

THE TOP 10 **SMALL MODULAR REACTOR** HOTSPOTS TO WATCH OUT FOR IN 2025



INTRODUCTION

Global interest in small modular reactors (SMRs) continues to mount, accelerated by data centers entering the market at a rapid rate. SMRs are deemed to be cheaper and easier to build than traditional nuclear reactors—and are increasingly seen as the way forward for an industry that struggles to complete large-scale projects on time and within budget.

The question for many now is when, not if, the first Western SMR will go live.

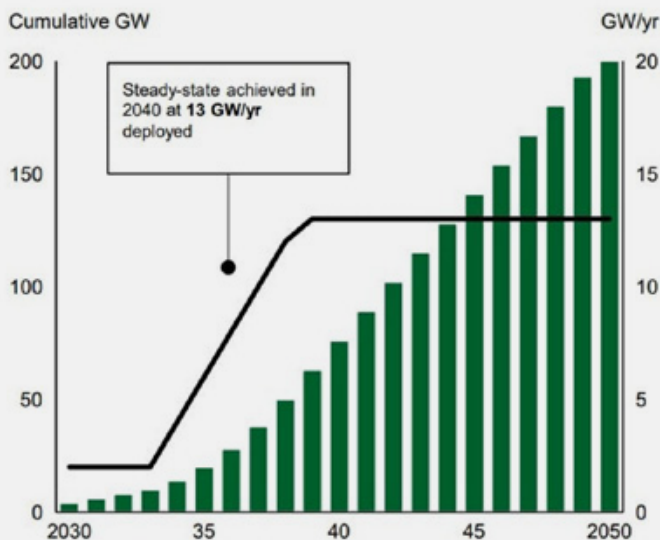
And there are plenty of contenders. In October 2024, the International Atomic Energy Agency listed 68 SMR designs under development, including four in operation and another four under construction.¹

This report lists 10 initiatives likely to see progress in 2025, globally.

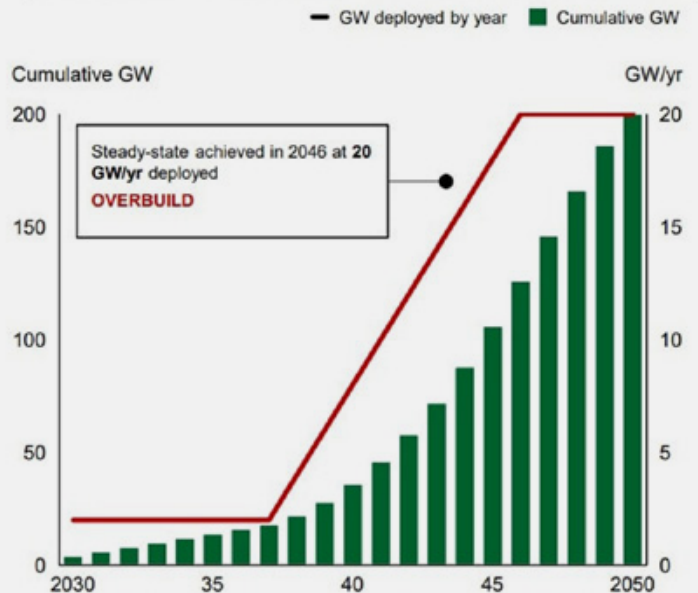
U.S. NUCLEAR COULD BE POISED FOR TAKEOFF

New nuclear build-out scenarios and industrial base capacity requirements.

New nuclear deployment starting in 2030
Annual deployment (GW/yr) built and Cumulative GW online



New nuclear deployment starting in 2035
Annual deployment (GW/yr) built and Cumulative GW online



Source: U.S. Department of Energy (DOE), *Pathways to Commercial Liftoff: Advanced Nuclear* (September 2024). Note: ‘Steady state achieved’ line shows the pace nuclear capacity must be deployed to reach targets depending upon when deployment at scale begins. If scale deployment is delayed until 2035, “delivering projects at that rate and scaling a supply chain to 20-plus gigawatts could come at significantly higher capital costs, both overall and for the marginal unit,” says the DOE.²

GE HITACHI IN CANADA

Canadian utility Ontario Power Generation has selected GE Vernova to build what are claimed to be the first SMRs in North America, with construction scheduled to start in 2025 and commercial operation to follow in 2029.³

Vernova's GE Hitachi Nuclear Energy unit has been contracted to build four 300 MW BWRX-300 SMRs at Ontario Power Generation's Darlington New Nuclear Project site, near Toronto.

GE Hitachi has selected Canada-based Worley Chemetics to design and fabricate the SMRs' isolation condenser systems, for passive safety,⁴ and Montreal-headquartered Velan for valve manufacturing and engineering support.⁵

X-ENERGY IN THE UNITED STATES

Touting a 76 MW pebble bed high-temperature gas-cooled nuclear reactor design called the XE-100, Maryland-based X-energy is benefiting from corporate decarbonization programs with an agreement to supply clean power to Dow.

The chemicals company has requested four reactors to power its Union Carbide Corporation Seadrift Operations manufacturing site in Texas, with construction slated for 2026 and completion by the end of the decade.⁶

X-energy reactors could also power data centers under a separate agreement with Amazon (which is an investor in the SMR company) and Energy Northwest, a consortium of public utilities in Washington state.⁷

KAIROS POWER IN THE UNITED STATES

The Darlington project's "first in North America" claim faces serious competition from Kairos Power, which is already building a demo reactor at Oak Ridge in Tennessee, United States, with operation due to start in 2027.

