

Nuclear Industry Association Response to Energy Security and Net Zero Committee's 'Revisiting the Nuclear Roadmap' Inquiry

The Nuclear Industry Association (NIA) welcomes the opportunity to respond to the Energy Security and Net Zero Committee's 'Revisiting the nuclear roadmap' inquiry.

The NIA is the trade association and representative body for the civil nuclear industry in the UK. We represent more than 300 companies operating across all aspects of the nuclear fuel cycle, including the current and prospective operators of nuclear power stations, international designers, and vendors of nuclear power stations, and those engaged in decommissioning, waste management and nuclear liabilities management.

Executive summary

Nuclear energy is ideally placed to help deliver the Government's goals of economic growth, energy security, and net zero. Nuclear is the most powerful energy source on Earth by far, provides clean, reliable power, and generates well-paid, long-term jobs in the communities that need them most. UN analysis has shown that nuclear has clean energy source with the lowest land use, lowest ecosystem impact and the lowest lifecycle carbon of all generating technologies at 5.1-6,4g CO₂/kWh.¹ Currently, the sector sustains close to 90,000 jobs in the UK, generating at least £6.1 billion in GDP and at least £4.5 billion in tax revenues for the Exchequer each year.² Nuclear power plants protect consumers from price fluctuations in international energy markets, and limit grid balancing costs by providing stable, domestically produced baseload power to the grid. This unique contribution of attributes makes nuclear essential to the success of the UK's energy transition.

The principal hesitation about nuclear is undoubtedly whether or not new power stations can be built within reasonable budgets and timescales. The answer is that the UK must apply the model proven to work from international experience to cut build times and costs:

- Political certainty to enable planning of major long-term capital investments
- Robust, buildable and operable nuclear reactor designs
- Proportionate and predictable regulation to reduce costs from country-by-country variations and additions to power station designs
- Thorough pre-Final Investment Decision (FID) and pre-First Nuclear Concrete (FNC) planning of nuclear construction to ensure maximum efficiency and reduce design rework during construction
- Experienced and empowered project managers and leadership
- Experienced supply chain
- Experienced workforce

¹ United Nations Economic Commission for Europe (2022) *Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources*. Available at https://unece.org/sites/default/files/2022-04/LCA_3_FINAL%20March%202022.pdf

² Nuclear Industry Association (2023) *Delivering Value: The Economic Impact of The Civil Nuclear Industry*. Available at <https://www.oxfordeconomics.com/resource/delivering-value-the-economic-impact-of-the-civil-nuclear-industry/#:~:text=We%20find%20it%20supports%20an,clusters%20of%20civil%20nuclear%20activities.> The NIA is currently updating this work and will share the new version with the Committee when available.

- Continuous construction of new nuclear capacity to maintain supply chain and workforce skills
- Replication of established designs to maximise “fleet effect” cost reductions

Nuclear deployment in France and South Korea has demonstrated the value of this basic model:

- World Nuclear Association data confirms that from 1971 to 1986, France built 42 GW of nuclear capacity in 15 years.^{3 4} 33 of the 41 reactors built were at least 3rd of a Kind replicas of previously constructed designs. Construction times reached their lowest when the maximum number of units were under construction due to application of lessons on replica projects, fresh experience in major construction management, efficient supply chain capabilities, and a skilled and productive workforce.
 - On New Year’s Day 1980, the French had 34 reactors under construction at once. Six reactors were finished that year, all in less than six years’ construction time.
- A study by Jessica Lovering *et al* (2016) confirmed that South Korea achieved sequential cost reduction of approximately 2% per year from the 1970s to 2010s. The basis of the Korean programme was the continuous activation of nuclear supply chain building replicas of one standard Pressurised Water Reactor (PWR) design and its subsequent evolutionary improvements.⁵

The UK can and should apply this model to large scale reactors, Small Modular Reactors (SMR), and Advanced Modular Reactors (AMR) to enable them to play a key role in driving sustainable economic growth and energy security.

