁴³ Yet, the TDP is predicated on the notion that any demand-side measures are confined to core urban areas. Moreover, these demand-side measures do not necessarily add up to an absolute reduction in car miles travelled, certainly not against a growing baseline.



our research shows a 30-50% reduction in car km’s is required

³⁴ Department for Transport. 2021. Decarbonising Transport. A Better, Greener Britain. [Access here](#).

³⁵ Department for Transport. 2004. The Future of Transport White Paper. [Access here](#).

³⁶ DfT. 2021. Transport use during the coronavirus (COVID-19) pandemic. Figures for 31/10/2021. [Access here](#).

³⁷ UKERC Transport Energy and Air pollution Model (TEAM). [Access here](#).

³⁸ CREDS. 2021. The role of energy demand reduction in achieving net zero. [Access here](#).

³⁹ Element Energy. 2021. Decarbonising the Scottish Transport Sector. [Access here](#).

⁴⁰ <https://www.nextgreencar.com/electric-cars/statistics/>

⁴¹ <https://iopscience.iop.org/article/10.1088/1748-9326/abef8c>

⁴² Scottish Government. 2020. Securing a green recovery on a path to net zero. [Access here](#).

⁴³ Welsh Government. 2021. Roads Review. [Access here](#).



The absence of the underpinning TDP data severely undermines the credibility of this long awaited plank of the Government's decarbonisation strategy, especially when parallel modelling exercises have included all of the policy prescriptions in the TDP, and reached such clear conclusions. Since its publication, the policy emphasis continues to be on the technological transition via a proposed Zero Emission Vehicle (ZEV) mandate.⁴⁴ This does not address average tailpipe emissions from the new car fleet, plus the government is expecting only 55-60% of new cars to be fully electric by 2030.⁴⁵ Announcements about investment to encourage modal shift have been made in the absence of policies to ensure this happens alongside car mileage reductions – which seems unlikely given the announcement this year of the tenth annual freeze to fuel duty and

the prospect of even cheaper 'electric' motoring. Both of these make driving cheaper than travelling by bus or rail whose prices have been allowed to rise well above inflation.

In conclusion, it would appear that the Government's strategy is to allow road traffic to increase and for the transport sector to continue to not pull its weight towards carbon budgets. Nevertheless, increasing disruptive weather events and continued global failure to prevent additional climate change will dampen mobility through physical and economic disruption. It would appear, therefore, that both scenarios of 'success' or 'failure' each involve less distance travelled.⁴⁶ The question is whether this is achieved proactively or reactively.

⁴⁴ Announced in the Government's Net Zero Strategy, this will mean a certain proportion of a car manufacturer's sales must be for EVs. [Access here.](#)

⁴⁵ as was the case in the CCC's Sixth Carbon Budget report. [Access here.](#)

⁴⁶ <https://www.transportxtra.com/publications/local-transport-today/comment/69570/we-are-now-facing-two-alternative-futures-plus-an-untenable-one/>

Achieving decarbonisation whilst maintaining environmental standards?

Nicola Beaumont, Plymouth Marine Laboratory; Astley Hastings, University of Aberdeen; Rob Holland, University of Southampton; Andrew Lovett, University of East Anglia; Anita Shepherd, University of Aberdeen

Net zero targets have been communicated by 59 countries representing 54% of global greenhouse gas emissions, with many more in discussion. Whilst ambition for rapid decarbonisation is commendable it is recognised that it risks a wide range of unintended negative environmental consequences, both locally and across the world.⁴⁷ Decarbonisation must be harmonised with broader environmental goals to enable the exploitation of co-benefits and minimise negative impacts. This coupled approach was demonstrated at COP26 where efforts to reduce fossil fuel use were set alongside the Glasgow Leaders' Declaration on Forests and Land Use,⁴⁸ with 141 countries agreeing to halt and reverse forest loss and land degradation by 2030. The extent to which environmental factors are integrated into decarbonisation policy varies both geographically and between sectors, providing a tangible opportunity for lessons to be learned.

