World Nuclear Performance Report 2025

WORLD NUCLEAR ASSOCIATION

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World Nuclear Association is grateful to the International Atomic Energy Agency (IAEA) for access to its Power Reactor Information System (PRIS) database, used in the preparation of this report.

Country Pages data correct as of 31 July 2025.

Contents

Introduction

A record 2667 TWh of electricity was generated by the world's nuclear reactors in 2024, beating the previous record of 2660 TWh, achieved in 2006.

The 2024 total is an increase of 66 TWh on the total achieved in 2023, with an additional 40 TWh of generation in France making a significant contribution, as reactors continued to return to service after outages in 2022 and 2023.

Construction started on nine reactors, six in China and one each in Pakistan, Egypt and Russia. Seven reactors were connected to the grid, four in China, and one each in France, India, UAE and USA. Four reactors shut down, two in Canada and one each in Russia and Taiwan, China.

At the end of 2024, the 440 operable nuclear reactors worldwide had a total capacity of 398 GWe, up 6 GWe on 2023. This includes 19 GWe of capacity in Japan in suspended operation.

The average capacity factor for the 410 reactors that generated electricity in 2024 was 83%, up from 82% in 2023. These high capacity factors are achieved by reactors of all ages, with no overall age-related decline in capacity factors observed.

The case studies in this edition of the World Nuclear Performance Report highlight different aspects of nuclear reactor construction and operation. The first case study looks at how construction and operation of reactors at Hongyanhe, in China, have been carried out to protect and support the marine wildlife in the region. The second case study looks to ways in which the future applications of the planned reactors at the UK's Sizewell C could be diversified.

With rising demand from new sectors, such as data servers and AI, the challenge for the nuclear industry is to accelerate growth at the scale and speed required to meet future needs.

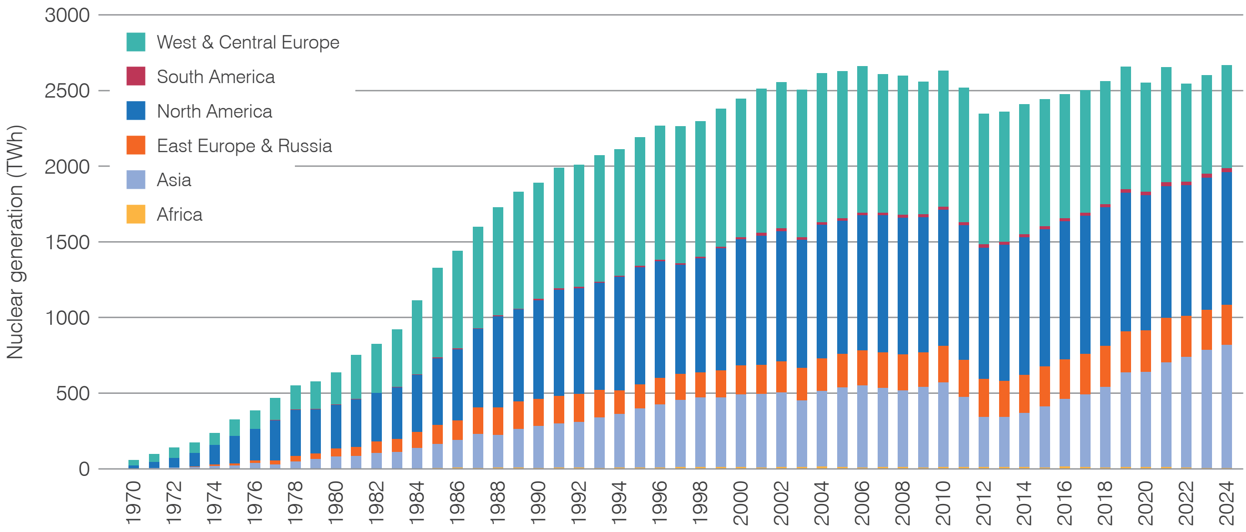
Sama Bilbao y León
Director General
World Nuclear Association

1 Nuclear industry performance

1.1 Global highlights

Nuclear reactors generated a total of 2667 TWh of electricity in 2024, up 66 TWh from 2601 TWh in 2023. This is the highest ever generation from nuclear in one year, surpassing the previous record of 2660 TWh in 2006.

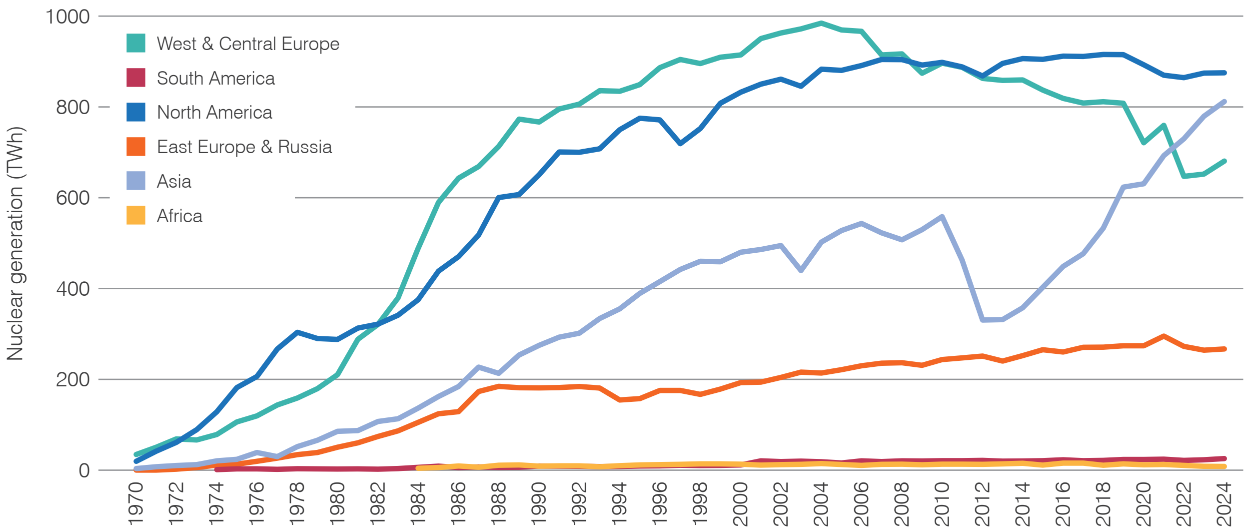
Figure 1. Global nuclear electricity production



Source: World Nuclear Association and IAEA Power Reactor Information Service (PRIS)

Generation increased in Asia, with five of the seven reactors connected to the grid in 2024 being located in that region. Generation also increased in West & Central Europe, with the return to service of reactors in France following outages in 2022 and 2023 contributing to this. In other regions, total generation in 2024 was broadly similar to the previous year.

