

Assessing the case for public ownership in the energy sector

A report by the Energy Research Accelerator
Policy Commission





Foreword

The events of the last two years have made it clear that the energy transition is going far too slowly. 2023 was the hottest year on record, causing extreme weather all over the world, and emissions are still rising. At the same time, soaring fossil fuel prices after Russia's invasion of Ukraine have led to global stagflation and pushed millions into penury. It has never been more obvious that we need to radically accelerate the shift to cheaper clean energy. The question is how.

One idea gaining traction in the UK is a return to public ownership. For many, the example of European state-owned energy companies such as Orsted, Statkraft and EDF, is compelling. These companies combine development of low carbon energies with wider economic benefits including support for local supply chains and jobs. Some like EDF also managed to hold customers' bills down during the worst of the energy crisis. Surely, the argument goes, it is time for Britain to create its own national energy 'champion'?

Much of this discussion has been driven by the Labour Party's plans to create GB Energy, but there is also a wider debate over the pros and cons of nationalisation compared to private sector ownership and investment. In this context, the Energy Research Accelerator brought together a Policy Commission to assess Labour's plans along with proposals from several trade unions and think tanks.

We have drawn on a wide set of stakeholders to think through in detail the potential roles of such a company in areas such as offshore wind, grid development, energy storage and critical infrastructure through to local energy. This report sets out where we believe a well-focused public energy company could provide the maximum benefits.

Beyond the role of a public energy company in the energy transition, it is also clear that Britain needs to radically improve the way it implements policy and delivers infrastructure projects. Whoever forms the next government will need to introduce a thoroughgoing industrial strategy for clean energy, achieve genuinely 'joined-up' government, and raise net zero to its highest priority. It is in these areas, we believe, that the Commission makes some of its most important recommendations.



Professor Martin Freer
Director, Energy Research Accelerator

The ERA partnership

9 world-class midlands partners

Supporting over

1000 companies

1400 researchers

£110 million
industrial investment

Funded by



Innovate
UK

Delivered by



Supported by



UNIVERSITY OF
BIRMINGHAM



UNIVERSITY OF
LEICESTER



Loughborough
University



University of
Nottingham
UK | CHINA | MALAYSIA



British
Geological
Survey

Contents

Foreword	3
Executive summary	8
Findings	9
Recommendations	10
The Net Zero Delivery Unit	11
Introduction	14
Britain's critical path to net zero	15
Net zero grid	15
Home heating	17
Energy tariffs, fuel poverty and fairness	19
Nationalisation and national energy champions	21
Labour's plans	24
Great British Energy	26
National Wealth Fund	29
An alternative arrangement	34
Wider reforms	35
Market reform	36
Grid connection and planning	36
Domestic decarbonisation	37
Fundamental reform: the Net Zero Delivery Unit	38
Conclusion	41
Appendix 1: The team	42
References	44

Disclaimer

This report represents the consensus view of the commission but individual commissioners may not agree with every point or recommendation.

Out of time?

Antarctic sea-ice at 'mind-blowing' low alarms experts

New record set for world's hottest day – as scientist warns milestone is a 'death sentence'



More than
100,000
evacuated as
flooding returns
to Pakistan

Drying of the Amazon could be
early warning of 'tipping
point' for the rainforest

Extreme weather
**displaced 43m
children** in past six years,
Unicef reports



Wildfires burn in
Tenerife, Canada and
Portugal amid warning
of 'alarming' speed of
climate change

Heatwaves are new
normal as 50C hits US
and China – UN

World breaches
key 1.5C warming
mark for record
number of days

Record low 2022
Antarctic sea ice led to
catastrophic breeding
failure of emperor
penguins



Global warming
could push
tropical forest
leaves past
a 'critical
temperature'

Killer heatwave sweeps
across Europe as nine cities
issued with red alert

Antarctic ice levels undergo
'massive decrease', data shows

Extreme weather hits world's
seven continents in July 2023



Executive summary

If Labour wins the next election, it plans to create two new public bodies to speed up the energy transition: Great British Energy (GBE), a state-owned energy company; and a National Wealth Fund (NWF) to make strategic investments. These organisations are central to its plan to reach zero-carbon electricity by 2030, five years ahead of the government's target, cut bills and create a million jobs over ten years.

The Energy Research Accelerator (ERA) Policy Commission convened a group of energy experts to assess Labour's plans – along with alternative proposals from several trade unions and think tanks – and make recommendations.

The question of what role public bodies should take in the energy transition could hardly be more urgent: the climate is deteriorating faster than predicted; British net zero policy is badly behind on several fronts; and industrial competitors like the US and the EU are now throwing hundreds of billions at the problem.

In these circumstances, a publicly owned energy company could make a major contribution and state-backed investments could be decisive. But given the range of possible roles, it is vital to define exactly what the new organisations are intended to achieve, how they would work and how to prevent it becoming an exercise in shuffling deckchairs.

In the broadest terms, we welcome GBE but worry its remit is too wide and that Labour expects too much from it in the short term. We also welcome the public investments proposed for the NWF but think they should be far more ambitious. We think that the NWF itself is unnecessary, however; these investments could be made sooner through the UK Infrastructure Bank (UKIB) and Department of Net Zero and Energy Security (DESNZ).



We stress however that even if Labour were to accept our recommendations in full and revise its plans for GBE and the NWF, this alone would not guarantee a future government would achieve its 2030 and 2035 targets. The lead-times are simply too long. To hit the targets, we believe fundamental reform is necessary at the top of government: a new Net Zero Delivery Unit (NZDU) with equal standing to the Treasury. This is more important than founding a national energy company or investment fund.

Findings

- Britain, which likes to proclaim itself a leader on net zero, is badly behind on several fronts such as transport and domestic heat. Vital interim deadlines in 2030 and 2035 are looming and on current trends we are likely to miss them. This urgency means any reforms must be decisive but minimal.
- State investment in early-stage technologies is important over the longer term but irrelevant to achieving net zero targets in 2030 and 2035.
- State investment in strategic infrastructure is vital. Some of these investments may not generate a return until markets can be created to support them, or may never do so, but must be made anyway.
- A publicly owned energy company could be extremely effective at tightly focused challenges such as Labour's Local Power Plan (LPP) and Local Area Energy Planning (LAEP, currently absent from Labour's published plans). It could also be a major force to nurture public support for net zero.
- Public or private ownership, however, is not the most important factor in achieving either net zero or social equity.
- Labour's reliance on the example of various European energy 'champions' is a weakness in its argument. Their profits are small compared to the social benefits Labour hopes to achieve – even for those that have been operating 50-100 years.
- In any event, the overwhelming bulk of renewables capacity to 2035 will be built by private developers and the heavy lifting will be done by offshore wind. This is probably the quickest route to lower bills.
- Decarbonisation of home heating is vital but best pursued through public programmes – as Labour plans – rather than a state-owned energy company.
- With or without a nationally owned energy company, an industrial strategy aligned with net zero is vital. Britain needs one urgently.
- Net zero 2050 and net zero grid 2030/35 are impossible to achieve without reforms to planning, grid connection and market arrangements.
- None of this will happen in time without fundamental reform at the top of government, hence our proposal for a net zero delivery body. 'Wartime footing' is no longer just a rhetorical device.

Recommendations

If Labour forms the next government we recommend it should:

- Establish a new Net Zero Delivery Unit with the power to direct and hold to account all ministries and with equal status to the Treasury. This is the highest priority and more important than establishing a publicly owned energy company.
- Set up GBE but narrow its remit to LPP, LAEP and collective procurement of transmission assets.
- Invest in early-stage clean energy technologies and strategic infrastructure, through UKIB where possible and otherwise directly by DESNZ.
- Raise the ambition of its strategic infrastructure investments (see Table 1).
- Pursue planning, grid access and market reform with all haste, and do everything incrementally possible to encourage renewable development in areas of high demand and low renewable supply, and to reduce the effect of marginal gas pricing on retail prices.
- Accept the recommendations of the Winsor report and implement on a wartime footing.
- Raise the price ceiling on contract-for-difference (CfD) auctions to levels that reflect recent price inflation.
- Take action to raise UK carbon prices for example by restoring the link with the EU Emissions Trading Scheme (ETS) so limiting the impact of the EU Carbon Border Adjustment Mechanism (CBAM).
- Level the playing field between renewable and fossil electricity generators by equalising the terms of the windfall tax for those sectors.
- Impose much stronger regulation on the Distribution Network Operators (DNOs).

THE NET ZERO DELIVERY UNIT

Of all our recommendations, the Net Zero Delivery Unit is the most important. This is a vital reform because responsibility for net zero policies cuts across many different ministries, devolved administrations, local authorities, regulators and companies. There is no single ministry or minister responsible for the targets with powers to hold others to account. There is no single point of contact for companies and civil groups trying to overcome barriers to net zero.

The Skidmore Review proposed a new co-ordinating body overseen by DESNZ and DHLUC, but we argue the new unit should sit at the very top of government because it needs the power to direct all relevant organisations including those ministries. It needs at least parity with the Treasury, which has a history of blocking strategic projects on narrow economic grounds. The unit's job is not to devise policy but to make sure existing targets and deadlines are met and to overcome barriers.

Labour has suggested something similar with its Cabinet Subcommittee on National Resilience and Minister for Resilience in the Cabinet Office to “*coordinate department-wide responses*”, but we think any new unit should be explicitly focused on net zero and have the powers we propose – not only over Whitehall departments but also regional and local authorities, Ofgem, National Grid, DNOs and GDNs, and indeed GBE, UKIB and NWF. It should be led by or report to the deputy prime minister. A closer model might be the Delivery Unit of Blair's second term, which is widely credited with delivering an ambitious programme of public service reform 2001-2005.

Labour's plans for GBE and NWF are important policy suggestions, and if revised as we suggest, could make a significant impact. By themselves, however, they are nothing like enough. To have any chance of achieving net zero by 2050, let alone net zero grid by 2030, requires fundamental reform at the top of government.

Table 1: Labour's plans, Commission recommendations

Labour	Energy Research Accelerator Policy Commission
<p>GB Energy invests in early-stage renewable technologies; builds generic wind and solar farms; supports local renewable projects (Local Power Plan, LPP); absorbs GB Nuclear; organises collective procurement of electricity transmission cables and competes to build individual transmission projects.</p>	<p>GB Energy: Focuses on LPP and Local Area Energy Planning (LAEP). No early-stage technology investment; no generic renewables (mature wind and solar); GB Nuclear remains separate. Yes to communal procurement of transmission supply assets, but defer GBE bidding for individual transmission projects until after 2030.</p>
<p>NWF: Invests £8 billion in ports, green hydrogen, battery gigafactories, decarbonising steel and industrial clusters.</p>	<p>NWF: We think the investment list is a good start but should be more ambitious (see UKIB/DESNZ below). But creating a new institution is unnecessary and will cause delay. By the time NWF is fully operational, UKIB will have a four-year head start.</p>
<p>UKIB / DESNZ: N/A</p>	<p>UKIB / DESNZ: Of the proposed investments, those that fall within UKIB's remit – it has to make a return – can be provided by the bank, and all others by the government directly through DESNZ. To Labour's list we would add:</p> <ul style="list-style-type: none"> ■ Additional non-commercial interconnectors for grid balancing and energy security. ■ Hydrogen caverns and other forms of large-scale long-term and multi-year energy storage. ■ Strategic gas reserve and power stations. ■ Carbon Capture and Storage (CCS) network – trunk routes and first reservoirs. ■ First three deep geothermal and other first-of-a-kind plants. ■ Direct air capture CCS plants. ■ HVDC (high voltage direct current), cable and grid component manufacturing capacity to avoid global bottlenecks.
<p>GB Nuclear: Folded into GBE</p>	<p>GB Nuclear: Remains independent because GBN already exists, with different and highly specialised skillsets, and is liable to dominate GBE if folded in.</p>
<p>Cabinet Subcommittee on National Resilience and Minister for Resilience in the Cabinet Office: intended to “coordinate” only, and not explicitly focused on net zero.</p>	<p>Net Zero Delivery Unit: devoted entirely to delivery of net zero, with equal status to the Treasury and powers to direct and hold to account all relevant ministries, devolved and local authorities, regulators and companies. Led by or reports to the deputy prime minister.</p>

