

Written Evidence submitted by the Department for Business, Energy & Industrial Strategy and the Office of the Secretary of State for Wales

What role can, or should, nuclear power play in achieving net zero and UK energy security?

1. Nuclear power generated in the UK reduces our dependency on imported fossil fuels and limits our exposure to volatile global prices. Generating more low-carbon power in the UK – including nuclear – is fundamental in ensuring our energy security and independence.
2. Moreover, as outlined in the Net Zero Strategy, by 2035 all of our electricity will need to come from low carbon sources, subject to security of supply, whilst also meeting an anticipated 40-60% increase in demand.
3. A low-cost, net zero consistent system is likely to be composed predominantly of wind and solar. But ensuring the system is also reliable, means intermittent renewables need to be complemented by technologies which provide power, or reduce demand [on renewables], when the wind is not blowing, or the sun does not shine.
4. Large-scale nuclear is a well-established technology which is energy dense and generates continuous, low-carbon electricity at scale that can provide the necessary baseload to compliment renewable energy. Authorities including the UN Economic Council for Europe and the OECD International Energy Agency have both stressed the importance of developing new nuclear capacity, alongside more renewables, to meet the doubling in demand for electricity in the decades ahead.
5. In the British Energy Security Strategy, the Government outlined its plans for deployment of civil nuclear to up to 24GW by 2050, about 25% of our projected electricity demand. To realise this ambition, Government intends to take one project to Final Investment Decision (FID) this Parliament and a further two projects to FID, subject to value for money and relevant approvals, in the next Parliament¹.
6. Advanced Nuclear Technologies have the potential to work alongside other low-carbon energy sources to support a secure, affordable decarbonised energy system, to create synthetic fuel for future use, and to complement the high levels of intermittent renewable sources of energy. Small Modular Reactors could offer an exciting way to cut costs and build new nuclear quickly. Nuclear energy also has the potential for a range of co-benefits outside electricity generation. The low-carbon, high-temperature heat from AMRs could be used for clean hydrogen production and process heat for industrial and domestic use².
7. Sizewell C, together with its partners, is also developing and constructing an innovative heat-powered Direct Air Capture demonstrator plant that could in the future be scaled up and integrated with the proposed Sizewell C power plant with the potential to contribute towards the decarbonisation of difficult-to-decarbonise sectors and help the UK achieve its Net-Zero ambitions.

What are the main challenges to delivering the UK's commitment to bring at least one large-scale nuclear project to final investment decision by the end of this Parliament?

8. Nuclear projects are complex undertakings, acknowledged by the 10 Point Plan for a Green Revolution, requiring high up-front capital costs and involving long development and

¹ British Energy Security Strategy: <https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy>

² AMRs use novel coolants and/or fuels and typically have higher temperature outputs (~700-950°C) and smaller power outputs than conventional reactors.

construction periods, with projects globally, experiencing both cost and time overruns. Lack of available funding has in part led to projects at Wylfa and Moorside not materialising.

9. The Government announced up to £1.7bn funding in the 2021 Spending Review to support a large-scale nuclear project reaching a Final Investment Decision this Parliament. The Government entered into negotiations with the developer over the Sizewell C project in January 2021.
10. In addition to the £1.7bn funding, the Government separately entered into a £100m Combined Option agreement with EDF to invest in the Sizewell C project - the most advanced potential project currently in the UK. This investment is intended to bring the project to maturity and advance to the next phase in negotiations.
11. The Secretary of State granted development consent for the Sizewell C Nuclear Power Station on 20th July 2022, after thorough consideration of all relevant information. Commercial negotiations on the project are strictly separate from consideration of the application for development consent.
12. To help address this financing challenge, the Government has passed the Nuclear Energy (Financing) Act 2022 establishing a new Regulated Asset Base (RAB) model for nuclear projects. This could bring in new investment at a lower cost to consumers, compared to using the Contracts for Difference model, and help to unlock new private investment.

How important is the finance model to ensuring a successful nuclear project, and is the regulated asset base (RAB) model the best one to deliver this?

13. As noted above, nuclear projects have many unique characteristics, including lengthy construction times and high capital costs. Indeed, the cost of finance is the biggest driver of a new nuclear project's cost, making a project's financing model a critical consideration in the success of a potential project.
14. The Government established use of the RAB model through the Nuclear Energy (Financing) Act 2022 (NE(F)A) as an option to finance new nuclear projects with a lower cost of finance to consumers than existing funding mechanisms [as recommended by the NAO]. RAB is a tried and tested model, successfully used to finance other large-scale infrastructure projects, such as the Thames Tideway Tunnel.
15. The Government is in negotiations to use the RAB model on the Sizewell C project in Suffolk, but the NE(F)A is not specific to any individual project and would allow use of the RAB model to finance potential large, small, and advanced nuclear projects. The most appropriate financing model for a new project will be determined through negotiations between the project developer and Government.
16. By allowing the company's investors to share some of the project's construction and operating risks with consumers, the RAB model aims to help to reduce the cost of financing new nuclear projects compared to the Contracts for Difference model, and thereby reduce the end cost of electricity for consumers. BEIS estimates that a generic large-scale project using RAB could reduce the cost of a large-scale nuclear project by more than £30bn (in present value terms), compared with using the Contracts for Difference model.
17. The Act will also help to end our reliance on overseas developers for finance, which has significantly contributed to the cancellation of various nuclear projects in the UK, and could unlock investment from insurers, pension funds and other institutional investors.
18. Use of the RAB model will be determined by the Secretary of State, using the processes and criteria set out in the NE(F)A, to designate and then amend the electricity generation licence of a project company, subject to satisfying all relevant Government approvals. These

