



BWRX-300

The **BWRX-300** is a design for a small modular nuclear reactor proposed by GE Hitachi Nuclear Energy (GEH). The BWRX-300 would feature passive safety, in that neither external power nor operator action would be required to maintain a safe state, even in extreme circumstances.

Technology

The BWRX-300 is a smaller evolution of an earlier GE Hitachi reactor design,^[note] the Economic Simplified Boiling Water Reactor (ESBWR) design and utilizing components of the operational Advanced boiling water reactor (ABWR) reactor.^[1] Boiling water reactors are nuclear technology that use ordinary light water as a nuclear reactor coolant. Like most boiling water reactors, the BWRX-300 will use low pressure water to remove heat from the core. A distinct feature of this reactor design is that water is circulated within the core by natural circulation. This is in contrast to most nuclear reactors which require electrical pumps to provide active cooling of the fuel. This system has advantages in terms of both simplicity and economics.

Decay heat removal

Immediately after a nuclear reactor shuts down, almost 7% of its previous operating power continues to be generated, from the decay of short half-life fission products. In conventional reactors, removing this decay heat passively is challenging because of their low temperatures. The BWRX-300 reactor would be cooled by the natural circulation of water, making it distinct from most nuclear plants which require active cooling with electrical pumps.

New build proposals

In 2019, GEH expected construction to start in 2024/2025 in the US or Canada, entering commercial operation in 2027/2028, and for the first unit to cost less than \$1 billion to build.^[1]

Canada

On December 1, 2021 Ontario Power Generation (OPG) selected the BWRX-300 SMR for use at the Darlington Nuclear Generating Station.^[2] In October 2022, OPG applied for a construction license for the reactor, with plans to start operations in 2028.^[3] On July 7, 2023 Ontario Power Generation chose three additional BWRX-300 SMR for construction at the Darlington New Nuclear Project in Ontario, Canada, joining the first already planned.^[4]

On June 27, 2022 Saskatchewan Power Corporation selected the BWRX-300 SMR for potential deployment in Saskatchewan in the mid-2030s^[5]

Poland

On December 16, 2021 Synthos Green Energy (SGE), GE Hitachi Nuclear Energy and BWXT Canada announced their intention to deploy at least 10 BWRX-300 reactors in Poland in the early 2030s.^[6] On July 8, 2022 Orlen Synthos Green - a joint venture between SGE and PKN Orlen - applied to the National Atomic Energy Agency for a general opinion on the BWRX-300 SMR technology.^[7] In August same year a date of delivery of the reactor was announced: 2029. Construction of the reactor will begin in 2024, in Darlington, Ontario.^[8] In December 2023 the initial government permit was issued to Synthos Green.^[9]

USA

On August 3, 2022 TVA announced that it had entered into an agreement with GEH to support its planning and preliminary licensing for the potential deployment of a BWRX-300 small modular reactor at the Clinch River site near Oak Ridge in Tennessee.^[10] In January 2025, a TVA-led coalition applied for federal funding to accelerate construction of the first SMR with commercial operation planned for 2033.^[11]

Sweden

On March 14, 2022 Kärnfull Future AB signed a Memorandum of Understanding with GEH to deploy the BWRX-300 in Sweden.^[12]

Estonia

On February 8, 2023 Fermi Energia AS chose the BWRX-300 SMR for potential deployment in Lääne-Viru County of Estonia in the early-2030s^[13]

Notes

[^] GEH describes the BWRX as the tenth version of their Boiling Water Reactors.^[14] following BWR 1-6, ABWR, SBWR, and ESBWR.^[15]

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External links

- [The BWRX-300 Small Modular Reactor \(https://nuclear.gpower.com/build-a-plant/products/nuclear-power-plants-overview/bwrx-300\)](https://nuclear.gpower.com/build-a-plant/products/nuclear-power-plants-overview/bwrx-300)
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