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Australian Naval Nuclear Regulator established on 1 Nov 2025

The Australian Naval Nuclear Power Safety Regulator (ANNPSR) was established on 1 November 2025 as Australia's independent regulator for naval nuclear propulsion.

Mr Michael Drake was appointed as the inaugural Director-General of ANNPSR. He is responsible for the regulation of naval nuclear propulsion related activities associated with Australia's acquisition of Virginia submarines and future AUKUS SSNs.

Mr Drake brings to the role technical expertise and a decade of maritime regulation experience, including most recently as Executive Director of Operations with the Australian Maritime Safety Authority, and before that 15 years in the Royal Australian Navy where he served primarily in Australia's Collins Class Submarines.



Mr Michael Drake

The new Agency is headquartered in Canberra and commenced with 70 staff. In the coming years, it will expand in Western Australia and South Australia.

ANNPSR will regulate the Australian naval nuclear propulsion related activities at HMAS *Stirling* at Garden Island in Western Australia and at the Osborne Naval Shipyard in South Australia.

The Australian Naval Nuclear Power Safety Regulator is a non-corporate Commonwealth entity within the Defence portfolio and is established under the *Australian Naval Nuclear Power Safety Act 2024*.

<https://www.minister.defence.gov.au/media-releases/2025-11-01/aukus-milestone-launch-australian-naval-nuclear-power-safety-regulator>
<https://www.annpsr.gov.au/>

Nuclear developments December 2025

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

New Builds and Life Extensions

South Africa: Koeberg Unit 2 has been granted an operating life extension of 20 years taking the operating life to 60 years by the South African regulator. Koeberg 2 is a 930 MWe pressurised water reactor (PWR).



Koeberg Nuclear Power Plant, South Africa

South Korea: Kori Unit 2 has been granted a licence extension to 2033, a ten-year extension on the original 40-year operating permit. Kori Unit 2 is a 685 PWR and commenced operation in August 1983.

China: Unit 2 of the Zhangzhou nuclear power plant (NPP) has been connected to the grid. Unit 2 is a Hualong One (HPR1000) pressurised water reactor. Six of these units are planned for the site. Construction commenced in September 2020. Hualong One is a Chinese generation III pressurized water reactor

China: First concrete has been poured for Unit 3 at the San'ao NPP, Unit 1 at the Zhaoyuan NPP, and Unit 6 at the Ningde NPP. Six Hualong One reactors are planned for both the San'ao and Zhangzhou sites. Two Hualong One reactors are planned for the Ningde site.

United States: Units 1, 2 and 3 of the Browns Ferry NPP, Unit 1 at Clinton, Units 2 and 3 at Dresden and Point Beach Units 1 and 2 have been granted 20-year licence extensions. The NRC issued 13 20-year licence extension renewals in 2025.

France: Flamanville 3 EPR reactor in France has reached full power of 1650 MWe for the first time. Two EPR reactors are operating in China, one in Finland and two are under construction at Hinkley Point in the UK.

Policy

Australia: The Australian Naval Nuclear Power Safety Regulator (ANNPSR) was established on 1 November 2025. See page 1.

United States: The US Department of Energy has released a national strategy on the deployment and commercialisation of fusion energy. Called the “Fusion Science & Technology Roadmap”, the document identifies the key gaps that must be filled to facilitate fusion commercialisation by the mid 2030s.

Sweden: Sweden has removed its ban on uranium mining and extraction, coming into effect on 1 January 2026. Uranium exploration and mining was banned in Sweden in 2018 but is now seen as a “concession mineral”, or one that is especially useful for society. Sweden has 27% of Europe’s known uranium stocks.

World: 33 countries now support the at least tripling of nuclear energy worldwide by 2050, with Senegal and Rwanda recently joining the initiative.

Belgium: Both Tihange Unit 1 and Doel Unit 2 nuclear reactors have been taken offline after 50 years of service. A federal law was passed in 2003 to phase out the use of nuclear energy, which includes both a phase out and a ban on the construction of new plants. The last remaining reactors, Doel 4 and Tihange 3, have had their lives extended to 2035 after originally being scheduled to also be shut down in 2025. Earlier this year the Belgium parliament voted to repeal the 2003 law.

Other

The Netherlands: The construction of the Pallas research reactor has been officially launched. Pallas will be a 55 MWt ‘tank-in-pool’ type reactor and will replace the existing High Flux Reactor (HFR).

Continued Page 3

Recent Nuclear Energy Developments – Continued from Page 2

Argentina: A start-up licence has been granted to the National Atomic Energy Commission for the Argentine Proton Therapy Centre.

