Fueling America's Nuclear Renaissance: How Trump's Executive Orders Create Strategic Opportunities for the Nuclear Fuel Industry

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Key Points

- Federal Land Access and Permitting Advantages: The Executive Orders' directives to
 facilitate the construction of advanced reactors and privately funded nuclear fuel
 facilities at Department of Energy and Department of Defense sites create a novel legal
 pathway that may expedite or bypass many traditional siting and permitting
 challenges. This represents a strategic competitive advantage for companies that can quickly
 navigate federal property use agreements as these sites offer pre-existing security
 infrastructure and potentially expedited environmental reviews under federal jurisdiction rather
 than more complex state processes.
- Defense Production Act Contracting Framework: The Orders' explicit authorization of Defense Production Act voluntary agreements creates a specialized legal framework for nuclear fuel procurement and fuel supply chain development. The Orders also permit the DOE to play an active role in assuring a demand for nuclear fuel supply chain services and products through appropriate contracts and guarantees with private sector consortia. **Companies should develop compliance strategies for this unique contracting environment.**
- Regulatory Transformation and New Market Entry Opportunities: The Executive Orders signal a significant policy shift by directing the revival of commercial spent fuel reprocessing in the U.S., abandoned since the 1970s. If this initiative moves forward, nuclear fuel companies should prepare for substantial regulatory actions affecting licensing, waste management, and security requirements, while positioning themselves to enter this potentially lucrative market.

Introduction

On May 23, 2025, President Donald Trump issued four Executive Orders – <u>Reinvigorating the</u> <u>Nuclear Industrial Base, Deploying Advanced Nuclear Reactor Technologies for National Security,</u> <u>Reforming Nuclear Reactor Testing at the Department of Energy</u>, and <u>Ordering the Reform of the</u> <u>Nuclear Regulatory Commission</u> – that, collectively, are intended to "<u>usher in a nuclear energy</u> <u>renaissance.</u>"

The Executive Orders articulate the Administration's support for the nuclear power industry and seek to leverage the Department of Energy (DOE) and the Department of Defense (DOD) to accelerate the deployment of advanced nuclear reactors and the development of the nuclear supply chain. Given the ambitious and in some respects novel plans outlined in the Executive Orders, it remains to be seen whether the stated goals, including the expansion of U.S. nuclear energy capacity from 100 GW in 2024 to 400 GW in 2050, can be achieved and within the timeframes specified.

These directives mark a significant shift in U.S. policy, particularly for the nuclear fuel sector. Consistent with recent bipartisan support for nuclear expansion, these orders break new ground by having the federal government play an active role in enabling the development of the nuclear fuel supply chain and creating a demand for its products.

Furthermore, the orders explicitly encourage commercial nuclear fuel recycling—a major departure from decades of U.S. policy. The directives call for identifying uranium and plutonium inventories that could be recycled into reactor fuel and prioritize establishing a secure domestic High-Assay Low-Enriched Uranium (HALEU) supply chain critical for advanced reactors. Combined with provisions for power uprates at existing plants, the construction of numerous new commercial reactors, and expedited reactor deployment at the DOE and military installations, these policies create substantial new market opportunities for American nuclear fuel companies. However, the industry's ability to capitalize on this renaissance may hinge on whether the Administration resolves contradictions between its ambitious nuclear goals and proposed budget and staffing cuts at key implementing agencies.

Nevertheless, the Executive Orders may have immediate benefits for the nuclear fuel sector. By prioritizing federal inventories to support nuclear fuel supplies, supporting the development of nuclear fuel infrastructure, and directing the construction of advanced reactors on federal property, the Executive Orders have the potential to accelerate the expansion of the domestic nuclear industrial base and the deployment of the advanced reactors it will support.

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Nuclear Fuel Supplies

All currently operating commercial nuclear reactors in the United States are fueled with low enriched uranium (LEU); that is, <u>fuel that has been processed</u> to increase the percentage of the fissile isotope Uranium-235 from its natural state of 0.7% to a range of 3%-5%. As discussed below, the United States does not currently have the capability of meeting its own needs from domestic uranium production or processing.