Figure 2. Nuclear electricity generation by region



Source: World Nuclear Association, IAEA PRIS

In 2024 the end-of-year capacity of operable nuclear power plants was 398 GWe, up 6 GWe on the 392 GWe at the end of 2023. This includes 19 GWe of capacity in Japan and less than 1 GWe capacity in India where the status is categorized as 'Suspended Operation' by the International Atomic Energy Agency (IAEA).

The total number of operable reactors at the end of 2024 was 440, up three from the previous year.

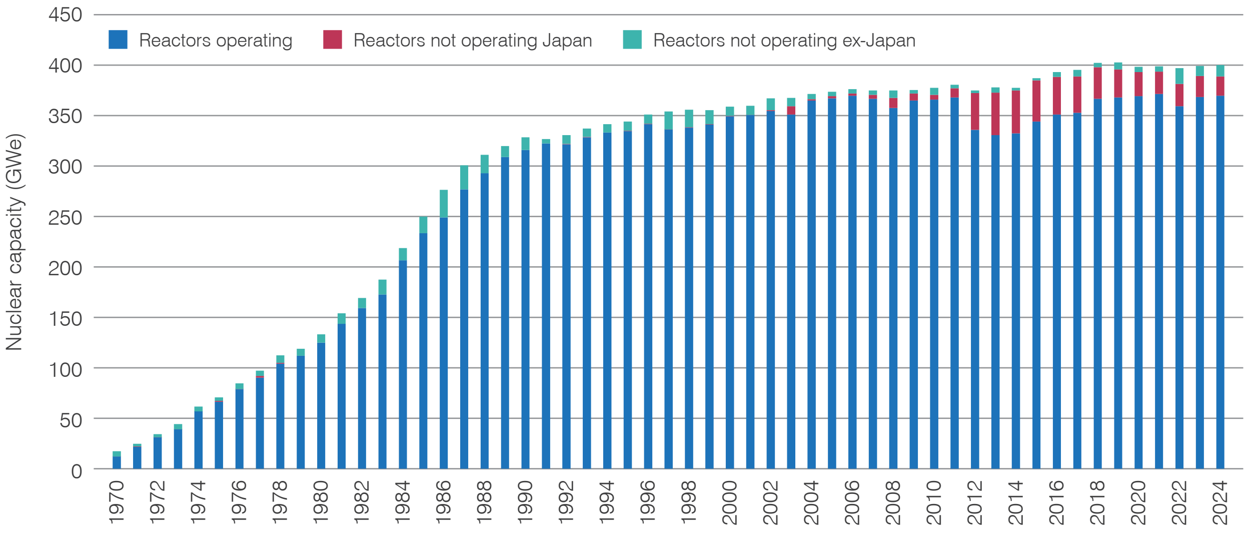
Table 1. Operable nuclear power reactors at year-end 2024 (change from 2023)

	Africa	Asia	East Europe & Russia	North America	South America	West & Central Europe	Total
BWR		19		33		8	60
FNR			2				2
GCR						8	8
HTGR		1					1
LWGR			10 (-1)				10 (-1)
PHWR		24 (+1)		17 (-2)	3	2	46 (-1)
PWR	2	109 (+3)	41	63 (+1)	2	96 (+1)	313 (+5)
Total	2	153 (+4)	53 (-1)	113 (-1)	5	114 (+1)	440 (+3)

Source: World Nuclear Association, IAEA PRIS

The total capacity of reactors that produced electricity in 2024 was 369 GWe, up 1 GWe on the 2023 total. In addition to the 20 GWe of offline reactor capacity in Japan and India, a further 11 GWe of operable reactors did not produce electricity in 2024. The six reactors at Zaporizhzhia in Ukraine comprise nearly 6 GWe of this.

Figure 3. Status of operable nuclear capacity



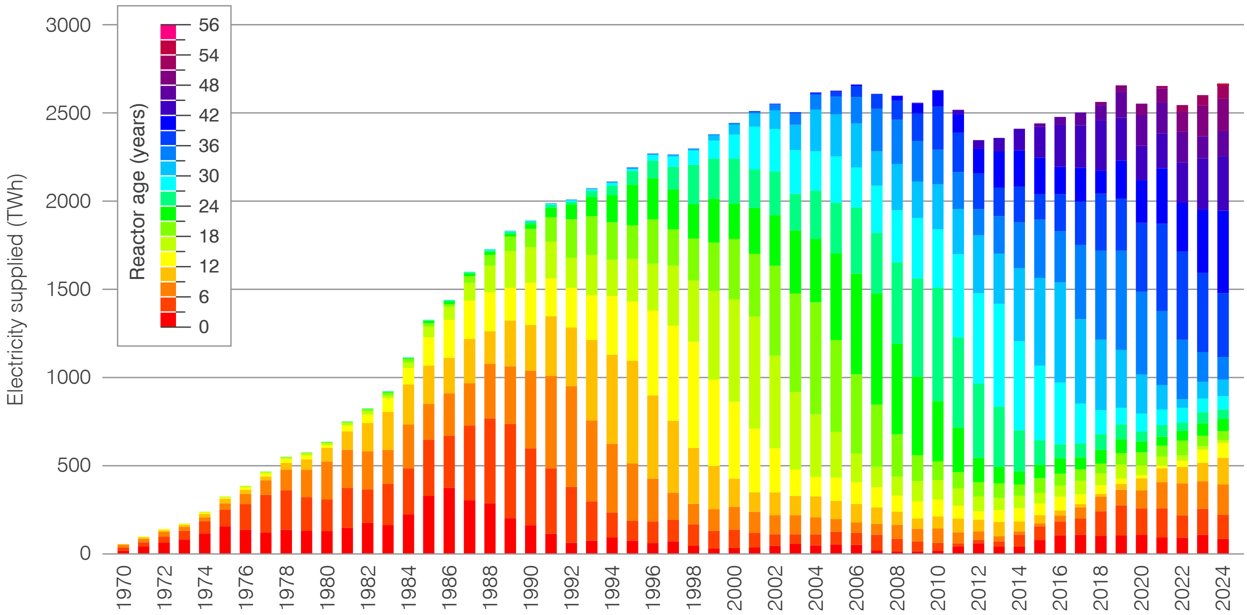
Source: World Nuclear Association, IAEA PRIS

