

Current Status of Small Modular Reactors (SMRs)

By John Benson

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1. Introduction

It has been almost a year since I updated this Nuclear Power Industry Developing class of power plants. My last post was:

Small Modular Reactors (SMR) Update, December 2025: *The nuclear industry hopes to launch advanced small modular reactors (SMRs) by the early 2030s, aiming to meet the deep-pocketed electric utility sector's growing need for electricity to fuel rapidly expanding fleets of data centers.*¹

Nuclear energy has relied largely on the same pressurized-water reactor technology for the past 70 years, but those plants have proven incredibly expensive to build in the U.S. in the 21st century.

The first new nuclear plant completed in decades, reactors 3 and 4 at Plant Vogtle in Georgia, infamously cost about \$18 billion more than expected and opened seven years behind schedule. Each of those reactors can generate 1,114 megawatts of electricity, enough for more than 800,000 homes.

The advanced reactors under development (mainly SMRs) promise to have smaller, lighter footprints that could make them cheaper and quicker to build when they are fully commercialized. But the industry is crowded with more than 90 different technologies in various stages of development around the world, per the Nuclear Energy Agency.

I thought it was time to revisit this evolving new class of power reactors and see how they are doing.

2. Clinch River Unit 1, Tennessee

Developer: Tennessee Valley Authority (TVA)

Reactor type: GE Vernova Hitachi Nuclear Energy BWRX-300 boiling-water SMR

Capacity: Up to 300 MW (about one-third the size of conventional reactors)

Status: NRC construction permit issued after a 14-month review; TVA must still obtain an operating license before fuel-loading.

Significance: First U.S. utility authorized to build a commercial SMR; only the second advanced-reactor construction permit in the U.S.

Design features: Modular factory-built components, passive safety systems, smaller land/water footprint, scalable deployment.

Location: Near Oak Ridge, TN, adjacent to DOE's Oak Ridge National Laboratory

¹ <https://www.energycentral.com/nuclear/post/small-modular-reactors-smr-update-JZQHUVgGfBcumtg>

2.1. Current Status

The U.S. Nuclear Regulatory Commission (NRC) has issued the first-ever construction permit for a commercial small modular reactor (SMR) in the U.S., authorizing TVA to build the GE Vernova Hitachi BWRX-300 at Clinch River Unit 1 — but no construction start date has been set.

On Sept. 29 2026, the NRC formally approved the construction permit after a 14-month review — four months ahead of schedule — following a June 2026 staff safety evaluation that found TVA’s application met all regulatory requirements. This makes TVA the first U.S. utility permitted to construct the BWRX-300, and only the second advanced reactor construction permit ever issued in the nation.

This permit clears a major regulatory hurdle and positions Clinch River as a national leader in SMR deployment, but it is not a green light to build immediately. TVA and partners must complete engineering, financing, and licensing steps before physical construction begins.

2.2. Next Steps & Remaining Requirements

No construction start date has been announced; TVA is continuing site-specific engineering and project development.

Cost-sharing negotiations with industry partners are ongoing to ensure “responsible cost sharing and financial accountability.”

Operating license still required: Before fuel loading and operation, TVA must obtain a separate NRC operating license.

Regulatory pathway: The Clinch River permit is intended to set a repeatable licensing model for future BWRX-300 projects.

2.3. Additional Details

According to TVA, an SMR can generate up to 300 megawatts of electricity, about one-third the size of a traditional nuclear unit. Major components can be manufactured in factories and transported to the site, a process intended to reduce construction time, cost and complexity. TVA also says the technology uses less land and water and additional reactors can be added in phases as electricity demand grows.

TVA leaders said the technology could eventually help the utility meet increasing demand for electricity across its service area.

3. Late News Reaguarding SMRs

As I’m starting to write this section it is October 6, less than a week before this is to be posted. Since most of the above is dated from when I stated working on this post, over a month ago, I thought it would be good to update this with the latest news from today. Fortunately, I found an article from today, and excerpts from this are below.