Figure 1: Institutional reform needed to support 2030 net zero grid target

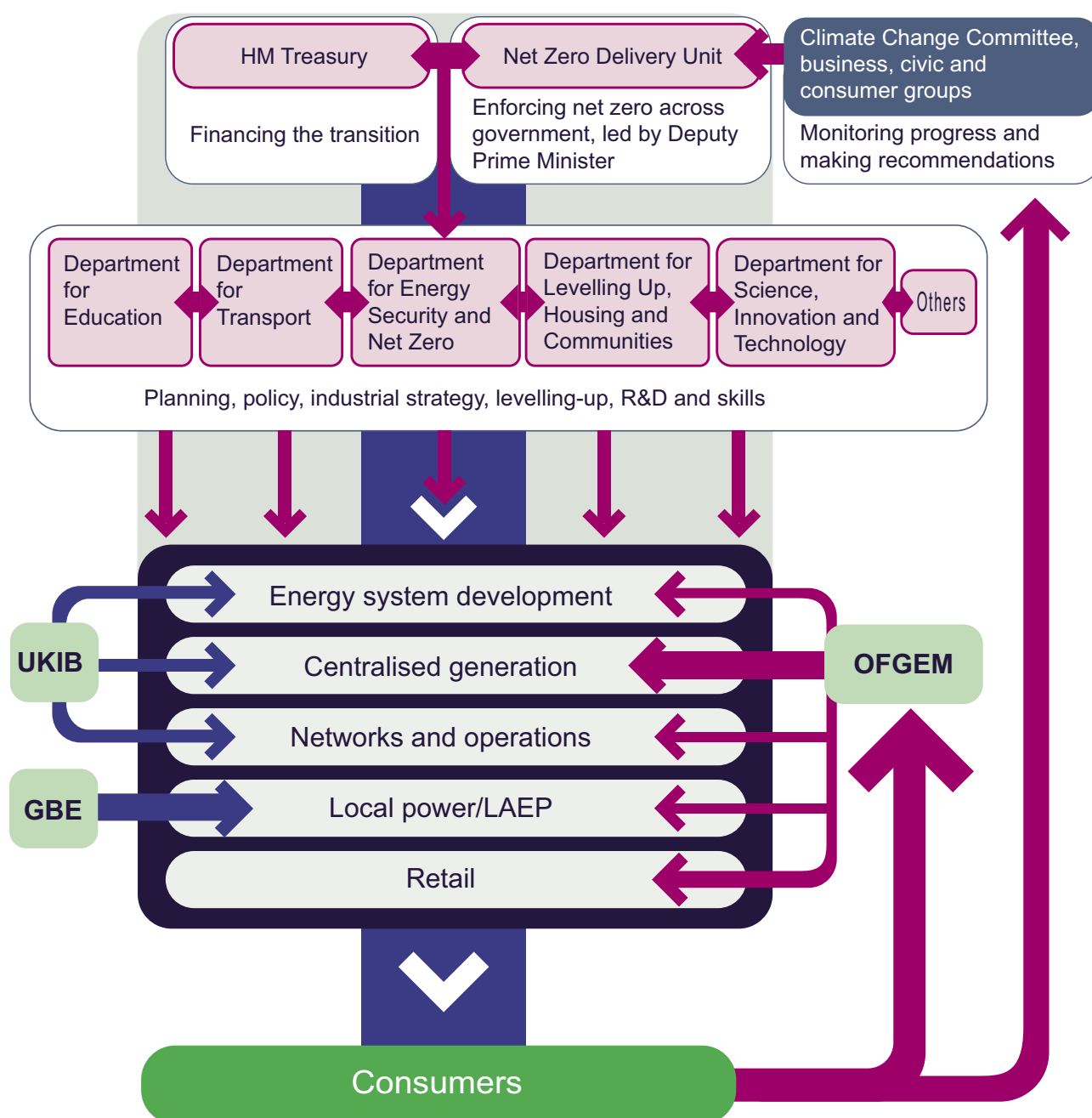


Diagram ©Faye McAnulla, 2023.

Introduction

Public ownership of energy is back on the agenda.

It's not hard to see why.

Since Russia invaded Ukraine, energy bills have gone through the roof, pushing millions more into fuel poverty and many businesses to the brink of insolvency. The government has spent £40 billion to support households and bail out failed energy suppliers.¹ Many energy companies have gone bust and others have made vast windfall profits.

Unsurprisingly, many now question whether private companies should continue to control this vital service. Two thirds of people support nationalisation of energy and the number who do so strongly has almost doubled over the past three years to 37%.²

Now a whole series of different proposals has emerged to 'take back control'. The Green Party wants to nationalise the big five energy suppliers, while trade unions Unite and the GMB prefer to nationalise the entire industry. The TUC and Common Wealth, a thinktank, each propose setting up a new national energy champion, the IPPR a new manufacturing investment fund. The SNP has long advocated a publicly owned Scottish generator, and more recently Labour announced plans to set up Great British Energy (GBE), a national clean energy company to "*supercharge*" the transition to net zero. Even the government now seems to favour some direct investment in the sector through Great British Nuclear.

Supporters of public ownership argue it will reduce energy bills; support early-stage clean energy technologies like tidal or hydrogen; nurture domestic manufacturing and jobs; strengthen energy security; and generally accelerate progress towards net zero. What's not to like?

It is not obvious, however, that private ownership is holding back progress towards net zero: Britain has cut carbon emissions more deeply than any other G7 nation and built more offshore wind capacity than any country bar China *without* a publicly owned energy company. Renewables now generate almost half our electricity. This has been financed entirely by private investors and foreign sovereign wealth funds behaving as private investors.

It is true, however, that Britain has no domestic turbine manufacturing industry to show for it and, more broadly, has failed to capture the industrial and jobs benefits of the energy transition. It is also true that international competition for these economic spoils has intensified with the US Inflation Reduction Act and the EU Net Zero Industry Act throwing hundreds of billions into the fight. And despite its success in expanding cheap renewable generating capacity, Britain still has some of Europe's highest energy prices and worst levels of fuel poverty.

So should the UK now follow the pack and create its own national energy company? And if so, what exactly should this company do?

For any incoming government, the question is now beyond urgent. The climate is deteriorating much faster than forecast and global emissions continue to rise. The International Energy Agency has just warned that holding global heating to 1.5C means that by 2030 global renewables capacity must triple and fossil fuel consumption fall by a quarter.³ Yet some of Britain's climate policies lag those of other countries, others have been scrapped or delayed by prime minister Rishi Sunak, and our biggest challenges lie just ahead.

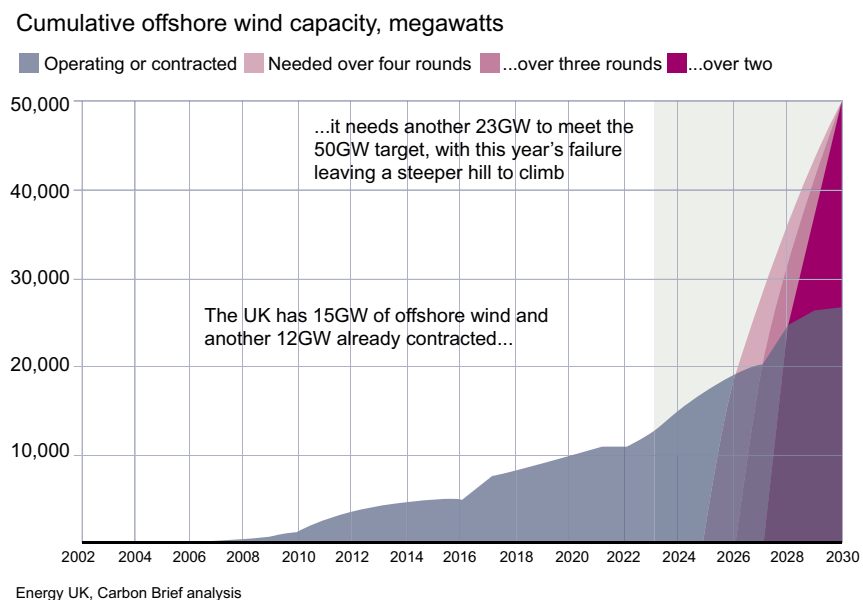
Britain's critical path to net zero

To have any chance of reaching net zero by 2050, Britain must first eliminate emissions from its electricity grid – the foundation of its entire strategy – and start to make serious progress on decarbonising home heating. To make net zero politically sustainable, it must also bring energy prices down. We are way off track on all three.


Net zero grid

The government plans to decarbonise the grid by 2035 with an interim target of 50GW of offshore wind by 2030 – up from 14GW today. But despite strong growth in offshore wind so far, and even though building generating capacity is – relatively speaking – the ‘easy bit’, we are still far short of the necessary trajectory (see Figure 2). In 2022 Britain built scarcely half the offshore wind needed annually to stay on course and just one sixth of the solar.⁴ The 2023 CfD auction (AR5) failed to award any offshore wind contracts. Major renewable projects – both on and offshore – are being cancelled because of sharply rising costs and the windfall tax on renewable generators.⁵

Figure 2: The UK's 50GW offshore wind target looks increasingly steep.
Source: Carbon Brief⁶



As well as generating capacity, however, we also need to build many new overhead lines and underground cables – both on and offshore – along with transformers, sub-stations and other grid infrastructure. National Grid estimates we need to invest £50 billion to 2030 and build five times more high voltage transmission lines in the next five years than in the last thirty. Yet these lines take an average of 14 years to complete. At current rates, a line proposed today would start working in 2037.



This bottleneck in turn severely restricts the speed at which new generating capacity can connect. The queue of proposed projects now totals 280GW – almost four times the size of our current generating capacity.⁷ In 2022, of those projects that received an offer to connect, more than a quarter were offered dates after 2032 – a decade hence. One solar plant was given a connection date of 2037.⁸ Only 4% of applications made between 2018 and 2021 have been connected so far.⁹

To speed up the building of the electricity grid and renewable generation requires fundamental reforms to planning law and a new kind of politics that fosters local consent. The growth in renewable capacity, and the failure of the current system to translate cheap renewable power into lower energy tariffs, also demands major changes to energy market arrangements.

As if these challenges were not enough, as renewable capacity grows over the next decade, we will need to invest in entirely *new* infrastructures to ensure security of supply.

A grid powered largely by intermittent renewables will need a dispatchable supply to fill in the gaps – particularly during the still, overcast days of a high-pressure weather system in winter ('Dunkelflaute'). In the short term this will continue to be provided by gas, but running power stations on this basis will become increasingly uneconomic. At some point, the government will need to step in to ensure they keep operating, and possibly create a national reserve of gas to fuel them. Who will own these assets is not clear.

Within a very few years the carbon emissions of these gas plants will need to be captured and stored, requiring investment in CCS plants and a pipeline network to transport the CO₂ to depleted offshore oil and gas fields. Over time this will need to be augmented or replaced by long-term energy storage technologies, possibly including hydrogen salt caverns as proposed in a recent Royal Society report¹⁰, and the infrastructure to support them.

Most of this needs to be in place to achieve the government's net zero grid target. Yet the Climate Change Committee concluded in its 2023 report to parliament that "*The government is still lacking a credible overall strategy*" to get there by 2035.¹¹ Labour's net zero grid target is 2030.

All this feeds through – or rather, doesn't feed through – to the rest of the economy. Industry cannot decarbonise heat processes because it cannot secure powerful new electricity connections.¹² EV companies cannot install charging points for the same reason. DNOs sometimes refuse to supply new housing developments because they fear the heat pump or EV load is too high.

“

A grid powered largely by intermittent renewables **will need a dispatchable supply to fill in the gaps...**

These challenges look especially daunting in the UK context, since Britain's delivery of new infrastructure has typically been worse and far more expensive than in other rich countries. France completed a new 200-mile TGV line in 2017 for £46 million per mile, for example, whereas the costs of HS2 are currently estimated at £262 million per mile – almost six times higher – and rising.¹³ The government's response has been to cancel the line north of Birmingham, but in the case of net zero, abandoning the project is not an option. Britain quickly needs to get much better at delivery.

At the same time, we need urgently to reform the wholesale electricity market. While half our electricity is already produced from renewables, which – even after recent supply chain inflation – still generate at around half the cost of gas fired power stations, the effect on energy bills is muted by the system of marginal gas pricing. Reforming this arrangement is vital both to help tackle cost of living crisis and to maintain political support for net zero.

Home heating

Whereas the net zero grid is about a relatively few huge infrastructure investments, decarbonising home heating means interacting with 28 million homes. Here too Britain is far behind – and likely to lag further since the government abolished tighter home efficiency standards for landlords and its own energy efficiency taskforce.¹⁴ To reach net zero by 2050 Britain needs to be installing 600,000 heat pumps a year by 2028, almost ten times the current rate.¹⁵ In a league table of 21 European countries ranking heat pump installation per 1,000 people, Britain comes last (see Figure 3).

