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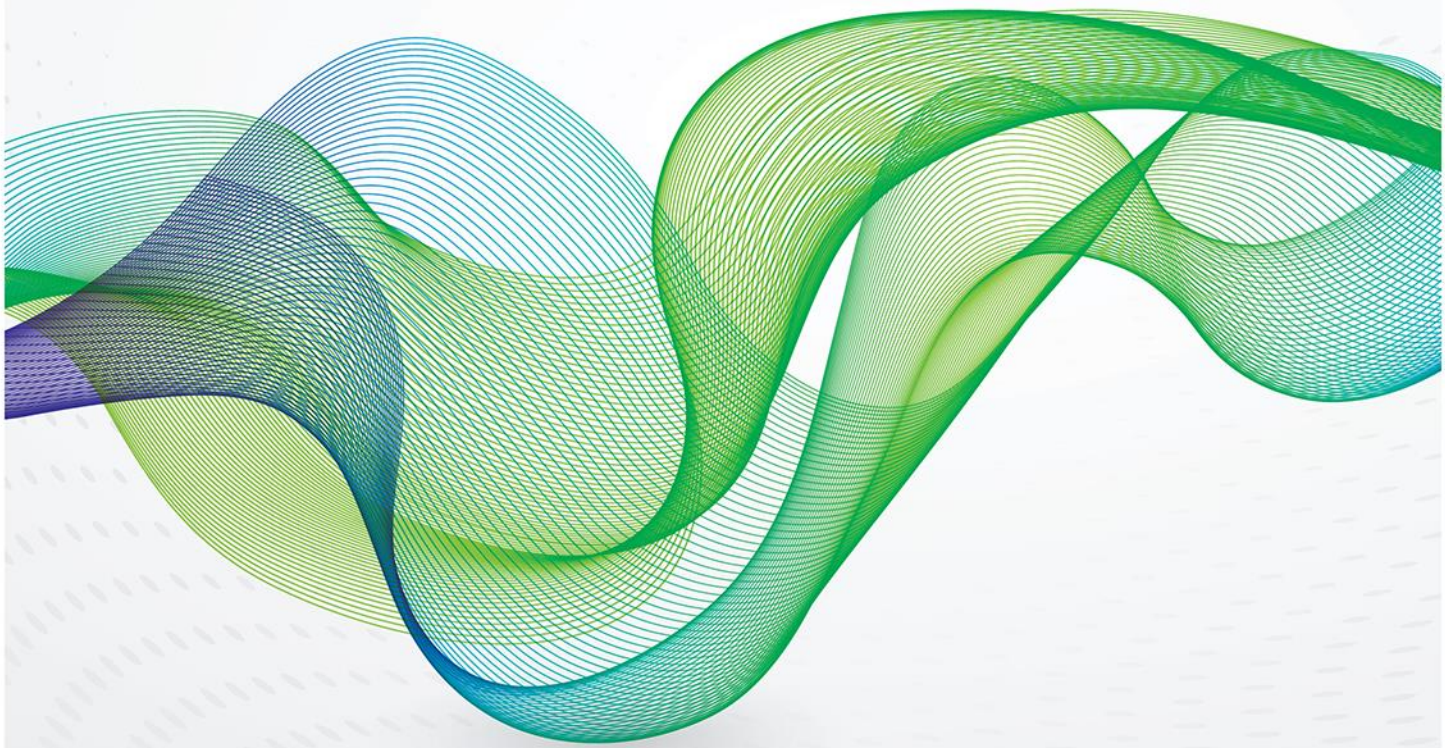
The UK's Decarbonisation Objectives and the Role of Great British Energy



OIES ENERGY COMMENT

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Introduction

The United Kingdom's new Labour government came to power after an overwhelming victory (at least in terms of Parliamentary seats won) in the General Election of July 4th. Throughout the campaign, it trod a fine line between promising change and holding out the prospect of stability, after what it saw as the chaos of the latter years of Conservative government. This difficult balancing act will now have to be implemented in a number of policy areas as the new government develops the details of its programmes, and the problems may be particularly acute in relation to energy policy.