World: According to the IAEA's World Fusion Outlook 2025 report there are now more than 160 fusion devices either operational, under construction or planned. In addition, nearly 40 countries have active nuclear fusion programs.

World: A study commissioned by Urenco called "A Brave Nuclear World: How Small Modular Reactors can Power Industry" has identified the top five SMR accessible markets in Europe and North America as synthetic aviation fuels, coal plant repowering, synthetic maritime fuels, data centres and chemicals. Other

markets are also identified. The study analyses the energy demand of the industries that use 80% of industrial energy to examine where SMRs could make a significant impact.

World: The latest International Energy Agency World Energy Outlook estimates that global nuclear power capacity is expected to increase from 420 GWe to 728 GWe in a scenario based on existing energy policies (the Current Policies Scenario). The report also identifies that more than 40 countries have nuclear power in their energy strategy, and that there is 70 GWe of new capacity under construction, one of the highest levels of new build in 30 years.

Jo Lackenby ANA

Plans for Disposal of High-Level Radioactive Waste

A recent IAEA event provided an update on plans for deep geological facilities for high level waste

Canada: In Nov 2024, the Wabigoon Lake Ojibway Nation and the Township of Ignace were selected as the host communities for the proposed repository for used nuclear fuel, following a consent-based siting process. The formal regulatory process for the Canadian facility has begun with an initial decision expected in 2030.

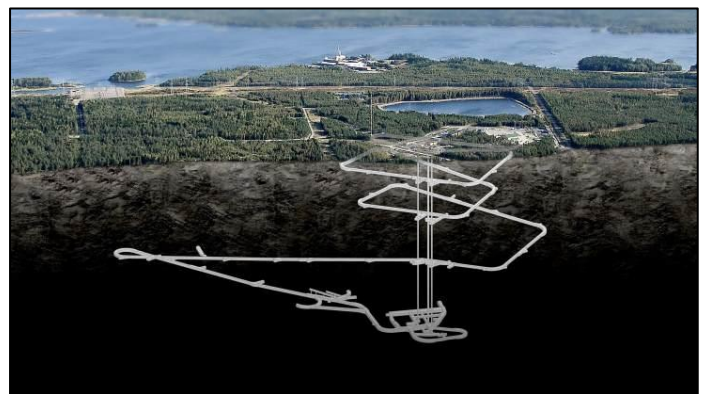
Finland has the most advanced facility with the Onkalo project near the Olkiluoto Nuclear Power Plant. Used fuel will be placed in in copper canisters surrounded by bentonite buffer in crystalline rock at a depth of 400 - 430 m. A construction licence was issued in 2015. The regulator is currently reviewing the operating licence application with decision expected mid-2026.

France plans to construct the Centre Industriel de Stockage Géologique (Cigéo) repository in a natural layer of clay near Bure, to the east of Paris in the Meuse/Haute Marne area. The facility will have a capacity to dispose of 10,000 cubic metres of high-level waste and 75,000 cubic metres of intermediate-level waste. The construction licence application was submitted in 2023 with a target for first operation in 2035.

Sweden has selected a site for its Spent Fuel Repository in Söderviken near the Forsmark nuclear power plant. An application to start underground excavation was submitted in January 2025 and is currently being considered. Above-ground construction work is underway while the repository construction permit is

considered, with the authority's approval expected in 2026 or 2027.

Switzerland is in the final stage of the site selection for a facility for high- low- and intermediate-level waste. A licence application has been submitted for site a Nördlich Lägern in northern Switzerland. A government decision is expected in 2029 followed by a national referendum.



Underground used fuel repository at Olkiluoto, Finland

USA: In 1987, Yucca Mountain was named in the US Nuclear Waste Policy Act as the sole initial repository for disposal of used nuclear fuel and high-level radioactive wastes. However since 2016 funding for assessing the license of the Yuca Mountain facility has been halted and the licensing process is currently suspended.

Based on World Nuclear News item by Alex Hunt
<https://www.world-nuclear-news.org/articles/how-are-geological-repository-projects-progressing>

John Harries

Update on Inertial Confinement Fusion at LLNL

The National Ignition Facility (NIF) at Lawrence Livermore National Laboratory (LLNL) has achieved ignition in at least eight experiments that produced more fusion energy than the amount of laser energy delivered to the target.