approvals would include robust assessments of project value for money, to prevent consumers from bearing unacceptable levels of risk.

What practical steps can the UK Government take to support the nuclear industry in developing a range of nuclear technologies, including small modular reactors?

19. In the British Energy Security Strategy (BESS), we announced that we will scope and set up Great British Nuclear (GBN) to enable nuclear projects and get us on a pathway to meet the Government's ambition to have deployed up to 24GW by 2050. GBN will be tasked with helping projects through every stage of the development process and developing a resilient pipeline of new builds. We are working closely with industry, which has a major role to play in supporting the creation of GBN so that GBN has the capability and capacity to deliver Government's ambition.
20. In 2021, the Government announced up to £120m for a new fund to provide targeted support to address barriers to entry to the nuclear market. The Future Nuclear Enabling Fund (FNEF) will competitively award funding to projects which have the potential to be part of our next decisions on new nuclear projects.
21. Government intends to initiate a selection process in 2023, with the intention that we will enter negotiations with the most credible projects to enable a potential Government award of support as soon as possible, including (but not limited to) Wylfa.

Policy Framework

22. The government has committed to developing a long-term nuclear siting strategy, as outlined in the BESS. This will inform a new National Policy Statement (NPS) for nuclear power generation, which will set out the planning and consent framework for nuclear fission projects deployable after 2025. This will be consulted on in the usual manner, in due course.
23. As stated above, the RAB model could finance potential large, small and advanced nuclear projects thus reducing the cost of finance and attracting investors for a range of nuclear technologies.

Supply Chain & Skills

24. Strengthening domestic supply chain capabilities is important to enable the UK to meet its ambitions outlined in the British Energy Security Strategy. The Government continues to work with the sector on how to ensure that the UK supply chain is well positioned to support meeting our ambitions and to seize the opportunities of new nuclear.
25. New projects should consider growth in the UK supply chain through the development of competition, the facilitation of new entrants and enable boosting innovation and skills.
26. Government will also launch a £75m Nuclear Fuel Fund to preserve the UK's front-end nuclear fuel cycle capability. This is in recognition of the value of our domestic nuclear fuel sector to our wider nuclear, and energy, strategy. Over three years, the Nuclear Fuel Fund will invest in projects to establish new domestic fuel capabilities (across Gigawatt reactors, SMRs and AMRs). This will allow the UK fuel supply chain to capitalise on emerging export opportunities and support the effective deployment of new reactor technologies domestically. A Request for Information was published on 19th July to inform the final design of the fund. This will close on 4th August. We expect that the fund will open for bids in autumn 2022.
27. The Government is working in collaboration with industry and the relevant skills bodies through the Nuclear Skills Strategy Group (NSSG) to better understand skills requirements and potential challenges faced by the sector. The NSSG published its updated Nuclear

Government Skills Strategic Plan in December 2020 which aims to secure the required supply of suitably qualified and competent personnel for the UK nuclear sector.

28. Government plans to deliver skills for the sector's requirements through national Science, Technology, Engineering and Mathematics (STEM) education including apprenticeships and higher education in combination with organisations' in-house training and targeted support from accredited skills bodies.
29. BEIS are supporting an ongoing high-level nuclear skills review across civil and defence nuclear which is expected to put forward recommendations in summer 2022. A number of strategic challenges with the skills landscape have been identified and multiple recommendations are expected. Government will need to consider the recommendations of both the this and GBN, including how they can be implemented. BEIS will work collaboratively with the Welsh Government on skills development.