Energy was an important component of the Labour Party's platform; one of its five key 'missions' was to 'make Britain a clean energy superpower to cut bills, create jobs and deliver security with cheaper, zero-carbon electricity by 2030, accelerating to net zero' and one of its proposed first six steps was to set up Great British Energy (GBE) 'a publicly-owned clean power company, to cut bills for good and boost energy security'. To achieve its 2030 goal the government promised to 'work with the private sector to double onshore wind, triple solar power, and quadruple offshore wind by 2030.'[1] The goals are very ambitious and represent a deliberate contrast with the policies of the previous Sunak government, which had deferred the target for the phase-out of fossil fuel vehicles and promised an 'affordable and pragmatic approach to net zero'[2] in order to minimise the impact on citizens.

Yet, although there were wide divergences between the parties in terms of the rhetoric used, there were also question marks over whether the Labour approach would be as ambitious as it looked. The then Shadow Chancellor (now Chancellor) Rachel Reeves had announced to the 2021 Labour Party Conference a Green Plan based on investment of £28 billion each year up to 2030. But this commitment was also deferred before the Election; GBE will have a capitalisation of only £8.3 billion (over the lifetime of the new government) as the need for fiscal stability appears to have been prioritised over the environmental goals. Against this background, this Comment looks at the new approach to energy policy (and in particular the goal of zero carbon electricity by 2030 and the role of GBE). It considers whether the new government has the will, means and resources to deliver its ambitious targets.

Great British Energy

The new government has wasted no time in starting to implement its mission. On 25 July Ed Miliband, the new Secretary of State for Energy Security and Net Zero published a 'Founding Statement'[3] for GBE and introduced a Bill to Parliament to bring it into being. The new company is not a traditional energy company – it will not be involved in supplying power to consumers. Its aim is rather to act as a catalyst, working with industry, local authorities, communities and public bodies to 'speed up the deployment of mature and new technologies, as well as local energy projects, to support the government's aim of decarbonising our electricity system by 2030'. It will be headquartered in and run from Scotland. It is hoped that it will promote energy independence, create jobs, lower bills and put the UK on the path to becoming a clean energy superpower.

These goals are very wide but, perhaps recognising the resource constraints, the government has provided a clearer focus in a set of five functions for GBE:

- **Project Investment and Ownership** The aim is that GBE will be more than simply an investment vehicle; it will also directly invest in and operate clean generation assets, particularly in less developed technologies like floating wind and carbon capture.

[1] *Change* Labour Party Manifesto 2024
[2] Conservative and Unionist Party Manifesto 2024
[3] See at https://www.gov.uk/government/publications/introducing-great-british-energy

- **Project Development** GBE will partner with other bodies to promote clean energy investment. An agreement has already been announced with the Crown Estate (which manages offshore waters in the UK) to bring forward new offshore wind developments, stimulate new technologies, unlock strategic bottlenecks and lower risks for future investors.
- **Local Power Plan** GBE is to work with local authorities and communities to help develop a more decentralised and resilient energy system with more local generation and ownership.
- **Supply chain** GBE will work to drive investment in clean home grown energy production and supply chains across the UK
- **Great British Nuclear** Great British Nuclear was set up in 2023 to help deliver new nuclear projects. GBE is exploring how best to work with it to deliver the common goals (though as yet the practical outcomes are unclear).

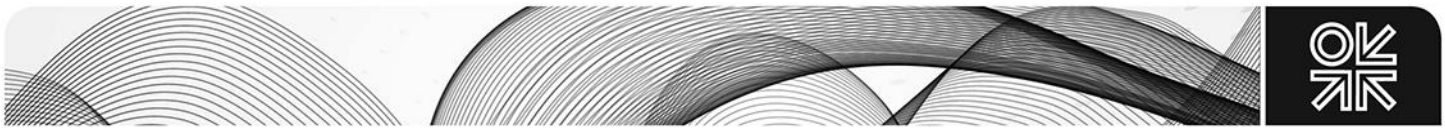
Assessment

The government has moved with commendable swiftness to start delivering on its clean energy goal and the plans for GBE seem to have been thought through, with a sensible identification of priority areas. Of course, some will be unhappy with the idea of a public corporation. There are well recognised risks with such a body – it may lack expertise and face insufficient competitive pressures to promote efficiency. However, the government believes that the public should be able to share more directly in the benefits of decarbonisation investments. There is also a case for saying that, in an area dominated by policy decisions, a public corporation is better placed to take policy risk, for instance in supply chain investments. In any event, the issue is academic. The government included GBE in the policy platform which it presented to the UK public and for which it received a clear endorsement.