Harmonisation of decarbonisation and environmental policies in the UK

The UK has demonstrated international leadership in developing ambitious decarbonisation pathways, including the Industrial Decarbonisation Strategy,¹⁸ the Energy White Paper,¹² and the Ten Point Plan.¹ It has also shown an element of leadership around environmental targets, including the 25-year Environment Plan,⁴⁹ Agricultural Transition Plan⁵⁰ and the forthcoming Environment Bill. Despite persistent issues around air pollution, waste, and water quality, internationally the UK performs well above average based on measures of environmental performance.⁵¹ However, policy documents which reference decarbonisation and other environmental objectives with equal weight, including the potential trade-offs between these, remain atypical. Many of the scenarios in the Ten Point Plan, are informed by carbon reduction targets but provide minimal reference to wider environmental consequences.



141 countries agreed to reverse forest loss and land degradation by 2030

⁴⁷ Shepherd et al. 2021. Scotland's onshore wind energy generation, impact on natural capital & satisfying no-nuclear energy policy. Energy Reports. [Access here.](#)

⁴⁸ UK COP26. Glasgow Leaders' Declaration on Forests and Land Use. [Access here.](#)

⁴⁹ DEFRA. 2018. 25 Year Environment Plan. [Access here.](#)

⁵⁰ DEFRA. 2020. Agricultural Transition Plan 2021 to 2024. [Access here.](#)

⁵¹ Wendling et al. 2020. Environmental Performance Index. [Access here.](#)

However a nascent shift is underway. One recent policy which considers both decarbonisation and the environment is the new shared policy programme in the Scottish Government between the SNP and The Green Party.⁵² It states that local Regional Land Use Partnerships will facilitate land use change for a just transition, adopting a natural capital approach, with five pilots established this year. Yet, conversely the SNP capital investment plan issued at the same time contradicts this, focusing on building new motorways with little environmental consideration.

On the ground, the Oxford to Cambridge Arc has been introduced as part of a UK cross-governmental initiative to build a better economic, social and environmental future. The Arc supports sustainable growth in five counties through integrated planning across various sectors, including roads, railways, housing, and environment.⁵³ From a research perspective UK Research and Innovation has also recently invested in several interdisciplinary programmes to address this issue, UKERC and Ecological Consequences of Offshore Wind (ECOWind) are key examples which explicitly bring energy and environment together.

Lessons to be learnt from the global community

To avoid tensions between environmental and decarbonisation objectives in the Maldives, Greece, Costa Rica and Portugal the responsible national bodies are combined to enable synergistic policy development. Equally international panels such as the Intergovernmental Panel on Climate Change and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services may benefit from closer working relations or the establishment of bridging panels.

Costa Rica saw huge rates of deforestation in the late twentieth century which have been successfully reversed through government intervention and the introduction of a Payments for Environment Services (PES) scheme. This PES program paid farmers to protect watersheds, conserve biodiversity and/or mitigate carbon dioxide emissions. The planned decarbonisation strategy is taking a similar approach, with policies being framed in a holistic context and around the potential social and economic benefits. “We have learned that the pocket is the quickest way to get to the heart,” says Carlos Manuel Rodríguez, Costa Rica’s minister for environment and energy.



⁵² Scottish Government. 2021. Scottish Government and Scottish Green Party: draft shared policy programme. [Access here.](#)

