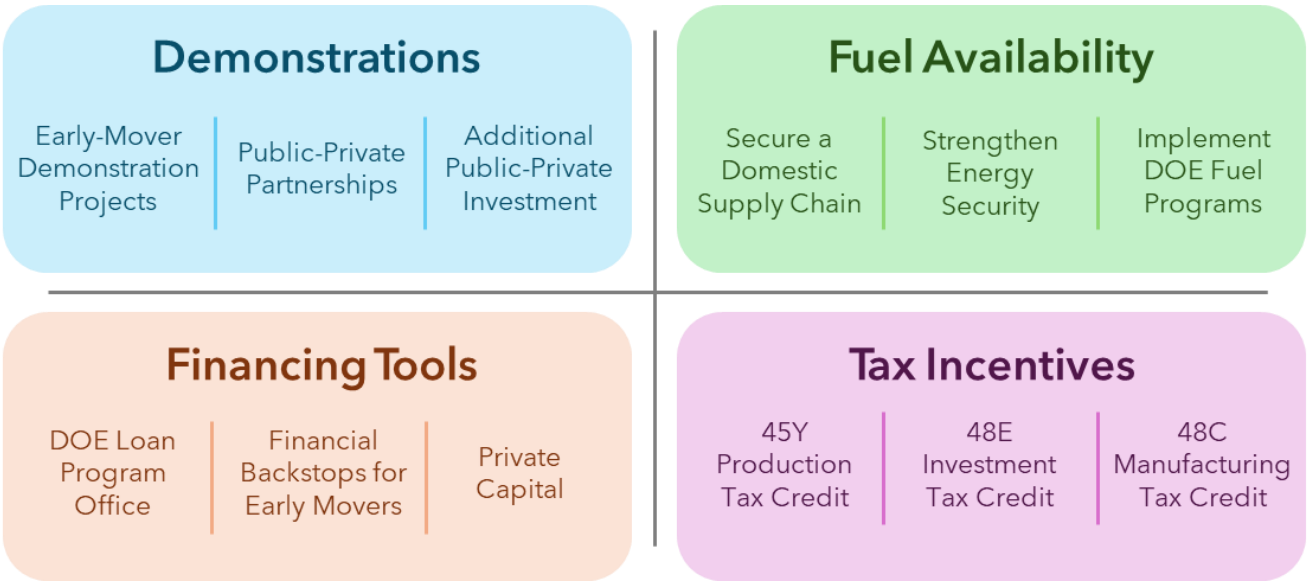
NUCLEAR INNOVATION ALLIANCE

The Federal New Nuclear Energy Investment Portfolio

by Erik Cothron and James Richards - April 2025

As the U.S. seeks to strengthen energy security and reduce emissions amid growing demand, new nuclear energy technologies have emerged as a key solution. Realizing their potential will require more than just technological innovation. It will take coordination across the public and private sectors, effective implementation of key federal programs, and additional federal policies that help spur nuclear energy commercialization. This fact sheet identifies the priorities at the federal level for ensuring the success of new nuclear energy deployment and provides links to additional resources on each topic for those wanting to learn more.



Demonstrations

Both the U.S. government and the private sector are investing billions of dollars to realize new nuclear energy's potential. The U.S. Department of Energy's (DOE's) Advanced Reactor Demonstration Program (ARDP) and GenerationIII+ Small Modular Reactor (GenIII+ SMR) Program are the United States's premier public-private partnerships seeking to deploy first-of-a-kind new nuclear reactor technologies.

The ARDP provides financial support through a cost-share funding mechanism to 10 different companies seeking to deploy their unique advanced reactor designs. The ARDP has made substantial progress over the past few years, and recent accomplishments include: Kairos Power receiving construction permits for both their Hermes 1 and Hermes 2 reactors; TerraPower breaking ground in Kemmerer Wyoming for their Natrium project; and X-energy and Dow submitting the construction permit application to deploy four Xe-100 reactors at Dow's chemical plant in Seadrift, TX.

The GenIII+ SMR Program seeks to support the initial U.S. deployments of advanced light water SMRs, including those being developed by companies like NuScale, GE Hitachi, Westinghouse, and Holtec. This program will focus on catalyzing an "orderbook" of follow-on projects using the same design and

will be awarded through a payment-for-performance milestone approach, which can increase the cost-effectiveness, incentivize rapid innovation, and provide off-ramps for federal funding for unsuccessful projects.

While these demonstration projects have already made substantial progress and attracted significant private capital from private industry (e.g., the recent Google-Kairos, and Amazon-X-energy partnership announcements), **additional private investment and federal funding will be required to successfully complete these demonstration projects**.