The anticipated fuel requirements of Small Modular Reactors (SMRs) and microreactors currently under development further exacerbate fuel supply challenges. <u>Many SMRs and microreactors are designed to operate on HALEU</u>; that is, uranium in which the percentage of U-235 has been increased to between 5% and 20%. HALEU is produced by downblending high enriched uranium (HEU) - uranium with greater than 20% U-235) with LEU or by enriching LEU to increase its percentage of U-235 above 5%.

The Executive Orders call for several actions to help assure the fuel supply for the nation's current reactors and anticipated advanced reactors.

In the short-term, "to fully leverage federally owned uranium and plutonium resources," the Secretary of Energy is directed to update the DOE's Excess Uranium Management Policy and Surplus Plutonium Disposition Program to determine how the DOE's <u>inventories of LEU, HEU, and plutonium</u> not needed for national security purposes can be used to advance the Executive Orders' policies and goals. Additionally, pursuant to the Defense Production Act (DPA), the Secretary is directed to seek voluntary agreements with domestic nuclear energy companies for the cooperative procurement of LEU and HALEU, including through the establishment of nuclear fuel supply chain consortia. Notably, the Executive Orders recognize the importance of assured market demand for nuclear fuel products and services, and authorize the Secretary to "provide procurement support, forward contracts, or guarantees to such consortia as a means to ensure offtake for newly established domestic fuel supply, including conversion, enrichment, reprocessing, or fabrication capacity."

The Executive Orders also require the Secretary to "release into a readily available fuel bank not less than 20 metric tons of [HALEU]" for private sector projects authorized and regulated by DOE and located on DOE property "for the purpose of powering AI and other infrastructure," and to ensure long-term fuel supplies for such projects through domestic fuel fabrication and supply chains. No timeframe is specified for this requirement. It is likely <u>the six HALEU supply chain contracts</u> awarded by the Biden Administration in October 2024 as part of DOE's HALEU Availability Program will play a key role in the production of the fuel bank's supply.

In the longer-term, the Secretary is directed to recommend a national policy on the management of spent nuclear fuel and high-level radioactive waste, including reprocessing and recycling of spent fuel to recover uranium, plutonium, and other products useful to the nuclear fuel cycle or otherwise. While the United Kingdom, France, and certain other countries have long reprocessed spent nuclear fuel, the U.S. has not had a commercial spent fuel reprocessing capability since the 1970s. Therefore, the Executive Orders' directives related to reprocessing will likely require relevant policy and regulatory changes as well as significant financial support and infrastructure development over a period of years.

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the construction of privately funded nuclear fuel fabrication and other fuel cycle facilities at identified DOE and DOD sites.

Nuclear Fuel Infrastructure

In addition to providing potential new supplies for nuclear fuel, the Executive Orders call for several actions focused on expanding domestic uranium conversion and enrichment capabilities.

The nuclear fuel cycle starts with uranium mining. There is very little uranium mining in the United States. As a result, for more than 30 years, <u>U.S. nuclear reactor operators have relied</u> on LEU imported from countries such as Canada, Kazakhstan, and Russia. The <u>Prohibiting Russian Uranium</u> <u>Imports Act of 2024</u> created further fuel supply challenges for U.S. reactors by banning, subject to certain quotas and potential waivers, imports of Russian sourced LEU.

Two prior Trump Administration Executive Orders, <u>Unleashing American Energy</u> and <u>Immediate</u> <u>Measures to Increase American Mineral Production</u>, addressed uranium as one of the minerals critical to U.S. national and economic security, and <u>included various directives to prioritize and</u> <u>promote its production</u>. After mining and milling, uranium ore concentrate must be converted to uranium hexafluoride (UF₆) before it can be fed into the enrichment process to increase the percentage of U-235 for reactor fuel purposes. Currently, there is only one commercial uranium conversion plant in the U.S., and only one commercial enrichment plant with two other plants under development. The current Executive Orders build on the earlier Executive Orders and require the Secretary of Energy to develop within 120 days a plan to expand domestic uranium conversion and enrichment capabilities to meet the nation's LEU, HALEU, and HEU requirements.

The Executive Orders specifically contemplate use of DPA voluntary agreements "to establish consortia and plans of action to ensure that the nuclear fuel supply chain capacity, including milling, conversion, enrichment, deconversion, fabrication, recycling, or reprocessing, is available to enable the continued reliable operation of the Nation's existing, and future, nuclear reactors."