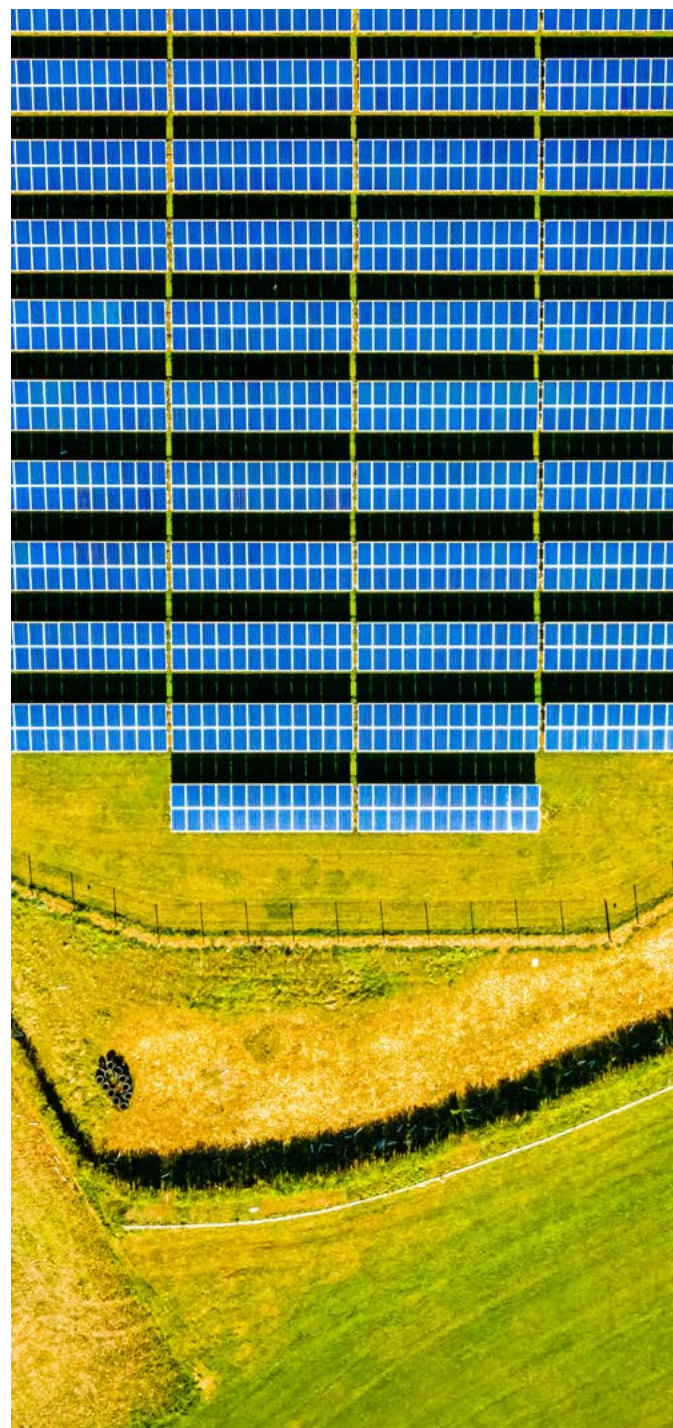
⁵³ DLHC & MHCLG. 2020. Oxford-Cambridge Arc. [Access here.](#)

Better energy-environment integration has also been evidenced by the German government, who have commissioned a series of projects on the environmentally compatible expansion of renewable energies.⁵⁴ With a recent study exploring a nature-compatible transition to 100% renewable energy, quantifying nature-compatible 'reserves' of power.^{55,56}

Next steps for the UK

To take leadership in addressing the interdependencies between achieving decarbonisation and non-climate related environmental degradation, UK environmental policies must be harmonised with decarbonisation strategies, with respective bodies working together at national and international levels.

Economic analysis and financial mechanisms should be developed and deployed to provide transparency around environmental, social and economic trade-offs. This would ensure that the full impacts of decarbonisation are recognised, and the societal and environmental benefits are maximised.



⁵⁴ BfN. 2020. Renewable Energy Report 2019: Delivering an Environmentally Compatible Energy Transition. [Access here.](#)

⁵⁵ Thiele, J. et al. 2021. Konkretisierung von Ansatzpunkten einer naturverträglichen Ausgestaltung der Energiewende, mit Blick auf strategische Stellschrauben. [Access here.](#)

⁵⁶ BfN (2021) RE100 in Practice – Environmentally Compatible Energy Transition. [Access here.](#)

Reference

This report should be referenced as:

Gross, R., Bradshaw, M., Bridge, G., Weszkalnys, G., Rattle, I., Taylor, P., Lowes, R., Qadrdan, M., Wu, J., Anable, J., Beaumont, J., Hastings, A., Holland, R., Lovett, A., Shepherd, A. 2021. Review of Energy Policy 2021. UK Energy Research Centre. London.

DOI: 10.5286/ukerc.edc.000951

About UKERC

The UK Energy Research Centre (UKERC) carries out world-class, interdisciplinary research into sustainable future energy systems. Our whole systems research informs UK policy development and research strategy. UKERC is funded by the UK Research and Innovation, Energy Programme.

Contact

T: +44 (0)20 3108 7564

Email: UKERC@ucl.ac.uk

Website: www.ukerc.ac.uk

Twitter: [@UKERCHQ](https://twitter.com/UKERCHQ)

LinkedIn: www.linkedin.com/company/uk-energy-research-centre

UKERC is committed to making all of its publications accessible, with all new PDFs published from March 2021 meeting accessibility standards. We're always looking to improve the accessibility of our publications. If you find any problems or would like further assistance please contact UKERC@ucl.ac.uk

UK Energy Research Centre,
Central House, BSEER,
14 Upper Woburn Place,
London, WC1H 0NN