This should come as no surprise given how often UK support for low carbon heating technologies has chopped and changed over the past decade. In contrast, Germany's KfW scheme – a single coherent subsidy covering all technologies and forms of tenure – has been more generously funded and consistently applied since 2006. Worse, Britain has loaded net zero and social policy costs onto electricity bills rather than gas ones or general taxation, making heat pump running costs higher than they need be.

True, the UK is handicapped by having some of the worst housing stock in Europe, but that too is largely self-inflicted. The rate at which homes are insulated collapsed in 2012 after a change of policy and remains around 90% below the peak (see Figure 4). Most egregiously, since the end of the short-lived Green Homes Grant there is no subsidy for insulation in the 60% of homes that are owner occupied and not classed as fuel poor.¹⁶

Home decarbonisation is usually presented as one of the thorniest problems of climate policy but other countries don't seem to find it so difficult. Whereas Britain installed only 60,000¹⁷ heat pumps in 2022, Poland managed 200,000 and Italy 500,000. And analysis by the Climate Change Committee shows there are 10 million homes that could install a heat pump without any further insulation.¹⁸

Britain is starting late and has a mountain to climb.

“

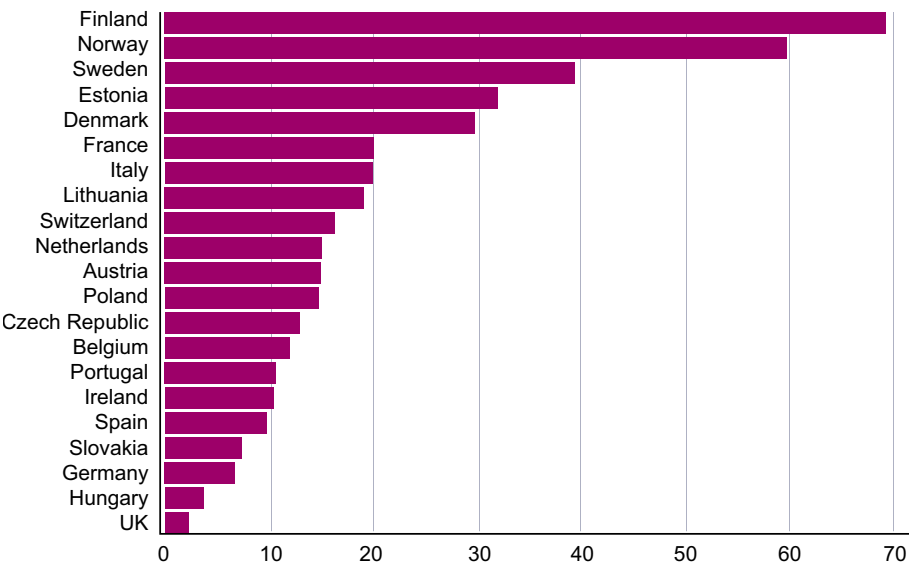
To reach net zero by 2050 Britain needs to be installing 600,000 heat pumps a year by 2028, almost ten times the current rate.

“

In a league table of 21 European countries ranking heat pump installation per 1,000 people, Britain comes last.

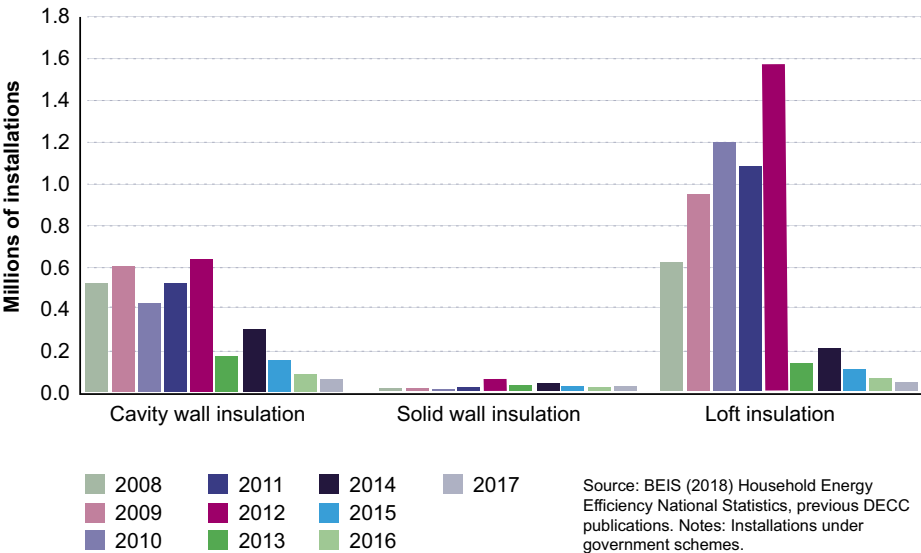
Figure 3: UK heat pump sales lag far behind other European countries. Source: Financial Times¹⁹

Heat pump sales per 1,000 households, 2022



Source: European Heat Pump Association. ©FT.

Figure 4: UK insulation rates 2008-2017 Source: Climate Change Committee²⁰



Source: BEIS (2018) Household Energy Efficiency National Statistics, previous DECC publications. Notes: Installations under government schemes.

Energy tariffs, fuel poverty and fairness

Decarbonising the electricity grid and home heating both require enormous investments, yet to maintain public support for the energy transition, household energy bills must also come down. Current funding mechanisms are regressive and without care the energy transition could worsen that unfairness.

Britain has long suffered some of the worst levels of fuel poverty in Europe because of comparatively high energy tariffs combined with poor housing stock. At the peak of the energy crisis, tariffs rose much higher in Britain than in France, say, where EDF held increases to 4% in 2022, driving UK fuel poverty to a peak of 7.2 million households – *a quarter* of the country. Even in mid-2023, 6.6 million UK households spent more than 10% of their income on energy.²¹

Some subsidies for social and net zero policies are levied as flat rate standing charges, which fall hardest on the poorest and those who consume least. Perversely, most of the levies fall on electricity – the lower carbon fuel.

There is a risk that the energy transition will worsen inequality: the better off can consume cheaper off-peak electricity because they can afford to invest in heat pumps and EVs whereas the poor cannot. And as the middle classes shift wholly to electricity, gas network charges will fall on a shrinking customer base – the left-behind poor – and therefore will rise on a per household basis.

In his net zero u-turn, the prime minister announced that 20% of households would be exempted from moving to heat pumps and so – presumably – remain on gas. The cost of maintaining the gas network is currently borne by 23 million households, but if that number were to fall to under 5 million, annual network charges could rise from £100 to £500 per home.

Shifting policy costs from electricity bills to gas – to encourage heat decarbonisation – would add to the unfairness. Shifting them to general taxation would be fairer but would still cost £5 billion per year.

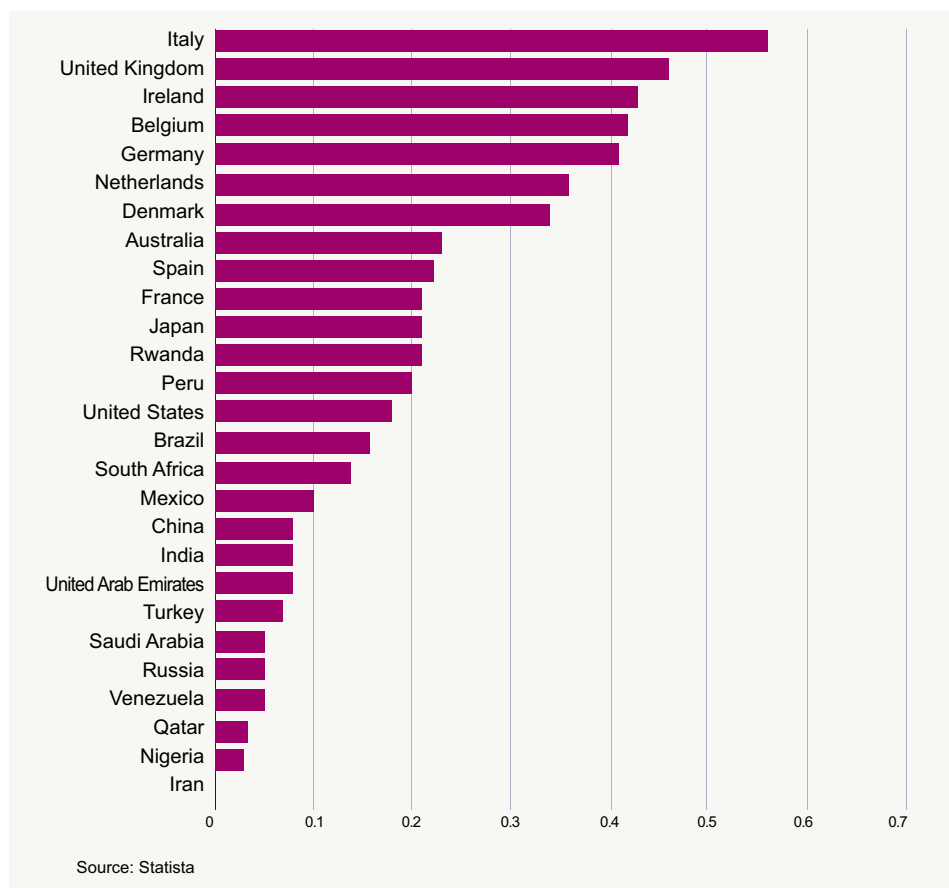
The most effective way to bring down everybody's bills may well be to pursue the fastest possible expansion of renewable generation, but it is also vital that any new policy costs are levied in ways that reduce unfairness rather than exacerbate it.



“
There is a risk that the energy transition will worsen inequality: **the better off can consume cheaper off-peak electricity because they can afford to invest in heat pumps and EVs whereas the poor cannot.**”



Figure 5: UK electricity prices are higher than most. Source: Statista²²



There are many other challenges, of course, including transport, industry and agriculture – and the government has made them all harder by deliberately deflating the UK carbon market (see Figure 6). But those we highlight above are absolutely the most urgent: net zero grid because it enables everything else; decarbonising home heat because we are so far behind; lower bills and greater fairness because they are socially just and make the energy transition politically sustainable.

Figure 6: UK carbon prices fall to steep discount versus EU.

Source: Financial Times²³



It is these challenges against which any proposal for public ownership in the energy sector must be judged. If it can be shown to significantly raise our chances of tackling these challenges over the next decade, then we should pursue it. If not, it could turn into a dangerous distraction.

Nationalisation and national energy champions

The energy crisis has sparked a series of proposals around public ownership in the energy sector from political parties, trade unions and think tanks. These are interesting but present some significant issues.

Nationalising the big five energy suppliers, for example, as favoured by the Green Party, would be problematic. The suppliers control only metering and billing and have very little leverage over the price of energy. The tariffs they charge are already set by the state. They make paper thin margins and almost thirty went bust in the energy crisis. What would be the point?


Nationalising the entire industry – including oil and gas producers, generators, transmission and distribution grids, and suppliers – would be expensively counter-productive. The trade union Unite estimates it would cost £196 billion at market prices but favours paying just £90 billion to cover only what the current owners have invested ('equity book value'). This seems likely to provoke years of legal challenge and deter future private investment, both serious obstacles to urgent net zero actions required over the next five and ten years. £196 billion is roughly equal to the total investment required in electricity storage and grid infrastructure to 2050, according to a recent study by the Royal Society.²⁴ If we were ready to increase national debt by almost 8% at a stroke, this would surely be a better use of the money than handing it to shareholders.²⁵

The TUC and Common Wealth, a think tank, both propose not to nationalise private companies but to build a new state-owned energy company from scratch. In separate reports they each argue that most other countries in Europe have a such a company and argue that if Britain did so too it could lower bills, foster domestic industries and jobs, strengthen energy security and accelerate progress towards net zero.

Both groups assume state ownership would deliver many different public goods simultaneously and skirt the likely trade-offs. A pound spent reducing domestic energy bills cannot be used to support pre-revenue technologies, for example. If a new public energy company were meant to grow quickly, then it would have little spare cash to subsidise either new technologies or energy prices. Attempting to satisfy all three 'priorities' would reduce the benefits in all of them.

Both groups applaud state-owned EDF for having held tariff increases to 4% in 2022, as instructed by the French government, but forget to mention that the company also posted a record 19 billion euro loss.²⁶ Nor do they reflect that the company's funding model is increasingly challenged by its €65 billion net debt and its need to raise annual investment from around €16 billion per year to €25 billion to fund the construction of six new nuclear reactors.²⁷ The Arenh system, under which EDF sells power at €42/MWh to industry and its competitors – compared to current wholesale market price of €100/MWh – is due to expire in 2025, and the company's future funding is the subject of intense debate in France. The row encapsulates the trade-offs inherent in state-ownership during a period of high investment. Nevertheless, the TUC cites EDF as a model, and says that with public investment of £82 billion a new British state-owned company could grow as big as the French one by 2040 - which it describes as "*ambitions, but just about possible*".