The first experiment to achieve ignition on 5 Dec 2022 produced 3.15 megajoules (MJ) of fusion energy from 2.05 MJ of laser energy delivered to the target, an energy gain factor of 1.5. The energy release corresponds to the energy of about 3 sticks of dynamite or enough energy to boil about 10 litres water from room temperature.

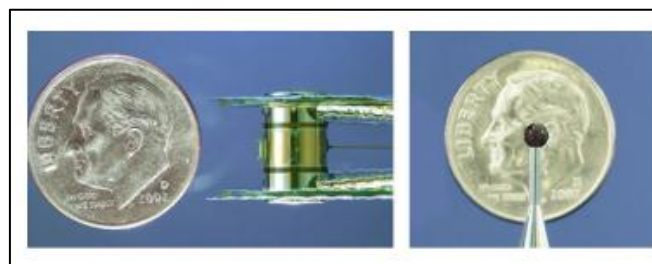
Whilst there was a positive energy gain at the target, the 192 lasers consumed about 300 MJ to produce the 2.05 MJ on the target. The overall energy gain, which is relevant if inertially confined fusion is to be used as a source of energy, was only about 0.01.

Very intense UV light from 192 lasers was fired into a centimetre sized hollow cylinder, the hohlraum, to generate X-rays to compress a very small diamond capsule containing deuterium and tritium to the very high temperature and pressure required for fusion.

This is inertial confinement fusion because the speed of the implosion allows the fusion reaction to occur before the capsule disassembles.

The eighth ignition experiment on 7 April 2025 set a record, a yield of 8.6 MJ for 2.08 MJ of energy to the target; a target gain of 4.13.

Fusion in these experiments produces an intense pulsed



Centimetre sized target, the hohlraum (left), and the 2 mm diameter diamond capsule (right) which contains deuterium and tritium at a temperature a few degrees above absolute zero.

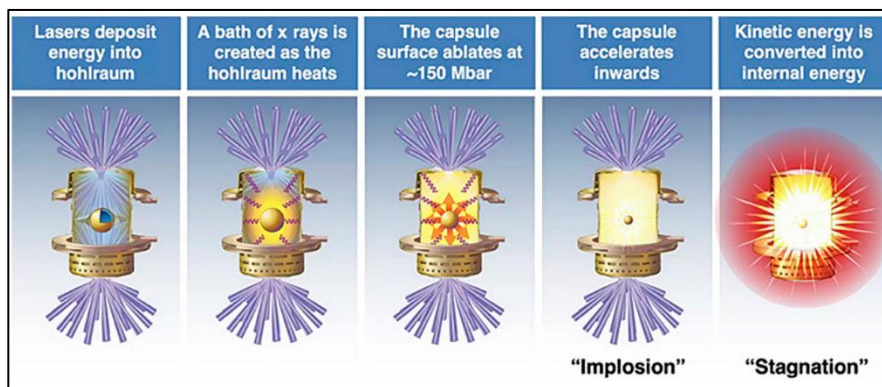


Illustration of laser-driven inertial confinement fusion. In ignition experiments, the implosion crushes the capsule to smaller than the width of a human hair, impelling the fuel to temperatures and densities exceeding those found in the sun.

source of high energy 14 MeV neutrons which are used to assess weapons stockpile survivability questions.

The experiment on 1 Oct 2025, which produced a yield of 3.5 MJ and a target energy gain of 1.74, used the intense neutron flux to demonstrate its use as an intense neutron source for survivability studies.
<https://lasers.llnl.gov/news/llnl-conducts-milestone-nuclear-survivability-experiment-nif>

For more information:

https://lasers.llnl.gov/sites/lasers/files/2024-06/age_of_ignition_book_1.pdf

John Harries ANA

Siting licence for new ANSTO Nuclear Medicine Manufacturing Facility

On 22 Dec 2025, ARPANSA issued a siting licence for the new ANSTO Nuclear Medicine Manufacturing Facility (NMMF).

This proposed facility will replace the existing ANSTO nuclear medicine processing and distribution facility, which has served Australians for more than 60 years.

The approved siting licence is the first stage of the facility licensing process and allows work to commence to prepare a site for the new facility. Prior to commencing construction, ANSTO must submit a

construction licence application for ARPANSA assessment.

Major construction is expected to begin in 2027, with the facility operational in the mid-2030s.

Each week ANSTO produces radioisotopes which enable 10,000 – 12,000 nuclear medicine procedures in hospitals and clinics across Australia.

<https://www.ansto.gov.au/news/new-nuclear-medicine-manufacturing-facility>

<https://www.arpansa.gov.au/licence-approved-new-nuclear-medicine-facility>