



Department for Energy Security & Net Zero

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Rt Hon Philip Dunne MP
Chairman of the Environmental Audit Committee
House of Commons
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27th March 2024

Dear Philip,

Thank you for your letter of 13 February, on behalf of the Environmental Audit Committee, setting out the Committee's observations following receipt of 34 evidence submissions and a further evidence session of 13 December 2023, as part of an inquiry into Small Modular Reactors (SMRs) and the transition from fossil fuels.

Nuclear power is and will continue to be an essential part of the UK's energy mix, generating "firm" electricity to offset intermittent renewables and ensure a lower cost electricity system for consumers. Compared to the high gas prices of 2022/23, were Hinkley Point C generating power, for example, it would have saved electricity consumers around £4bn in that year.

The Civil Nuclear Roadmap published in January reiterates the Government's long-standing commitment to deploy up to 24GW of nuclear power by 2050, as part of our Net Zero targets, and further sets out new policy priorities to underpin the UK's ambitious nuclear programme. As you note, the Roadmap includes an ambition to secure investment decisions to deliver between 3GW and 7GW of nuclear generating capacity every five years from 2030 to 2044. This is a significant step forward as the Government undertakes the biggest expansion of nuclear power in 70 years and highlights our long-term commitment to the sector. It is to this end that the Roadmap includes a commitment to explore options for a further large-scale nuclear plant beyond Sizewell C.

SMRs are expected to play an important part of the UK's nuclear renaissance. As you are aware, in 2023 Great British Nuclear (GBN) launched a Technology Selection Process for SMRs, with the aim of identifying those technologies best able to reach a project Final Investment Decision (FID) in the next Parliament and deliver projects in the mid-2030s, potentially releasing billions of pounds of private and public investment. Our aim is to deliver the fastest competition of its kind in the world.

Whilst GBN is very much focused on the Government's flagship SMR Programme, it is also building the capability and skills to lead the delivery of the Government's programmatic approach to nuclear and to provide government with the best possible advice to underpin effective nuclear policy.

To enable the nuclear programme, access to suitable sites will continue to be essential ingredient. On 6 March, the Government announced that GBN is buying sites at Wylfa

(Ynys Mon/ Anglesey) and Oldbury-on-Severn (Gloucester). While no decisions on projects have yet been taken, the acquisition of these two sites will ensure we can progress with plans to build varying sizes of new nuclear power stations.

You also reference nuclear regulation. The Roadmap details a number of measures regulators have taken to streamline regulatory processes. As a result of these measures, the Government expects that there is significant potential for streamlining and acceleration. Subject to the maturity of the technology and design, and the level of comparability between the Generic Design Assessment (GDA) processes and those of any other well-established regulatory bodies who have assessed and licensed the design against international standards, the timescales for completion of a GDA could potentially be reduced by up to 50%.

Finally, a continued commitment to nuclear safety, security, environmental protection and non-proliferation remains at the core of our approach to nuclear energy. In the financial year 23/24, the Government provided direct funding to the ONR to review its approach to and process for design assessment and nuclear site licensing to identify opportunities for simplification and streamlining. This is on top of funding in previous years to support a review of our internationally recognised Generic Design Assessment process.

Answers to your specific questions are below.

Q1: Please set out the contribution in GW which power from SMRs is expected to make to the electricity generation mix in the UK by 2035, the date by which the UK's power system is expected to be decarbonised.

A: The 2022 British Energy Security Strategy set out our ambition to deploy up to 24 Gigawatts of civil nuclear generation by 2050, around 25% of our projected 2050 electricity demand. Achieving this will require a mix of nuclear technologies and the Government has committed to a programmatic approach to the delivery of new nuclear projects beyond Sizewell C (SZC), including the ambition to take two Final Investment Decisions during the next parliament.

To deliver this, we have launched Great British Nuclear (GBN), an arm's-length body responsible for helping deliver new nuclear projects. Because we consider that SMRs could play a vital role in helping to deliver our nuclear ambitions, GBN's initial priority is running a competitive technical selection process to choose those SMR technologies most likely to facilitate operational projects by the mid-2030s. This process is expected to result in contract awards and inform the eventual size of any projects taken forward, although the ambition is for SMR projects to be making a material electricity generation contribution by the mid-2030s.

The Civil Nuclear Roadmap set out government plans to take investment decisions on 3-7GW of nuclear capacity every five years between 2030 and 2044. There is value in maintaining flexibility over the specific technologies and capacities we pursue to ensure best value for money. Further clarity on the optimal mix of nuclear technologies will be provided as the programme develops.

Q2: What assessment has the Government made of the cost to (a) the public purse and (b) consumers of (i) an electricity system with SMRs as part of the energy mix and (ii) a system based on variable renewables?

A: Published modelling by BEIS in 2020 shows that most of the UK's future electricity needs should be met from renewables and flexible technologies, including energy storage and demand side response. But it also demonstrates that to achieve a stable, low-cost electricity system to meet net zero, we need more low-carbon firm power, like nuclear, to complement the intermittency of technologies like wind and solar and the uncertainties associated with storage technologies.

