The State of Nuclear Power Construction

David T. Stevenson

9/29/2025

General Issues

- 2024 Advance Act requires faster NRC approvals, financial support
- President Trump signed four Executive Orders speeding development
- Closed power plants reopening
- Small Modular Reactors starting construction
- 40 states taking action on nuclear, 200 nuclear related bills this year
- Expansion of uranium mining, enrichment, waste recovery planned
- Waste storage finally nearing a solution, industry coalition
- Publicly traded stock prices are up 60% to 120% since April

Closed power plants reopening

- Three Mile Island, Pennsylvania, 819 MW with 95.7% capacity factor, completed in 1968 ($2 billion cost in 2023 $), $1.6 billion to restart by 2028, Constellation to sell power to Microsoft under 20 year contract
- Palisades, Michigan, 800 MW with 99.2% capacity factor, completed in 1971 ($0.9 billion in 2023 $), $1.5 billion loan to restart by 2027 by Holtec. Preparations complete, ready early for refueling.
- Duane Arnold Energy Center, Iowa, 601 MW, with 99.4% capacity factor, completed in 1975 ($1.165 billion cost 2023 $), restart by 2028

Planned light water SMR power plants

- Darlington, Ontario, BWRX300 MW GE/Hitachi , $3.8 billion cost, to be completed by **2029**
- Clinch River, Oakridge, TN, BWRX300 MW GE/Hitachi , $5.4 billion cost, to be completed by **2032**, 0.8 billion DOE grant, $83 million TVA grant, 30% ITC brings cost down to $2.9 billion, expects 2.5 year NRC license timing
- Palisades, Michigan, two Holtec SMR 300, first reactor by **2030**
- Meta committed to build 1 – 4 GW, Google 500 MW in 2030's
- Appalachian Power, VA committed to build an SMR by 2030's
- Texas, X Energy Xe-100MW received first 18 month NRC permit plan

Planned light water SMR power plants, Cont’d

- X-energy and the owner of British Gas made a deal for six gigawatts of nuclear power across 12 modular reactors
- Sweden said it’s ready to offer $23 billion in loans for new nuclear
- The Tennessee Valley Authority announced an agreement with ENTRA1 Energy to develop up to 6 GW of new nuclear power in the largest U.S. small modular reactor deployment program to date. The project will utilize small modular reactors developed by NuScale Power, the first fully approved SMR design by the Nuclear Regulatory Commission

Advanced Reactors

- Oakridge, TN, 150 MW Hermes GEN 4 by Kairos Power by **2027**, 650C molten salt with TRISO fuel (tri-structural isotropic particles in pebble form) using HALEU (high assay low enriched uranium) enriched to 19.74% (standard enrichment in typical reactors is 5%)
- Kemmerer, WY, 345 MW Natrium TerraPower reactor using liquid sodium for cooling, low pressure, 500 C, combined with molten salt power storage estimated to be operational by **2027** (started construction with NRC permit not issued yet).
- General Atomics has a helium cooled high temperature design they claim could be assembled in two years for used fuel recycling
- Idaho National Lab, Oklo Aurora 75MW, fast breeder reactor **2027**
- Utah, NUCube high temperature TRISO fueled reactor agreement

Used fuel issues requiring study and legislative action

- Authority to reprocess and recycle used fuel
- Authority to Transport used fuel casks across state lines
- How to efficiently use recycled products
- How to permanently store non-recyclable waste, state agreements
- Adopt science based radiation limits
- Adopt policies to boost international sales by US suppliers with used fuel take back
- Use of existing Nuclear Waste Fund, Investment Tax Credits