1. Is the Government’s policy to reach 24GW by 2050 a credible one?

- a. We believe that at least 24 GW of nuclear will be necessary to meet net zero by 2050 with energy security and strong economic growth.
 - i. The National Energy System Operator (NESO) projects annual electricity demand in 2050 to range from 533 TWh to 700TWh.⁶ 24 GW of nuclear would allow about 25% of this to be supplied from baseload nuclear power. This would make a critical contribution, providing a stable electricity system at a low cost and meeting rising energy demands.
 - ii. Organisations like the CCC that forecast a lower nuclear capacity requirement assume that nuclear cannot cut costs in a way that it assumes for other technologies. However, rigorous application of the

³ World Nuclear Association (2025) *Nuclear Power in France*. Available at <https://world-nuclear.org/information-library/country-profiles/countries-a-f/france>

⁴ Vadim Vinichenko *et al* (2023) *Historical diffusion of nuclear, wind and solar power in different national contexts: implications for climate mitigation pathways*. Available at <https://iopscience.iop.org/article/10.1088/1748-9326/acf47a/pdf>

⁵ Jessica Lovering *et al* (2016) *Historical construction costs of global nuclear power reactors*. Available at <https://www.sciencedirect.com/science/article/pii/S0301421516300106>

⁶ National Energy System Operator (2024) *Future Energy Scenarios: ESO Pathways to Net Zero*. Available at <https://www.neso.energy/document/321041/download>

model outlined above should deliver cost reductions and thus increase nuclear's share in the future energy mix.

- b. The 2024 Roadmap also outlined a helpful, if broad, cadence of nuclear projects, targeting 3-7 GW of project approvals in each 5-year period to 2044, and we encourage the government to set out interim capacity targets as well. Again, long-term predictability and visibility are essential to planning major capital investments like nuclear projects.
- c. Nonetheless, more detail on how to deliver the specific projects required to meet these capacity needs would be welcome. This detail should include:
 - i. Where new projects will be built
 - ii. What designs and how many units will be built on those sites
 - iii. Who will build those projects and who will operate them once built
 - iv. How those projects will be financed and funded
 - v. In what order projects will be delivered
- d. Government can then use this detail to establish a clear strategy on reaching a minimum output of 24GW of nuclear energy by 2050, which is also vital in enabling the country to break out of the incremental approach taken in deploying nuclear power stations.
 - i. As part of this, we support the work being undertaken by NESO in developing the 2050 optimum for nuclear as part of the SSEP modelling work.
 - ii. It is also essential that progress is maintained on the construction of a Geological Disposal Facility and that the current assumption that it will need to handle 24GW of new nuclear is maintained.

2. Should the Government commit to a further large scale reactor?

- a. We strongly urge Government to commit to further large-scale reactor deployment beyond Sizewell C because large-scale reactors have unmatched power density, generate transformative economic impacts and rely on proven technology already in commercial operation around the world to drive sustainable economic growth and energy security.
 - i. Large scale nuclear reactors require minimal land use to produce vast amounts of reliable, low-carbon energy, which minimises environmental impacts, makes transmission connections more efficient and delivers energy security.
 - a) Hinkley Point C, for instance, will produce enough electricity to power 6 million homes for 80 years from less than a quarter of a square mile.
 - ii. Committing to a further large scale reactor would boost economic growth in rural areas, and help to address regional inequalities across the country.
 - a) The construction of Hinkley Point C has already tripled the size of the nuclear workforce in the South West, from 8,500 workers in 2014 to over 27,000 in 2024. The project has also brought £5.3 billion of investment into the region.⁷
 - b) Large scale nuclear deployment at Wylfa, for instance, could bring £20 billion investment in Ynys Môn, North Wales, and the Welsh supply chain, and bring close to £100 million in wages for

⁷ Nuclear Industry Association (2024) *Nuclear Jobs Hit Record High as Major New Projects Revitalise Sector*. Available at <https://www.niauk.org/nuclear-jobs-hit-record-high-as-major-new-projects-revitalise-sector/>

the local economy each year, boosting economic growth in one of the country's most deprived regions.⁸