Figure 4 shows total global electricity generation from nuclear power plants by age in each year since 1970, with generation from reactors of different ages shown in distinct colours.

The rapid expansion of nuclear capacity in the 1970s and 80s is reflected in the predominance of electricity generated from young reactors. As the number of new reactors coming online fell in the 1990s and the reactors built in the 1970s and 1980s entered their second and third decades of operation, the proportion of electricity generated from older reactors increased.

Over the last decade, with the number of new reactors entering service each year gradually increasing, the amount of electricity generated by younger reactors has started to increase again. Most of the reactors built since 1970s have continued to operate, meaning the amount of electricity generated by reactors in their fourth, fifth and sixth decades of operation has continued to rise.

Figure 4. Total global nuclear electricity generation by age of reactor



Source: World Nuclear Association, IAEA PRIS

Reactor construction, operation and shutdown

In 2024 construction began on nine large pressurized water reactors (PWRs), six in China and one each in Egypt, Pakistan and Russia.

Table 2. Reactor construction starts in 2024

	Location	Model	Process	Capacity (MWe)	Construction start
Chashma 5	Pakistan	Hualong One	PWR	1100	31 December 2024
El Dabaa 4	Egypt	VVER-1200/V-529	PWR	1100	23 January 2024
Leningrad II-3	Russia	VVER V-491	PWR	1101	14 March 2024
Lianjiang 2	China	CAP1000	PWR	1161	26 April 2024
Ningde 5	China	Hualong One	PWR	1116	28 July 2024
Shidaowan 1	China	Hualong One	PWR	1134	28 July 2024
Xudabao 2	China	CAP1000	PWR	1000	17 July 2024
Zhangzhou 3	China	Hualong One	PWR	1126	22 February 2024
Zhangzhou 4	China	Hualong One	PWR	1129	27 September 2024

Source: World Nuclear Association, IAEA PRIS

With nine construction starts in 2024, and seven reactor connections to the grid, the total number of units under construction at the end of 2024 was 62, one more than at the end of 2023.

Table 3. Units under construction year-end 2024

	BWR	FBR	PHWR	PWR	Total
Argentina				1	1
Bangladesh				2	2
Brazil				1	1
China		2		27 (+3)	29 (+3)
Egypt				4 (+1)	4 (+1)
India		1	2 (-1)	4	7 (-1)
Iran				1	1
Japan	2				2
South Korea				2	2
Pakistan				1	1
Russia		1		3 (+1)	4 (+1)
Slovakia				1	1
Turkey				4	4
Ukraine				2	2
United Arab Emirates				0 (-1)	0 (-1)
United Kingdom				2	2
United States of America				0 (-1)	0 (-1)
Total	2	4	2 (-1)	54 (+3)	63 (+2)

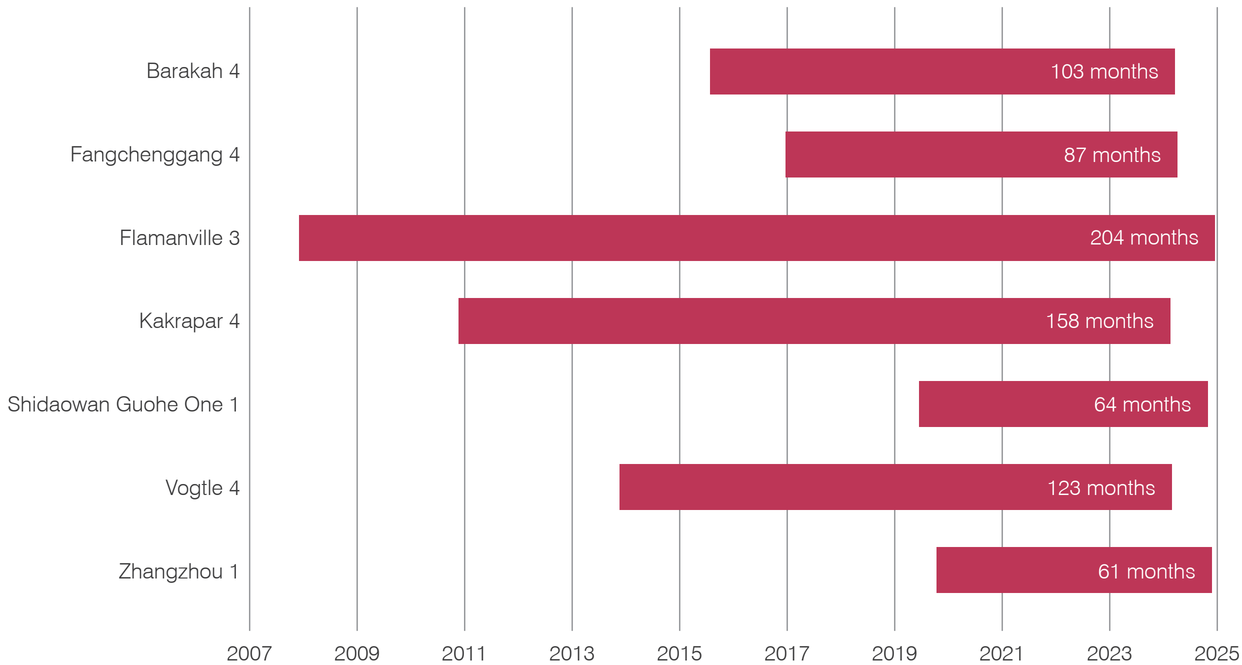
Source: World Nuclear Association, IAEA PRIS

In 2024 seven reactors were connected to the grid for the first time, including three reactors in China and one reactor each in France, India, United Arab Emirates and USA.

