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Virginia class submarine moors at HMAS Stirling in WA

The US Virginia class submarine, USS Minnesota (SSN 783) arrived at HMAS Stirling in Western Australia on 25 February 2025 for a routine port visit.

USS Minnesota is powered by a 210 MWth pressurised water reactor.

This visit is the first of several planned US SSN submarine port visits to Australia in 2025. The next port visit to HMAS Stirling later this year will be a three-week submarine maintenance period.



USS Minnesota (SSN 783) arriving at HMAS Stirling

This year's port visits follow the recent submarine tendered maintenance period at HMAS Stirling in 2024 with the U.S. submarine tender, USS Emory S. Land (AS 39) and the US submarine, USS Hawaii (SSN 776).

"The Australian and US Navies operate on shared behaviours, shared values, and a shared commitment to assuring the prosperity and security of the Indo-Pacific region," Chief of the Royal Australian Navy Vice Admiral Hammond said.

These port visits help Australia and the U.S. prepare for the start of Submarine Rotational-Force West at HMAS Stirling from as early as 2027, during which one UK Astute class submarine and up to four US Virginia class submarines will have a rotational presence at the base.

The start of Submarine Rotational-Force West is the first phase in the AUKUS Pillar I program, which will ultimately result in Australia's acquisition of a future fleet of conventionally-armed, nuclear-powered submarines

Australia Submarine Agency 26 Jan 2025

Recent Nuclear Energy Developments around the World: January to March 2025

Information sourced from World Nuclear News
<https://www.world-nuclear-news.org/>.

New Builds and Life Extensions

South Africa: Unit 2 of the Koeberg nuclear power station has returned to service following the completion of maintenance to extend the operational lifespan by 20 years. Koeberg 2 is a PWR with net capacity 930 MWe.



Koeberg Nuclear Power Station, South Africa

United States: A life extension has been announced for Monticello to 2050. The plant began commercial operation in 1971.

China: Earthworks have commenced for Unit 1 at the new Bailong nuclear power plant. The first two units at the site are planned to be CAP1000 PWRs and are estimated to cost in total US\$5.6 billion and take 56 months to construct. Once in operation, it is estimated that the two units will reduce coal use by 6 million tonnes and carbon emissions by 16 million tonnes annually. Four CAP1400 units are also planned for the site.

Russia: Leningrad unit 3 has been granted a further 5-year life extension, extending operations to 50 years. The original design life of the RBMK-1000 unit was 30 years.

United Kingdom: The decommissioned Llynfi coal fired station in Wales might one day be home to four 20 MWe microreactors. US microreactor developer Last Energy has entered the UK's nuclear site licensing process. This is the first new site to enter the nuclear licensing process in the UK since Torness in 1978. Last Energy is developing the PWR-20, which is aiming to have a 24-month fabrication, transport and assembly period. The main use for the technology is envisaged to be industrial applications. The target date for

implementation is 2027 pending licensing and permitting requirements.

Policy

United States: A deal to supply 10 million MWh has been signed between Constellation and the General Services Administration, which includes 80 federal facilities from 13 government agencies. The deal is aimed at providing a carbon free energy future whilst protecting taxpayers against future electricity price hikes. The procurement agreement will involve Constellation adding 2.4 million MWh of nuclear capacity via licence extensions and uprates over the 10-year period. The US government is the country's largest energy consumer.

United States: Existing nuclear power plants are now eligible for hydrogen tax credits under the Inflation Reduction Act.

World: A report released by the International Energy Agency called "The Path to a New Era for Nuclear Energy" identifies that interest in nuclear energy is at its highest since 1970. In the last 5 years, decisions have been made to extend the lifetime of more than 60 reactors or about 15% of the fleet. Annual investment in nuclear has increased 50% in the three years since 2020. The report also suggests that by 2050, current policies should see total SMR capacity at 40 GW. This number could be as high as 120 GW or about 1000 SMRs if key challenges can be overcome, such as tailored policy that supports nuclear and streamlined SMR regulations.

Belgium: The new government of Belgium has announced plans to further extend the lives of two reactors beyond the extension already agreed, plus construct new reactors. Building new reactors will include lifting the ban on the construction of new reactors. The government aims to double nuclear capacity from the current 4 GW to 8 GW.

Spain: Spain looks to be on track to reverse its nuclear phase out following the approval of a proposal calling for the government to implement measures to reverse the phaseout.

Japan: Japan aims to increase its use of nuclear energy to about 20% of total electricity generation by 2040. Currently, approximately 8.5% of electricity is generated by nuclear.

Continued page 3

To reach the 20% value, most Japan's operable reactors, including those under construction, will need to be operational. Japan's energy plan is revised every 3 years. In the latest revision it was noted that in the locations where nuclear power plants have restarted, electricity costs are as much as 30% lower than in other areas.

India: India is looking to expand its nuclear fleet from the current 7 GW to 100 GW by 2047.

World: Major energy users, including Meta, Amazon, Dow and Google, have signed a pledge supporting the tripling of nuclear energy by 2050.

Other

Sweden: Sweden has broken ground for the construction of a final repository for used nuclear fuel and radioactive waste in Forsmark. Construction is expected to take about 10 years before the introduction of waste. The permit for the repository allows 6000 canisters to be deposited containing approximately 12,000 tonnes of waste at depth of about 500 m, from

the 12 reactors that currently operate or have previously operated in Sweden. An approved safety report is still required before any tunnelling can commence.

United Kingdom: The selection process to choose one or two SMR technologies for the UK has entered the final phase, with the selection expected to be completed by winter. The four short listed technologies are GE-Hitachi's BWRX-300, Holtec's SMR-300, the Rolls Royce SMR (470 MW), and the Westinghouse AP-300.

