

## **Nuclear Industry Association Response to the Business and Trade Committee's Export-led Growth Inquiry.**

The Nuclear Industry Association (NIA) welcomes the chance to respond to the Business and Trade Committee's inquiry into export-led growth.

The NIA is the trade association and representative body for the civil nuclear industry in the UK. We represent around 250 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. Members also include nuclear equipment suppliers, engineering and construction firms, nuclear research organisations, and legal, financial and consultancy companies.

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**

1. Nuclear fuel presents the UK a historic opportunity to expand exports, bolster allies' energy security and cut Kremlin revenues. Russia exports billions of dollars of uranium conversion, enrichment, and fuel fabrication services every year, including to our allies in the United States, France, South Korea, Japan, and countries across Eastern Europe. Russia exported [\\$1.2 billion in enriched uranium](#) to the United States and France alone in 2022.
2. The UK is uniquely placed to capture the Russians' market share because we have room to add extra uranium conversion at Springfields in Lancashire and enrichment capacity at Capenhurst in Cheshire. France and the United States also are planning for capacity expansions, but only with extra British capacity can we close the gap.
3. The export opportunity today is worth several hundred million dollars per year for decades, as nuclear reactors are expected to operate for at least 60 years.
4. The IEA projects that [nuclear capacity must double](#) to reach net zero worldwide by 2050, and all our major allies, bar Germany, plan to expand nuclear capacity.
5. The UK therefore has a rare and precious opportunity to help our allies and hurt the Kremlin by securing billions of pounds worth of extra export orders.
6. To secure the opportunity, Government must take the following actions to support the export of nuclear fuel and civil nuclear technologies:
  - a. Provide policy certainty that UK reactors will not use any Russian fuel
  - b. Work with our allies to build up enough competitive Western nuclear fuel services capacity that all Western reactors can use all-Western fuel services as soon as possible. A specific date set in consultation with allies would be a helpful signal to countries looking to diversify from Russian fuel.
  - c. Utilise our diplomatic networks to encourage our allies to switch their contracts from Russian to UK fuel.
7. The UK has a strategic as well as economic interest in providing this policy certainty to counteract the Russians' use of nuclear fuel to establish geopolitical leverage over other countries. With this distortion removed, UK suppliers should be able to invest and compete effectively in the nuclear fuel market without major direct UK Government cash investment.
8. The NIA would welcome the chance to provide oral evidence to the Business and Trade Committee specifically on the export of nuclear fuel and technologies to displace Russian supplies.

### *Other Opportunities*

9. There is the potential for the deployment and export of domestic SMRs, such as the Rolls-Royce SMR, to generate billions of pounds in export earnings and create another viable Western reactor to displace Russian exports. At present, the Russians are the leading exporter of nuclear reactors worldwide, earning billions of dollars through contracts to build, finance and service nuclear plants for developing countries.
10. Lastly, the UK has amongst the most advanced capabilities and expertise in nuclear decommissioning and radioactive waste management. This is another source of potential export earnings if the Government allows UK companies to import waste from other countries for treatment in the UK, especially where it has no material impact on UK waste inventories.