Construction times for these seven reactors differed widely. The mean construction time for all seven reactors was 114 months, with the fastest construction being the Zhangzhou 1 Hualong One in China, which was constructed in 61 months; and the slowest being the Flamanville 3 EPR in France, which took 204 months from first concrete to grid connection.

The construction time of Shidaowan Guohe One 1 is uncertain, as there has been no announcement of first concrete. The construction start date is based on satellite imagery. Nevertheless, the construction time of around 64 months is remarkable for a first-of-a-kind reactor design.

Figure 5. Construction times of units grid-connected in 2024



Source: World Nuclear Association, IAEA PRIS

Table 4. Reactor grid connections in 2024

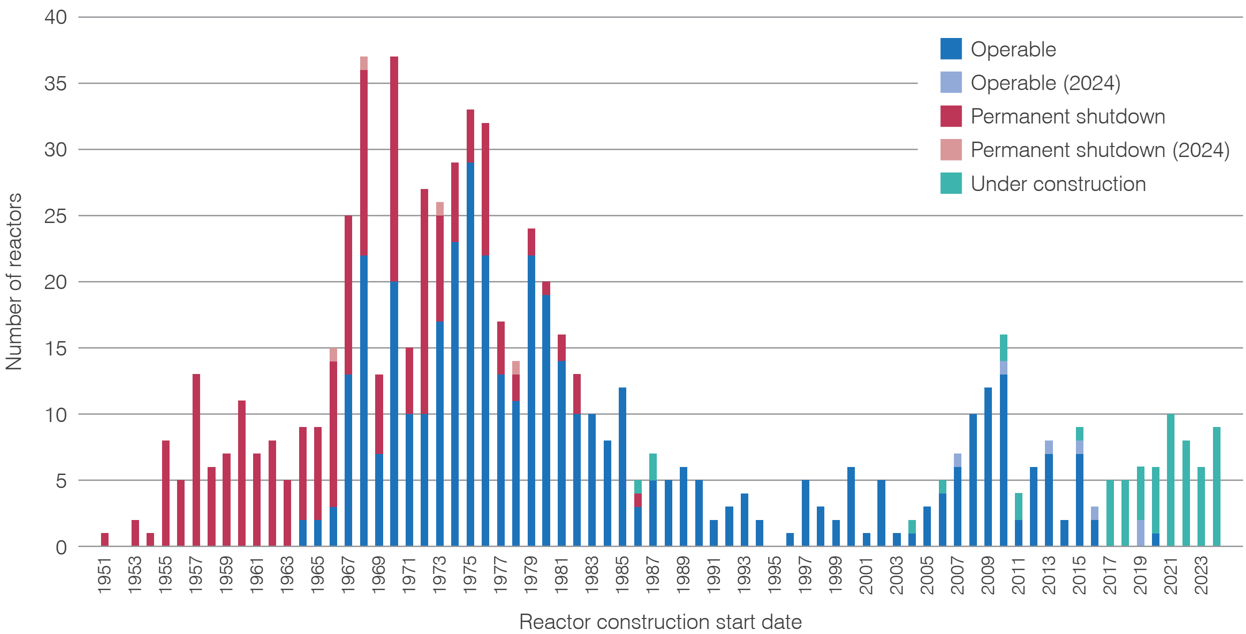
	Model	Process	Net capacity (MWe)	Construction start	Grid connection	Construction time (months)
Zhangzhou 1	Hualong One	PWR	1126	16 October 2019	28 November 2024	61
Vogtle 4	AP1000	PWR	1117	19 November 2013	1 March 2024	123
Shidaowan Guohe One 1	CAP1400	PWR	1400	19 June 2019 (estimate)	31 October 2024	64
Kakrapar 4	PHWR-700	PHWR	630	22 November 2010	20 February 2024	158
Flamanville 3	EPR	PWR	1630	3 December 2007	21 December 2024	204
Fangchenggang 4	HPR1000	PWR	1105	23 December 2016	9 April 2024	87
Barakah 4	APR-1400	PWR	1337	30 July 2015	23 March 2024	103

Source: World Nuclear Association, IAEA PRIS

Most reactors under construction today started construction in the last seven years. Of those taking more than ten years, most have periods where construction has been suspended. This includes Khmelnitski 3&4 in Ukraine, where construction was halted in 1990. Construction might be completed on unit 4 after Energoatom signed an agreement with Westinghouse in 2021, however there have also been proposals for new construction projects at that site. In Slovakia, construction started in 1987 on Mochovce 3&4, was halted in 1990 and recommenced in 2015. Mochovce 3 was connected to the grid in in January 2023, and work is continuing to bring unit 4 into service. Construction on Shimane 3 and Ohma in Japan were halted in 2011. Both Angra 3 in Brazil and the Carem25 unit at the Atucha site in Argentina have seen construction suspended intermittently.

Of all reactors under construction today, only the PFBR prototype and Rajasthan 8 PHWR, both in India, have continuous construction times longer than ten years.

Figure 6. Operational status of reactors by construction start year



Source: World Nuclear Association, IAEA PRIS

Four reactors were permanently shut down in 2024. These include Kursk 2 in Russia, an RBMK light water graphite reactor, Pickering 1&4 PHWRs in Canada, which had operated for 53 and 51 years respectively and Maanshan 2, a 41-year-old PWR that was closed as part of the Taiwanese government phase-out policy.

