

Nuclear Industry Association Response to the Department for Science, Innovation & Technology's Technology Adoption Review

The Nuclear Industry Association (NIA) welcomes the opportunity to respond to the Department for Science, Innovation & Technology's 'Technology Adoption Review'.

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. Due to the diversity of our membership, our views in this submission will cover high-level, industrywide matters.

Executive Summary

Efficient technology adoption in the nuclear sector is essential to realising the Government's decarbonisation and clean energy commitments. Advanced nuclear technologies including Small Modular Reactors (SMRs) and Advanced Modular Reactors (AMRs) produce low carbon, reliable energy. To support the adoption of these technologies, we encourage Government to provide clarity on the role of nuclear in leadup to Net Zero by 2050, support the skills needs of the sector, streamline nuclear regulation, and broaden financing options for new technologies.

The current situation

- 1. Why does the UK rank lower than some OECD countries in technology adoption? What dynamics exist in the UK, but not in countries such as Germany or Estonia that might explain it?**
 - a. No comment.

- 2. What are the biggest barriers to technology adoption in your sector and/or across sectors? Does business size and geographic location affect how firms are impacted by these barriers?**
 - a. No comment.

- 3. What is the evidence for technology adoption across different sizes of businesses?**
 - a. No comment.

- 4. What are the differences in technology adoption rates in the nations and regions of UK and how can they be explained?**
 - a. No comment.

- 5. Do technology adoption rates differ at a worker level, including by gender, ethnicity or other protected characteristics? If so, does this have wider effects on professions and sectors where a large proportion of that workforce comes from a lower technology adopting group?**
 - a. No comment.

Existing measures

- 6. How effectively does the UK support the adoption of new technology? What could be improved in your sector and/or across sectors?**

- a.** The measures announced on building more nuclear in the recent Plan for Change publication sends a positive signal to prospective nuclear developers on the government's intention to enable small and advanced modular reactor deployment in the UK.
 - i.** We welcome the interventions aimed at addressing the barriers in the UK's planning and regulatory systems, and there is a role for the nuclear sector to play in informing the development and implementation of further proposals related to regulatory reform.
 - ii.** We encourage the government to implement measures that allow the UK to leverage international regulatory experience, to lower development costs incurred through the UK regulatory process and facilitate the adoption of new nuclear technologies.
- b.** Whilst previous restrictions on sites for new nuclear technologies have been removed, greater clarification is required on the government's plans to adopt and expand nuclear technologies alongside other energy technologies within the parameters of the Strategic Spatial Energy Planning work.
 - i.** Clearer plans on the next wave of nuclear projects beyond Sizewell C and the SMR competition would ensure that the skills and capabilities that the supply chain has developed through previous and current projects can be applied to advanced nuclear technology deployment.
- c.** Government intervention is required to activate parts of the UK supply chain which otherwise face competition with overseas alternatives. As a first step, the UK should seek to maximise UK content in its pursuit of SMR technologies:
 - i.** If more than one SMR technology is selected through the GBN down selection process, ordering multiple units of each of those, in consultation with the supply chain, will justify UK companies investing in capital intensive capabilities such as the fabrication of reactor pressure vessels.
 - ii.** Maximising UK content is also crucial to driving the expansion of the nuclear workforce and contributing to the overall growth of the economy. Where possible, this should start with the use of UK nuclear fuel, which is our most mature supply chain capability.
 - iii.** Where it is not realistic to achieve UK content in a particular area, technology providers should publish medium-term localisation strategies, involving joint ventures and other partnerships between foreign suppliers and UK industry.
 - iv.** The standardisation of the single most successful SMR design after the initial deployment phase would aid this. This will concentrate investment efficiently on the required capabilities, allowing swifter introduction of UK content and more competitive exports.
- d.** Beyond the SMR down selection process, it is critical that we keep companies interested in deploying their technologies in the UK who are not selected in the current process. Whilst the government's recently proposed measures on planning reform, removing site restrictions and on nuclear regulation will support this, the government should consult the investor community to inform the development of the appropriate business models to finance advanced reactors.
 - i.** The Contract for Difference and Regulated Asset Base funding models have been used to finance large scale projects such as Hinkley Point C and Sizewell C in the UK. Making such funding models available to advanced nuclear technology developers would speed up technology adoption in the sector.

- e. Providing optionality for deploying a range of projects will also provide the demand to keep our workforces mobilised, to train more people, to invest in more capacity and better capabilities, and to strengthen our project management expertise.

7. What current policies and/or initiatives support technology adoption in your sector and/or across sectors?

- a. We welcome the SMR technology selection process of Great British Nuclear which supports the deployment of Small Modular Reactors in the UK.¹
- b. We welcome the AMR Research, Development & Demonstration Programme which supports the development of High Temperature Gas Reactors.
- c. We welcome the government's recent package of announcements on nuclear as part of the Plan for Change.
- d. We welcome the Government's efforts to realise The National Nuclear Strategic Plan for Skills, which supports the skills needs required for technology adoption in the nuclear sector.²

8. The availability of skilled employees is a significant enabler of technology adoption. What are the main skills needs across the economy/in your sector required to drive technology adoption and where are the most significant gaps?

- a. The National Nuclear Strategic Plan for Skills has identified that 40,000 new jobs will need to be filled across the nuclear sector by 2030 to meet Government's decarbonisation commitments. The recruitment rate for the sector will need to be more than doubled to meet this goal.
- b. We would encourage the Government to enhance training capacity and capability for workers, including support for initiatives to allow those currently working in nuclear sector to train the next generation.
- c. To attract new talent, we would encourage the Government to support the development of partnerships across the nuclear sector.

9. What international examples of technology adoption have been most successful, specifically from countries with economies similar to the UK and/or any novel or effective approaches from other countries?