Nonetheless a number of question marks remain over the 2030 goal and how and whether it can be achieved. It may help that the goal has not been clearly defined. Although sometimes the government has talked about clean 'energy' by 2030, more often it has referred to clean 'power' and it seems that it is referring to a zero carbon electricity system – a more realistic goal than a zero carbon energy system – with the net zero target for energy overall remaining at 2050. However, even in relation to electricity, a completely zero carbon system also looks very difficult to achieve. For instance, the Electricity System Operator has recently published a set of 'Future Energy Scenarios' showing pathways to a zero carbon energy system in 2050; all its pathways show some fossil electricity production in 2030.[4] A goal of a low carbon system (say emitting less than 50g of CO2 per kWh – more than 90% below the 1990 level by 2030) would be much more achievable. Indeed it has already been achieved for short periods; for example, during the weekend of 23–24 May 2020, while the Covid crisis was under way, electricity system carbon intensity reached the lowest level recorded, at 46g/kWh[5]. Getting to this target on a sustained basis would be much more difficult, of course, but should be feasible.

The problem is that, unless there are enormous advances in battery and other technologies, the system is likely to need to call on some fossil resources for back-up supply in times of low wind and solar generation, even with a huge growth in renewable generation. Indeed, the new government appears to recognise the need for some continuing gas fired generation. The Manifesto speaks of maintaining 'a strategic reserve of gas power stations to guarantee security of supply'. Nuclear may also have a role in the longer run, but in the period up to 2030 we cannot expect major new developments beyond those in the pipeline. Fossil fuel generation fitted with carbon capture may also be an option but again it seems unlikely that much will be available by 2030 – and the cost could be high. In other words the 2030 target might be achievable in

[4] Future Energy Scenarios (FES) | ESO (nationalgrideso.com)
[5] Microsoft Word - Glimpses of the future electricity system.docx FINAL2.docx (oxfordenergy.org)



principle, provided there is a bit of wiggle room in the precise definition. But is it achievable in practice? There are significant problem areas.

Resources: Reference was made above to the contrast between the original commitment to £28 billion per annum of government spending and GBE's capitalisation of £8 billion. This is not the full story of course; one of GBE's specific aims is to catalyse investment from private and other sources – the Department of Energy Security and Net Zero estimates, for instance, that the partnership with the Crown Estate could help leverage up to £30 to £60 billion of private investment. Indeed, most investment in green technology is made by private industry rather than directly by government, for instance through the Contracts for Difference for renewable generation.

But that does not mean that such investment is problem-free for a government committed to fiscal stability. It still has to balance environmental goals against its fiscal goals. An early indication of its attitude has come with the AR6 auction round for renewable generation currently under way. Such auction rounds are subject to a 'budget' - not an actual pot of money but an estimate of the cost which would (under current arrangements) be passed on to consumers. The budget for offshore wind in AR6 was set originally by the previous government at £800 million but interested parties, such as RenewableUK, called on ministers to increase the budget to £1.5 billion[6]. In the event, the government announced an increase to £1.1 billion.[7]This is a record budget, but also represents something of a pragmatic compromise and underlines one of the government's dilemmas – a higher budget would be more consistent with the step change in spending needed to meet the 2030 target, but would also make the promise of cheaper energy more difficult to achieve. One way out of this dilemma would be to transfer the cost of renewables support from consumers to the taxpayer but this could be politically difficult for a government facing a very tight fiscal situation.

In general, it is not at present clear that sufficient resources are likely to be directed to this area if the goal is to meet the 2030 target. The original £28 billion per year commitment was regarded by many analysts as about the right order of magnitude (the Climate Change Committee, for instance, has estimated that about 1-2% of GDP needs to be devoted to clean energy investment each year - say £25-50 billion) and, even with the extra private sector investment which the Department of Energy Security and Net Zero hopes to generate, GBE is unlikely to be able to mobilise anything like this level of resources.