SMRs have the potential to reduce the cost of new nuclear owing to a number of factors. Their modularity, which refers to the manufacture of most of the components off-site in standardised factory conditions (reducing issues like weather-dependency), allows for replication and quality control. Faster deployment also offers the potential of reducing financing costs, which would lead to further savings overall. However, until SMRs have been deployed commercially it is not possible to test or quantify these potential savings.

Thinking in this area is currently being developed and will be given due consideration as part of usual Government policy development processes. Industry has been invited to provide views via the Alternative Routes to Market for New Nuclear Projects consultation, which is open until 12 April.

Ahead of reaching a final investment decision on any SMR project, a full value for money assessment will be made, in line with Green Book guidance to ensure value for money.

Q3: The Government is expecting investment decisions on nuclear generating capacity of between 3 and 7GW in each of the three five-year periods between 2030 and 2044. For each such period, please set out the (a) minimum and (b) maximum likely number of investment decisions in each of these periods which involve SMRs, and the Government's estimate of the (i) lowest and (ii) highest proportion of overall generating capacity represented by investment decisions involving SMRs.

A: To signal our commitment to a long-term nuclear programme, the Civil Nuclear Roadmap (CNR) announced the intention to make nuclear project investment decisions concerning 3-7GW every five years between 2030 and 2044. Alongside the SMR technology selection process currently underway, the CNR committed to exploring the option of a further large-scale nuclear plant after Sizewell C. As we move towards our ambition of delivering up to 24GW of nuclear capacity by 2050, we need to be flexible about the technologies we pursue, and the exact role government takes in supporting their deployment over the coming decades.

It is too early to indicate the minimum and maximum number of investment decisions, which will in part be informed by the type of nuclear technology deployed. As above, subject to contract awards and the eventual size of any projects taken forward, the ambition is for SMR projects to be making a material electricity generation contribution by the mid-2030s.

Q4: Please set out the Government's overall assessment of the readiness for deployment of the designs for SMRs selected in the GBN competition, given that none are yet commercially available or licensed by any nuclear regulator.

A: GBN will assess all bids against criteria, which includes readiness for deployment, and ensure a robust process throughout the competition. Bidders will need to satisfy

all applicable regulatory requirements prior to deployment. Further announcements will be made in due course.

Q5: What account will the Government be taking of low carbon construction techniques in making a final decision on initial investment in the SMR programme and in developing the programme?

A: The SMR technology selection process will be subject to relevant building regulations and procurement rules. The environment and sustainability requirements ensure that all designs are aligned with the conditions for management of whole-life carbon in buildings and infrastructure and that they take account of carbon reduction plans in the procurement of major government contracts.

Q6: What is the estimated overall cost of the initial SMR programme the Government is contemplating, and how much of this is likely to be borne by the public purse?

A: It is too early in the process to make calculations on spending, as it will depend on which technology or technologies we choose to support. Final decisions on funding will be taken after a detailed competitive negotiation process, subsidy control analysis, and value for money assessment, and will be consistent with the government's overall fiscal objectives. The Contract Notice, published on 18 July 2023, sets out an intention to enter into a development contract with those successful bidders, with the option of pursuing a project through FID to construction and subsequently operations, providing a route to market for successful bidders.

Q7: Under the Regulated Asset Base (RAB) model under consideration by the Government:

- **to what extent will the cost of constructing and operating SMRs be borne by electricity consumers; and what assessment Ministers have made of the effect this might have on consumer behaviour?**
- **will the consumer contribution to SMRs be capped, and if so, what criteria will be taken into account when setting the cap?**
- **what assessment have Ministers undertaken of the potential risks to the energy market and to consumers of the use of a RAB model for the financing of SMR installations?**

A: Government funding models are tools to help investors manage risk, enabling infrastructure projects with high upfront capital costs to be financed at lower cost than would be the case in their absence. This should ultimately reduce costs to consumers, and investment risk should decline as technologies mature and developers learn and implement efficiencies.

One approach is the Regulated Asset Base (RAB), which is being applied to Sizewell C and which has been used successfully in other sectors, for example in the development of the Thames Tideway Tunnel. A process by which RAB could be applied to new nuclear projects was established by the Nuclear Energy (Financing) Act 2022 (NEFA).

The nuclear RAB model has the potential to reduce the cost of new nuclear projects by sharing risk between investors and consumers. This should benefit consumers through lower bills.

Government has published detailed guidance on the operation of the nuclear RAB model, covering procedure and criteria for designation, nuclear RAB revenue stream regulations and development costs and nuclear RAB model.

Detailed policy decisions for SMR funding models have not been taken at present.

Q8: Will Ministers undertake to publish each value for money assessment undertaken for Government on any or all elements of the SMR programme in advance of committing the Government to contracts; and will Ministers undertake to facilitate a review by the National Audit Office of the value for money of the programme in advance of any final investment decision involving public money?

A: As with any government spending decision, the SMR technology selection process will be subject to rigorous value for money assessments and future Treasury spending rounds. The government will consider the most appropriate approach to publishing such assessments.

In the case of Sizewell C, a Value for Money assessment was published alongside the project's RAB designation, and the Government has committed to publishing a full value for money assessment at the point of any Sizewell C final investment decision.

