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Small Modular Reactor Nuclear Policy Update

2025 NCRA Annual Conference Raleigh, NC

"America's nuclear energy renaissance starts now. Abundant and affordable energy is key to our nation's economic prosperity and security. This solicitation is a call to action for early movers seeking to put more energy on the grid through the deployment of advanced light-water small modular reactors."

-Chris Wright, U.S. Secretary of Energy

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US Nuclear Power Plants in Operation or Seeking Restart



- US: 94 nuclear reactors and a total capacity of nearly 97 GW (19% of US power generation)
 - France: 57 reactors totaling 63 GW
 - China: 57 reactors totaling 55.3 GW
 - Russia: 36 units totaling 28.6 GW
- Plant Vogtle in Georgia is the largest nuclear plant in the country, totaling about 4.5 GW.
- Southern Co. completed a two-unit expansion of Vogtle in 2024 for a total of four reactors in operation.
- Before Vogtle unit 3 came online in 2023 and unit 4 entered service in 2024, the 4-GW Palo Verde plant in Arizona was the largest nuclear plant in the US.
- Constellation Energy Corp.'s R.E. Ginna plant in New York is the country's smallest nuclear plant, with a single 582-MW reactor.
- The two new Vogtle units and one unit at the Tennessee Valley Authority's Watts Bar Nuclear Plant are the only reactors to enter service in the US since 1996.

New Technologies in Development

	Small Modular Reactors (SMRs)	Advanced Reactors (ARs)
Description	Light-water-cooled, like current fleet, typically ≤300 MW, simpler designs, technology available today	Non-light-water-cooled, e.g., gas, liquid metal, molten salts, will have increased efficiencies
Use Case	Baseload generation, standard fuel	Flexible operations, load following, thermal storage and process heat
Leading Technologies	Image: Second	FerraPower GEH Natrium* X-Energy Xet

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Overcoming "FOAK" Risk

"We're moving as fast, as prudently, as we can . . . We understand that we can't put first-of-a-kind costs on our customers, and we're looking for partners that are looking for this type of generation to offset those first-of-a-kind costs." TVA CEO Don Maul, May 1, 2025 (Reported by S&P)

• Key Challenge:

- FOAK projects often face higher capital costs, construction delays, and technology validation hurdles.
- Investors perceive elevated risk due to unproven supply chains, regulatory uncertainty, and a lack of operational data.

DOE Gen III+ SMR Support to Mitigate FOAK Risk:

- \$900 Million in Federal Funding (2024) allocated to:
 - Accelerate the **first commercial deployments** of American-made SMRs.
 - Support cost-sharing agreements between government and industry.
 - Support **collaborations** between utilities, vendors, constructors, and end-users.
 - Establish first-of-a-kind reference plants, providing critical real-world data.

Key Aims of the Funding:

- De-risk initial projects through federal co-investment.
- Create a **template** for future SMR licensing, construction, and operation.
- Boost **domestic manufacturing capabilities** and workforce development.
- Support deployment in **underserved communities** or energy transition regions.

• Focus on cr and integra

First Mover Team Support

Tier 2:

Fast Follower

Deployment Support

- Up to **\$800 million** for 1–2 teams leading first-of-a-kind SMR deployment.
- Focus on creating multi-reactor orderbook and integrating security-by-design via NNSA

- About \$100 million to accelerate followon SMR projects
- Targets persistent barriers in licensing, design finalization, supply chain, and site readiness.

TVA Clinch River Project



- Clinch River Project Accomplishments
 - Early Site Permit from the NRC (2019)
 - Programmatic Environmental Impact Statement complete for an advanced nuclear reactor technology park both light water and non-light water reactors
 - Support from the surrounding community, State of TN and our elected representatives
 - Investment of up to \$350 million approved by TVA Board
 - Leading industry partnerships including utilities who seek to be fast followers
 - Working on standard design of GE BWRX-300
 - Recently announced plans to submit construction permit application to NRC by June
- Key Challenges
 - FOAK Technology / cost risk
 - TVA Debt Cap
 - Board approval required to proceed with construction (TVA Board currently lacks quorum)

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Financial and Policy Support for New Nuclear

- Inflation Reduction Act (IRA) Incentives:
 - "45U" Production Tax Credit (PTC) for operating reactors and "45J" PTC for power from advanced nuclear facilities
 - Investment Tax Credit (ITC) of 30% for new projects, increased up to 50% with siting adders (e.g., in energy communities)
 - Loan Programs Office (LPO) Support: Expanded loan guarantees can fund up to 80% of eligible project costs
- Energy Community Bonuses:
 - New nuclear projects built at retired coal plants or at eligible energy community sites receive additional 10% ITC bonus
- ADVANCE Act of 2024:
 - Streamlines Nuclear Regulatory Commission (NRC) licensing processes
 - Supports the commercialization of Gen III+ and Gen IV reactors
- DOE Funding Programs:
 - \$900 million to support Gen III+ SMRs demonstration and deployment (Reissued by Trump Admin. DOE March 24, 2024)
 - \$2.72 billion allocated to incentivize a domestic nuclear fuel supply chain (Biden Admin)
- Innovative Power Purchasing Mechanisms:
 - Regulatory encouragement for 24/7 clean energy procurement contracts from tech and industrial sectors to backstop nuclear investments
 - Dominion Energy Amazon announce partnership to explore SMR development in Virginia (Oct. 2024)
- Integrated Project Delivery Models and Financial Risk Sharing:
 - Cost-overrun insurance via ITC coverage
 - Encouragement of consortium-based purchasing to de-risk first deployments
- Recognition of Clean Firm Standards:
 - Emerging discussions around setting clean firm power standards that could systematically recognize and value nuclear's reliability and decarbonization contributions

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NC Policy Support for SMR Development



- NCUC Order under "Carbon Plan" framework authorizes Duke Energy to take "reasonable steps" to achieve COD of 300 MW SMR 1 in 2034, SMR 2 in 2035, and to report on feasibility of achieving 1,200 MW COD by 2036
- 2024 Carbon Plan Integrated Resource Plan pre-approved early development cost of \$440M for Duke Energy to pursue SMR development through 2026 as part of least cost IRP to achieve carbon neutrality by 2050
- S. 261 proposes additional financial support for utility investments in SMR, enabling recovery of CWIP during construction

Questions or Comments?