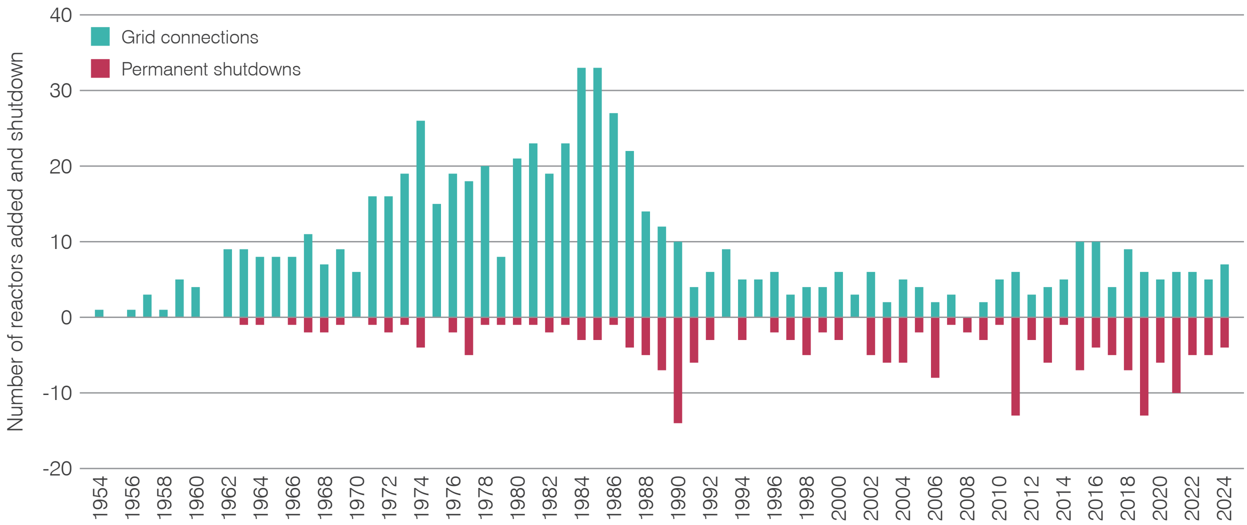
Table 5. Shutdown reactors in 2024

	Location	Model	Process	Capacity (MWe)	Permanent shutdown
Kursk 2	Russia	RBMK-1000	LWGR	925	31 January 2024
Pickering 1	Canada	CANDU 500A	PHWR	515	28 July 2024
Maanshan 1	Taiwan	WE 312	PWR	936	1 October 2024
Pickering 4	Canada	CANDU 500A	PHWR	515	31 December 2024

Source: World Nuclear Association, IAEA PRIS

In 2024, with seven grid connections and four permanent shutdowns, the number of operable reactors worldwide increased by three, to 440.

Figure 7. Reactor first grid connections and shutdowns 1954-2024

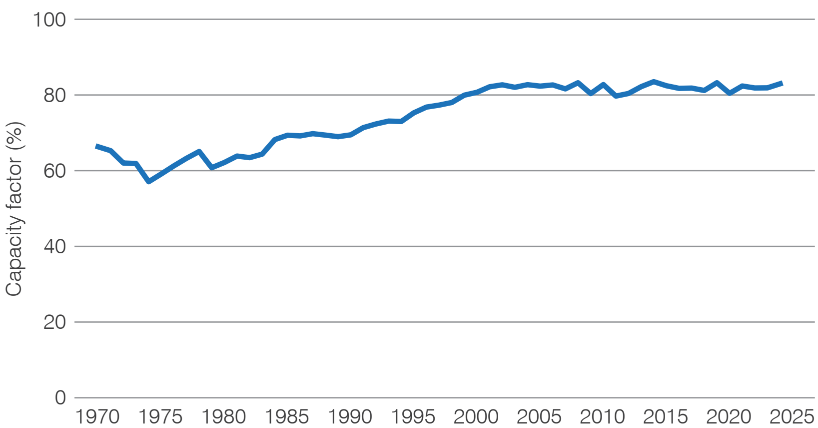


Source: World Nuclear Association, IAEA PRIS

Operating performance

In 2024 the global average capacity factor was 83%, up from 82% in 2023, continuing the trend of high global capacity factors seen since 2000. Capacity factors in this section are based on the performance of those reactors that report electricity generation in any one calendar year.

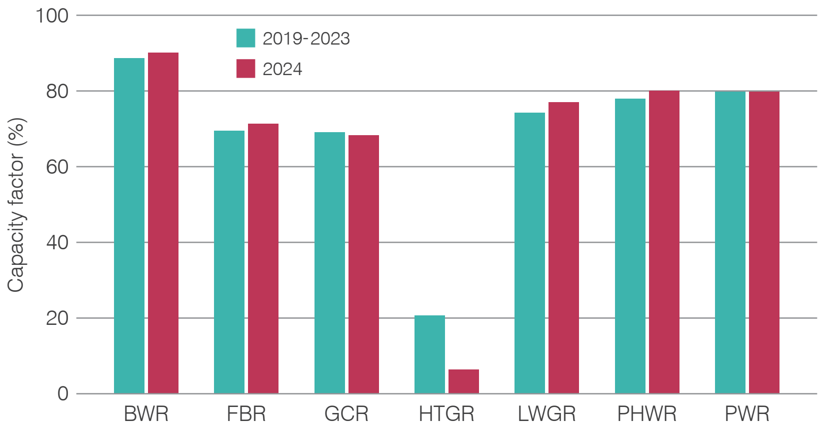
Figure 8. Global average capacity factor



Source: World Nuclear Association, IAEA PRIS

Capacity factors for different reactor types were broadly consistent with the average achieved over the previous five years. The high-temperature gas-cooled reactor category is represented by only one reactor, Shidaowan HTR-PM 1 in China.

