

Public Account Committee: Decarbonising the power sector

Energy UK response

13 March 2023

About Energy UK

Energy UK is the trade association for the energy industry with over 100 members – from established FTSE 100 companies right through to new, growing suppliers, generators and service providers across energy, transport, heat and technology. Our members deliver nearly 80% of the UK's power generation and over 95% of the energy supply for 28 million UK homes as well as businesses.

The sector invests £13bn annually and delivers nearly £30bn in gross value - on top of the nearly £100bn in economic activity through its supply chain and interaction with other sectors. The energy industry is key to delivering growth and plans to invest £100bn over the course of this decade in new energy sources.

The energy sector supports 700,000 jobs in every corner of the country. Energy UK plays a key role in ensuring we attract and retain a diverse workforce. In addition to our Young Energy Professionals Forum, we are a founding member of TIDE, an industry-wide taskforce to tackle Inclusion and Diversity across energy.

Executive Summary

Energy UK and our members would like to thank the Public Account Committee for the opportunity to respond to this publication.

Energy UK is fully supportive of the Government's commitment to deliver a decarbonised electricity system by 2035, subject to security of supply. We therefore welcome this opportunity to engage with the Public Accounts Committee and the report by the NAO. We also acknowledge the Government's enhanced focus on strengthening security of supply because of the volatility in international gas markets in recent months, which was driven to a significant extent by geopolitical factors.

Throughout our response, the NAO report, and the recent CCC report on decarbonising the power sector is a consistent call for the Government to deliver a series of specific plans to achieve its laudable ambitions. These plan must also address the concerns around an upcoming investment hiatus as the UK competes with other global markets. The UK has the potential to be a genuine world leader in a number of new sectors, including CCUS and Wind but will require clear Government support

A decarbonised power sector will be a significant boost for the UK, through an expansion in high-paying jobs, combating climate change, improving our energy security and the potential to lead in new technology markets.

Energy UK Submission Decarbonising the power sector consultation

On Monday 13th March 2023 electricity demand was 37.7 gigawatts (GW) at peak, which is around average for this time of year. The peak for the grid happens on cold winter days at around 7.30am, but that can rise to just under 50GW. Expressed over the course of a year, the UK used about 330 terawatt hours last year, 5% down on 2019, when the coronavirus pandemic dampened demand. By 2035, demand is projected to reach 460 terawatt hours, an increase of almost 40%.ⁱ

The NAO's report on the challenges faced by the UK as it looks to decarbonise the power sector by 2035 highlights a number of concerns industry, trade associations, and the R&D sectors have had in recent years. The report repeats the conclusions Energy UK spoke of in its recent "[Investment Hiatus](#)" paper. Namely, the need for a large and rapid increase in generation capacity and grid capability.

This response focuses on the benefits of decarbonising the power sector, and why it is paramount the Government now make decisions to aid investment in the UK's clean energy sector.

1. Vision (The What - renewables & decarbonising)

The government has set out a number of bold targets for the 2030s. These targets, and the Government's broader vision for a Net Zero energy system, are laid out in the Net Zero Strategy published in 2021. These ambitions increased further in 2022 with the publication of the British Energy Security Strategy (BESS), such as 50GW offshore wind as a target rather than 40GW by 2030, and 10GW of hydrogen rather than 5GW. The ambitions are to be applauded but with an increase in ambition must come an increase in the will to deliver on them. The UK has been taking several steps to decarbonise the power sector in recent years, including:

- A. Phasing out coal and gas: The UK has committed to phasing out unabated coal power plants by 2024. This means that any coal-fired power plant that does not have technology to capture and store carbon emissions will be closed down. Coal plants did have to be fired up again in 2022/3 due to the extraordinary circumstances faced by the UK. Gas power plants are expected to produce around 25GW of energy by 2030, down from 41GW in 2021. The [CCC recommends](#) the UK aims for unabated gas fired power stations to be phased out completely by 2035 in the most ambitious scenario. At the minimum, no new unabated gas plant should be built from 2030, and those built prior to this should be suitable for retrofit.
- B. Increasing renewable energy capacity: The UK government has set a target to generate up to 50GW of offshore wind power by 2030 with expectations of over 1GW of innovative floating offshore wind. It has also increased support for onshore wind and solar power and has provided funding for research and development of new renewable energy technologies. In 2022, approximately 40% of the UK's electricity was made up of renewable energy.ⁱⁱ
- C. Supporting low-carbon technologies: The UK government has provided funding for research and development of new low-carbon technologies such as carbon capture and storage (CCS) and hydrogen fuel cells.
- D. Carbon pricing: The UK has implemented two carbon pricing mechanisms that put a price on carbon emissions. This incentivizes power producers to reduce their carbon emissions.
- E. Nuclear power: The UK is investing in new nuclear power plants, which are low-carbon and can provide baseload power. The Hinkley Point C nuclear power station is currently under construction, and plans are underway for additional nuclear power plants.
- F. Power CCUS: The UK is investing in power CCUS projects to capture emissions at source. The aim is to put in place commercial frameworks to help stimulate the market to capture 10-30Mt of CO₂/annum by 2030.
- G. Networks: Across the UK networks will need to expand to accommodate more geographically disperse electricity generation, and greater flows of electricity as demand increases. A significant expansion in low carbon electricity generation will require a fundamental change in the energy networks of the UK to handle all the variable energy.

- H. Energy efficiency measures: The UK has implemented several energy efficiency measures such as the Energy Company Obligation (ECO) and the Green Homes Grant, which provide funding for energy efficiency improvements in homes and businesses.

Overall, the UK is taking a multi-faceted approach to decarbonising the power sector, which includes both increasing renewable energy capacity and supporting the development of new low-carbon technologies. DESNZ has repeatedly said it will not target a specific energy mix, but a range of flexible zero and low carbon technologies to achieve decarbonising the power sector. Energy UK supports this stance.

2. Action (The How)

The government has produced several documents in recent years detailing how it will achieve its goal of a decarbonised power sector. This includes the 10 Point Plan for a Green Industrial Revolution, the Net Zero Strategy and the Energy White Paper. These documents lay out the foundation for achieving this transition.

Based on whole-system modelling in the [Net Zero Strategy](#), by 2050, UK emissions associated with power could need to drop by 95-98% compared to 2019, down to 1-3 MtCO₂e. Even with the improvements in energy efficiency and system flexibility the UK is looking at a minimum of doubling demand, meaning an increase in low carbon energy generation of 400%.

The Energy White Paper envisages a significant shift to renewables in the power sector by the early 2030s, with the remaining time before 2050 spent on far more difficult to abate challenges. However, it is important to note that the decarbonisation of those sectors rely heavily on electrification, and therefore necessitate a substantial increase in clean electricity generation. The Energy White Paper lays out that the UK will generate all its electricity from low-carbon energy sources by 2035.

Energy UK agrees with the overall conclusion of the NAO report, that there are not enough concrete plans put in place by the government on how these will be achieved. This is having negative impacts on investment in the UK, where we are seen less favourable than the USA and EU. Energy UK recently released an in-depth [paper](#) on the coming investment hiatus in the UK in large part due to the uncertainty present. The need for investable frameworks for all key technologies needed for meeting the target is imperative.

3. Resilience (Supply chain/volatility/vulnerability/ Security of supply)

Supply Chain: The supplier hub model provides a strong foundation for a reformed energy market that helps consumers afford and manage their low carbon energy for their homes and vehicles. Smart meters and a single point of contact on their energy service can be incentivised to perform well through competition. This will support innovation that will be critical to driving consumer understanding and engagement in an energy system that support consumers to reach this future.

Energy suppliers are already driving change at the heart of the energy system by delivering the huge and rapid government support schemes, while providing world first demand flexibility services and developing low-cost heat pumps. While it is vital for the sector to have standards set that imbue confidence and trust in energy suppliers, energy suppliers need a new model of predictable and replicable interventions around which there is scope for innovative and sustainable business models. Currently, the prescription within the price cap and lack of clarity over bill support through bills limit scope for innovation.

The UK power sector has been experiencing supply chain issues in recent times, which have impacted the industry in various ways. Some of the key issues include:

- A. Shortage of key components: There has been a shortage of key components such as semiconductors and power electronics, which are essential for the operation of power generation, transmission, and distribution equipment. This has resulted in delays in the delivery of equipment and increased costs.