3.1. Big Milestone for Small Nuclear Reactors

Will nuclear power be able to scale up quickly enough to meet America's energy needs? That's one of the most pressing challenges for the industry, and there's no guarantee of success. One major milestone last week, however, offers hope.²

The Nuclear Regulatory Commission granted a construction permit for a small modular reactor near Knoxville, Tennessee. The approval means the commission determined that the reactor's design is safe and that its operator — the Tennessee Valley Authority, a public utility — can begin building, though the TVA will still need an operating license to loading fuel and starting to generate power.

This marks the first time the NRC has given the green light for a commercial small modular reactor, which, if successful, could usher in a new era for nuclear power. Unlike the hulking traditional reactors of the past, which rely on large-scale energy generation to make sense financially, this new technology goes in the opposite direction: It attempts to shrink the technology, providing less energy per reactor but using a design that doesn't take so much space and can be replicated more easily via standardized major components that can be built in a central factory and transported to the plant-site via standard transport methods.

The TVA project is projected to generate 300 megawatts, enough to power 240,000 homes. That's about a quarter of the power produced by America's most recently built nuclear reactors in Georgia. A government-owned utility in Canada is planning a fleet of reactors using the same design, which it began constructing in April.

Several obstacles remain: TVA, though it has authorized \$350 million for the project, is still negotiating with partners on cost-sharing and has not committed to breaking ground. Costs for the first reactor are also likely to be high, though the hope is for them to fall as the utility works out the kinks and builds additional generation capacity.

This project is the furthest along, but about a dozen companies are developing their own smaller reactor designs, often with investments from large tech companies looking to power the artificial intelligence boom. One of them is Amazon, whose executive chairman, Jeff Bezos, owns The Post.

The enthusiasm about modular reactors reflects increasingly bipartisan support for nuclear energy. A decade ago, investing in the technology was risky, since it takes years to develop and therefore needs sustained support across administrations. Now, majorities in both parties understand the need for expanding nuclear power, so much so that Congress overwhelmingly passed reforms to speed up the onerous review process for new reactors.

The NRC managed to issue the construction permit for TVA in 14 months, four months faster than anticipated. That's the second time the notoriously lethargic agency shocked developers with its speedy review of an advanced reactor. The first, for TerraPower's proposed plant in Wyoming, was completed nine months ahead of schedule.

² Editorial Board, The Washington Post, "Small nuclear reactors reach a big milestone," October 6, 2026, <https://www.washingtonpost.com/opinions/2026/10/06/small-nuclear-reactor-permit-approval-tennessee-is-big-milestone/>

Those are encouraging signs of a possible nuclear renaissance — or, at the very least, they're indications that the industry will succeed or fail based on economic merits, not ideological grounds.

3.2. Other Impending Power Reactors in the U.S.

3.2.1. GE Vernova Hitachi BWRX-300 – Other U.S. Projects

Indiana Michigan Power (IMP) – South Bend, IN: IMP is pursuing a BWRX-300 at its South Bend site, with DOE funding and engineering work underway. The design's proven boiling-water reactor lineage is giving it a regulatory speed advantage over first-of-a-kind SMRs.³

Elemental – Indiana, MI: Elemental is also developing a BWRX-300, with DOE's fleet-oriented funding strategy covering multiple sites.

These projects are in similar stages to Clinch River, with NRC safety reviews in progress and potential for construction permits in the near term.

3.2.2. NuScale Power – SMR (Helium-cooled, 80 MW)

NuScale's 80 MW SMR has completed its NRC safety review and is in the final stages of licensing for commercial deployment. Multiple sites (including in Idaho and California) are in advanced development, with the first commercial unit expected to reach construction readiness in the next few years.

3.2.3. OKTEC – SMR (Helium-cooled, 100 MW)

OKTEC's 100 MW design has completed NRC safety review and is in the final licensing phase. It is positioned as a potential competitor to BWRX-300, with multiple U.S. sites in planning.

3.2.4. Other Designs in Development

The NRC and DOE have identified “dozens of SMR designs” in development, with the goal of maturing them to safe, marketable, and scalable status

While not all are at the construction permit stage, several are in advanced licensing or engineering readiness, with NRC reviews ongoing.

³ The following query-string was used in my Microsoft Bing Copilot Search, and this resulted in the above text in section 3. “The NRC has approved the first commercial small modular reactor (SMR) for TVA's Clinch River site. What other upcoming reactors are approaching this stage?”