Figure 9. Capacity factor by reactor type



Source: World Nuclear Association, IAEA PRIS

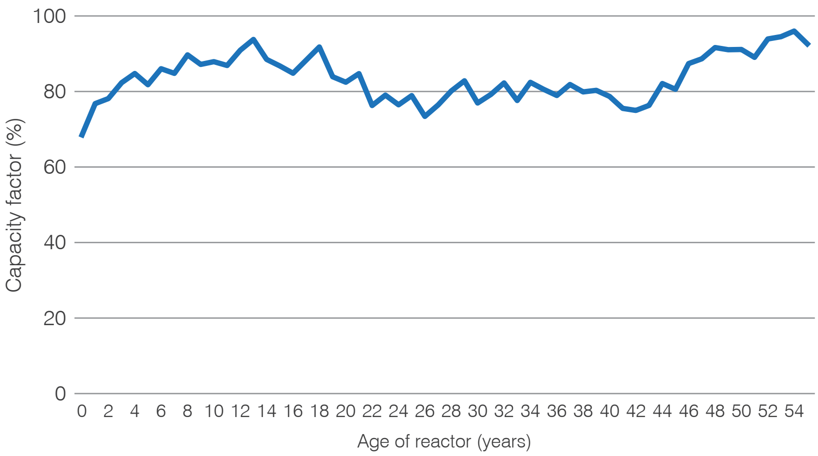
In 2024 the capacity factor of reactors in the geographical regions shown in Figure 10 were also broadly consistent with those achieved over the previous five years. Reactors in North America maintained the highest average capacity factors, achieving an average of 90%. South Africa's Koeberg 2 was offline until December 2024, when it restarted after the completion of extensive maintenance to extend the unit's operating lifetime by 20 years.

Figure 10. Capacity factor by region

Source: World Nuclear Association, IAEA PRIS

As observed in previous years, there is no overall age-related decline in nuclear reactor performance, in terms of average capacity factors achieved by reactors of different ages. This includes reactors that have operated for 40 years and longer, which is a positive indication for the potential of reactors continue to function well when entering periods of extended operation.

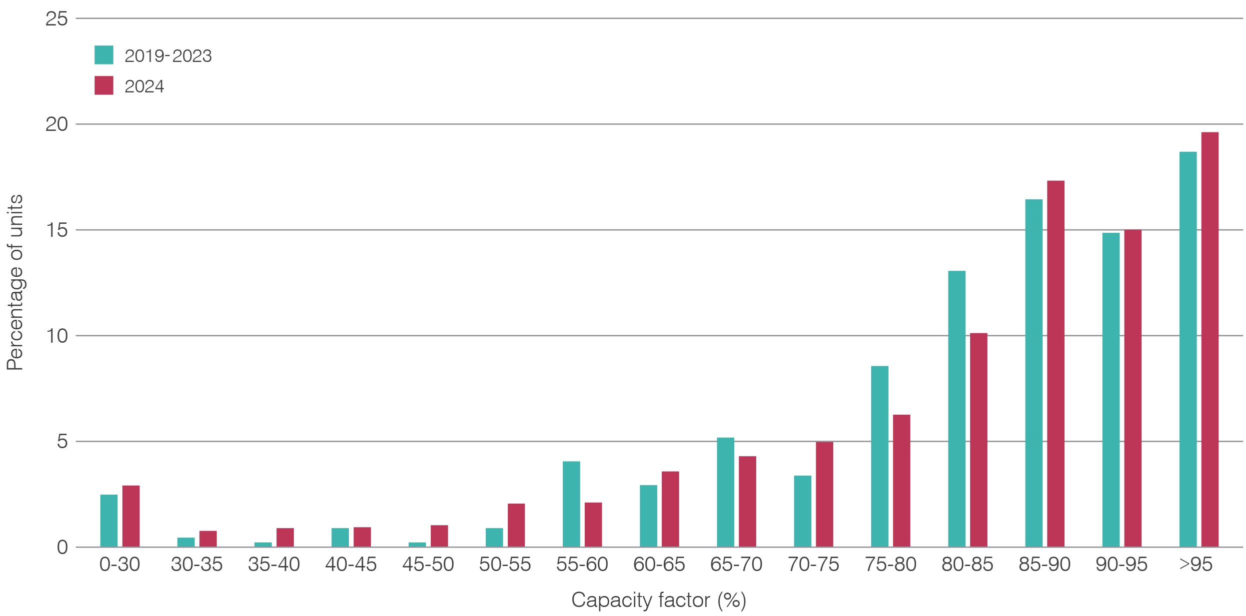
Figure 11. Mean capacity factor 2019-2024 by age of reactor



Source: World Nuclear Association, IAEA PRIS

The spread of capacity factors in 2024 is broadly similar to the average of the previous five years, with over 60% of reactors achieving a capacity factor more than 80%.

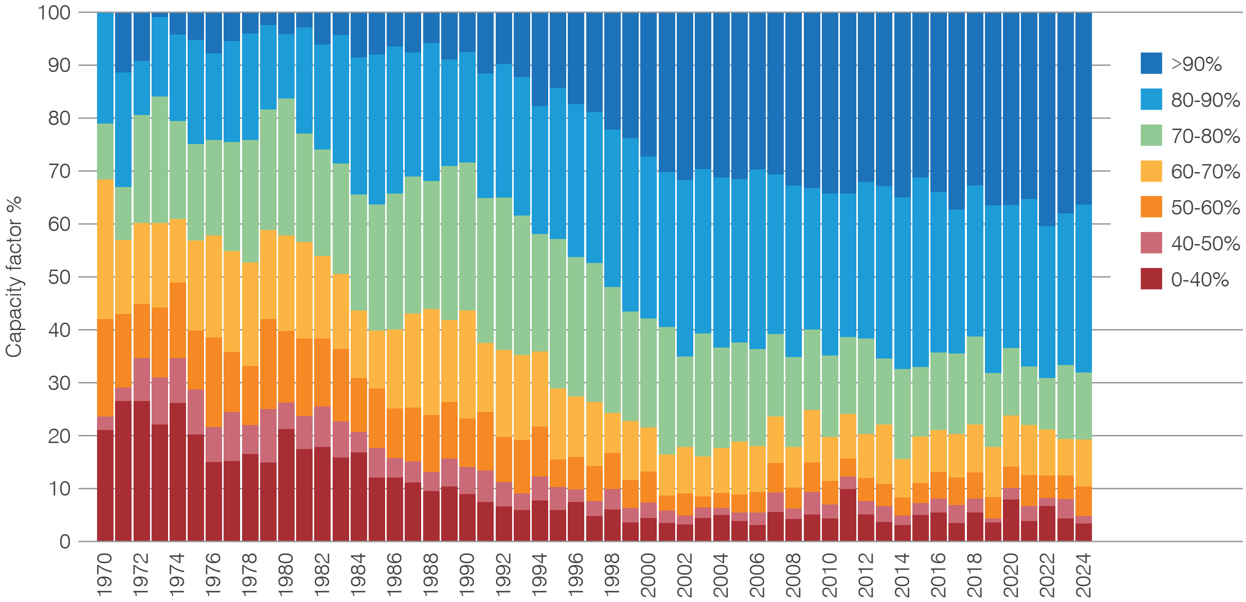
Figure 12. Percentage of units by capacity factor



Source: World Nuclear Association, IAEA PRIS

There has been a steady growth in average capacity factors in each decade since the 1970s, with the greatest improvements taking place in the 1980s and '90s, although capacity factors continued to increase in subsequent decades. The capacity factor deciles in 2024 were broadly similar to those recent years.