Common Wealth proposes Public Power Britain (PPB) to build 40-50GW of mature and frontier renewables by 2030. PPB would be an



integrated generator-supplier, and a Power Purchase Agreement (PPA) between the two arms would allow the company to bypass the wholesale market – and the problem of marginal gas pricing – and sell low carbon energy “at low cost”. But any PPA between a state-owned generator and state-owned supplier that lowers bills by passing on lower state-backed cost of capital seems likely to provoke legal challenge under state aid rules.

Both groups argue that public energy company could build domestic supply chains and provide good jobs, but these would almost certainly be more expensive: if we have to build a wind turbine factory from scratch, for example, it is unlikely to be competitive against existing capacity abroad. It may still be worth doing, but again there is a risk of double-counting the benefits: do we want supply chain jobs, or the cheapest possible energy?

Balancing these competing claims is the job of industrial policy – and policymakers – rather than a state-owned company. Both groups praise European energy champions for nurturing domestic supply chains, but they have typically done so in the context of supportive industrial policy. Orsted, for example, started to shift from oil and gas to renewables in 2008, but was building on strategic decisions taken by Danish government decades before – such as long-term support for community wind projects.²⁸

Britain today is not so fortunate, having no explicit industrial policy since the government abandoned it after a brief flirtation in 2017 (although Labour plans to reinstate one should it win the next election).²⁹ Any publicly owned energy company could only succeed in the context of a well-thought-through industrial policy, and would be its instrument rather than its author.

Both groups argue that state-ownership would accelerate investment in renewables. Common Wealth claims PPB would “*deliver a fossil fuel free power system within the decade by accelerating the roll out of both proven and “moonshot” technologies*”, when it must be clear that “moonshot” technologies will make little difference to 2035 and none to 2030. It doesn’t explain how a single start-up company could build 50GW in five years from a standing start.

Neither confronts Britain’s outstanding record in building offshore wind – almost 14GW in scarcely a decade. It’s true of course that the latest UK auction for contracts for difference (CfDs) failed to attract a single offshore windfarm bid, but this was because the government failed to raise the price cap to reflect recent supply chain inflation. Ireland has recently adopted a similar system but allowed for supply chain inflation and at its first auction in May 2023 secured 3GW of offshore wind for €86/MWh³⁰ (£76/MWh). That’s a higher price than achieved by previous UK auction rounds, but still less than *half* the forecast cost of gas fired electricity (see Figure 7).³¹

“

Any publicly owned energy company could *only* succeed in the context of a well-thought-through industrial policy, and would be its instrument rather than its author.”

Figure 7: The latest UK renewable auction secured no new offshore wind and contracted only a third of last year's capacity overall. Source: Carbon Brief³²

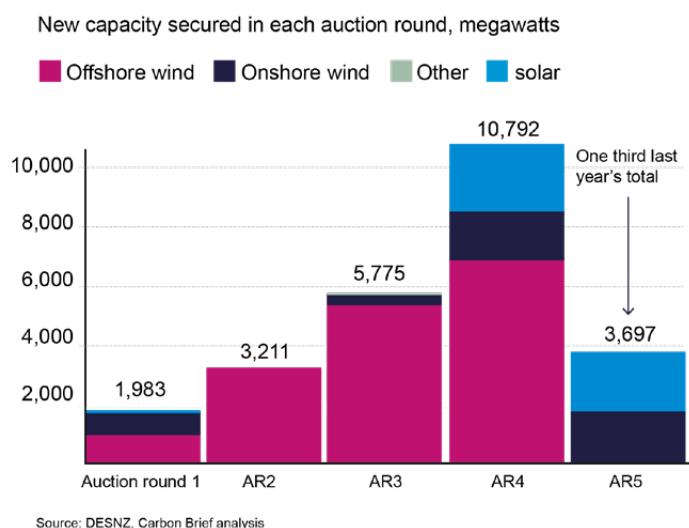


Figure 8: The latest UK renewable auction is the smallest since 2015 and will generate 82% less electricity than last year's. Source: Carbon Brief³³

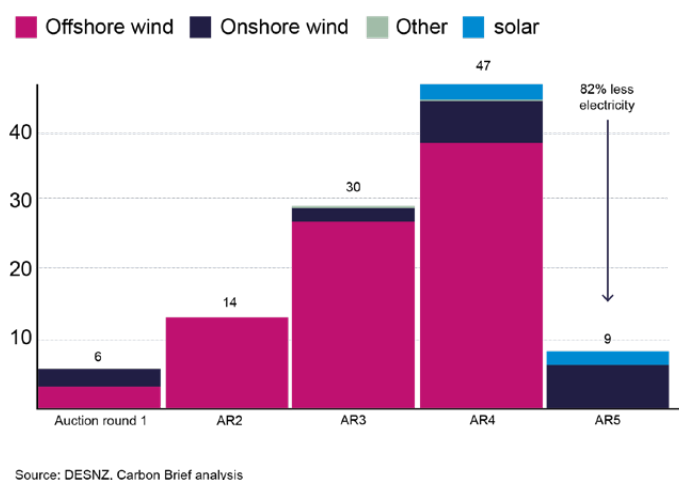
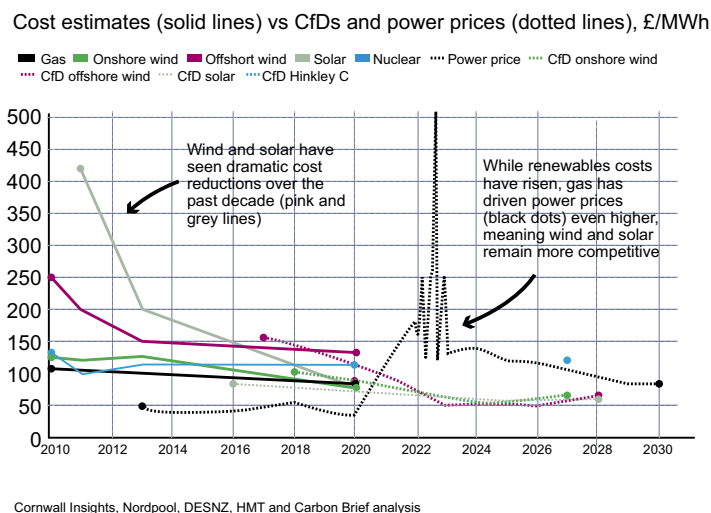


Figure 9: Wind and solar remain significantly cheaper than gas in the UK. Source: Carbon Brief³⁴



Labour's plans

Delegates at the Labour Party conference in October 2023 voted to back a motion proposed by Unite to nationalise the energy industry.³⁵ But Labour policy is to create a new national energy company, Great British Energy (GBE), and a National Wealth Fund (NWF) to make strategic investments in net zero infrastructure. Alongside GBE and NWF, Labour proposes a £6 billion a year Warm Homes Plan to insulate and decarbonise housing, and a swathe of broader reforms to planning laws and energy markets.

Labour's net zero energy plans are described in its mission paper *To make Britain a clean energy superpower*.³⁶ Its aim is not only to reach zero-carbon electricity by 2030, five years ahead of the government's target, but also to cut bills and create a million jobs over ten years. The party plans to be spending £28 billion per year by the second half of the parliament subject to its fiscal rules.



The party plans to be spending £28 billion per year by the second half of the parliament subject to its fiscal rules.

Labour conceives GBE as an operationally independent publicly owned energy *generator* which it hopes will serve several potentially competing policy objectives: net-zero and energy security; lower bills; “good jobs” and UK supply chains; and eventually become an Orsted-style national champion. It would be set up under a corporate charter directing it to support “the transition to cheap, clean energy by 2030” but would be operationally independent. Labour would mandate it to:

- invest in “next generation” energy technologies such as tidal power and floating offshore wind to de-risk and stimulate private investment
- co-invest in mature technologies such as wind and solar

- scale-up local energy generation through a £1 billion per year Local Power Plan (LPP), supporting local authority and community schemes that provide direct benefits such as bill discounts to local people

- absorb Great British Nuclear.

At its party conference in October Labour announced that GBE would also get involved in building new electricity transmission lines. It would do this by coordinating existing transmission operators to launch “a super-tender which will procure the grid supply chain that Britain needs”, and by “opening up future grid development to competition, with GB Energy looking to be involved”.³⁷

The NWF would make strategic equity investments totalling around £8 billion in ports, green hydrogen, battery gigafactories, and decarbonising steel production and other industrial clusters. It would ‘de-risk’ early-stage technologies, overcome market failures and crowd-in private sector investment. The British taxpayer will “get a return on its investment and where appropriate, own a share of the project to ensure it happens.”



Labour proposes a £6 billion a year Warm Homes Plan to insulate and decarbonise housing, and a swathe of broader reforms to planning laws and energy markets.

BOX 1: Labour in its own words

In a recent speech, Shadow Energy Secretary Ed Miliband summarised Labour's plans:

"...Fourth and finally, we will establish our new publicly-owned energy generating company: GB Energy. This country needs change. GB Energy is a vital part of this change to help ensure that the green transition works for Britain. Why have other countries, like Denmark, been winners in the global race for renewables? Because companies like Orsted, national, publicly-owned champions, haven't just invested in renewables, they have built the supply chain, the know-how, the clusters to make Denmark the European home of offshore wind manufacture. Every real leader in zero-carbon power has a national champion: EDF in France, Statkraft in Norway, Orsted in Denmark, Vattenfall in Sweden.

"Indeed, nine out of ten countries leading on zero-carbon power in Europe have state-owned national champions. Only one does not: Britain. That's why 45% of our offshore wind assets are owned by foreign governments. In years to come, it will seem absurd that Britain had no public clean energy champion to deliver jobs and wealth as so many of our competitors do. A Labour government will, and it will have a clear mission: to build clean energy and do it in Britain.


"GB Energy will exist to capture the potential of Britain's resources, for the benefit of the British people. It will invest in the next frontier of green energy like green hydrogen, floating wind, tidal power. And it will also look to partner with the private sector in more mature technologies. This can drive the creation of clean energy jobs in Britain and generate a return for taxpayers.

"So this is the British version of the Inflation Reduction Act: 2030 zero carbon power. Action to break down the barriers in planning, grid, skills and supply chains. A new national wealth fund to invest in partnership with the private sector. And GB Energy, our new publicly-owned energy company. And, by the time of the next general election, this will have been complemented by further plans, including for nature, transport and homes".³⁸

Labour also plans to reinstate a formal industrial strategy should it win power. Labour would: revive the short-lived Industrial Strategy Council on a statutory footing similar to the Climate Change Committee or OBR; retain successful policies such as the energy Catapults; set up a supply chain taskforce; and institute a Cabinet Subcommittee on National Resilience and a Minister for Resilience in the Cabinet Office to *"coordinate department-wide responses"*. Labour says it would avoid past pitfalls by picking challenges rather than winners, and cites the Covid vaccine response and the Automotive Council as good examples. It gives little detail about how GBE or the NWF would fit into this framework, but would invest in port capacity for offshore wind, and claims *"With Labour, Britain can become a global leader in producing electric cars, in engineering nuclear technologies, in developing hydrogen"*.³⁹

What we think

We agree with many of Labour's proposals, but not all; there are some important gaps to be filled; some areas to avoid; and the issue of who-does-what between the two new organisations and existing bodies such as UKIB needs to be refined.



But even if Labour were to accept our recommendations and revise its plans for GBE and the NWF, this alone would not guarantee a future government would achieve its targets. We believe more fundamental reform is necessary, which we outline at the end of this summary.

We reviewed Labour's plans against three principles:

- 1. Reform needs to be decisive but minimal – we have no time left to reinvent wheels.**
- 2. Any new organisations should be tightly focused to give the greatest chance of success.**
- 3. State-owned bodies should concentrate on the problems nobody else can solve.**

Great British Energy

Taking GBE first, we agree in principle that public equity investment in early-stage technologies is a good idea. The state having skin in the game would send a strong signal to companies and investors and should speed up commercialisation. A paper by Professor Marianna Mazzucato in Energy Policy found that direct public investment encourages far more private investment than measures such as feed-in tariffs, taxes and renewable portfolio standards.⁴⁰ A portfolio approach could manage the inevitable losses and might even nurture a future Tesla.