## What are the new or growing opportunities for exports which can drive UK economic growth? How can these be exploited?

### Nuclear Fuel

11. Nuclear energy has increasingly been recognised as a key part of the energy transition to net zero. Nuclear power produces less CO<sub>2</sub> emissions over its lifecycle than any other electricity source, according to the United Nations Economic Commission for Europe.<sup>1</sup> In its analysis of lifecycle greenhouse gas emissions, the Commission found that nuclear has the lowest carbon footprint of any technology.
12. The projected growth of the civil nuclear industry to help meet the growing global demand for low-carbon energy is a significant export opportunity for the UK. The Government's target of 24 GW of installed nuclear capacity in the British Energy Security Strategy would quadruple domestic demand, and as noted, the IEA projects a doubling of nuclear capacity in its central Net Zero scenario. A domestic base and growing worldwide demand means that the opportunity for exporting our nuclear power expertise and technology is substantial.
13. The Russian invasion of Ukraine has highlighted a particular export opportunity in nuclear fuel potentially worth billions of pounds for the UK. It is also a chance for the UK to promote energy security and energy independence for the Western Alliance.
14. Dozens of countries are dependent on Russia to maintain their nuclear facilities and for the provision of fuel to run them. Not only does this feed revenue into the Russian war economy, but it also strengthens Russian geopolitical energy leverage. Nuclear is the leading source of clean power in the United States, Europe, South Korea, and Japan, but all these countries rely heavily on Russian nuclear fuel imports.
15. Tenex, the uranium products subsidiary of Russian state-owned civil nuclear company Rosatom, showed that the revenue from their uranium products totalled approximately \$2.5 billion in 2021.
16. Research from the Royal United Services Institute shows that the value of Harmonized System (HS) Code 284420 imports, which includes enriched uranium, from Russia into the US and France, totalled just under \$1.2 billion in 2022.<sup>2</sup> The US imported \$829.8 million worth of Russian materials under HS code 284420 in 2022, and an additional \$70 million worth in January 2023. France imported \$377.5 million worth of enriched uranium from Russia in 2022, up from \$109.2 million in 2021.
17. Globally there are five primary conversion suppliers Orano (France), Cameco (Canada), Honeywell (USA), TVEL/TENEX (Russia) and CNNC (China). These cover about 72% of global demand (as per UXC CMO report 2023), and there have been repeated bottlenecks in the industry. Outside Russia and China, the world needs about 40,000 tonnes of uranium conversion per year. Western capacity is only 34,500 tonnes. Russia currently fills the gap since it owns 20% of global conversion capacity and sells significant amounts to the United States, South Korea, Japan, and Western allies.
18. Springfields Fuels conversion facility in Lancashire, currently in care and maintenance, could convert around 4,000 tonnes of uranium per year. The facility, if restored to operations, would be a critical asset to help wean Western dependence on the Russian state and an additional supplier to strengthen the market.
  - a. The Government's £13 million through the Nuclear Fuel Fund to Westinghouse to examine the restoration of uranium conversion at Springfields is a wise enabling investment to help get much-needed Western capacity back online.
19. Russia is also the only current supplier who can process and pelletise Reprocessed Uranium (RepU). The UK can no longer export its significant RepU stockholdings from the THORP plant at Sellafield leaving a liability that was once an asset. France also holds a large RepU stocks that it sends over to Russia for processing, both countries are currently reliant on Russia to supply RepU pellets. Springfields is well placed to bring in a new line in order to produce RepU pellets that could be used by both the UK and France. This would allow both

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<sup>1</sup>United Nations Economic Commission for Europe, *Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources* (2022). Available at [https://unece.org/sites/default/files/2022-04/LCA\\_3\\_FINAL%20March%202022.pdf](https://unece.org/sites/default/files/2022-04/LCA_3_FINAL%20March%202022.pdf). Accessed: 12 July 2023.

<sup>2</sup>Royal United Services Institute, *Atoms for Sale: Developments in Russian Nuclear Energy Exports* (2023). Available at <https://rusi.org/explore-our-research/publications/special-resources/atoms-sale-developments-russian-nuclear-energy-exports>. Accessed: 12 July 2023.

- countries to utilise fully this cheaper feedstock that otherwise would be sent to Russia or potentially for disposal in a geological disposal facility.
20. For uranium enrichment, without Russian exports, the world would face an annual shortfall in uranium enrichment of 8-10 million Separate Work Units (SWU), a specialised unit of enrichment activity. Much information about pricing is naturally commercially sensitive, but to give an approximate sense of scale, but the Energy Information Administration has reported that the average price paid by American nuclear operators was \$101.03/SWU.<sup>3</sup> Filling the shortfall could be worth around \$1 billion per year.
  21. In Capenhurst, owned and operated by Urenco, the UK has a world-leading enrichment facility with a capacity of 4.5 million SWU with room to expand. Urenco has a global capacity of approximately 18 million SWU. Urenco could invest in expanding its enrichment capacity at Capenhurst, creating high-quality jobs, and providing critical fuel supplies.
  22. To exploit these opportunities, the UK Government must do three things:
    - a. Provide policy certainty that UK reactors will not use any Russian fuel.
    - b. Work with our allies to build up enough competitive Western nuclear fuel services capacity that all Western reactors can use all-Western fuel services as soon as possible. A specific date set in consultation with allies would be a helpful signal to countries looking to diversify from Russian fuel.
    - c. Utilise our diplomatic networks to encourage our allies to switch their contracts from Russian to UK fuel.
  23. The UK Government through these diplomatic networks plays a vital role in helping UK businesses. The government's international network can promote UK fuel by communicating the importance of security of supply, a diversified nuclear fuel portfolio, and the UK's domestic capabilities to support these ambitions. We would encourage the Committee to recognise the importance of robust economic diplomacy in facilitating export-led growth.
  24. Direct UK government investment should not for the most part be required if the UK Government establishes the required policy certainty with our allies. With this certainty that Russian supplies will not flood back to distort the market, the business case for Western investment is robust and will convince customers that seek to diversify away from Russian nuclear fuel that viable Western alternatives will be built out in the short-term, especially for uranium conversion and enrichment.