Advanced Nuclear Technologies (including Small and Advanced Modular Reactors)

30. The Government intends to take two projects to FID in the next parliament, including Small Modular Reactors. The Ten Point Plan for a Green Industrial Revolution set a target milestone to deploy SMRs in the UK by the early 2030s.
31. Through the £385m Advanced Nuclear Fund (ANF) – announced in 2020 – government is providing funding for a Small Modular Reactor design and are progressing plans to build an Advanced Modular Reactor demonstration by the early 2030s.
32. As part of the ANF, Government has announced up to £210m of funding to support development of the Rolls Royce Small Modular Reactor design. This has been matched by private investment. The work will further develop the design and enable it to undergo the first two of three stages of Regulatory assessment.
33. In March 2022 the Government asked the independent nuclear regulators to accept the Rolls-Royce SMR into the Generic Design Assessment and to begin the safety, security and environmental impact assurance of the reactor design.
34. BEIS published guidance on Gov.uk for Advanced Nuclear Technologies to enter the Generic Design Assessment (GDA), the first stage of the UK's nuclear regulatory process to help support development, and effective regulation of, this technology³.
35. The Nuclear Decommissioning Authority (NDA) and Cwmni Eginio recently announced that they will work together on proposals for the siting of a new nuclear development at Trawsfynydd. The NDA mission is to decommission but both organisations are keen to understand what mutual benefits there are to working together. BEIS will continue to engage with Cwmni Eginio and the nuclear sector to discuss thinking on enabling and siting policy for new nuclear.

What would the likely cost be to the taxpayer of the UK Government supporting the development of a new nuclear power station at Wylfa?

36. Government continues to recognise the strength of the Wylfa Newydd site as a site which could host both gigawatt and SMRs and also notes the strong interest and support for nuclear power at Wylfa across North Wales. Government continues to have positive discussions with organisations who are interested in developing potential projects at Wylfa but no decisions have been taken on where the UK's next nuclear project will be sited.

³ GDA Entry is an open and ongoing process, with a standing invitation for advanced nuclear companies to apply when they believe they are ready to do so.

37. Government has always been clear that any new nuclear project in the UK must provide value for money for consumers and taxpayers. The most appropriate financing model for any new project will be determined through negotiations between the project developer and Government.
38. Use of the RAB model will be determined by the Secretary of State, using the processes and criteria set out in the NE(F)A, to designate and then amend the electricity generation licence of a project company, subject to satisfying all relevant Government approvals.
39. The key criteria when designating projects to benefit from the RAB model are that the project is sufficiently advanced, and that designation is likely to result in value for money. The Government has published [guidance](#) setting out how the Secretary of State would expect to judge that these criteria had been met when designating a project.
40. Any project would also have to fulfil all other approvals for Government in line with HMT Green Book principles, before a revenue collection contract is entered into. This will require due diligence, and further, detailed value for money assessments as the maturity of the project and engagement with the market progresses.

What is the potential economic impact for Wales of a new nuclear power station at Wylfa?

41. New nuclear offers significant economic benefits both locally and nationally and creates high-value, high-skill jobs including various engineering disciplines, safety case authors, nuclear physicists, as well as a huge range of construction jobs. The UK is one of only a few countries with a nuclear industry covering the life cycle of fuel production, generation, decommissioning, waste management and research which presents economic opportunities across the country.
42. BEIS analysis suggests that a typical large-scale nuclear project like Hinkley Point C will support around 10,000 jobs during the peak of construction and around 900 permanent jobs once the plant is operating – a period expected to last at least 60 years.
43. In the case of Hinkley Point C, EDF expects that 64% by value of contracts will be awarded to UK companies and has spent £4.1 billion with companies in the South West to date. There is a target of £130 million of community investment spending, with £123 million delivered to date.
44. EDF have reported that 15,000 job opportunities have been created, with 36% of the workforce recruited from the local area, and over 900 apprentices trained to date.
45. Wales has already benefited from the construction of a new nuclear power station in the South-West. Government will work to ensure that any new project provides strong social and economic benefits to the local community and the regional economy, as we have seen with Hinkley Point C.
46. Around 200 Welsh companies are working as part of the Hinkley Point C supply chain in areas including steel fabrication, training, engineering, scaffolding, water management, transportation, and site services. Contracts worth over £250 million have been awarded to Wales-based businesses.
47. Research & Development and local education providers from colleges to universities are important to the nuclear industry and future projects. As an example, EDF has worked with multiple universities including the University of Sheffield and the University of Bath to support development of Hinkley Point C and other aspects of the nuclear industry.
48. EDF and the Nuclear AMRC (Advanced Manufacturing Research Centre) are working together to maximise the opportunities for hundreds of UK manufacturers, including many SMEs, during the building of new low-carbon power plants at Hinkley Point and Sizewell.⁴

Given its proximity to the Wylfa site, Bangor University is well placed to benefit from similar potential opportunities.

49. Bangor University were one of the successful UK entities in the most recent fission Euratom Research & Training programme research call and they will be free to put forward proposals for the next. The Euratom programme is a part of the EU's efforts to further develop technological leadership and promote excellence in nuclear research and innovation.
50. Bangor University's Nuclear Futures Institute has recently signed a Memorandum of Understanding (MoU) with the National Nuclear Laboratory that will see them work together to advance education and research in the field of nuclear energy. They will also work on joint research projects and share access to infrastructure, facilities and equipment that will advance nuclear technologies.

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⁴ <https://www.sheffield.ac.uk/energy/news/edf-and-university-sheffield-nuclear-amrc-deepen-collaboration>