Australia: Decommissioning of Australia's first research reactor HIFAR has commenced. Decommissioning involves two Phases A and B, with Phase A having three stages. Approval has been granted for Phase A Stage 1 and includes the removal of select items. Most of the waste generated by the initial work will be solid waste that can be recycled, although some will be low level waste.

Jo Lackenby ANA

Fostering STEM-Policy Connections: Insights from Science Meets Parliament 2025

Hasliza Omar, ANA Vice President attended the 2025 Science Meets Parliament as an ANA delegate. This is her report:

I had the privilege of attending Science Meets Parliament 2025 (SMP2025) on February 12 and 13 at the Australian Parliament House. This event stands as Australia's premier initiative for fostering meaningful connections between the STEM sector and policymakers.

On the first day, I, along with other scientists, participated in a masterclass on navigating negotiations with parliamentarians, led by the Honourable Bill Shorten. This, along with other sessions, helped us build confidence in effectively promoting our scientific research to parliamentarians within a very limited timeframe.

This preparation proved useful when I had the opportunity to engage in an extended one-hour meeting with Mr. Luke Gosling MP from the Northern Territory. Our discussions on energy security for Australia and the Northern Territory were so fruitful



*Hasliza Omar, ANA Vice President with
Mr Luke Gosling MP*

that the meeting extended beyond the originally planned 30 minutes.

I also had the pleasure of meeting other scientists from various fields, which gave me the chance to assess the general reception towards nuclear energy in Australia. The interesting insight I gathered was that there is a consensus that natural gas is a viable long-term solution, while nuclear energy is considered impractical due to long build times and radioactive waste management issues. When I challenged this perception by linking waste

management to the AUKUS deal, it became clear that there is a gap in understanding how AUKUS development could pave the way for commercial nuclear power.

As the general election approaches, this insight could prove valuable in navigating the nuclear energy conversation in Australia. Overall, the SMP2025 experience was enriching and provided valuable insights into the intersection of STEM and policy.

Hasliza Omar, ANA

Current Status of Small Modular Reactors

There are over 90 Small Modular Reactor (SMR) land-based designs under development. SMRs are nuclear power reactors with a power of 20 to about 300 MWe. Most designs are pressurised water reactor (PWRs), but there are also high-temperature, fast and molten salt reactors at advanced stages of development.

Modern SMRs Operating

About 200 small nuclear reactors provide propulsion in about 160 naval ships, submarines and icebreakers with more under construction.

CNP-300 is a 300MWe PWR developed in built and operating in China and Pakistan. Units began operation in 1991, 2011, 2016 and 2017.

HTR-PM: a thermal high-temperature gas-cooled (HTGR) pebble-bed reactor in China. Two 250 MW reactors drive a single steam turbine to produce 210 MWe. HTR-PM started commercial operation in 2023.

IPHWR-220: a 220 MWe Indian pressurized heavy-water reactor, with 14 units operational in India.

KLT-40S: a 150 MW thermal PWR in the Russian floating nuclear power station Akademik Lomonosov, commercial operation from 2020.

SMRs Under Construction

ACP100 (Linglong One): an integrated 125 MWe PWR being built in China. Construction began in 2021.



Dome being installed on Linglong One in China

BREST-300: a 300 MWe Russian lead-cooled fast reactor. Construction began in 2021.

CAREM25: an integral PWR being built in Argentina. Construction began in 2013, currently on hold.

RITM-200: a 55 MWe PWR used in Russian icebreakers. Plans to use RITM-200N (land-based) and RITM-200M (floating) to power remote towns.

SMRs close to deployment in near term

AP300: a 300 MWe PWR Westinghouse: One of four SMR technologies being assessed for UK Program.

BWRX-300, a 300 MWe GE Hitachi Boiling Water Reactor. In 2021, Ontario Power Generation selected the BWRX-300 for its Darlington Nuclear Generating Station and has prepared the site. Also plans to use BWRX-300 in USA at Clinch River, Saskatchewan Poland, Estonia and Sweden. One of four SMR technologies being assessed for UK Program

Holtech SMR-160: a 160 MWe PWR. Holtec has invested over \$50 million USD in development and environmental activities and plan to build two units at existing Palisades Nuclear Plant in Michigan. One of four SMR technologies being assessed for UK Program

Kairos: a fluoride (FLiBe) salt-cooled high temperature reactor (KP-FHR) using TRISO fuel. Kairos is constructing a low power demonstration reactor Hermes and has received approval from USNRC to construct the 50 MWe Hermes 2 Demonstration Plant at Oak Ridge, Tennessee. Google is supporting the commercial deployment of the Kairos power reactor.

Sodium: a 345 MWe sodium-cooled fast with a molten salt energy storage system supported by Bill Gates. Site works started at a retiring coal facility at Kemmerer in Wyoming. Permit application was submitted to US Nuclear Regulatory Commission (USNRC) in March 2024.

NuScale: a modular PWR, the 50 MWe version certified by the USNRC. Earlier plans to construct a 6-unit plant in Idaho cancelled because of high costs.

Rolls-Royce SMR: a 470 MWe PWR. One of four SMR technologies being assessed for UK Program

SMART100: a 220 MWt PWR design with integral steam generators was granted standard design approval by the Korean regulator in 2024.

Xe-100: a pebble bed high-temperature gas-cooled nuclear reactor design using TRISO fuel. X-Energy has secured about US\$1.1 billion to commercialise Xe-100. Dow and X-Energy applied for construction licence at Dow Seadrift site in Texas on 31 March 2025. Amazon will fund construction of four Xe-100 reactors at Hanford.

For **more information** <https://world-nuclear.org/> and <https://www.world-nuclear-news.org/>.

John Harries, ANA