- iii. Further large-scale reactors would also rely on proven technology, which allow the UK to benefit from previous construction experience.
 - a) The main large-scale designs that could be deployed in the UK, the EPR, AP1000 and APR-1400, all have multiple units in commercial operation around the world. This provides a number of practical risk mitigations that the UK could use to control deployment times and costs in this country:
 - 1) The reactors are proven to perform reliably and safely in operation, so they will deliver the promised clean energy benefits.
 - 2) The supply chains for these reactors have been activated, improving confidence in component quality and delivery during construction.
 - 3) Many on-site construction issues have been experienced and resolved, offering greater construction certainty for Next-of-a-Kind (NOAK) projects in the UK.
 - 4) Construction leaders have gained valuable experience that could be applied in the UK, which has not otherwise completed a nuclear power station in 30 years.
 - b. Countries across Europe are pursuing large scale nuclear deployment to achieve energy security and reach Net Zero by 2050 because they see the unique advantages set out above. We encourage Government to advance consideration of large scale nuclear projects at well-suited sites like Wylfa, so the UK does not fall behind in the international race for investment.
 - i. France plans to build 6 EPR IIs, which an option for 8 more.
 - ii. Poland has contracted to build 3 AP1000s to cut coal use and raise energy security. It has also given Decisions-in-principle to an APR-1400 project as well as to Rolls Royce SMR and GE Hitachi BWRX-300 SMR projects.
 - iii. The Czech Republic has decided to build two APR model large-scale reactors.
 - iv. Bulgaria has approved construction of 2 AP1000 units.
 - v. The Netherlands is running a selection process for large-scale reactors, as are Slovakia and Slovenia.
 - vi. Sweden is also running a blended selection process including large-scale and SMR reactors.
 - vii. Hungary is building two further large-scale units, albeit with Russia technology.
 - viii. Romania is advancing plans to build two new large-scale Canadian heavy water reactors, alongside its plans to deploy SMRs.
 - a) It is important to emphasise that many of these countries have smaller economies, lower per capita GDP, lower electricity needs, and lesser financing capability compared to the UK, yet they still are pursuing large-scale nuclear developments because of the unique benefits on offer.
 - c. We encourage Government to explore large scale deployment options nearby historic nuclear sites to leverage preexisting nuclear site licenses, existing workforce capabilities, and community support for nuclear.

⁸ Nuclear Industry Association (2024) *Wylfa is the Biggest Prize in Welsh History*. Available at <https://www.niauk.org/wylfa-is-the-biggest-prize-in-welsh-history/>

3. How is the Government supporting the investment in and deployment of Advanced Modular Reactors?

- a. We welcome Government's nuclear planning reforms announced in the recent Plan for Change publication, which intend to enable SMR and AMR deployment in the UK.⁹
 - i. We welcome the inclusion of SMRs and AMRs in the National Policy Statement, the implementation of a criteria-based approach to siting nuclear, and the removal of deployment deadlines from the planning framework for new nuclear.
 - ii. We encourage ongoing engagement with the nuclear industry to ensure that regulatory reforms led by the Nuclear Regulatory Taskforce adequately support the deployment of new nuclear reactors including AMRs.
 - iii. We also encourage Government to implement measures that allow the UK to leverage international regulatory experience to support cost effective deployment of AMRs.
 - a) For example, the Canadian Nuclear Safety Commission and the Impact Assessment Agency of Canada are working on changes to their regulatory frameworks to effectively support the deployment of advanced nuclear technologies. Alignment between Canadian and UK nuclear regulatory frameworks would allow both countries to leverage reviews of reactor designs across borders.
- b. We support the development of High Temperature Gas Reactors through the AMR Research, Development & Demonstration Programme, and encourage the Government to drive forward the commercialisation of this technology.
- c. We welcomed the Government's £196 million award to Urenco to support the construction of the advanced nuclear fuels facility at Capenhurst. We urge Government to continue to support the development of HALEU fuel production capabilities in the UK, to support fuel supply for AMRs.

4. How will future nuclear projects be financed?

- a. We believe that the Regulated Asset Based (RAB) funding model used to enable financing of Sizewell C, will continue to play an essential role in the development of future large-scale nuclear projects, and that Contracts for Difference and government equity investment should be available to projects of different kinds
- b. We encourage the Government to clarify funding models that are open to advanced nuclear technology developers, at what stage of project development those models would be open and under what standard, rather than bespoke, conditions, they would be available.
 - i. We encourage the Government to consult with the investor community to identify how models used for large scale nuclear can be adapted to finance advanced reactors.