- B. Labour shortages: The UK has experienced labour shortages in various sectors due to factors such as leaving the European Union, the COVID-19 pandemic, and changes to immigration policies. The power sector has also been affected, with shortages of skilled workers in areas such as engineering, construction, and maintenance.
- C. Logistics and transport issues: The pandemic has disrupted global supply chains and led to delays in the delivery of equipment and components. There have also been issues with transporting equipment and materials due to shortages of shipping containers and increased demand for transport services.
- D. Price increases: The supply chain issues have led to increases in the cost of equipment and materials, which has impacted the profitability of power sector companies. This has also increased the cost of electricity for consumers.

The UK government and industry stakeholders are taking steps to address these issues. For example, the government has launched a new Energy Security and Resilience Strategy, which includes measures to improve supply chain resilience and increase domestic manufacturing capacity for key components. Industry stakeholders are also investing in new technologies and exploring alternative supply chain options to mitigate the impact of the supply chain issues.

Volatility: As the past eighteen months have shown, internationally traded commodities, like gas, that are subject to global factors outside of our control can be very volatile. Indeed, gas is especially so because physical restrictions (i.e. the need to move it by pipeline or liquefying it) mean there are more regionally segmented and illiquid markets for natural gas than exist for, say, crude oil. With high capital but low operating costs, renewable electricity is better suited to being bought and sold on long-term, fixed price contracts. More electricity locked into fixed prices gives consumers more certainty and protects them from wild swings in the market. This decoupling of retail electricity prices from gas is already happening, and is set to speed up significantly as more low cost renewable electricity is generated. From January 2023, CfDs are reducing the price cap for a typical bill by the equivalent of £54 per year.¹⁸ If the capacity commissioned through Auction Round 4 (an additional 11GW) had been in place at the agreed strike prices in 2022, it would have saved consumers an extra £4bn.

Vulnerability: The NAO report makes clear the challenges of building large scale nuclear, with 24GW the aim by 2050. Significant capital investment is needed, strict safety guidelines must be followed, and time allowed for the building of a new site. DESNZ has developed a mechanism called the Regulated Asset Base (RAB) model. This model gives companies a licence from Ofgem to charge a regulated price to consumers towards the cost of the nuclear plant's construction. This will enable investors to share some of the project's construction and operating risks with consumers, lowering the cost of capital. However, DESNZ does not have a plan for how it will finance any large-scale nuclear stations after Sizewell C. This must be a priority for DESNZ to keep the ambition of 24GW achievable. DESNZ must also look at how to support newer technologies including advanced modular reactors (AMRs) and small modular reactors (SMRs).

One of the biggest benefits of nuclear is that it is at far lower risk to international factors than oil and gas. Once a reactor is started, it will run 24/7 except for planned down time. This is why DESNZ must make it clear nuclear's role in the system.

Security of Supply: The renewable resources available to the UK are immense and combined with other technologies are more than capable of meeting our energy needs. Given the UK's vast potential for offshore wind capabilities combined with our R&D track record the UK is in a good position to become a net exporter of energy. The [Future Energy Scenario](#)ⁱⁱⁱ predicts that by 2035 the UK will be exporting 117.5 TWh of energy, this presents major opportunities for alternative income stream for both the UK taxpayer and industry. This is dependent on the UK achieving all the ambitions set out in the BESS. If prices maintain at current levels of approximately £50/MWh this would be a net income of £6bn/annum.

In other words, the UK has the potential to not only power itself by the middle of the next decade, but export billions of pounds worth of energy to Europe.

4. Affordability

Savings: A key point in the NAO's report is section 2.1 where it states that "DESNZ currently lacks an overarching delivery plan that brings these together." Referring to the plans to decarbonise the power sector.

Historically, renewables were supported by the Renewables Obligation mechanism that provided subsidies per MWh for renewable generation, funded by bills. These arrangements will unwind over the next two decades.

Now, renewables are supported by CfDs which offer generators a fixed price for their electricity. CfD strike prices for established technologies (e.g. fixed-bottom wind and solar) are now lower than wholesale electricity prices and return an average of £54 per year to every household. Emerging technologies (such as floating wind and marine energy) will continue to be offered high strike prices, but this will have the effect of reducing costs in the long run.