Planning and Networks: One of the key barriers to the faster development of low carbon energy in the UK has been the difficulty of gaining planning approval (at least for onshore projects; the simpler planning processes are one of the factors which have boosted offshore wind). Under the previous government, for instance, onshore wind was subject to such a restrictive regime that it was in practice almost impossible to develop an onshore wind facility. The Labour government has made it clear that it will prioritise growth over 'Nimbyism' (opposition to new development at local level) and make planning approvals easier to obtain, for nationally significant developments in particular (including larger renewables projects). It has already removed the effective ban on onshore wind and Ed Miliband has approved a number of solar farm projects, including one in Cambridgeshire which went against the recommendation of the government's planning inspectorate. So the will appears to be there but it is unclear how sustainable it will prove to be – governments often find it easier to take difficult decisions early in their term of office. There are larger projects in the pipeline, including the Cottam Solar project, which have attracted considerable opposition. Campaigners argue that it will destroy prime agricultural land and wildlife and diversity. The decision on this project, due soon, will provide a further indication of the government's determination.

Perhaps even more difficult are the debates on the new transmission lines which will be needed to transport renewable electricity, including that from offshore wind, to centres of consumption. Even when they are necessary for the development of renewable sources, they can face huge numbers of objections and take

[6] As reported in 'The Guardian' of 29 July

[7] Record breaking funding for clean energy in Britain - GOV.UK (www.gov.uk)

5-10 years or more to come to fruition (as was the case with the Beauly-Denny line in Scotland, which attracted around 20,000 objections). Timescales like this would, of course, make the 2030 deadline even more of a stretch. There is also a wider question over whether the GB grid and regulatory frameworks are able to accommodate the new sources and loads associated with decarbonisation in a timely manner. Efforts are being made to deal with the problem but it is not clear whether they will succeed, for example to eliminate queues for connection to the grid.

(Over) Coordination: GBE is not the only new body set up to help promote decarbonisation. The UK is currently in the process of establishing a National Energy System Operator. This body, which was formerly part of the National Grid, responsible for operating the electricity system, is soon to become an independent public corporation responsible for planning Britain's electricity and gas networks as well as continuing to operate the electricity system. It will be tasked with 'ensuring that Britain's energy system is secure and affordable as well as forging the path to a sustainable future for everyone'.

Meanwhile, the government has set up a new body called 'Mission Control', headed by Chris Stark, the fomer Chief Executive of the UK Climate Change Committee. Its role is to 'turbocharge the government's mission to provide Britain with cheaper and clean power by 2030'[8]. What that means in practice is unclear, though it seems that its role will focus on troubleshooting. The aim is that 'it will work with key energy companies and organisations including the regulator Ofgem, the National Grid and the Electricity System Operator to remove obstacles and identify and resolve issues as they arise. This will speed up the connection of new power infrastructure to the grid, and cleaner, cheaper power to people's homes and businesses.' It has four main tasks:

- setting and tracking the overall approach to delivering 2030 across the energy system
- real time monitoring of progress on UK infrastructure projects critical to 2030
- acting as an innovation centre by encouraging discussion among experts
- serving as a convener for the Mission Control approach across government and with industry.

At the same time as announcing this new body, Ed Miliband also asked the Electricity System Operator to 'provide advice on the pathway towards the 2030 ambition, with expert analysis of the location and type of new investment and infrastructure needed to deliver it.'

Although there is much talk in these announcements, and those concerning GBE itself, of the new bodies 'working together' with industry, other public organisations and so on, it is difficult to avoid the impression that all these bodies will be operating in closely overlapping areas, potentially treading on each other's toes (for instance, both GBE and Mission Control are tasked with debottlenecking; both Mission Control and the ESO are expected to advise on pathways to 2030). This could risk creating confusion, rather than clarity, for the private and public bodies which will be expected to deliver the investment needed to meet the 2030 target. The energy sector was already fairly crowded with advisory and regulatory bodies of one sort or another (Ofgem, the Climate Change Committee, the Department of Energy Security and Net Zero and so on) and it is not clear that the new bodies all have distinct functions to perform. Just as there seems to be some lack of clarity about the respective roles of GBE and Great British Nuclear, so there is an apparent multiplication of bodies expected to advise on pathways towards the 2030 goal and means to promote it. It is not clear what happens if the various bodies see the priorities differently. Presumably the government will have to referee the process but it may take some time to see how this will work in practice.