#### Traditional Reactor Exports

25. Since 2017, over 30 nuclear reactors began construction globally; 17 are Russian designed, according to the International Energy Agency. Four new-to-nuclear countries have started building or have connected their first nuclear power plants: Belarus, Bangladesh, Egypt and Turkey, with these contracts valued at \$72.65 billion. These countries have used Russian finance, expertise, and reactor designs in their nuclear programmes. India has started building four additional Russian reactors with Russian finance in the last five years, and Hungary, a NATO ally, is breaking ground on a new Russian reactor with Russian finance. Russia offers a full range of capabilities which these countries do not have low-cost finance, proven reactor designs, nuclear construction expertise, regulatory expertise, and training in the operation of nuclear power plants. Their approach deliberately creates a path dependency on Russian money and capability.
26. The UK has globally respected regulatory expertise that can be used to help new nations deploy nuclear reactors. There is also the potential for UK reactor designs such as the Rolls-Royce SMR to provide a non-Russian export option. The UK is a proven leader in SMR R&D, as is evident from the development of the Rolls-Royce SMR, and is well positioned to capture the opportunity of the global market and drive UK economic growth.
  - a. The opportunity is there, for example, for the Rolls-Royce SMR's unique 'factory-built' power plant to be a solution for countries that have smaller grids and range of energy needs. Rolls-Royce SMR has recently progressed to Step 2 of the Generic Design Assessment. Reaching this milestone is significant and is an important step in the development of non-Russian nuclear technologies.

#### Advanced Nuclear Fuels

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<sup>3</sup>Energy Information Administration, *Uranium Marketing Annual Report* (2023). Available at: <https://www.eia.gov/uranium/marketing/>. Accessed 14 July 2023.

27. Since the United States has been notably bolder than the United Kingdom in pursuing advanced nuclear technologies and the High Assay Low Enriched Uranium required for those technologies (HALEU – uranium enriched to between 5% and 20%), the first Western HALEU production plants are likely to be in the United States.
28. The US allocated \$700 million in the Inflation Reduction Act for the development of HALEU capabilities, against the United Kingdom allocating approximately \$75 million (£63 million) in the Nuclear Fuel Fund for all types of fuel capabilities. The US has also provided billions of dollars for two advanced reactors demonstrators that will use HALEU, Terrapower's sodium-cooled fast reactor, and X-Energy's high-temperature Gas-Cooled Reactor (HTGR), against £170 million in the UK for a HTGR demonstrator, an amount unlikely to fund a full project. The US is thus significantly further ahead in creating market demand.
29. The UK, however, could play a key role in providing specialised deconversion services: deconversion happens after enrichment to ensure that the uranium is ready to be made into usable fuel rods or pellets. Urenco could have the capability to do this at Capenhurst to establish itself as a key supply chain partner of United States utilities and to create a capability that could be expanded to service a growing global market.