We have some reservations, however. First, some of the technologies in GBE's proposed portfolio are perhaps already too mature: tidal projects are already supported by CfDs;⁴¹ and private companies are already developing the Erebus floating windfarm off the Welsh coast.⁴² Has this turbine already sailed?

Second, none of these kinds of investments is likely to make a noticeable difference to Labour's 2030 net zero grid target and perhaps little even to 2035. That doesn't invalidate the basic idea - if not now, when? – but given the urgency of other net zero challenges, it might influence the allocation of effort.

Third, the role of early-stage investor is only one of several within GBE, and overlaps with Labour's plans for NWF, so there is a case here for rationalisation – and also for considering whether these investments could be made sooner by UKIB (see National Wealth Fund, section on page 29).

More generally, to be successful, any early-stage investments or manufacturing subsidies should be closely aligned to a clear-sighted industrial strategy. Labour has already outlined an industrial strategy but provided little detail so far of how the investments made by GBE or NWF would integrate.

GBE's second priority would be to co-invest in established renewables such as offshore and onshore wind *“where there is a clear case that public investment can...accelerate the pace...building supply chains and creating wealth for Britain.”*


We think this is the weakest of GBE's proposals.

First, the idea of creating a store of public wealth is unlikely to pay off for decades. It's true that European state-owned energy companies do now generate what at first glance appear significant sums for their governments: Orsted paid Denmark a dividend equivalent to £331 million in 2022;⁴³ Sweden received £292 million from Vattenfall;⁴⁴ and in Norway, Statkraft remitted £1.3 billion.⁴⁵ Divided between the UK's 28 million households, however, the numbers look modest, amounting to £12, £10 and £46 respectively.

For further context, shifting social and green policy costs from (regressive) UK electricity bills to (progressive) general taxation would cost £5 billion per year. Introducing a social tariff would cost between £2.3 billion and almost £15 billion depending on the type of scheme, according to modelling by the Social Market Foundation (the lowest cost scheme would benefit over 17 million people but leave almost 10 million worse off⁴⁶). During the cost-of-living crisis the government spent £40 billion to support households and bail out failed energy suppliers.⁴⁷ The gap between the profits of the Scandinavian national energy champions and the cost of meaningful social interventions in Britain is striking.

The youngest of the three companies was founded just over fifty years ago, and the other two have been around for more than a century. It seems unlikely therefore that a new British state-owned generator starting from scratch would generate significant amounts for several decades, and even then the returns per household would probably be small. For the same reasons, GBE investment in mature renewables would be unlikely by itself to *“supercharge”* the energy transition; the company would be just one developer among many – and a start-up, at that. Nor is owning a national energy ‘champion’ always a one-way bet; Orsted's share price slumped 60% in the year to November 2023 following a series of management missteps and \$4 billion in write-offs.⁴⁸

Meanwhile there is still plenty of private capital eager to finance the expansion in British renewables. The Commission heard evidence that developers and their backers have *“billions to invest”* provided CfD terms are improved to reflect recent supply chain inflation. It is widely agreed that the failure of the AR5 auction to attract a single offshore windfarm bid happened only because the government ignored repeated industry warnings that the price cap made project costs uneconomic. The success of the first Irish wind auction supports that conclusion.



In short, no witness could explain what problem the idea of GBE investing in mature renewables was meant to solve. That is not to say that a future Labour government should not pursue this course, simply that it should be clear about what exactly it hopes to achieve and the limitations. With so many other urgent tasks facing any incoming government, we cannot see this as a high priority.

GBE's third priority is the Local Power Plan (LPP), under which GBE would partner with energy companies, local authorities and co-operatives to build 8GW small-scale solar, wind and hydro in 20,000 projects by 2030. GBE would provide £600 million per year to local authorities and £400 million in low-interest loans to local communities to get this done. The idea is to emulate Germany and Denmark, where around half onshore wind is community-owned, and to provide direct benefits such as discounted energy bills to local people. Labour says this will ease grid congestion and strengthen local support for renewables, *"two of the biggest obstacles to the renewables rollout"*.

We entirely see the political point of this proposal. With some factions at Westminster and in the press trying to inflame opposition to net zero, it is important that measures to tackle the climate crisis are also seen to ease the cost-of-living crisis. It is also true that generating more energy closer to where it is consumed will reduce the cost of curtailment and could reduce the number pylons we need to build. Decentralised projects would also expand some of the cheapest renewables such as solar and onshore wind.

But again we have some reservations. We are unsure how many people will directly benefit by 2030, and we worry that those that do are more likely to live in affluent rural constituencies than deprived urban ones. A measure meant to ease cost-of-living pressures might end up worsening inequality. So any LPP would need to include measures to prevent such an outcome. Arguably, however, the quickest way to get *everybody's* bills down would be to accelerate the expansion of commercial offshore wind via CfDs, along with planning and market reform.

One important aspect missing from Labour's mission paper is Local Area Energy Planning (LAEP), through which local authorities map energy resources, patterns of demand and energy networks to determine which low carbon heating technologies are best suited to each neighbourhood, and to predict future infrastructure investment needs. This work is vital but

“

The gap between the profits of the Scandinavian national energy champions and the cost of meaningful social interventions is striking.

very few councils are yet engaged, and most will need guidance, training and funding to carry it out. Distribution Network Operators (DNOs) are struggling to supply new projects that involve lots of heat pumps or EV chargers, and to predict future loads. It would make sense for Labour's LPP to be closely coordinated with LAEP, so we think GBE should take on the role of directing and funding LAEP. There would be plenty of cross-fertilization between the two programmes and the outputs of LAEP should speed up the expansion of LPP.

While we think GBE should take on LAEP, there are some other areas it should avoid. It should probably not, for example, intervene in district heating, where the private sector approach is quite far advanced and changing horses now would be damaging.

Labour's more recent broadening of GBE's remit to include expanding the electricity transmission grid is short on detail and includes both strong and weaker elements, which we discuss in the Wider Reforms section on page 35.

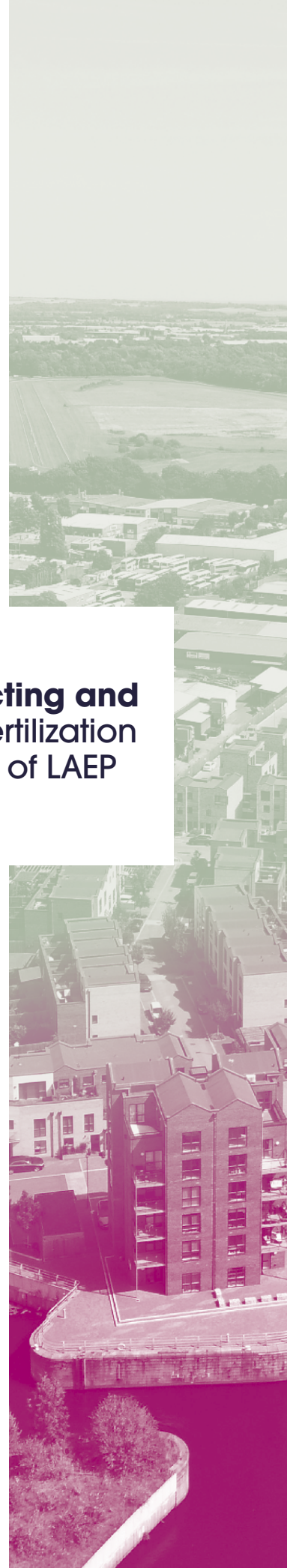


We think GBE should take on the role of directing and funding LAEP. There would be plenty of cross-fertilization between the two programmes and the outputs of LAEP should speed up the expansion of LPP.

National Wealth Fund

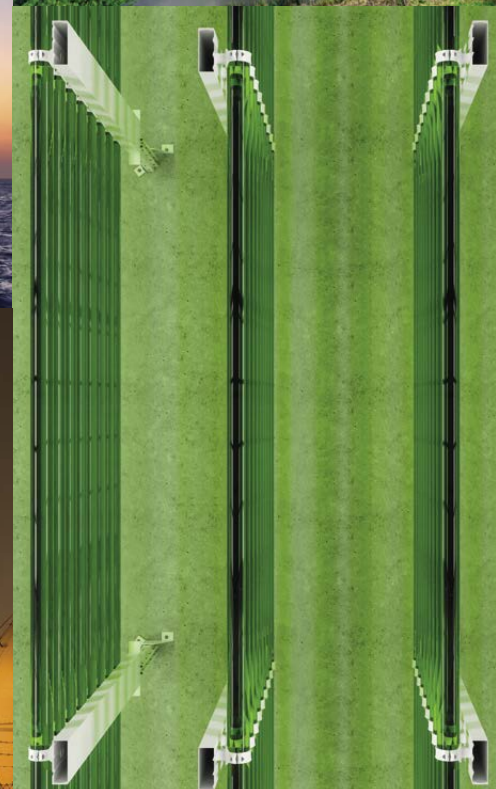
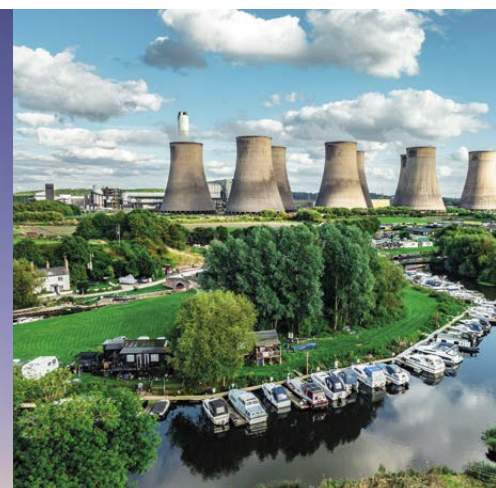
Labour's National Wealth Fund (NWF) would invest in big projects *"necessary to the energy transition and our industrial future"*. Over the course of a parliament it would invest £1.8 billion in ports, £500 million in green hydrogen, £1 billion into decarbonising industrial clusters and £2 billion in battery gigafactories. It would spend £3 billion over ten years decarbonising steel manufacturing. The British taxpayer will *"get a return on its investment and where appropriate, own a share of the project to ensure it happens."*

We agree with the proposed investment areas on Labour's list but have some broader reservations about the fund itself. First, the investment list is a good start but should be more ambitious (see Box 3 on page 31). Second, it is not clear what Labour's numbers are based on. Third, there is an assumption in the fund's name that it will generate a return, whereas we fear that many vital strategic investments may not – as shown by the history of Britain's gas storage capacity, (see Box 2 on page 30) – or only over some distant time horizon. That's why the investments need to be made by the state. Partly because of this, but also for the sake of speed, we question the need to create a new institution.



BOX 2: Strategic gas storage in Britain

In the early 1980s (state-owned) British Gas converted the depleted Rough field in the North Sea into a gas storage facility to manage seasonal variation in gas supply and demand – injecting and withdrawing gas as needed. It had a notional capacity of around 9 days' UK consumption but could supply at a maximum rate of 10% of peak demand. In 2014 (privatised) Centrica was not making enough money from the facility to finance necessary repairs. It told the government that if Britain needed a strategic gas reserve it would have to cover the cost since Rough was no longer commercially viable. A former insider recalls the government – heavily influenced by Treasury thinking – decided storage was unnecessary because there were several sources of supply including two pipelines and growing LNG capacity, and the facility closed in 2017. The energy crisis exposed the false economy of that decision and last year Rough reopened with government financial support. Centrica plans eventually to convert Rough to store hydrogen.⁴⁹





BOX 3: High ambition strategic investments

We agree with Labour's target areas, especially CCS with its 20-year history of policy flounder. In these huge, expensive infrastructure projects, the effect of public investment could be decisive. But we think the list should go much further and focus on the big bold investments needed to enable net zero generally and a net zero electricity grid by 2030 in particular. These could include:

- **Additional non-commercial interconnectors for grid balancing and energy security** such as the Xlinks cable. This privately developed scheme plans to import almost 4GW of highly reliable wind and solar power from Morocco through a 3,800km cable to provide “near-constant” energy for over 20 hours per day⁵⁰, and the government has already granted it Nationally Significant Infrastructure Project status.⁵¹ The company will need to raise £16 billion which it says it could achieve if granted a CfD of £48/MWh. But if there is any difficulty raising the capital, this is exactly the kind of project in which the government should consider investing directly.
- **Hydrogen caverns and other forms of large-scale long-term and multi-year energy storage.** In an electricity grid increasingly supplied by intermittent renewables we will need inter-seasonal and multi-year storage capacity to provide energy security, particularly during the still, overcast days of a high-pressure weather system in winter. A recent report from the Royal Society found that hydrogen stored in geological salt caverns, already widely used in the refinery industry, would be the most effective and economic, and that by 2050 we would need 100TWh of hydrogen storage capacity.⁵² But salt caverns take up to a decade to excavate and there is not yet a market that could support them as energy storage. For these reasons the government should fund their urgent development in the short term, as it should other technologies capable of providing the same multi-year energy security.
- **Strategic gas reserve and power stations.** Until we develop large-scale long-term energy storage, our energy security will have to be provided by natural gas. But for that we need to develop a properly strategic reserve of gas far larger than the Rough storage facility that reopened in 2022 (see Box 2). Like Rough, this store could be held in depleted North Sea gas reservoirs. But as Rough has demonstrated, there is no commercial case at present, so any new strategic reserve would need government financial support or direct investment. The depleted North Sea reservoirs could be converted from gas to hydrogen storage in future. The government should begin and finance this work at once and worry about how to recoup the cost later.
- **Carbon Capture and Storage (CCS) network – trunk routes and first reservoirs.** Since Britain will maintain gas fired power stations for some years, and since it must decarbonise heavy industry in any case, it must develop CCS. After 20 years of policy flounder some progress is now emerging. One thing the government could do to accelerate the development of CCS is to build the first reservoirs – again, in depleted North Sea fields – and a trunk route connecting them to Britain's centres of heavy industry. This would encourage massive private investment by proving Britain is finally getting serious and that CCS will happen here soon.