Figure 13. Long-term trends in capacity factor



Source: World Nuclear Association, IAEA PRIS

2 Case studies

Environment stewardship at nuclear sites in China

CGN Group is China's biggest domestic nuclear power operator, with more than 50% of the domestic market, and is the world's largest nuclear power construction company. In China, CGN operates nuclear plants at Daya Bay, Ling Ao, Hongyanhe and Ningde.

Great importance is attached to the protection of marine biodiversity surrounding nuclear power plants and various measures are undertaken to protect marine species and their habitats from project site selection, engineering construction and project operation.

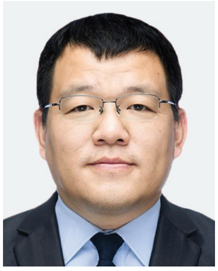
This has resulted in actions that have benefited the environment around their nuclear plants, which are reported in their Biodiversity Conservation report.

At Daya Bay, to protect marine ecosystems and biodiversity, pre-operational and subsequent ecological surveys were carried out by use of satellite remote sensing, measurement and other methods to monitor the water temperature and study the heat resistance of characteristic marine organisms.

During construction of Daya Bay the local population of Chinese Egrets moved away. However, once the plant was put into operation in 1994, measures such as replanting trees to restore and protect the ecological environment were carried out, and the egret population returned.

During the construction of Yangjiang nuclear power plant measures were taken to protect the Chinese white dolphin population, including reducing the amount of suspended solids in seawater and strictly controlling waste discharge during construction.

The Hongyanhe nuclear power is situation in the Liaodong Bay area, the natural environment of spotted seals, which are the only marine pinniped mammals that breeds in China. The seals are extremely sensitive to the habitat environment: even the sound of ship engines can drive them away. At the Hongyanhe nuclear power plant CGN formulated strict management regulations for construction ships from the beginning of the construction stage, prohibiting high-noise navigation and the discharge of sewage and solid waste into the sea. It also set up monitoring points near the sea for regular environmental monitoring and minimized construction activities in winter to reduce impacts on the seals.



Interview with Han Wenyu

Senior Engineer, Chief of the Civil & Construction Management

What measurements have been carried out to monitor the environmental impact of construction and operation of plant at Hongyanhe?

From 2016 to 2020, Hongyanhe Company commissioned the Liaoning Provincial Ecological Environment Protection Science and Technology Centre to conduct a five-year monitoring program covering water quality, ecological conditions, and spotted seal observations. The findings concluded that thermally altered discharge water has not caused significant impacts on the ecological environment of the surrounding marine areas.

In 2020, Hongyanhe Company further commissioned the Liaoning Marine and Fisheries Science and Research Institute to evaluate the potential impacts of the Hongyanhe Nuclear Power Plant on spotted seals and their habitats. By September 2021, the project received official opinions from the Ministry of Agriculture and Rural Affairs . Based on expert reviews and the company's commitments, Hongyanhe Company initiated a 10-year monitoring program for spotted seals (with the first phase spanning three years) in December 2021, commissioned to the Marine Sciences Academy.

As of the end of 2024, the Marine Sciences Academy conclusions are as follows; through years of observing known haul-out sites, China's spotted seal population has remained generally stable, with an estimated over 2,000 individuals. During the operational phase of the Hongyanhe Nuclear Power Plant, the company fully implemented the recommended conservation measures outlined in the Special Evaluation Report on the Impacts of the Hongyanhe Nuclear Power Plant on Spotted Seals and Their Habitats. Through strict environmental management practices, the plant's operations have not caused significant impacts on spotted seals or their habitats.

This conclusion underscores the effectiveness of the protective measures and ongoing environmental stewardship by Hongyanhe Company.

A large population of Chinese Egrets was spotted in the sea around Hongyanhe. Is this associated with the conservation measures that CGN has been undertaking?

There is no direct evidence that the implemented conservation measures have directly caused an increase in the population of the Chinese Egret. However, the designation of functional zones around the Hongyanhe area, which prohibit fishing activities and other disruptive practices, has created a more favourable environment for the reproduction and survival of marine organisms. This improved ecological condition likely contributed to an increase in the availability of the Chinese Egret's primary food sources, which in turn may have supported population growth in the species.

There have also been efforts to improve and optimize community structure and water ecology at Hongyanhe, what have these involved?

A total of 200 million juvenile shrimp, 30 million crabs, 4.8 million turbot (brown teethed flounder), and 1.8 million mackerel have been released into the sea. This has supported the recovery of population biomass for key species, promoting the restoration and regulation of the Bohai Sea ecosystem near Dalian. It has enhanced economic returns for local fisheries through improved resource abundance. It has also contributed to carbon sequestration thereby improving marine environmental quality.

The program underscores the synergy between sustainable resource management and ecological conservation, aligning with broader goals of balancing marine development with environmental stewardship.

Sizewell C: maximising the value of nuclear power

Sizewell C is the 3.2GW nuclear power plant planned to be constructed in Suffolk on the UK's east coast - adjacent to the existing Sizewell B nuclear power plant. The project has been approved by the UK Government and recently received a positive final investment decision (FID). Site preparation works are already underway.

The project will replicate the design and operation of Hinkley Point C, currently under construction in the south-west of England, in Somerset. Both plants will create thousands of jobs and generate enough low-carbon electricity to power over six million homes for over 60 years.