- a. Similarly to the UK, the Canadian government has committed to a net-zero economy by 2050.³
- b. In 2018, the industry, federal, provincial, and territorial governments collaborated to produce A Canadian Roadmap for Small Modular Reactors, which outlined recommendations for all key stakeholders to expedite SMR deployment in pursuit of

¹ Great British Nuclear (2024) *Small Modular Reactors: technology selection process*. Available at <https://www.gov.uk/guidance/small-modular-reactors-competitive-technology-selection-process>

² Nuclear Skills Delivery Group (2024) *National Nuclear Strategic Plan for Skills*. Available at <https://nuclearskillsdeliverygroup.com/wp-content/uploads/2024/05/NSDG-National-Nuclear-Strategic-Plan-For-Skills.pdf>

³ Government of Canada (2024) *Net-zero emissions by 2050*. Available at <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050.html>

the clean energy mission.⁴ This has been followed by Canada's SMR Action Plan Progress Updates in 2020 and 2022.⁵

- c. In Ontario, site preparation is now ongoing for the first commercial SMR, the 300MWe Darlington SMR project. This project is being developed by Ontario Power Generation in collaboration with GE-Hitachi, SNC-Lavalin, and Aecon Group. To finance phase 1 of development, the project received a \$970M loan from Canada Infrastructure Bank.
 - i. There are plans to deploy 3 more SMRs in the area, as well as a micro SMR. Bruce Power is also planning to build another 4800 MWe of capacity at their existing site.
- d. The Canadian Nuclear Safety Commission and the Impact Assessment Agency of Canada are working on changes to their regulatory frameworks to effectively support further SMR deployment.
 - i. Alignment between Canadian and UK nuclear regulatory frameworks would support cost effective nuclear deployment in both countries by leveraging reviews of SMR designs across borders.
- e. To support the clean energy mission, nuclear projects in Canada are eligible for green bonds through the Green Bond Framework – green bonds worth C\$5.7 billion have been issued for nuclear projects thus far.^{6 7}

Future action to drive technology adoption

10. What are the top two transformational technologies for productivity in your sector and/or across sectors and why?

- a. No comment.

11. Where is government uniquely placed to drive technology adoption?

- a. The government is uniquely placed to support technology adoption in the nuclear sector by providing clear policy support to the next wave of nuclear projects. Establishing a new nuclear deployment plan for achieving Net Zero by 2050 or building on previous ones is essential to support technology adoption.
 - i. In doing so, the Government can avoid supply chain gaps that would complicate the deployment of advanced nuclear technologies, and ensure that companies remain interested in deploying their technologies in the UK.
- b. The Government also has the capacity to support financing of technology adoption.
 - i. We encourage Government to explore how funding models used for large scale nuclear can be adapted for financing advanced nuclear technologies.

⁴ Canadian SMR Roadmap Steering Committee (2018) *A Call to Action: A Canadian Roadmap for Small Modular Reactors*. Available at https://smrroadmap.ca/wp-content/uploads/2018/11/SMRroadmap_EN_nov6_Web-1.pdf?x93402

⁵ Natural Resources Canada (2022) *Canada's SMR Action Plan Progress Update*. Available at https://smractionplan.ca/?_gl=1*oc9339*_ga*MjAwMzE1Mjk2Mi4xNzM5MTkxMDA1*_ga_C2N57Y7DX5*MTczOTE5ODI2My4yLjAuMTczOTE5ODI2My4wLjAuMA..#inline_content

⁶ Department of Finance Canada (2024) *Canada issues second green bond*. Available at <https://www.esgtoday.com/canada-issues-4-billion-green-bond/>

⁷ Bruce Power (2024) *Bruce Power issues additional \$600 million in Green Bonds to power a clean energy future*. Available at <https://www.brucepower.com/2024/03/07/bruce-power-issues-additional-600-million-in-green-bonds-to-power-a-clean-energy-future/>

- ii. We urge Government to ensure alignment between energy policy and sustainable finance interventions. Nuclear is currently excluded from the Green Financing Framework, despite the essential role of nuclear in the energy transition. We welcome the Government's proposal to classify nuclear as green in any future UK Green Taxonomy and encourage this proposal to be realised.

12. Where is industry uniquely placed to drive technology adoption in your sector and/or across sectors? Where could industry go further to support the objectives of this review?

- a. No comment

13. What opportunities are there for government and industry partnerships to drive technology adoption in your sector and/or across sectors?

- a. The SMR technology selection process of Great British Nuclear (GBN) has supported the deployment of Small Modular Reactors in the UK. Similar partnerships between industry and government could support the deployment of advanced nuclear technologies more broadly.
 - i. We would welcome clarity on the role of GBN in the delivery of advanced nuclear technologies beyond the SMR programme. Lack of clarity on the role of GBN in deploying privately led nuclear projects in the future, delays privately funded projects going forward right now.

14. What approach or policies should government consider to accelerate technology adoption across the economy and/or within sectors?

- a. We encourage the Government to establish a clear timeline with actionable objectives to clarify the role of nuclear in the leadup to Net Zero by 2050.
- b. We encourage the Government to continue to streamline regulatory processes for advanced nuclear technology deployment through the Nuclear Regulatory Taskforce.
- c. We encourage the Government to continue to address the skills needs of the nuclear sector and engage with industry to determine changing skills needs.
- d. We encourage the Government to include nuclear as a sustainable economic activity in the UK Green Taxonomy to support financing of technology adoption.
- e. We also encourage the Government to reconsider the exclusion of nuclear from the Green Financing Framework to make nuclear eligible for green bonds.
- f. We encourage the Government to clarify funding models that are open to advanced nuclear technology developers.

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.roden@niauk.org to do this.