- **First three deep geothermal and other first-of-a-kind plants.** Deep geothermal is already widely used across northern Europe so the technology is proven – although big advances are being made in the US based on advanced oil and gas drilling techniques.⁵³ Britain’s sole operating deep geothermal plant opened at the Eden Project this year but provides only heat for the greenhouses; it has been offered an electricity grid connection in 2036.⁵⁴ Deep geothermal can provide either heat or baseload and load-following power, so is “*as pretty damn close to the holy grail as you can get*” according to Michael Liebreich, who advises one of the technology developers, and it ties up very little land. But is still five times more expensive than onshore wind and eight times costlier than solar.⁵⁵ Britain should commit to build the first three plants to bring the technology down the cost curve.
- **Direct air capture CCS plants.** To stay on course for net zero in 2050, global renewables capacity must triple and fossil fuel consumption fall by a quarter over the next seven years. The world is so far beneath the necessary trajectory that we are almost certain to need direct air capture. The country that develops it first is likely to have a major export industry, and the government that invests now could steal a march.
- **HVDC, cable and grid component manufacturing capacity to avoid global bottlenecks.** HVDC cables are vital for interconnectors and to connect offshore wind farms, yet European manufacturing capacity is limited to four cable suppliers⁵⁶ with total capacity of 2,000km per year and an average backlog of four to six years.⁵⁷ The Xlinks scheme (see above) alone needs over 15,000km and the company plans to build its own cable factory in Hunterston. But even if the project goes ahead that capacity will be devoted to Xlinks in the early years, and Britain aims to triple its offshore wind capacity to 50GW by 2030. The government should fund a state-owned HVDC factory immediately. This is the definition of a strategic investment.



The arguments for the state investing in these kinds of projects are 1) they are essential for net zero but too big and risky for the private sector so won't happen without public funding, 2) they are massive investments so the lower cost of state-backed capital is a major benefit; 3) by signalling serious intent they will galvanise £ billions in private investment; 4) the state can carry these costs, as public sector debt if necessary, and prevent them falling onto consumer bills until the assets start to operate, unlike the National Grid/Regulated Asset Base model, so helping to preserve public support for net zero.

None of this would be cheap, of course, and would probably add tens of billions to the national debt – at least temporarily. Longer term, NWF/UKIB could either sell assets off once operational, and recycle the capital into new projects, or continue to hold for the nation and use the profits to fund bill discounts or other social objectives. Multi-year energy storage could generate positive revenues over time and could also solve the issue of renewables 'cannibalisation' by creating a buyer-of-last-resort.

Labour describes the NWF as “*upgrading existing functions from the UK Infrastructure Bank (UKIB) and British Business Bank*”, but this begs the question of whether these investments could be achieved more quickly by repurposing UKIB than by creating yet another institution. Should Labour win the next election, UKIB would have a three-year head start on any new organisation it might create.



Should Labour win the next election, the UK Infrastructure Bank would have a three-year head start on any new organisation it might create.

An alternative arrangement

We worry that GBE as currently conceived would combine too many different skillsets in a single organisation: early-stage technology support; local energy; generic renewable generation; and absorbing GB Nuclear. This catch-all organisation would be hard to manage. We see no case for GBE to become a generic generator of mature renewables in any case, and we think it should take on other tasks such as LAEP. We think NWF should be more ambitious and – if a separate fund is even necessary – should integrate with UKIB. In any event, there is also some overlap between GBE and NWF to rationalise.

One arrangement could therefore be:

- **GBE:** LPP and LAEP only. No early-stage technology investment, no generic windfarms, no nuclear.
- **NWF:** big bold equity investments or other kinds of financial support for infrastructure and manufacturing capacity. On balance, however, we think creating this new institution is unnecessary. Of the proposed investments, those that fall within UKIB's remit – it has to make a return – can be provided by the bank, and all others by the government directly through DESNZ (the Department of Energy Security and Net Zero).
- **GB Nuclear:** remains separate.

The rationale is that GBE now has a much tighter focus on all the local work that directly touches people's lives. There is a real coherence in putting LPP and LAEP together. Instead of a somewhat sprawling remit, GBE's mission would be only to deal with 'all of the local stuff'. Including LAEP may make it more appropriate to set up GBE as a delivery agency rather than a company: at some point somebody has to say, in effect, 'you lot are having heat pumps, and you other lot are on district heating'. Can a company do that – even a publicly owned one?

In any case, the LPP must ensure its actions reduce not worsen inequality, perhaps by balancing urban and rural generation projects; directing profits specifically to fuel poor communities; incentivising investment by providing public funding for the social elements.

If created, the role of the NWF stays essentially the same, but its to-do list just got longer, and it takes on the early-stage investor role from GBE. On balance, however, we think it would be quicker and more effective to make these

investments through existing institutions. UKIB could make any investments that fall within its remit – under which it must make a return – and the government could make all others directly. UKIB may need more capital and staff, but its remit would barely change; it has already made one equity investment.

UKIB and the government could either sell assets once established and recycle capital into new projects, or they could hold assets long term and charge their use out to industry, so earning for the state/citizens and building wealth over time. Having taken all the risk, it should perhaps hold at least some assets for the returns. The strategic gas reserve and multi-year energy storage, fundamentally important for national energy security, should stay in public hands.

More generally, we think a significant benefit of NWF building new net zero energy infrastructure is that it can carry these costs and prevent them falling onto consumer bills until the assets start to operate, unlike the National Grid/Regulated Asset Base model, so helping to preserve public support for net zero.

In this arrangement, GB Nuclear remains separate and is not absorbed into GBE, because it has already been established, is highly specialised and doesn't sit well with GBE's other roles. Alternatively, GBN could oversee current projects at Hinkley and Sizewell, and UKIB and/or the NWF could invest in Small Modular Reactors (SMRs), Advanced Modular Reactors (AMRs) and fusion.

In this conception of GBE, mature renewables would be left to the private sector and expansion "supercharged" by market and regulatory reform.

Wider reforms

If we are to achieve net zero by 2050 and decarbonise the grid by 2035 or even 2030, GBE and NWF will not achieve it by themselves. That will depend on a series of wider reforms.

In any scenario, offshore wind must continue to do most of the heavy lifting. It's rapid expansion over the past decade is now threatened by the government's failure to raise the CfD ceiling to reflect supply chain inflation. Vattenfall, whose costs have risen 40% in 2023, recently abandoned its Norfolk Boreas offshore windfarm as uneconomic; no other offshore wind developer bid in the AR5 auction; and Community Windpower, one of Britain's biggest onshore developers, recently scrapped a major Scottish project because of rising costs and the windfall tax on renewable generators.⁵⁸

Assuming that problem is fixed, offshore and onshore grid construction needs to accelerate. Otherwise the continued rapid expansion of renewable generation combined with slower growth in the electricity grid would lead to soaring curtailment charges and/or delays in connecting the necessary generation.

At the same time, bills are higher than need be because of the primary importance of marginal gas in wholesale electricity prices. Eliminating or reducing this influence is vital to reducing bills as soon as possible, itself important in easing the cost-of-living crisis and maintaining public support for net zero.

In other words, the success of the whole net zero project therefore depends not only on new bodies such as GBE and NWF but on wider reforms to markets, grid development and planning.

Market reform

The government is consulting on various proposals. But energy markets and their regulation are stupefyingly complicated, and previous reforms have been long-drawn-out. The last round led to a three-year investment hiatus that we cannot afford to repeat.

In the short term, reforming CfDs to incentivise developers to build generation capacity in areas of high demand, so avoiding grid bottlenecks, would seem to be the easiest win. The process stays the same; we just need to revise the terms of the contracts to be auctioned. Now that auctions are held annually, successive CfD rounds could be amended quickly to deal with any problems that arise. This should keep the renewables capacity coming.

The next priority should be to eliminate the influence of marginal gas on the electricity price, which would reduce bills both immediately and increasingly over time. The Green Power Pool or split markets appear to be the proposals that address this directly.

“

The next priority should be to eliminate the influence of marginal gas on the electricity price...

Nodal pricing (or Locational Marginal Pricing) may be an option longer term, which should encourage more onshore renewable generation – as should Labour’s LPP. But neither will change the fact that most of the wind resource is in the North Sea and most of the demand is south of the England-Scotland border. We are going to need a massive expansion of the grid regardless.

We recommend concentrating on reforming CfDs; implementing the Winser review; rolling out Labour’s Local Power Plan; and developing inter-year energy storage. All of these will help ease grid bottlenecks while easier market reforms such as Green Power Pool or split markets are assessed. Restoring and ramping

up the offshore wind CfD programme should bring down average wholesale prices and feed through to bills.

Grid connection and planning

To create a net zero grid we need many new transmission lines. At present these take on average fourteen years to complete. The trouble is we don’t have that time. The government’s target date is just twelve years away and Labour’s – should it win power in 2024 – would be due within six.

A recent report by the Electricity Networks Commissioner, Nick Winser, makes recommendations to reduce the lead time to seven years.⁵⁹ The proposals include establishing the proposed Future Systems Operator (FSO) quickly and tasking it to produce a Strategic Spatial Energy Plan, to forecast and map future supply and demand; urgent work to establish regional flexibility markets to reduce the need to expand transmission; imposing on transmission owners a *“heavily incentivised responsibility to deliver to time and cost”*; planning reforms; and generous compensation payments to homeowners and communities close to new transmission lines.

In this context, we think Labour’s recent broadening of GBE’s remit to include transmission – though short on detail – combines stronger and weaker elements.

Coordinating existing transmission operators to launch *“a super-tender which will procure the grid supply chain that Britain needs”* is an excellent idea. It follows the example of the Dutch transmission operator, TenneT, which recently signed a €30 billion framework agreement covering up to twenty offshore grid connection systems.⁶⁰ This has secured priority access to Europe’s limited cable manufacturing capacity, supports standardisation and should reduce delay. Britain has not one but three transmission operators, so organising collective procurement could be a good way to emulate the Dutch approach. We would go further and encourage Labour to invest in domestic cable and substation production capacity here in the UK (see National Wealth Fund section on page 29).

We are less convinced by “*opening up future grid development to competition, with GB Energy looking to be involved*” – at least in the short term. Labour and others might argue this would inject some much-needed competitive pressure and in principle we agree. But GBE would be starting from scratch and given the extreme urgency of Labour’s 2030 deadline and the critical shortage of engineers,⁶¹ we question whether it could have any impact on individual projects before then. The additional complication might even cause further delay.

Winsor recommends the incumbent transmission operators should build the new lines but under “*strong and heavily incentivised responsibility to deliver to time and cost*” with both incentives and penalties. We recommend a future Labour government accept the Winsor recommendations in full and implement them on a wartime footing. The idea of GBE competing for individual projects is best left until after 2030.

The stiffer penalties and incentives regime that Winsor proposes for the Transmission Operators should be extended to the DNOs, which are investing far too little and making extraordinary profits, and whose tax-avoiding financial engineering resembles that of the scandal-ridden privatised water industry.⁶² Ofgem has recently been given powers to require DNOs to reconcile their Ofgem submissions with their actual tax returns. This exercise should be made compulsory and annual, and Ofgem should be given powers to enforce restitution.

Domestic decarbonisation

Decarbonising Britain’s home heating is often presented as the thorniest outstanding challenge for net zero. But other countries don’t seem to find it that hard. In a league of 21 European countries for heat pump sales in 2022, Britain came last. Finland managed almost 70 sales per 1,000 people, Britain just three.