(Lack of) Systems thinking: It may not seem the most immediate issue at first sight, but the biggest problem with the new government's approach may well be the lack of systems thinking. It is ironic that, despite the plethora of bodies discussed above, there is apparently none concerned with the architecture of the low carbon energy system as a whole (as opposed to the inputs needed for such a system or

[8] Chris Stark to lead Mission Control to deliver clean power by 2030 - GOV.UK (www.gov.uk)

pathways towards it). This represents a continuation of the policy approaches to decarbonisation over many decades, based on bottom-up, 'technology push' measures. The thinking seems to be that all that is needed to decarbonise the energy system is to substitute zero carbon sources for fossil fuels. But this ignores the fact that the energy system is just that – a system. Any change in one component changes the operation of the whole system and, as the changes accumulate, necessitates a fundamentally new approach.

It is not clear that the new government has recognised the scale of this challenge. Its policies, as outlined above, are focused largely on technology development and delivery. In one sense, this is both understandable and necessary. The UK Climate Change Committee has recently published a Report to Parliament[9] saying that urgent action is needed to get the UK back on track to meeting the 2050 zero carbon target (and the 2030 interim target of a 57% reduction in emissions) under the Climate Change Act for energy as a whole. Even before taking account of the new government's wish to accelerate decarbonisation and its new target for zero carbon electricity by 2030, it is clear that investment in low carbon sources needs to be stepped up fast. But investing in supply sources without considering the impact on the system risks being inefficient or ineffectual (or both).

This may seem like an academic point, but it is more than that – it has direct implications in practice. The growth of intermittent renewable sources of generation, for instance, leads to fundamental economic and practical changes. At the physical level, it raises challenges of both under- and over- supply. There are times of low wind and solar generation – which can last for days or even weeks. This is not to imply that there is no such generation during these periods, but if, as can happen, generation is well below nominal capacity, that still leaves a big gap to be filled. There are, of course, ways of doing so - alternative sources of generation as described above and other options, like interconnections with other systems, or demand response, but not all are low carbon and the zero carbon alternatives may involve significant cost and the removal of market and other barriers. Optimising the system would mean giving more attention to these other options and helping develop them, rather than just focusing on wind, solar etc. Simply expanding intermittent renewable sources to the maximum achievable does not ensure the achievement of environmental objectives. However much wind power you build, it will not help when the wind resource is not available. Indeed, ironically, it may give rise to the opposite problem – of over-supply at times when the natural resource of wind and solar is strong.

This is not just a theoretical problem. Even under the previous government's less ambitious targets, it was estimated that by the mid 2030s there would be excess generation for over 50% of the hours in the year, and over 60% by the 2040s. (It is true that any electricity system is likely to have excess generation capacity at some periods; however, in a traditional system based on fossil plants, sources which are not generating will be saving fuel costs, which form the bulk of total system costs. In a system based on intermittent renewable sources, whose costs are almost solely capital, there are no such savings, so the cost of excess generation capacity is far more significant). There are potentially ways of putting such excess generation to use, such as battery or other storage, and hydrogen generation, but there are cost and institutional barriers which need to be overcome or clarified – for instance, the question of whether there will be a hydrogen pipeline system, and whether the government will prioritise hydrogen use for industry. The system view needs to embrace not just electricity, but also the wider energy system.

In short, the system needs to be optimised somehow. In principle, market forces could be left to identify and develop the potential uses for excess generation, but in practice, the fact that wind and solar (and hydrogen) development are policy driven, with prices set by government action, means that it is unrealistic to hope that the system will optimise itself through the market route alone, especially given the tight timetable. The risk is therefore that a push to develop wind and solar generation by 2030, without

[9] Progress in reducing emissions 2024 Report to Parliament - Climate Change Committee (theccc.org.uk)

considering how they would fit into an optimised system, will result in an unbalanced generation fleet, with far too much capacity for most of the time, and too little to ensure energy security at other times.