Finally, the Executive Orders direct the Secretaries of Energy and Defense to utilize their authorities to facilitate the construction of privately funded nuclear fuel fabrication and other fuel cycle facilities at identified DOE and DOD sites.

...the Executive Orders declare the policy of the United States is to "facilitate the expansion of American nuclear capacity from approximately 100 GW in 2024 to 400 GW by 2050."

Nuclear Fuel Demand

Having put in motion steps to improve the supply of nuclear fuel and develop nuclear fuel supply

chain infrastructure, the Executive Orders leverage the DOE and DOD to spur demand for nuclear fuels, starting with qualified test reactors. Recognizing that further effort is required to establish the fundamental technological viability of advanced reactor designs, the Executive Orders task the DOE with revising its guidance and regulations to expedite the review, approval, and deployment of qualified test reactors to be operated at DOE facilities with the goal of having three such reactors reach criticality by July 4, 2026. This will create an immediate need for fuel for these reactors.

Additional fuel will be required for a nuclear reactor – likely a stationary or mobile SMR or microreactor – that the Secretary of Defense is directed to operate at a domestic military base or installation by September 30, 2028. Similarly, the Secretary of Energy is required, within 90 days of the date of the Executive Orders, to designate one or more DOE sites for the deployment of advanced reactor technologies and to facilitate, within 30 months from the date of the Executive Orders, the operation of a privately funded advanced reactor at an identified DOE site "for the purpose of powering AI infrastructure, other critical or national security needs, supply chain items, or on-site infrastructure."

As noted above, the Executive Orders declare the policy of the United States is to "facilitate the expansion of American nuclear capacity from approximately 100 GW in 2024 to 400 GW by 2050." Given the current state of the domestic nuclear supply chain and the recent experience with construction of the Vogtle 3 and 4 reactors, this will be a very challenging policy goal to accomplish. As part of this expansion, the Executive Orders require the DOE to prioritize efforts to facilitate 5 GW of power uprates at existing commercial nuclear reactors and have ten new "large reactors" under construction by 2030. One means of achieving a power uprate is to refuel the reactor with a higher percentage of new fuel or with slightly higher enriched fuel as is presently being tested at the Vogtle 2 plant in Georgia. In both instances, more fuel will be required. Furthermore, with a typical 1,000 MWe reactor requiring about <u>27 metric tons of fuel per year</u>, a substantial amount of new fuel will be required to supply the proposed 10 new large reactors, to support the continued operation of the nation's existing commercial reactors, and to fuel the additional reactors needed to meet the 400 GW policy goal.

By requiring or setting goals for the construction of new reactors in the near future, the Executive Orders may have beneficial implications up and down the nuclear fuel supply chain. Uranium mines and *in situ* recovery operations, uranium milling and conversion facilities, and fuel fabrication companies will all have more certainty that there is need for their products and services, and advanced reactor developers will be able to place orders for reliable fuel supplies. As such, the Executive Orders help demonstrate that demand will exist for nuclear fuel to justify construction of new nuclear fuel supply chain infrastructure and the necessary private investments and financing.

Conclusion

The four Executive Orders include ambitious requirements and goals and set aggressive timelines to achieve them. Accomplishing these outcomes will require the DOE and DOD to move quickly to develop new nuclear-related programs in areas where little precedent exists. Nevertheless, even if only a portion of the Executive Orders' outcomes are realized, it could build significant momentum for rebuilding the nation's nuclear industry, including the nuclear fuel supply chain, and create opportunities for nuclear industry participants.

Industry participants and other stakeholders should carefully monitor plans and actions by the DOE, DOD, and the U.S. Nuclear Regulatory Commission to implement the Executive Orders' requirements. Nuclear fuel supply chain participants should be familiar with the <u>Defense Production</u>

Act and be prepared to take advantage of government contracting opportunities as well as any loan guarantees or direct loans that may be authorized under the Act. Where appropriate, industry participants may even proactively consider forming relevant consortia contemplated by the Executive Orders to take advantage of the DOE's nuclear fuel supply efforts.

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