### Nuclear Decommissioning

30. Around [200 reactors worldwide](#) and around 100 in Europe have been retired, with all of these requiring decommissioning and waste management. The UK has world-leading expertise in waste management and nuclear decommissioning, and thus the ability to win work in this area.
31. For example, Nuclear Transport Solutions (NTS) has been transporting nuclear materials for UK and international customers for over fifty years. NTS vessels have undertaken the repatriation of high-level waste to European and other international customers in Switzerland, Netherlands, and Australia. NTS also supports the US Government in the removal and transport of nuclear materials from around the world to the US under various US Government programmes. NTS is increasingly leveraging its security expertise to provide consultancy and capacity-building services for both UK-based and overseas nuclear sector partners.
32. NTS, and the wider UK nuclear enterprise, holds much of the world's leading expertise in nuclear decommissioning, including in the areas of transport, security, resilience, and non-proliferation. Demand for this expertise is increasing globally as more countries with established nuclear programmes approach their own transition to decommissioning, and further countries embark on new nuclear programmes, representing a significant export opportunity for the UK nuclear sector.
33. One key issue in expanding exports in decommissioning is how to balance the principle of self-sufficiency, that every country should have final responsibility for its own waste, with the objectives of sustainability, value for money, and economic efficiency. If every country develops the full suite of decommissioning capabilities, it will result in massive redundancy, overcapacity and wasted resources. The UK should specialise in waste management and decommissioning, taking advantage of our established expertise to win contracts, create jobs, and preserve skills vital for the progress of our own decommissioning programme. A reliable pipeline of domestic decommissioning work will provide a steady base on which we can build our export portfolio.
34. At a policy level, the UK Government should allow the pragmatic import and export of waste for treatment abroad or treatment in the UK, to maximise efficiency and export potential in the sector.

### **What do UK businesses need to increase exports? How does the UK compare to other countries in their support for exports?**

#### Nuclear Fuel: Long-Term Policy Certainty

35. For traditional nuclear fuel, the key steps are as follows:
  - a. Provide policy certainty that UK reactors will not use any Russian fuel.
  - b. Work with our allies to build up enough competitive Western nuclear fuel services capacity that all Western reactors can use all-Western fuel services as soon as possible. A specific date set in consultation with allies would be a helpful signal to countries looking to diversify from Russian fuel.

- c. Utilise our diplomatic networks to encourage our allies to switch their contracts from Russian to UK fuel.
36. Many utility companies that have historically relied on Russian fuel— such as Czechia and Bulgaria – are now seeking to diversify away from Russian supplies. Thus, there is increasing pressure on the UK fuel supply chain to support the build out of capacity for a Western alternative to the Russian uranium market. The greatest risk to commercial investments in the UK fuel supply chain is the chance that countries currently looking to replace Russian fuel services will return to Russian supplies in a few years' time. Western companies need assurance that Russian uranium imports will not come flooding back into the Western market in future years if they are to invest in expanding their operations. The UK can provide that certainty by ruling out a return to Russian supplies.
37. The UK should also look to the example of the United States and France, both of whom have created and continue to hold national stockpiles and who are traditionally much more forthright in advocating for “national champions” and utilising their diplomatic influence and networks to help American or French companies secure contracts abroad. The UK itself has extensive and well-respected networks, and these could be put to greater use to convert opportunities into orders.
38. For advanced nuclear fuel, we encourage the Committee to recognise the importance of providing long-term policy certainty about the deployment of advanced reactors in the UK. The UK Government has mentioned the potential for high-temperature reactors to aid with industrial decarbonisation and the production of hydrogen, and it has provided £170 million in funding for a High-Temperature Gas-Cooled Reactor demonstrator. However, there is a no clear roadmap to commercial deployment of advanced reactors. Companies involved in the front-end fuel cycle who are looking to invest in new plants to produce HALEU and other advanced fuels need to see that roadmap with clear deployment targets to justify investment.
39. The United States has been notably bolder than the United Kingdom in this respect, allocating \$700 million in the Inflation Reduction Act for the development of HALEU capabilities. It has also funded two advanced reactors demonstrators, Terrapower's sodium-cooled fast reactor, and X-Energy's high-temperature Gas-Cooled Reactor, worth billions of dollars that will both use HALEU and thus establish the beginnings of market demand.
40. The provision of long-term certainty will allow the market to respond to the increased global demand for non-Russian fuel and ensure that Western assets are not stranded in the future. Long-term policy certainty is about sending a clear signal to companies, to support business cases for investment, rather than to spur direct government investment by necessity.