True, Britain’s housing stock loses more heat than most other European countries, but the Climate Change Committee judges that 10 million homes are already heat-pump ready, an enormous market. The government recently raised the Home Upgrade Scheme heat pump subsidy to £7,500, meaning that in many homes heat pumps could now be installed for less than a replacement gas boiler (the total budget has not been increased, however, meaning a third fewer homes will benefit⁶³). As for the rest, insulation rates in Britain were ten times higher than today under policies abandoned in 2012.

Labour’s Warm Homes Plan, which aims to insulate 19 million homes within a decade through street-by-street programmes overseen by local authorities, and which should be worth £6 billion per year by the second half of the parliament, seems to match the scale of the challenge.



“

...insulation rates in Britain were ten times higher than today under policies abandoned in 2012.

Fundamental reform: the Net Zero Delivery Unit

Labour's plans for GBE and NWF are important policy suggestions, and if revised as we suggest, could make a significant impact. By themselves, however, they are nothing like enough. To have any chance of achieving net zero by 2050, let alone net zero grid by 2030, requires not only the reforms discussed in the previous section, but also fundamental reform at the top of government; a new **Net Zero Delivery Unit**.

The problem is that net zero policy spreads across several different departments and no single organisation or person owns the issue. The Skidmore Review clearly summarised the tangle of responsibilities:

Some of the largest decarbonisation challenges are shared across different parts of Government. These include decarbonising housing (DLUHC and DESNZ), developing the green economy (DESNZ, DIT, HMT, DfE and others), and ensuring land is used in a way that enables decarbonisation (DESNZ, Defra, and others). In all cases, the role of HM Treasury is crucial for determining the tax and spend levers used to deliver on these objectives – and in many cases some or all of the policy responsibility is devolved.⁶⁴

Skidmore argued that net zero requires a whole-of-government effort but heard evidence from the Institute of Government that: “a lack of joined-up policy making has often undermined cross-government ambitions. In 2020 we identified policy incoherence as a key barrier to progress on climate change.”

The interactions between policies are complicated, departments have their own vested interests, and because many policies are ‘cross-cutting’, companies often struggle to find “the right people in the right departments in government to discuss investment and business needs”.



Skidmore recommended that the government should set up new Office for Net Zero Delivery to (among other things):

- Take overall ownership of the delivery of net zero – including holding individual departments to account for their delivery
- Manage cross-cutting risks to delivery and share best-practice and common insights across different government delivery activity
- Manage the strategic relationship between the UK Government and Devolved Administrations (including ensuring regular net zero ministerial meetings)
- Own the delivery of priorities that sit outside any individual government department's remit – working in partnership with individual departments but ultimately being responsible

The Skidmore proposal has won widespread support. For example, the Aldersgate Group⁶⁵ of major businesses, academic institutions and civil society groups concluded *“it is difficult to see how a major economy can be decarbonised in fewer than three decades without an independent body co-ordinating and overseeing the timely delivery of key policy measures across Whitehall.”*⁶⁶

We agree with most of Skidmore's recommendations but think the Net Zero Delivery Unit needs even greater powers. Skidmore recommends it should have *“joint ministerial oversight from DESNZ and Cabinet Office”*. But we believe it should stand above all ministries including DESNZ (the Department for Energy Security and Net Zero) - because it needs the power to direct and hold all relevant ministries to account. And it needs at least parity with the Treasury, which has a history of blocking strategic projects on narrow economic grounds (see Box 2: Strategic gas storage in Britain, page 28).

One model could be the Delivery Unit of Blair's second term, widely credited with delivering an ambitious programme of public service reform 2001-2005.⁶⁷ Like that, a new Net Zero Delivery Unit should report to the prime minister or his or her deputy. It should have the power to direct and hold to account not only Whitehall departments but regional and local authorities, Ofgem, National Grid, DNOs and GDNs, and indeed GBE, UKIB and NWF.



We agree with most of Skidmore's recommendations but think **the Net Zero Delivery Unit needs even greater powers.**



The Net Zero Delivery Unit should also be a single point of contact for any company, local authority or civil society organisation that finds itself frustrated from delivering progress on net zero because of obstructive regulations or systemic issues. From evidence to the ERA Policy Commission, examples might well include:

- a local authority unable to install fast chargers because the DNO cannot or will not provide the connections
- operators of refrigerated warehouses prevented from acting in the grid storage market because of obstructive regulations
- grid storage operators losing out to gas peaking plant because of obscure operating practices in the National Grid control room

Another important characteristic is that it should have a team of independent experts to give public advice to make its actions transparent. Britain pioneered the practice of legally binding independent net zero advice with the Climate Change Committee – even if the current government appears determined to ignore it.⁶⁸ The difference here is that the advice would less about setting targets and deadlines and all about making sure we actually hit them.

Labour has suggested something similar with its Cabinet Subcommittee on National Resilience and Minister for Resilience in the Cabinet Office to “*coordinate department-wide responses*”, but we think any new unit should be explicitly focused on net zero and have the powers we propose to direct departments and hold them to account.

The body would be extremely powerful but the idea is not to tie up the entire regulatory and energy system in a ‘year zero’ reform. Rather, it is to add a single body to own the challenge, hold all relevant bodies to account, cut through obstacles and drive delivery. It would not create new policy but ensure current policy is carried out, and clear any barriers raised by existing regulations.



The Net Zero Delivery Unit should also be a single point of contact for any company, local authority or civil society organisation that finds itself frustrated from delivering progress on net zero because of obstructive regulations or systemic issues.

Conclusion

The challenges of delivering net zero – limiting climate change enough to preserve a habitable planet – are escalating fast. 2023 has become the hottest year in human history, unleashing worldwide heatwaves, wildfires, floods and ice-sheet collapse. Humanity is already testing the 1.5C limit and we are on track for much higher.⁶⁹ The Gulf Stream – which keeps British winters temperate rather than bitterly cold as in Canada, and causes the rains that help feed India, South America and West Africa – could fail as soon as 2025.⁷⁰ According to UN Secretary-General Antonio Guterres humanity has opened the gates of hell.⁷¹

The international and political context is also becoming more challenging. Industrial competitors such as the US and the EU are throwing hundreds of billions of pounds of public money at the problem, while at home some factions at Westminster and in the press seek to weaponise net zero costs as wedge issues at the next election.

In these circumstances, a publicly owned energy company could make a major contribution and state-backed investments could be decisive. But given the range of possible roles, it is vital to define exactly what these are intended to achieve, how they would work – and how to prevent it becoming an exercise in shuffling deckchairs.

As the headlines make excruciatingly clear, we are almost out of time. Nevertheless, with the reforms we have suggested, we believe Britain has a fighting chance of achieving net zero by 2050 and the vital net zero grid within a decade. It may be our last.



Appendix 1: The team

Lord Bilimoria (Chair)

Commissioners

First name	Surname	Job title	Organisation
Adam	Berman	Deputy Director	Energy UK
Nina	Skorupska	CEO	REA
Rachel	Fletcher	Director of Regulation	Octopus
Helen	Andrews-Tipper	Head of Policy	Carbon Trust
David	Boardman	Head of Strategic Projects	Birmingham Energy Institute
Phil	Longhurst	Professor	Cranfield University
Martin	Freer	Director	ERA
Faye	McAnulla	Programme Director	ERA
Benet	Northcote	Founding Partner	Four Thirty Two
John	Loughhead	Chair of Environment and Energy Technology	Mission Innovation
Andy	Manning	Energy Systems Lead	Citizens Advice

Witnesses

First name	Surname	Job title	Organisation
Donal	Brown	Director of Sustainable Design Collective	University of Sussex
Philip	McNally	Chair of Young Energy Professionals Forum	UCL
Rob	Saunders	Challenge Director	Innovate UK
Phil	Beach	CEO	Energy Utility and Skills
Paul	Spence	Director of Strategy	EDF Energy
Morten	Duedahl	Business Development Manager	Danish Board of District Heating
Jonathan	Friel	Associate Director	Mace
Nina	Skorupska	CEO	REA

First name	Surname	Job Title	Organisation
Tom	Greatrex	CEO	Nuclear Industry Association
Sara	Vaughan	Chair	Elxon
Tony	Curzon-Price	Economist Strategy Adviser	Self-employed & Ofgem
Michael	Liebreich	Energy consultant and thought leader	Liebreich Associates
Ryan	Jude	Programme Director	Green Finance Initiative
John	Flint	CEO	UK Infrastructure Bank
Christopher	Taylor	Technical Director	Vital Energy
Jon	Gibbins	Director	UK Carbon Capture and Storage Research Centre
Caroline Energy	Bragg	CEO	Association of Decentralised
Seamus	Garvey	Professor	University of Nottingham
Rachel	Fletcher	Director of Regulation	Octopus
Giles	Wilkes	Senior Fellow	Institute for Government
Lord	Deben	Former Chair	UK Climate Change Committee
George	Dibb	Head of Centre for Economic Justice	IPPR
Sandy	Hager	Senior Lecturer International Political Economy	City University
Melanie	Brusseler	Senior Researcher	Common Wealth
Adrienne	Buller	Director of Research	Common Wealth
Chris	Hayes	Senior Analyst	Common Wealth

Project team

First name	Surname	Job title	Organisation
Martin	Freer	Director	Energy Research Accelerator
Faye	McAnulla	Programme Director	Energy Research Accelerator
Nick	King	Marketing Manager	Energy Research Accelerator
David	Strahan	Writer	www.writefirstdraft.co.uk
Gill	Williamson	Graphic Designer	Gill Williamson Brand & Design

References

- ¹ £39,362,000 to end March 2023. Energy Prices Act 2022 and expenditure on energy schemes – Q1 2023 Statement made on 8 June 2023, <https://questions-statements.parliament.uk/written-statements/detail/2023-06-08/hcws835>
- ² Support for bringing energy companies back into public ownership, YouGov, <https://yougov.co.uk/topics/utilities/trackers/support-for-bringing-energy-companies-back-into-public-ownership>
- ³ Fossil fuel demand must fall by a quarter by 2030 to limit global warming, IEA says, *Financial Times*, 26 September 2023, <https://www.ft.com/content/44f71221-f99f-4d44-a46d-4255c085f199?segmentId=b0d7e653-3467-12ab-c0f0-77e4424cdb4c>
- ⁴ 0.7GW solar installed against 4.3GW needed annually. 2.7GW offshore wind installed against 4.5GW needed. Progress in reducing emissions, 2023 Report to Parliament, *Climate Change Committee*, June 2023, <https://www.theccc.org.uk/publication/2023-progress-report-to-parliament/>
- ⁵ Developer halts onshore wind farm due to rising costs and windfall tax, *Financial Times*, 27 September 2023, <https://www.ft.com/content/bb76a4c0-0b5d-4b18-8387-2143e4f1e064>
- ⁶ Analysis: UK renewables still cheaper than gas, despite auction setback for offshore wind, *CarbonBrief*, 8 September 2023 <https://www.carbonbrief.org/analysis-uk-renewables-still-cheaper-than-gas-despite-auction-setback-for-offshore-wind/>
- ⁷ Current capacity 78GW. Digest of UK Energy Statistics (DUKES): electricity, *National Statistics/ DESNZ*, July 2023, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1174357/DUKES_2023_Chapter_5.pdf
- ⁸ Work starts on UK's largest solar plant, *Financial Times*, 24 April 2023, <https://www.ft.com/content/037545f3-0f8f-4326-92cf-3a52fd910624?desktop=true&segmentId=7c8f09b9-9b61-4fbb-9430-9208a9e233c8>
- ⁹ Grid bottlenecks delay transition to clean energy, *Financial Times*, 30 May 2023, <https://www.ft.com/content/bf1b788a-f366-4637-9ae4-08dbc0bd90fa?desktop=true&segmentId=7c8f09b9-9b61-4fbb-9430-9208a9e233c8>
- ¹⁰ Large-scale electricity storage, *The Royal Society*, September 2023, <https://royalsociety.org/topics-policy/projects/low-carbon-energy-programme/large-scale-electricity-storage/>
- ¹¹ Progress in reducing emissions, 2023 Report to Parliament, *Climate Change Committee*, June 2023, <https://www.theccc.org.uk/publication/2023-progress-report-to-parliament/>
- ¹² Grid bottlenecks delay transition to clean energy, *Financial Times*, 30 May 2023, <https://www.ft.com/content/bf1b788a-f366-4637-9ae4-08dbc0bd90fa?desktop=true&segmentId=7c8f09b9-9b61-4fbb-9430-9208a9e233c8>
- ¹³ Why is HS2 costing so much? *The Spectator*, 27 August 2023, <https://www.spectator.co.uk/article/why-is-hs2-costing-so-much/>
- ¹⁴ Rishi Sunak scraps home energy efficiency taskforce, *BBC*, 24 September 2023, <https://www.bbc.co.uk/news/uk-politics-66900999>
- ¹⁵ The UK's 'green day' has turned into a fossil fuel bonanza – dirty money powers the Sunak government, George Monbiot, *The Guardian*, 29 March 2023, <https://www.theguardian.com/commentisfree/2023/mar/29/uk-green-day-fossil-fuel-dirty-money-sunak-renewables>