The 35 MW Hermes low-power demonstration unit is the first and only Generation IV reactor approved for construction by the U.S. Nuclear Regulatory Commission (NRC), and the first non-light-water design permitted in the United States in more than 50 years.⁸

In November 2024, the NRC greenlighted construction of a second Hermes unit that will share a power generation system with the first.⁹ Further down the line, Kairos has agreed to build a 500 MW fleet of SMRs for Google, with the first theoretically coming online by 2030.¹⁰

NUSCALE POWER IN ROMANIA

Oregon, U.S.-based NuScale Power Corporation has long been a poster child for SMR development, becoming the first vendor to achieve NRC licensing. It also seemed likely to be the first vendor to crack the U.S. market, until a deal with Utah Associated Municipal Power Systems fell through.

Today, the company's North American ambitions are centered on developing two plants providing almost 2 gigawatts (GW) of power for data center customers of hosting provider Standard Power from 2029.¹¹

But these plans could be overtaken by a scheme to build a 462 MW plant for Romania's RoPower Nuclear. The project, which should see a NuScale VOYGR-6 SMR starting up by 2030, has U.S. and Romanian government support.¹²



OKLO IN THE UNITED STATES

Vying with NuScale and Kairos for leadership in the U.S. market is Californian metallic fuel microreactor vendor Oklo, which is aiming to have a 15 MW Aurora Powerhouse unit up and running at the Idaho National Laboratory in 2027.

The reactor, which was given a site use permit from the U.S. DOE in 2019, will be located next to a fuel fabrication plant also built by Oklo.¹³ Like other SMR developers, Oklo is hoping its U.S. debut will pave the way for lucrative projects linked to data centers.

It has already inked agreements with data center operators Equinix, Prometheus Hyperscale, Switch and others. The Switch deal alone could see Oklo supplying 12 GW of data center power by 2044.¹⁴

ROLLS-ROYCE SMR IN CZECH REPUBLIC

Despite slimming down its nuclear business in recent years, aerospace and defense company Rolls-Royce remains a leading force in British SMR development.

Rolls-Royce SMR is backed by the parent company along with investor BNF Resources, U.S. energy firm Constellation and the Qatar Investment Authority. In September 2024, it was shortlisted along with three other vendors to begin the process of developing SMRs for Britain's grid.¹⁵

But the company's focus today is on the Czech Republic, where it has partnered with state utility CEZ to develop up to 3 GW of SMR capacity. Rolls-Royce SMR says work on the first of its 470 MW units could start "as soon as 2025."¹⁶

KÄRNFULL NEXT IN SWEDEN

In December 2024, Göteborg-based SMR project developer Kärnfull Next announced a tie-up with South Korean construction company Samsung C&T, which has previously worked on the Barakah Nuclear Power Plant in the United Arab Emirates, to develop projects in Sweden.

Under a program called Re:Firm South, the companies aim to develop so-called SMR campuses that will feature at least two GE Hitachi BWRX-300 reactors apiece, primarily to serve growing clean energy demand from data centers.¹⁷

Part of a wave of European SMR hopefuls that includes Copenhagen Atomics in Denmark and Hexana in France, Kärnfull Next is also collaborating with Helsinki-based Fortum and is looking to get its first SMRs online in the early 2030s.

Two Swedish municipalities, Nyköping and Valdemarsvik, have already been earmarked as possible SMR campus locations.¹⁸

TERRAPOWER IN THE UNITED STATES

June 2024 saw TerraPower, an SMR technology developer backed by Bill Gates, starting an estimated five years of construction on a site near Kemmerer, Wyoming, designed to house a 345 MW Sodium sodium-cooled fast reactor demonstration project.

With TerraPower still awaiting an NRC nuclear construction permit, the works so far are limited to non-nuclear assets. Nevertheless, said the company, "TerraPower is the first to submit its construction permit application for a commercial advanced reactor to the NRC."¹⁹

The TerraPower design, developed in partnership with GE Hitachi, features a novel energy storage system to improve performance and efficiency.²⁰



HOLTEC AND WESTINGHOUSE IN BRITAIN

Government-owned Great British Nuclear has shortlisted four technology providers—GE Hitachi, Holtec, Rolls-Royce SMR and Westinghouse—to tender for SMRs in Britain.

While a decision on the final selection is not expected until early 2025, and up to three could make the cut, Florida-based Holtec International is showing promise after passing the first step of the UK Generic Design Assessment process for its SMR-300 reactor in a record 10 months.²¹

Great British Nuclear is expected to make a final investment decision on SMR projects in 2029. Meanwhile, Westinghouse is moving forward with plans for Britain's first privately financed SMR fleet, based on its AP300 design.

The company is hoping to deploy four AP300s in North Teesside, with commercial operation in the early 2030s, under a deal with Community Nuclear Power.²³

CAREM IN ARGENTINA

The 25-megawatt (MW) SMR being developed in Zárate, in Argentina's Buenos Aires province, by Central Argentina de Elementos Modulares (CAREM), is one of just two SMRs currently under construction outside of China and Russia. And it has been under construction for some time.

The reactor design was unveiled by Argentina's National Atomic Energy Commission in 1984, but first concrete was not poured until 30 years later, in 2014. At the time, fuel was due to be loaded by 2017.²⁴

Today, construction is 85% complete but a revised go-live date of 2028 is in doubt after worker layoffs halted building work in September 2024.²⁵ It remains to be seen how or if the project will advance in 2025.

GROWING MARKET

These announcements underscore growing momentum behind the nascent SMR market, which is expected to be worth \$72.4 billion by 2033.

To bridge knowledge divides, secure contracts and capture market share in this space, sign up now for Reuters Events' SMR & Advanced Reactor 2025 conference, in Nashville on May 12 and 13, at <https://events.reutersevents.com/nuclear/smr-usa>.

DISCLAIMER

This report is not intended to provide an exhaustive listing of major SMR projects. The data used in this report has been obtained from public sources and Reuters Events makes no warranty as to its accuracy.



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