#### Investment in Emerging Nuclear Reactor Technologies

41. Government support can facilitate the development and deployment of emerging new nuclear reactor technologies. Governments play a vital role in providing assurance to the finance sector on which new low-carbon technologies are a safe investment. The inclusion of nuclear power in the UK Taxonomy, and Green Financing Framework, would facilitate the development and export of SMRs. In early 2022, French President Emmanuel Macron announced that France would build fourteen new reactors by 2050 as part of its bid to hit Net Zero and committed €1bn to France's SMR project. The UK Government should emulate France's decisive approach. Deployment of SMRs in the UK would justify investment in several SMR factories that can service foreign and domestic orders and activate supply chain capabilities, creating an essential viable Western reactor to help to drive Russia out of the global nuclear market in the long run.

#### Flexible Approach to International Waste Solutions

42. The UK can capture a huge amount of economic value from its expertise in waste management and decommissioning. Dozens of countries around the world have decommissioning and waste management needs, and the UK has some of the most advanced capabilities and extensive experience in this area.
43. The UK should change its policy to allow the importation of radioactive waste from other countries for treatment in the UK, especially where it has no material impact on the UK, even if it does not align with the general principle of self-sufficiency.
44. At present, licenses for transfrontier shipment of waste for treatment in the UK can be refused even if there would be no material impact on UK waste inventories. This approach costs us valuable export orders.

45. To cite one example, Tradebe Inutec, the nuclear site licensee at Winfrith, proposed to take some Low-Level Waste from an overseas nuclear fleet, for incineration at its Dorset and Fawley processing facilities and disposal at UK LA-LLW landfill sites. The contract would have been worth several million pounds in total over 10 years, while having no material impact on the UK's stock of waste. During discussions the Environment Agency, however, indicated that it would refuse permission for the shipment on the grounds that foreign States should manage their own waste.
46. We recognise the importance of the principle of self-sufficiency in waste management. However, the rigid application of this principle prevents the most cost effective and sustainable approaches to decommissioning: it simply does not make economic sense for every nation with radioactive waste to develop the full suite of capabilities necessary. The UK Government should collaborate with other nuclear nations and take a pragmatic approach to the import and export of radioactive waste. The Government should adopt a more risk-based appraisal of waste shipments and could consider exchanging radiologically equivalent amounts of waste with other countries to ensure the most efficient application of different countries capabilities.

**What can the Government do to promote and facilitate UK exporters' involvement in critical international supply chains? What opportunities are there for the UK to become a key supply chain partner to the United States, European Union and other democratic allies? What needs to be done to secure those partnerships?**

47. As noted, UK businesses can become a major supplier of nuclear fuel and nuclear technologies to the US, European Union member states and other democratic allies, who have relied heavily on Russian imports to date.
48. The Government can enable this by establishing policy certainty that reactors will not use Russian fuel and by working with our allies to use all-Western fuel services for all Western reactors.
49. The Government has established a framework for this collaboration with the US and other allies.
  - a. The [Atlantic Declaration for a Twenty-First Century U.S.-U.K. Economic Partnership](#), which was announced in June 2023 and included the launch of a new civil nuclear partnership, was a positive step in strengthening UK-US trade relations. The partnership will help minimise reliance on Russian fuel, supplies, and services and facilitate involvement of UK organisations in nuclear fuel supply chains in the U.S. Short -term priorities for joint action will be set by the US-UK Joint Action Group on Energy Security and Affordability, "to encourage the establishment of new infrastructure and end-to-end fuel cycle capabilities by 2030 in both continents, and substantially minimise reliance on Russian fuel, supplies, and services".
  - b. Similarly, the [joint statement](#) which was issued by Canada, France, Japan, the UK and US in early 2023 at the Nuclear Energy Forum, confirming proposals to leverage their civil nuclear power industries to ensure a stable supply of nuclear fuel, will facilitate the involvement of UK businesses in nuclear fuel supply chains across the globe.
50. We would urge the Committee to recognise the importance of international collaboration for UK businesses across the nuclear fuel supply chain to become a key supply chain partner to democratic allies.

**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 NIA, at [Lauren.Rowe@niauk.org](mailto:Lauren.Rowe@niauk.org) to do this.