⁹ Department for Energy Security and Net Zero (2025) *Government rips up rules to fire-up nuclear power*. Available at <https://www.gov.uk/government/news/government-rips-up-rules-to-fire-up-nuclear-power#:~:text=Reforms%20to%20planning%20rules%20will,affordable%20energy%20for%20working%20people.>

- ii. Financial support mechanisms are particularly important for deploying the first fleet of advanced nuclear technologies in the UK, and we encourage the Government to consult with technology vendors and developers to identify project specific needs.
 - iii. The SMR technology selection process of GBN has supported the deployment of SMRs in the UK, and we would welcome similar partnerships between Government and industry in the deployment of advanced nuclear technologies more broadly.
 - iv. We encourage Government to enable and leverage interest from private investors to finance advanced nuclear technologies for specific end energy uses.
- c. We welcome the Government's proposal to classify nuclear as green in any future UK Green Taxonomy. Including nuclear as a sustainable economic activity in the UK Green Taxonomy would help to raise private capital for future nuclear projects.
- d. We also encourage nuclear to be included in the Green Financing Framework alongside renewables to make nuclear eligible for green bonds.
 - i. As of January 2025, green bonds worth over USD 5 billion have been issued for nuclear projects in the world, displaying that sustainable investors have an interest in financing nuclear.¹⁰
 - ii. Making nuclear eligible for green bonds in the UK would broaden financing opportunities for the domestic nuclear sector.
- e. We also urge Government to ensure that the Nuclear Decommissioning Authority is equipped with the resources to facilitate decommissioning programmes for new nuclear.

5. How well are GB Nuclear, the Office of Nuclear Regulation and DESNZ co-ordinating to deliver new nuclear capacity?

- a. We encourage co-ordination between GB Nuclear, the Office of Nuclear Regulation, and DESNZ to effectively support nuclear policy objectives. We believe there is a vital role in particular for the new Nuclear Regulation Taskforce in identifying measures that will enable those bodies and other bodies, such as the Environmental Agency and Planning Inspectorate, to enable the delivery of new nuclear capacity through proportionate regulation.
 - i. The UK is known in the nuclear industry internationally as a market that has achieved the same excellent standard of nuclear safety but at much higher cost than other advanced economies.
 - ii. The NIA has produced a set of specific recommendations for reforming nuclear regulations to address how to reduce time and cost from regulation while maintaining the same high standard of safety.
 - a) Our principles in this work are that nuclear power plants should be regulated proportionately to the risks they create and the benefits they bring, equitably with other high hazard industries, and consistently with the standards of UK government appraisals and evaluation processes. Nuclear operations are not the only source of risk in society, so costs spent to satisfy

¹⁰ International Energy Agency (2025) *The Path to a New Era for Nuclear Energy*. Available at <https://iea.blob.core.windows.net/assets/b6a6fc8c-c62e-411d-a15c-bf211ccc06f3/ThePathtoaNewEraforNuclearEnergy.pdf>

nuclear regulations should be proportionate to the other risks society must address and to the benefits of nuclear power.

b) Our main recommendations were that

- 1)** The wider benefits of nuclear power should be incorporated into regulatory decisions, as was mandated by the Advance Act in the USA under the Biden Administration.
- 2)** Regulators should be mandated to apply Green Book guidance for cost-benefit analysis to ensure consistency in regulatory decisions.
- 3)** Regulators should be required to justify any variation or modification to a reactor that has already been approved by another respected regulator, to ensure that the fleet effect is preserved as far as possible. Regulators should also codify that international experience in nuclear operations and safety is treating on an equal footing to UK experience in regulatory decisions.

- b.** We encourage DESNZ and GBN to continue co-ordinating on the role of GBN in supporting nuclear policy objectives beyond the SMR technology selection process.
- c.** We also support the continued cooperation between GBN and the Nuclear Decommissioning Authority.
- d.** We urge Government to investigate the synergies between GB Energy and GBN, establishing clear ways of working, where system-wide considerations are taken in decision making. Under this structure GBN should continue to be the delivery body undertaking work on reactor evaluation, skills requirement planning, and forming Development Companies to take forward projects, without adverse impacts from GBE's set up.
- e.** We encourage increased alignment between DESNZ nuclear energy policies and HM Treasury green finance policies to ensure there is adequate private financial support to realise nuclear capacity targets.
- f.** We encourage increased co-ordination between DESNZ, MHCLG, and DEFRA to ensure efficient planning and permitting processes for nuclear developments.

Further Information

The NIA is happy to provide more context, or any clarifications desired on the content of our response and to ask our members where appropriate for additional information that may be useful.

Please contact Elisabeth Roden, Policy Analyst for the Nuclear Industry Association, at elisabeth.rodén@niauk.org to do this.