



Written by [Rebecca Terrell](#) on March 14, 2023

First U.S. Gen-III+ Reactor: Years Behind Russia, China, World

The first new nuclear unit built in the United States in more than 30 years will soon be powering hundreds of thousands of homes and businesses.

[Georgia Power](#) announced that its AP1000 unit at the [Vogtle](#) nuclear plant outside Waynesboro reached initial criticality on March 6.

“Criticality” means that operators safely started a sustained nuclear reaction. “This means atoms are being split and nuclear heat is being made, which will be used to produce steam ... for the production of electricity,” explains a company [press release](#).



georgiapower.com
Vogtle unit 3

The next steps will prepare the reactor’s power output for synchronization with the electric grid, and Georgia Power anticipates that the in-service date will occur in May or June.

This news relates to Unit 3 of 4 reactors at the site. Units 1 and 2 are pressurized water reactors that have been in operation since 1987 and 1989, respectively. Their technology is antiquated compared to that of Units 3 and 4.

The latter is another Westinghouse AP1000 unit currently being built. Westinghouse submitted its initial design approval application more than 20 years ago, in 2002, showing how slowly the bureaucratic wheels turn at the U.S. Nuclear Regulatory Commission ([NRC](#)).

Once Unit 4 is operational, Plant Vogtle will be “the largest of its kind in the U.S.,” said Chris Womack, chairman, president, and CEO of Georgia Power. Units 3 and 4 “are expected to power more than 500,000 homes and businesses.” The entire plant will service more than one million.

Generation III+

Construction on both Units 3 and 4 began a decade ago, employing “so-called Generation III+ reactors with fully passive safety systems and a modular construction design,” according to World Nuclear News ([WNN](#)).

This means that multiple redundant safety systems involved in the reactor are dictated by laws of nature rather than being reliant on human intervention. “Modular” refers to innovations in nuclear reactors that reduce capital costs without decreasing output, and that increase reactor lifespan.

By way of comparison, Tennessee’s Watts Bar Unit 2 most recently went online in 2016, but its traditional pressurized-water reactor construction began in 1973. Production was stymied by a myriad of regulatory roadblocks along the way, including new safety rules that the NRC imposed after an earthquake and tsunami damaged Japan’s Fukushima plant in 2011.



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Watts Bar Unit 2 would finally start generating power 43 years after its groundbreaking. Its sister, Watts Bar Unit 1, was the next most recent reactor to go online in May 1996, 23 years after construction began in 1973.

Leaps & Bounds

Meanwhile, what is now breaking news in the U.S. made headlines of distant memory in Russia and China. Six years ago, [Reuters](#) ran this story: “Russia completes world’s first Gen III+ reactor; China to start up five reactors in 2017.”

“Generation III+ reactors incorporate extra safety features to avoid the kind of disaster suffered at Fukushima in 2011,” including “a passive heat removal system that operates in the absence of electric power supply,” explains the article.

It also reported that two of China’s five newly completed reactors (as of 2017) were Westinghouse AP1000 units. During the same year, the communist nation began construction on eight more units. One year prior, it had brought online eight gigawatts of nuclear power.

“China’s rapid nuclear expansion will result in it overtaking the U.S. as the nation with the largest atomic power capacity by 2026,” reported [Bloomberg](#) in 2017.

Next Generation

But that was then. Today’s picture is slightly different, as China is now exceeding its previous expectations. As of last September, it had “the capacity to build more nuclear reactors than planned through 2025,” [Bloomberg](#) related.

“The national target is six to eight reactors a year, but that could be raised to 10, said the China Nuclear Energy Association.”

The country is exporting its technology as well. [Radio Pakistan](#) reported in February that China delivered two “third-generational nuclear power” reactors to Pakistan, and both have already been put into operation. They are the most recent of six nuclear power units at two power stations that the China National Nuclear Corporation operates in that country.

Also last month, [Bloomberg](#) wrote that “Russia’s nuclear exports have surged since the invasion of Ukraine, boosting the Kremlin’s revenue and cementing its influence over a new generation of global buyers, as the U.S. and its allies shy away from sanctioning the industry.” Russia’s exports of nuclear power jumped more than 20 percent in 2022.

To add insult to injury, various countries are already branching into Generation IV. “Italian utility Enel has signed a cooperation agreement with UK-based renewable energy firm newcleo to work on Gen-IV nuclear reactors,” writes [Power Technology](#). The firm plans a mini 30-megawatt lead fast reactor for France and a 200-megawatt commercial unit for the U.K. The company’s CEO, Stefano Buono, told Power Technology that “newcleo’s fast reactor technology is the necessary step in the nuclear industry to enable multiple recycling of already extracted uranium and a massive reduction in nuclear waste.”

In light of such pioneering international news, it is reasonable to ask whether Vogtle’s good news is too little, too late, and whether the United States can catch up to its adversaries.



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