Nuclear Industry Association Response to the Energy Security and Net Zero Committee's 'Securing the Domestic Supply Chain' Inquiry.

The Nuclear Industry Association (NIA) welcomes the chance to respond the Energy Security and Net Zero Committee's 'Securing the Domestic Supply Chain' inquiry.

The NIA is the trade association and representative body for the civil nuclear industry in the UK. We represent around 270 companies operating across all aspects of the nuclear fuel cycle.

Due to the diversity of our membership, our views in this submission will cover high-level, industry-wide matters. Our members may choose to make their own detailed submissions.

Executive Summary

- Nuclear is essential to the UK's future energy technology mix as it is the only single technology that can provide clean, firm, and sovereign electricity.
    - Analysis conducted by the United Nations Economic Commission for Europe confirms that nuclear has the lowest lifecycle CO2 emissions, the lowest land footprint, and the lowest impact on ecosystem of any electricity source.
- The UK needs sovereign capability to deliver clean, secure energy security into the future, particularly as the established international supply chain is becoming increasingly saturated as plans for new energy infrastructure and nuclear power stations accelerate internationally.
    - Building up and keeping the existing UK nuclear supply chain active also enables timely delivery of projects and is the best way to control costs.
- As a key enabler to energy security and economic value, the Government should put in place policies and measures that maximise the use of the domestic supply chain for new nuclear projects in the UK.

Questions:

1. **How can UK plc capture its fair share of the economic potential of emerging or less developed energy technologies?**
    a. Our analysis of the nuclear sector shows that it already contributes a range of benefits to the UK economy, generating £6.1 billion in GDP for the UK economy, supporting tens of thousands of jobs, and generating a substantial stream of £4.5 billion in tax revenues for the Exchequer each year.[1] When the indirect impact of the sector's activity is considered, the GDP figure more than doubles to £16.1 billion.[2]
    b. The civil nuclear sector is estimated to have a GVA multiplier of 2.6. So, for every £1 million it directly contributed to UK GDP, it supports another £1.6 million elsewhere in the economy through its expenditure.
    c. Providing such value depends upon the coordinated efforts of a broad range of firms spanning numerous civil nuclear activities and their supply chain. The inputs required by the civil nuclear sector stimulate a broad and complex network of supply chains reaching all parts of the economy. The spending of wages by the sector's employees (and those within its supply chains) creates further economic activity in the consumer economy. Our research shows that wage-financed consumer spending generated a £5.9 billion contribution in total to GDP in 2021.[3] Induced consumption, attributable to the civil nuclear sector, also supports almost 70,000 jobs.

[1]Nuclear Industry Association (2023), *Delivering Value: The Economic Impact of the Civil Nuclear Industry*. Available at https://www.niauk.org/delivering-value//. Accessed: 4 January 2024.
[2]Ibid.
[3]Ibid.

d. The UK must match the speed at which other countries are embracing emerging energy technologies, including the next generation of nuclear technologies to enable the parts of the supply chain that need intervention to compete with overseas alternatives. Although the Great British Nuclear (GBN) Small Modular Reactor selection has been welcomed, it is critical that we keep companies interested in deploying their technologies in the UK who are not selected in the current GBN process.
e. The Government should clarify the route to market for technologies that are not selected by GBN and should consult the investor community to inform the development of the appropriate business models to finance advanced reactors.
f. The Government should also provide clarification on what funding models are open to developers, such as the Contract for Difference and Regulated Asset Base models, and on the steps developers need to take to qualify to begin negotiations with Government. We strongly recommend that the Regulated Asset Base model is made available for all future large-scale and SMR projects to meet the ambition of 24 GW of nuclear under Great British Nuclear to reduce the cost of capital.

2. **What more can the Government do to encourage greater domestic supply chain investment in the energy industry by 2035, including through the Contracts for Difference scheme?**
   a. The Government should ensure that it takes decisions on bolstering support for new generation technologies and projects without delay, to retain and continually build appetite for the UK market, which will in turn encourage greater domestic supply chain investment in the energy industry.
   b. We believe that the Contracts for Differences (CfD) scheme will continue to have an important role to play in the deployment of new nuclear, along with the Regulated Asset Base (RAB) model. The RAB model will play an essential role in the development of future large-scale nuclear projects, particularly given the capital intensity and deployment timescales involved in these projects.
   c. The Government should introduce a new siting approach for advanced nuclear technologies based on developers showing that their chosen sites meet a set of published criteria, rather than developers having to choose from a set list of specific sites identified in Strategic Siting Assessments to support a fleet roll-out approach and to encourage greater supply chain investment.
   d. The Government should establish a level playing field for all low-carbon technologies in the drafting of the UK Taxonomy and drop the exclusion of nuclear from the Green Financing Framework.
      i. Analysis conducted by the United Nations Economic Commission for Europe confirms that nuclear has the lowest lifecycle CO2 emissions, the lowest land footprint, and the lowest impact on ecosystem of any electricity source.[4]
   e. The Government should plan to maximise the UK content of new energy projects to help rebuild the domestic supply chain.
   f. To justify the major investment in plant and equipment, the Government must insist that UK content, including UK front-end fuel cycle services, is maximised in the deployment of new nuclear and place orders to facilitate this.