- ¹⁶ Pathways for Local Heat Delivery, *Birmingham Policy Commission*, 2022, <https://www.birmingham.ac.uk/research/energy/policy/pathways-for-local-heat-delivery.aspx>
- ¹⁷ The UK's 'green day' has turned into a fossil fuel bonanza – dirty money powers the Sunak government, George Monbiot, *The Guardian*, 29 March 2023, <https://www.theguardian.com/commentisfree/2023/mar/29/uk-green-day-fossil-fuel-dirty-money-sunak-renewables>
- ¹⁸ Next steps for heat policy, *Climate Change Committee*, 2016, <https://www.theccc.org.uk/wp-content/uploads/2016/10/Next-steps-for-UK-heat-policy-Committee-on-Climate-Change-October-2016.pdf>
- ¹⁹ The humble heat pump blows a green wave across Europe, *Financial Times*, 7 August 2023, <https://www.ft.com/content/acd6e873-751a-46bc-b789-52fc49165833>
- ²⁰ Housing fit for the future?, *Climate Change Committee*, <https://www.theccc.org.uk/publication/uk-housing-fit-for-the-future/>
- ²¹ Fuel poverty in your constituency, *NEA*, <https://www.nea.org.uk/fuel-poverty-map/>
- ²² Household electricity prices worldwide in June 2023, by select country, *Statista*, June 2023, <https://bit.ly/43U0QU6>
- ²³ UK exporters face hefty EU carbon tax bill after Sunak weakens climate policies, *Financial Times*, 1 October 2023, <https://www.ft.com/content/53e91aab-3290-4eb8-944d-19b9ee915baa>
- ²⁴ Large-scale electricity storage, *The Royal Society*, September 2023, <https://royalsociety.org/topics-policy/projects/low-carbon-energy-programme/large-scale-electricity-storage/>
- ²⁵ UK government debt and deficit: March 2023, *Office for National Statistics*, <https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/publicspending/bulletins/ukgovernmentdebtanddeficitforeurostatmaast/march2023>
- ²⁶ EDF: French energy giant posts worst-ever results, *BBC*, 17 February 2023, <https://bit.ly/3AqnZA4>
- ²⁷ EDF chief and French government clash over strategy, *Financial Times*, 24 September 2023, <https://www.ft.com/content/eae5a3d-ba76-40ba-8300-082f586574e8?desktop=true&segmentId=7c8f09b9-9b61-4fbb-9430-9208a9e233c8>
- ²⁸ Equinor and Orsted: How industrial policy shaped the Scandinavian energy giants, IIPP Policy Brief, *UCL*, March 2021, <https://www.ucl.ac.uk/bartlett/public-purpose/publications/2021/mar/equinor-and-orsted-how-industrial-policy-shaped-scandinavian-energy-giants>
- ²⁹ *Labour's industrial strategy*, 27 September 2023, <https://labour.org.uk/page/prosperity-through-partnership-labours-industrial-strategy/>
- ³⁰ Ireland makes history with its first offshore wind auction, *Wind Europe*, 12 May 2023, <https://windeurope.org/newsroom/news/ireland-makes-history-with-its-first-offshore-wind-auction/>
- ³¹ National Grid pays high price for gas-generated power during UK cold snap, *The Guardian*, 9 March 2023, <https://www.theguardian.com/business/2023/mar/09/national-grid-pays-high-price-for-gas-generated-power-during-uk-cold-snap>
- ³² UK renewables still cheaper than gas, despite auction setback for offshore wind, *CarbonBrief*, 8 September 2023, <https://www.carbonbrief.org/analysis-uk-renewables-still-cheaper-than-gas-despite-auction-setback-for-offshore-wind/>
- ³³ UK renewables still cheaper than gas, despite auction setback for offshore wind, *CarbonBrief*, 8 September 2023, <https://www.carbonbrief.org/analysis-uk-renewables-still-cheaper-than-gas-despite-auction-setback-for-offshore-wind/>
- ³⁴ UK renewables still cheaper than gas, despite auction setback for offshore wind, *CarbonBrief*, 8 September 2023, <https://www.carbonbrief.org/analysis-uk-renewables-still-cheaper-than-gas-despite-auction-setback-for-offshore-wind/>

- 35 Labour conference votes to nationalise energy, *BBC*, 9 October 2023, <https://www.bbc.co.uk/news/uk-politics-67056005>
- 36 Switch on Great British Energy, *Labour*, <https://labour.org.uk/missions/making-britain-a-clean-energy-superpower/>
- 37 Labour will build a clean energy grid for Britain to cut bills and create jobs, *Labour*, 9 October 2023, <https://labour.org.uk/updates/stories/just-announced-labour-will-build-a-clean-energy-grid-for-britain-to-cut-bills-and-create-jobs/>
- 38 “Consistent and clear climate leadership” – Miliband’s speech to the Green Alliance, *LabourList*, 28 March 2023, <https://bit.ly/40AVc6E>
- 39 Labour’s industrial strategy, *Labour*, <https://labour.org.uk/page/prosperity-through-partnership-labours-industrial-strategy/>
- 40 Neither crowding in nor out: public direct investment mobilising private investment into renewable electricity projects, Marianna Mazzucato et al, *Energy Policy*, May 2020, <https://www.sciencedirect.com/science/article/abs/pii/S0301421519307803>
- 41 Tidal energy projects awarded CFDs for the first time, *EMEC*, 7 July 2022, <https://www.emec.org.uk/press-release-tidal-energy-projects-awarded-cfds-for-first-time/>
- 42 Floating windfarm that can power 4,000,000 homes gets Welsh approval, *Metro*, 13 March 2023, <https://bit.ly/3n0uhDm>
- 43 Ørsted’s dividend was DKK 5.7 billion DKK (£662 million), but Denmark owns only 50.1%. Annual report for 2022, *Ørsted*, 1 February 2023, <https://orsted.com/en/company-announcement-list/2023/02/2023020162371#>
- 44 2022 full year results, *Vattenfall*, 8 February 2023, <https://group.vattenfall.com/investors/vattenfallsfull-year-results-2022>
- 45 Results for the fourth quarter and year end 2022, *Statkraft*, 2 March 2023, <https://www.statkraft.com/newsroom/news-and-stories/2023/record-results-and-dividend-to-owner/>
- 46 Designing a durable energy bill policy: modelling the options, *Social Market Foundation*, December 2022, <https://www.smf.co.uk/wp-content/uploads/2022/12/Designing-a-durable-energy-bill-policy-Modelling-the-options-Dec-2022.pdf>
- 47 £39,362,000 to end March 2023, <https://questions-statements.parliament.uk/written-statements/detail/2023-06-08/hcws835>
- 48 Ørsted: ill wind blows no good for developer that bungled estimates, *Financial Times*, 2 November 2023, <https://www.ft.com/content/1e2dac1f-69af-4443-ae39-97127375d1b3>
- 49 Rough facility, *Wikipedia*, [https://en.wikipedia.org/wiki/Rough_\(facility\)](https://en.wikipedia.org/wiki/Rough_(facility))
- 50 Morocco-UK Power Project, *Xlinks*, <https://xlinks.co/morocco-uk-power-project/>
- 51 <https://xlinks.co/morocco-uk-power-project-confirmed-as-nationally-significant-infrastructure/>
- 52 Large-scale electricity storage, *The Royal Society*, September 2023, <https://royalsociety.org/topics-policy/projects/low-carbon-energy-programme/large-scale-electricity-storage/>
- 53 Oil giants BP and Chevron become part-owners of ‘world-changing’ deep-geothermal innovator Eavor, *RECHARGE News*, 16 February 2021, <https://www.rechargenews.com/technology/oil-giants-bp-and-chevron-become-part-owners-of-world-changing-deep-geothermal-innovator-eavor/>
- 54 UK’s first deep geothermal energy project for 37 years switched on, *Financial Times*, 19 June 2023, <https://www.ft.com/content/774c05ac-373d-45dc-bcaa-8377ddac658f>

- 55 Next-Generation Geothermal Technologies Are Heating Up, *BloombergNEF*, 10 May 2023, <https://about.bnef.com/blog/next-generation-geothermal-technologies-are-heating-up/>
- 56 UK Electricity Interconnection: Driving competition and innovation in the HVDC supply chain, *National Grid*, November 2016, https://www.ofgem.gov.uk/sites/default/files/docs/2016/12/national_grid_hvdc_supply_chain_nov16_public.pdf
- 57 Cleaning Up podcast, Michael Liebreich, episode 92, interview with Simon Morrish of *Xlinks*, 22 June 2022, https://www.cleaningup.live/ep92-simon-morrish-650-leagues-of-hvdc-under-the-sea/?utm_source=pocket_saves
- 58 Developer halts onshore wind farm due to rising costs and windfall tax, *Financial Times*, 27 September 2023, <https://www.ft.com/content/bb76a4c0-0b5d-4b18-8387-2143e4f1e064>
- 59 Accelerating electricity transmission network deployment: Electricity Networks Commissioner's recommendations, Nick Winser, Electricity Commissioner, 4 August 2023, <https://www.gov.uk/government/publications/accelerating-electricity-transmission-network-deployment-electricity-network-commissioners-recommendations>
- 60 TenneT announces large scale HVDC cable tender for offshore grid connections in the North Sea, *TenneT*, 20 September 2022, <https://www.tennet.eu/news/tennet-announces-large-scale-hvdc-cable-tender-offshore-grid-connections-north-sea>
- 61 Electricity Networks Commissioner – Companion Report Findings and Recommendations, *Energy Systems Catapult*, June 2023, <https://es.catapult.org.uk/report/electricity-networks-commissioner-report/>
- 62 Profiting Amid the Energy Crisis, The Distribution Networks at the Heart of the UK's Gas and Electricity System, *Common Wealth*, March 2022, <https://www.common-wealth.org/publications/profitting-amid-the-crisis#:~:text=It%20finds%20that%20the%20GDNs,than%2090%20percent%20market%20shares>
- 63 UK net zero targets 'harder to achieve' after PM's speech – advisers, *BBC*, 13 October 2023, <https://www.bbc.co.uk/news/science-environment-67087411>
- 64 Mission Zero: Independent Review of Net Zero, Rt Hon Chris Skidmore MP, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1128689/mission-zero-independent-review.pdf
- 65 *Aldersgate Group*, <https://www.aldersgategroup.org.uk/membership/organisations/>
- 66 Net Zero Policy Tracker June 2023 Turning net zero ambitions into reality, *Aldersgate Group*, <https://www.aldersgategroup.org.uk/content/uploads/2023/06/AG-Net-Zero-Strategy-Policy-Tracker-2023-1.pdf>
- 67 The Art of Delivery: The Prime Minister's Delivery Unit 2001-2005, *History of government*, <https://history.blog.gov.uk/2022/08/26/the-art-of-delivery-the-prime-ministers-delivery-unit-2001-2005/>
- 68 UK net zero targets 'harder to achieve' after PM's speech – advisers, *BBC*, 13 October 2023, <https://www.bbc.co.uk/news/science-environment-67087411>
- 69 Global Climate Highlights 2023, *Copernicus*, <https://climate.copernicus.eu/global-climate-highlights-2023>
- 70 Gulf Stream could collapse as early as 2025, study suggests, *The Guardian*, 25 July 2023, <https://www.theguardian.com/environment/2023/jul/25/gulf-stream-could-collapse-as-early-as-2025-study-suggests>
- 71 UN chief warns of 'gates to hell' in climate summit, but carbon polluting nations stay silent, *AP*, 21 September 2023, <https://apnews.com/article/climate-change-united-nations-summit-disasters-8b4de7469a1745f42d76a11bd7ac8641>

Contacts

Professor Martin Freer, Director

✉ M.Freer@bham.ac.uk

Faye McAnulla, Programme Director

✉ Faye.McAnulla@era.ac.uk

Nick King, Marketing Manager

✉ Nick.King@era.ac.uk

era.ac.uk