Q9: What assessment has the Government made of the risks of escalating costs to the public purse of the proposed SMR programme? Will Ministers publish any assessment made?

A: While the Government has committed to pursuing the full spectrum of nuclear technologies, where these provide value for money, SMRs offer the potential to reduce the cost of overall programme delivery. Unlike conventional nuclear reactors that are built on site, SMRs are smaller, can mostly be made in factories, and could transform how power stations are built through design replication. Like all major government programmes, the SMR programme will be subject to rigorous value for money and approvals processes. The government will consider the most appropriate approach to publishing such assessments, to align with its normal practice.

Q10: What assessment has the Government made of the (a) effectiveness and (b) cost control of programmes in other countries to deliver modular nuclear reactors?

A: The Government has, and will continue to, seek to learn from experience from nuclear and non-nuclear projects in the UK and internationally. In the development of the SMR Programme, GBN has engaged with developers, vendors, regulators, other organisations, and Subject Matter Experts, including projects in development outside of the UK. Given the current status of SMRs worldwide and that there is little experience of commercial deployment to date, the Government will continue to assess their effectiveness and cost control of global developments in the SMR market to understand lessons learned from international partners.

Q11: What governance arrangements does the Government plan to use to ensure that the proposed streamlining of planning and regulatory processes for SMRs does not compromise public safety and environmental protection?

A: Any SMR technology would need to satisfy all applicable regulatory requirements prior to deployment. New reactor designs in the UK must undergo rigorous scrutiny by the UK's independent regulators prior to construction.

Nuclear safety and security and protection of the public and the environment is a top priority for the Government. Our plans have been developed in partnership with the independent, sovereign regulators and are achievable without any compromise to safety, security, and environmental protection; reactor designs falling short of these standards would not be permitted. We remain committed to the highest standards, enforced by the Office for Nuclear Regulation, and the environmental agencies - EA in England, Natural Resources Wales (NRW) in Wales and Scottish Environment Protection Agency (SEPA) in Scotland.

Q12: What estimate have Ministers made of the quantity of waste expected to be produced annually by an SMR using Pressurised Water Reactor (PWR) technology; how this compares with the quantity of waste produced by GW-scale reactors; and what arrangements are to be put in place for the (a) storage and (b) processing of waste from SMRs prior to the commissioning of the geological disposal facility envisaged in the Civil Nuclear Roadmap?

A: As with any fission technologies, SMR waste will be subject to usual government policy for nuclear waste management – the quantity of forecast waste will be assessed in due course to inform a Funded Decommissioning Programme, which will be approved by the Secretary of State prior to construction of a new nuclear power station beginning.

Spent fuel and radioactive waste that is not suitable for disposal in existing facilities will need to be stored pending availability of a Geological Disposal Facility (GDF).

New reactor designs in the UK must undergo rigorous scrutiny by the UK's independent regulators prior to construction. Nuclear safety and security and protection of the public and the environment is a top priority for the Government.

Q13: How will the Green Industries Growth Accelerator Fund be deployed to facilitate development of the nuclear supply chain, and what consideration is being given to ensuring that the investment promotes growth across more green technologies?

A: As announced in the Nuclear Roadmap, through GIGA HMG will invest £300m in partnership with industry to deliver High Assay Low Enriched Uranium (HALEU) enrichment and deconversion capability in the UK. Further detail will be published in due course.

Q14: What assessment has the Government made of the potential market for export of SMR units if an SMR construction facility is established in the UK; what is the earliest date such a facility might be operational following a final investment decision on construction of the first SMR in the UK in 2029; and to what extent does the potential for future exports underpin the value for money case for supporting SMR projects with taxpayer funding?

A: There are many considerations beyond exports that underpin the government's decision to support SMR projects. The SMR technology selection process has down-selected those six vendors best able to deliver operational SMRs by the mid-2030s.

That said, the government recognises that the UK has a key role to play in seizing the opportunities of Net Zero and supporting the development of green industries at home and overseas.

There are a broad range of assessments of the market value of SMRs. According to a 2014 report by the National Nuclear Laboratory, SMRs fulfil a significant market need that cannot be met by large nuclear plants, with the size of the potential SMR market calculated to be approximately 65-85 gigawatts of new capacity by 2035, valued at £250-£400 billion, if the economics are competitive. However, this report only assesses the potential of SMRs for electricity production, whereas SMRs could also be used to support wider industrial decarbonisation. In contrast, in 2016, the Nuclear Energy Agency estimated that the global SMR market (electricity and wider non-power applications) could reach 21 gigawatts up to 2035.

Exports will be critical to supporting supply chain development alongside the nuclear programme as a whole, both of which will help the UK achieve its ambition to become a global leader in civil nuclear power and SMRs. This will in turn help create high-value jobs and develop our capabilities.

I hope you will find this reply helpful.

Yours ever,

A handwritten signature in black ink, appearing to read 'Claire Coutinho', with a long horizontal stroke extending to the right.

RT HON CLAIRE COUTINHO MP
Secretary of State for Energy Security & Net Zero