3. **Does the UK have the supply chain capacity to deliver the required energy infrastructure by 2035, including an expanded electricity network?**

[4]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/202208/LCA_0708_correction.pdf. Accessed: 3 January 2024.

a. The domestic supply chain is well placed to deliver the required energy infrastructure due to its established capability, including in the deployment of large-scale nuclear technologies and the manufacture of civil reactor fuel.
b. For example, our domestic enrichment capacity is currently being scaled up with Urenco planning to increase its enrichment capacity at its UK facility. This will help support meet current and future fuel demand in the UK.
c. Analysis from Nuclear AMRC and Rolls Royce SMR has indicated that it is possible to achieve up to 78% of UK content for a fleet of Rolls Royce SMRs in the UK.[5].
d. Significant construction capability exists within domestic organisations through previous and current installations, such as at Hinkley Point C. However, without a clear pipeline of new nuclear projects following Hinkley Point C, the UK could forfeit the substantial construction skills revived and regained through the project.
e. A full order book of nuclear projects is essential to mitigate this risk and capture the benefits of supply chain activation that come from having multiple projects proceed in close succession.
    i. The UK's previous approach to nuclear, leaving a 20-year gap between projects, meant that Hinkley Point C had to single handily revive a dormant UK supply chain, rebuild project management experience, build a First-of-A-Kind reactor and deal with a First-of-A-Kind regulatory system.
f. Programme clarity from Government is also essential to enable parts of the supply chain that need intervention to compete with overseas alternatives.

4. To what extent would growing the domestic supply chain bolster UK energy security?

a. The nuclear fuel supply chain is already a major component of the UK's clean energy and net zero infrastructure, however, building up this domestic supply chain will be vital for energy security and in meeting our net zero goals.
b. The established international supply chain is becoming increasingly congested as plans and orders for new energy infrastructure projects accelerate. From the NIA's own research, we estimate that Europe alone may undertake up to 90 GW of nuclear new build in the coming two decades and around 90 GW of nuclear life extension work. Our own research also indicates that about two-thirds of the global economy by Purchasing Power Parity is already building new nuclear, and approximately three-quarters of the global economy intends to undertake nuclear new build in the future. It is thus vital that the domestic supply chain adds capacity to play a key role in the deployment of new energy generation technologies. This will help embed long term capability into the UK energy supply chain and ensure a strong mix of providers to deliver the UK's energy needs.
c. The Government must implement a policy framework in the UK and in conjunction with allies internationally to ensure that there is no return to the use of Russian nuclear fuel services. This will provide the certainty to the nuclear fuel supply chain to retain and build up the UK's domestic capabilities to meet demand. The front-end nuclear fuel supply chain is one of the UK's strongest capabilities in the nuclear sector, providing high value added work with high export earnings. Urenco's enrichment facility at Capenhurst, for example, exports more than 80% of its output, worth about £300 million every year.
d. The Government must also realise the socioeconomic benefit of playing a key role in the delivery of energy infrastructure.

5. What are the key concerns with respect to the availability of raw materials in the supply chain and how might those be addressed?

[5]Nuclear AMRC (2021), 'Nuclear AMRC to support next phase of Rolls-Royce SMR development'. Available at: https://namrc.co.uk/centre/rolls-royce-smr-support-phase2/. Accessed: 3 January 2024.

a. Challenges with respect to the availability of raw materials are surmountable with strategic planning and investment from Government. The supply of uranium for nuclear reactors should be relatively secure, as the largest known deposits are in Australia, with Canada another substantial supplier. Australia's known reserves are approximately 1.7 million tonnes, equivalent to 25 years' of current global demand.[6] The UK itself owns a uranium stock of approximately 110,000 tonnes from past reprocessing of spent fuel and other activities. [7] The UK's current uranium use is less than 1,000 tonnes of uranium per year.[8] Uranium is also abundant in Earth's crust and exploration for uranium is relatively underdeveloped because of historical oversupply, so there is potential for considerably more uranium supply onto the market.
b. Nuclear fuel availability will need to be scaled up to meet our 24GW of nuclear by 2050 target and as new energy technologies approach deployment, and that will require extra Western conversion, enrichment and fuel fabrication capacity. The Government should continue to support efforts to restore uranium conversion at Springfields in Lancashire and work with allies to remove the use of Russian nuclear fuel with time, to create an investment environment to develop Western capacity.

c. High Assay Low Enriched Uranium (HALEU) will be required to fuel many of the advanced nuclear reactors that are approaching demonstration and deployment. The first deliveries of HALEU will be required beginning in 2028, however, Russia is currently the only viable supplier of HALEU to commercial reactor developers.
    i. The United States has allocated $700 million for the development of HALEU alone to avoid dependency on Russian supply.
    ii. Not only is the expansion of our own capabilities and capacity strategically important for the same reason, but advanced nuclear reactor vendors require optionality to obtain supplies from more than one country.
    iii. The estimated price of deconverted HALEU is £206m per annum for 10 metric tonnes of uranium and the export potential of HALEU for the UK is £3bn.
d. A robust domestic advanced fuel supply chain is essential to ensure fuel supply for advanced reactors in the UK.

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 Lauren Rowe, Policy Analyst for the Nuclear Industry Association, at Lauren.Rowe@niauk.org to do this.

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[6]World Nuclear Association (2023), 'Supply of Uranium'. Available at https://world-nuclear.org/information-library/nuclear-fuel-cycle/uranium-resources/supply-of-uranium.aspx. Accessed: 3 January 2024.

[7]Nuclear Decommissioning Authority and Department for Business Energy and Industrial Strategy (2022), *2022 UK Radioactive Material Inventory*. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1134901/2022_Materials_Report_-_010223.pdf. Accessed: 4 January 2024.

[8]World Nuclear Association (2024), 'World Nuclear Power Reactors & Uranium Requirements'. Available at https://world-nuclear.org/information-library/facts-and-figures/world-nuclear-power-reactors-and-uranium-requireme.aspx. Accessed: 4 January 2024.