As the UK transitions to Net Zero, the UK's electricity export potential via electricity interconnectors is expected to increase significantly due to the mass build-out of offshore wind around the British Isles. Increasing the country's electricity export potential will:

- A. Help to support the build-out of renewables, and reduce the risk of renewable curtailment in the UK by enabling exporting excess renewable power to be exported overseas to where greater demand is.
- B. In turn, this will be key in helping the UK to reach its ambition of 50GW of offshore wind by 2030.
- C. Contribute towards security of supply and grid resilience in the UK and, more broadly, across Europe.
- D. Help in reaching an operable and resilient Net Zero power system at the lowest cost.
- E. Also help the UK to move away from its dependence on natural gas as the main source of grid flexibility, as electricity interconnection provides for greater grid flexibility and cost-efficiency.

The consequences of failing to build the required capacity is serious:

- F. £62bn of missing investment in the UK economy between now and 2030.
- G. Missing generation that equals the annual usage of every UK home in 2022.
- H. Losing out on potential bill savings of hundreds of pounds per household (depending on the price of gas).
- I. By requiring additional unabated gas, the UK could emit an extra 40 million tonnes of carbon dioxide per year— around the same as the carbon emissions of all of Scotland.

Missing our legally binding targets will harm the UK's reputation globally, and arguably will make it harder for us to advocate for countries with higher total carbon emissions to make efforts to reduce them.

Over the long term, gas is forecast to remain above pre-crisis prices for much of the coming decade. Coupled with the cost reductions that have been achieved in low-carbon generation, this means that we have likely reached a tipping point where technologies such as wind and solar are permanently cheaper than fossil generation. Comparing the Auction Round 4 strike prices the forward cost of electricity in 2026 mean that for every missing gigawatt of generation, depending on technology, it will cost consumers:

- J. Onshore wind: £151m/GW per year
- K. Offshore wind: £246m/GW per year
- L. Solar: £57m/GW per year

Reaching Net Zero by 2050 is expected to cost over £1.3 trillion in additional capital spending above what would have been spent on our existing carbon-based system. Around 40% of this additional

investment - over £500bn - will be needed for networks and electricity supply to ensure a multi-fuel, multi-technology low-carbon energy system. Whilst these are significant investments, it's critical to note that they are dwarfed by the cost of not investing in new low-carbon energy and remaining susceptible to volatile fossil fuel markets that are often driven by geopolitics.

Conclusion: Decarbonising the power sector by 2035 will require significant expense to achieve and cannot be solely done on public expense. The harsh reality is that the investment climate for UK low-carbon generation has deteriorated significantly over recent months. Inflation, interest rates, supply chain difficulties, and increased competition from abroad are all leading international investors to reconsider where they allocate capital. This has been compounded by a poorly designed windfall tax has caused immediate concerns for the viability of new clean energy projects, particularly renewables. The knock-on effect for new low carbon generation is that overall costs have increased by a staggering 20-30%, with some developers reporting cost increases of up to 50% for specific projects. These cost increases are compounded by systemic regulatory uncertainty, and lengthy delays to planning and grid connections which hold back new projects from being built quickly.

The UK is on course for an investment hiatus in low-carbon generation that could have crippling consequences for our Net Zero trajectory. Without rapid Government intervention, the UK will miss out on vital low-carbon capacity that can bring down bills, ensure a secure sovereign energy system which has significant export opportunities, and foster economic growth across the country. However, it isn't too late for the Government to intervene and ensure that the UK remains an attractive destination for international investment. Both immediate fiscal interventions and actions to create a sustainable investment environment in the long term are needed to secure the UK's low-carbon future.

As soon as possible - ideally in the upcoming Budget - the Government should set out changes to address concerns about the Electricity Generator Levy and the broader tax treatment of low-carbon investment. Time is of the essence to prevent an investment hiatus.

We would like to thank you in advance for considering our response and look forward to hearing further clarification of the next steps in due course. If you have any questions regarding our response in the meantime, please do not hesitate to contact me on the details below.

Edward Jones

Senior Policy Manager, Investment
Energy UK
Edward.jones@energy-uk.org.uk

ⁱ <https://www.theccc.org.uk/2023/03/09/a-reliable-secure-and-decarbonised-power-system-by-2035-is-possible-but-not-at-this-pace-of-delivery/>

ⁱⁱ <https://www.weforum.org/agenda/2023/01/2022-renewable-energy-uk-electricity/#:~:text=The%20energy%20industry%20experienced%20a,%2C%20wind%2C%20biomass%20and%20hydropower.>

ⁱⁱⁱ <https://www.nationalgrideso.com/future-energy/future-energy-scenarios>