Advanced Reactor Deployment Timelines

Multiple advanced reactor developers have announced domestic demonstration projects in the 2020s and early 2030s, including demonstrations of non-light water reactors (non-LWRs), commercial small modular light water reactors (SMRs), demonstration and test microreactors, and university research microreactors (Figure 1).

Reactor developers are engaging with customers, state and local governments, and the NRC to secure the regulatory approvals necessary for construction, commissioning and operation. These first-mover projects will provide the licensing, construction, and operational experience that enable rapid commercial deployment of advanced nuclear energy in the 2030s. To get the most up-to-date information on advanced nuclear reactor developers, check out NIA's Nuclear Energy Project Tracker.

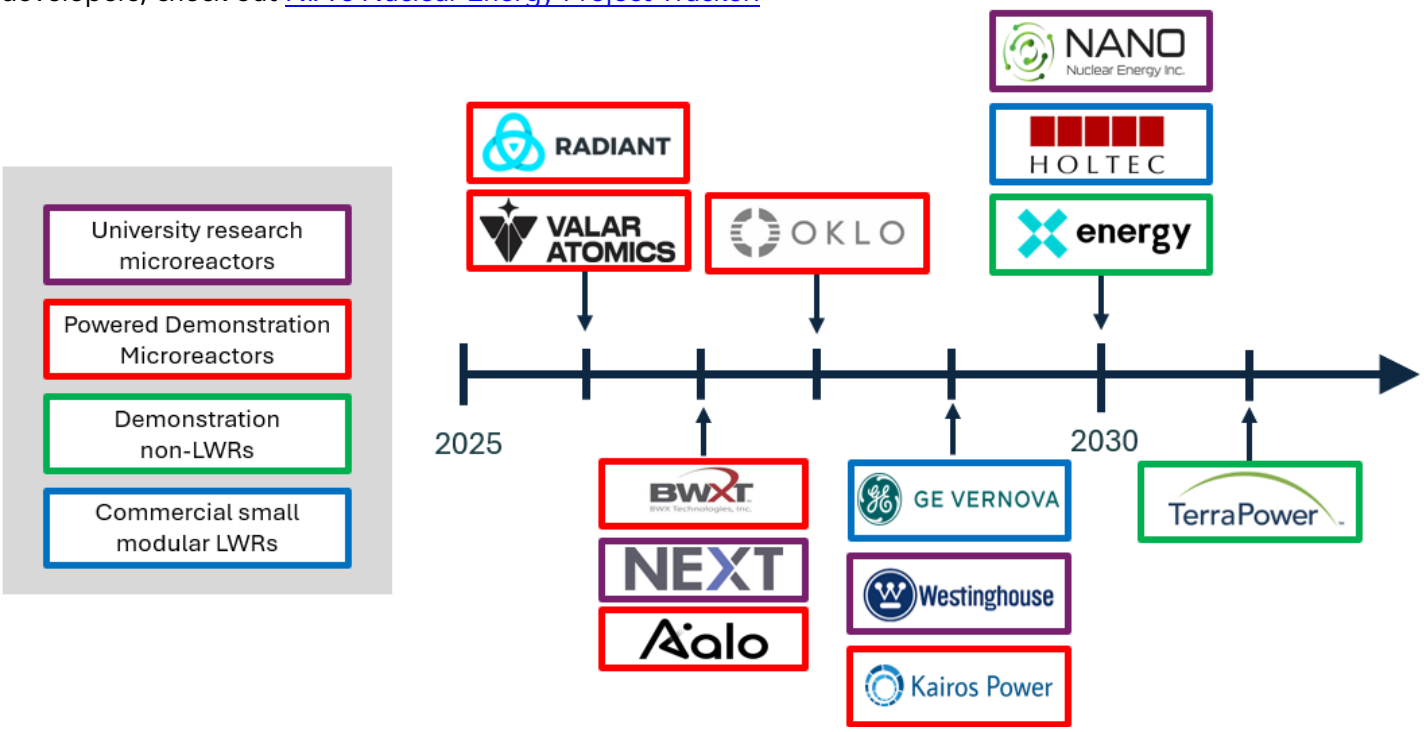

Figure 1: Announced Deployment Timeline for Selected Advanced Reactors Projects in the United States

Demonstration non-LWRs: The U.S. Department of Energy Advanced Reactor Demonstration Program (ARDP) made demonstration reactor cost-share awards to X-energy and TerraPower. X-energy and Dow Chemical Company will build four Xe-100 reactors at Dow's Seadrift site to provide high-quality steam and electricity to power the plant's operations, and TerraPower will build their Natrium reactor to support clean repowering of a retiring coal facility in Kemmerer, Wyoming.

Commercial small modular LWRs: GE-Hitachi announced commercial partnerships with the Tennessee Valley Authority and Ontario Power Generation, and plans to deploy the BWRX-300 reactor technology at the Clinch River Site in Tennessee and the Darlington site in Canada. Holtec has announced plans to build the SMR-300 reactor technology alongside the restarting large LWR reactor at the Palisades Nuclear Power Plant in Michigan

Powered Demonstration microreactors: Oklo and Aalo have both announced plans to construct and operate commercial demonstration microreactors at the Idaho National Laboratory (INL). BWXT is also slated to deploy the Project Pele demonstration microreactor for the U.S. Department of Defense at INL. Kairos Power has started construction on their Hermes test reactor near the East Tennessee Technology Park and is currently licensing two additional test reactors on the site.

University research microreactors: Several advanced reactor developers are working with universities as sites and partners for their initial research microreactors. NANO Nuclear is partnering with the University of Illinois at Urbana Champaign on a high-temperature gas microreactor. NEXT Lab and Natura Resources are partnering with Abilene Christian University (ACU) on a molten salt research reactor, and Westinghouse is partnering with Penn State University to begin the application process for building an eVinci microreactor at Penn State's new research facility.