To learn more about the ARDP and GenIII+ Program, see NIA's publications on:

- *ARDP: The Case for Continued Investment in the ARDP*
- *GenIII+ SMR Program: Innovative Approaches to Public-Private Partnerships*

Fuel Availability:

The future of new nuclear energy in the United States depends on a secure, reliable supply of uranium fuel. The current supply chain is dominated by a small number of foreign-controlled entities, including Russia's state-owned enterprise TENEX. TENEX provides roughly 25% of U.S. uranium enrichment services and is the only commercial source of High-Assay Low-Enriched Uranium (HALEU), which is an essential fuel type for many advanced reactor designs. U.S. dependency on foreign suppliers poses a serious energy security risk. In response, Congress has provided $3.42 billion to DOE's HALEU Availability Program to catalyze a more robust domestic fuel supply chain and establish domestic enrichment capacity.

With this funding, the U.S. has a significant opportunity to strengthen its energy security and enable the deployment of next-generation nuclear reactors. However, **DOE must now act quickly and effectively to build strong public-private partnerships and move the supply chain forward.** Delays risk undermining reactor deployment timelines and increasing costs for developers. Swift, coordinated action is essential, not only to secure fuel for current and future reactors but also to meet broader energy security and climate goals. Recent bipartisan support in Congress reflects growing recognition of this urgency, but **continued focus and congressional oversight will be key to successful program implementation.** The success of the HALEU availability program is essential to attract timely investment in domestic HALEU enrichment capacity.

To learn more about fuel availability and HALEU, see the NIA's publications on:

- *Fuel Availability: Securing America's Energy Future with Domestic Uranium Enrichment*
- *HALEU Technical Analysis: Characterizing an Emerging Market for HALEU Production*

Financing Tools

First-of-a-kind nuclear reactors come with a high upfront cost, timing uncertainties, and associated project execution risks. For this reason, the U.S. DOE's Loan Programs Office (LPO) and policies that provide financial backstops can help bridge the gap between first-of-a-kind demonstrations and projects that are attractive to private investors.

Government-backed loans from LPO help finance early movers by providing technologies that are on the cusp of commercialization with access to capital that is not reasonably available in private markets. By investing in early mover projects and supply chain developments, LPO loans enable reductions in technological and execution risk, making subsequent projects more attractive to private capital

markets. LPO achieves this with a relatively small amount of federal appropriations. For example, $5 billion was appropriated in 2022 to enable lending authority of $250 billion, so the appropriated amount is only 2% of the total lending amount, representing an efficient use of taxpayer dollars.

Another public-private funding mechanism would be a financial backstop for early mover projects. One such program was introduced in December 2024 by Senator Jim Risch (R-Idaho). The Accelerating Reliable Capacity (ARC) Act aims to accelerate investment in new commercial nuclear projects by minimizing cost overrun risk. The ARC Act would establish a risk reduction program for constructing advanced nuclear reactors by providing a backstop for unforeseen costs through enhanced financing terms.

Continued support for LPO and the creation of a financial backstop for early mover projects are critical to unlock the full potential of new nuclear energy.

To learn more about LPO and the ARC Act, see the following publications on:

- LPO: *The DOE Loan Program Office's Role in U.S. Nuclear Energy Leadership*
- ARC Act: *The ARC Act Fact Sheet (ClearPath Action)*

Tax Incentives

New nuclear energy projects are eligible for multiple tax credits, including the section 45Y clean electricity production tax credit (PTC) and section 48E clean electricity investment tax credit (ITC), which are intended to accelerate deployment of clean energy technologies, including new nuclear reactors. These tax credits can offset the cost to deploy early mover nuclear reactors by roughly 17-30%, enabling greater financial viability for projects and reducing the economic barriers to commercialization. By lowering upfront capital costs and improving long-term financial returns, these incentives help attract private investment, support early deployments, and drive economies of scale.

Similar to the technology-neutral tax credit, the advanced manufacturing ITC under section 48C is important to the nuclear industry. SMR vendors are planning to produce more components in factories through innovative manufacturing processes. The 48C ITC provides extra incentives for these companies to build domestic manufacturing capability. X-energy has already taken advantage of 48C, receiving a credit of $145 million for their fuel fabrication facility being built in Oak Ridge, TN.

A key feature of these tax credits for the nuclear industry is their transferability (i.e., they can be sold to another entity). Nuclear energy project developers are unlikely to have tax burdens large enough to take full advantage of these tax credits. For example, a developer's tax burden would likely be too small to realize an ITC in the year a plant is brought online. The credit would then need to be spread out over many years, seriously diluting the value of the credit. By allowing these credits to be transferred and traded, the nuclear project can receive the maximum value of the credit, ultimately making the cost of electricity from the nuclear energy asset cheaper.

It is critical that the technology-neutral advanced manufacturing and electricity tax credits remain available and transferable for future nuclear reactor deployments

To learn more about these technology-neutral tax credits, see NIA's publication on:

- *Tax Credits: The Importance of Tax Credits for U.S. Leadership in New Nuclear Energy | NIA*