The failure to think in system terms also affects the economics. Traditionally, the cost of electricity from different sources has been calculated by dividing the total cost of generation from that source by the output expected from it; after discounting, that produces the so-called 'levelised cost of electricity' (lcoe). But this measure is highly misleading in the new situation; what counts is not the cost of a particular source in isolation but the impact on total system costs. In the case of intermittent renewables there may be significant back-up costs, as well as increased network costs. There is also the problem of excess generation. Since lcoe calculations are based on the assumption that all output is used and useful, costs per unit used will be higher if that turns out not to be the case. So the consumer prices needed to cover costs may be significantly higher than lcoe calculations would imply.

This matters for the achievement of the government's 2030 target because part of its objective is to deliver cheaper electricity to consumers. Indeed, at some points, though not in its Manifesto, it promised a £300 reduction in consumers' bills. The origin of this specific number, and more widely of the expectation that bills would fall, is not clear but it appears to have been based on two beliefs:

- First, that renewables costs would continue to fall inexorably. That has indeed been the general trend in the past, but there is nothing automatic about it. The auction rounds for renewables referred to above, for instance, showed a general declining trend for the first four rounds, AR1 to AR4 (which secured some bids of £37.35/MWh). The last government thought the trend would continue for AR5 and set a relatively low strike price for offshore wind (£44/MWh). But this attracted no bids – costs have risen for a number of reasons including higher interest rates, which have a significant impact on capital intensive projects like offshore wind. The prices allowed have therefore risen for AR6 (to £73/MWh), which should help bring forward bids, but has also complicated the budget dilemma described above (the higher the price, the less the volume that can be absorbed within a given budget).
- Second, because the new government seem to have assumed that lcoe costs are a good reflection of the cost impact on consumers. But lcoe costs are very misleading in a high renewables system for the reasons outlined earlier. Even if the lcoe costs of renewables continue to fall, an increase in the volume of such generation may well lead to a rise, not a fall, in total system costs, if the issues discussed above are not addressed effectively.

So, focusing on the immediate need to expand low carbon sources may well be leading to problems down the line, in relation both to getting to zero carbon and to delivering lower costs. Despite the plethora of bodies involved, it is not clear that any is concerned with the high level architecture of the system and the changes which may be needed at that level.

An early challenge in this area may come in the current Review of Electricity Market Arrangements, started by the previous government. This process has been under way for some time and has involved widespread consultation which produced two (possibly contradictory) views: that present market arrangements are inadequate and need to be changed; but that radical changes would create too much uncertainty and should be avoided. It will be interesting to see how the new government takes this forward. It is the view of this author that radical changes in market structure are needed to reflect the fundamental system changes described above[10]; it is also difficult to see how electricity prices can be decoupled from fossil fuel prices, as the government wants, without a change away from the present system of wholesale power pricing based on short run marginal costs. But so far the government has paid little attention to such wider systems issues; it may prefer to duck the question in favour of shorter term continuity and stability.

[10] The Decarbonised Electricity System of the Future: The 'Two Market' Approach - Oxford Institute for Energy Studies (oxfordenergy.org)

Conclusion

The new Labour government has come to power with an ambitious set of energy goals. It has hit the ground running – removing the ban on offshore wind, approving some controversial solar projects, increasing the budget for AR6 and moving quickly to set up GBE, the centrepiece of its Manifesto commitments on energy. But in some ways the ambition is less than it appears, reflecting the government's commitment to fiscal stability. The resources devoted to decarbonisation are much less, at least so far, than promised earlier. The commitment to decarbonisation of energy by 2030 is in practice rather narrower than some of the rhetoric might imply. But it is still an ambitious target and will face a number of key challenges – in particular, whether the government can mobilise the higher level of resource needed; whether it can overcome planning delays; whether networks can accommodate new low carbon projects in a timely manner; whether the new institutional structure will create clarity or simply confuse the situation for all concerned, including the private sector actors who are expected to deliver most of the investment needed; and whether a real attempt will be made to optimise the system as a whole, rather than simply concentrating on technology inputs.

Of course, it is still very early in the new government's tenure, so no attempt will be made to produce any overall judgement in this Comment. However, the situation is developing rapidly; there will be some important decisions in coming months which will throw further light on the government's priorities. It should soon become clear how far the government is going to prioritise change over continuity and fiscal stability in its energy policy.