To provide maximum benefit to society, existing and future power generation assets should be utilized to their full potential. Optimal energy system design integrates a diverse mix of generation technologies to meet a nation's energy demands.

In the UK, plans to further decarbonise the grid involve increasing the proportion of wind and solar renewable generation significantly on the system. An increased proportion of weather-dependant and intermittent renewable generation poses a new set of challenges to balance demand and supply, as well as grid stability.

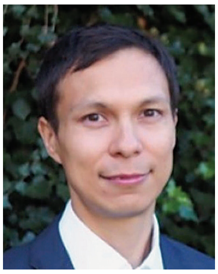
Nuclear will play a key baseload role in such a system, reducing overall system cost and providing high capacity factor and weather independent power. There are multiple additional benefits from having nuclear as a part of a diverse mix in terms of jobs and growth, energy security, carbon emissions, minimising infrastructure intrusion and managing overall system engineering delivery and operational risk.

However, the large-scale deployment of new wind and solar generation and their variability will mean that more flexibility will be required to balance the system efficiently and minimise curtailments and wasted power. In the UK this is expected to be most pronounced in the summer period when solar generation is at its highest and energy demand at its lowest – a seasonal pattern referred to as minimum summer demand.

Sizewell C plans to develop the capability to power off-grid applications and maximise the value of the generation asset to the energy system, electricity consumers and society by being able to maintain power generation at full capacity while reducing the amount of electricity exported to the grid when required and diverting energy to other non-grid uses.

Sizewell C could power off-grid uses with energy in the form of heat as well as electricity. The heat could be harnessed through a nuclear cogeneration process that would involve steam-extraction prior to the 'steam-to-electricity' conversion process in the generation cycle.

Heat from a nuclear power plant is particularly valuable. Its clean, low-carbon properties can help decarbonise industrial processes or power clean technologies such as hydrogen production or direct air capture more efficiently which can lead to further benefits and value to society.



Interview with Fred Chung

Head of Energy Strategy, Sizewell C

Nuclear power plants have been able to adapt to varying grid demand by reducing output to the grid by 'load-following' (*e.g.* in France). What is novel about Sizewell C's proposed approach to provide flexibility?

Although nuclear power plants can generally regulate the amount of energy produced to a limited extent, this is not their optimal operational mode. As is the case for many machines, the cost of operating the plant does not decrease proportionally with production. By maintaining full production capacity, we can maximise the utility of the generation asset as well as provide some flexibility to the energy system. Also, in France for example, the large fleet also allows for outage planning to manage overall generation.

How can Sizewell C's plans deliver benefits beyond helping to balance the energy system through flexibility?

Sizewell C's plans for an energy-hub ready power plant can enable technologies such as water desalination plants to 'soak up' power that would otherwise be surplus to the system and produce valuable commodities and products with this energy.

In addition, heat from the nuclear power plant can make hydrogen and carbon capture cheaper for industry and consumers. Technologies such as solid-oxide electrolysers (SOEC) and the type of heat-driven direct air capture technology that Sizewell is developing locally, could take advantage of our heat to help difficult-to-decarbonise sectors such as aviation achieve their ESG goals.

How much heat can the plant supply and is there an impact to electricity production?

Sizewell C will produce 3.2GW of electricity (enough to power 6 million homes in the UK) from 9GW of steam and the extraction of a small proportion of this heat (e.g. around 400 MWth) can provide significant industrial and decarbonisation opportunities while decreasing the electricity production by only approximately 3%.

3 Country pages

This chapter's Country Pages present summaries of recent developments and performance data for countries with reactors in operation, and updates on those new entrant countries with their first nuclear reactors under construction.

The information for the numbers of operable reactors and reactors under construction is correct as of 15 August 2025.

The lifetime CO_2 avoided data is calculated on the basis of the emissions of carbon dioxide that would have been released had the electricity supplied by nuclear generation in each country to 31 December 2024 been generated by coal-fired power plants instead. The values for emissions avoided annually since 2020 are derived from equivalent electricity generation from coal-fired or gas-fired plant.

The nuclear share of generation figures refer to the percentage of electricity generated from nuclear for 2024.

As in Chapter 1, capacity factors are calculated based only on those reactors that generated electricity in each calendar year. The electricity generation charts show total electricity generation for each year and subdivide this into electricity generation by reactors of different ages, based on the date of first grid connection.

Argentina

Argentina has two nuclear power plants: Atucha, about 100 km northwest of Buenos Aires; and Embalse, about 100 km south of Córdoba. The Atucha plant comprises two Siemens-designed pressurized heavy water reactors (PHWRs) that started up in 1974 and 2014; and Embalse, a single Candu 6 PHWR unit from Atomic Energy of Canada Ltd (AECL) that commenced operation in 1983.

A long-term operation project at Atucha 1 began at the end of September 2024. The shutdown is expected to last two-to-three years and would allow the unit to operate for a further two decades.

Construction of the 29 MWe CAREM25 prototype SMR – also at the Atucha site – began in early 2014 but has been beset by delays. Following government cuts to the budget of the National Atomic Energy Commission (CNEA), in May 2024 construction was halted and hundreds of workers at the site were laid off.

The President of the Argentine Nuclear Council, Demian Reidel, said in March 2025 that four ACR-300 small modular reactors, with a combined capacity of 1.2 GWe, will be installed at the Atucha site. The ACR-300 design has been developed by Argentine technical project company Invap. Reidel has said that Argentina aims to be among the first countries to sell SMRs commercially.

Operable Reactors

1641 MWe

Nuclear Share of Generation

7 %

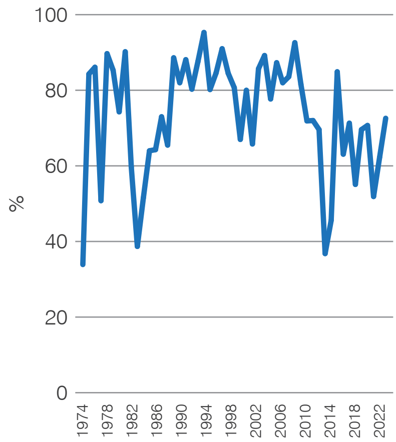
Reactors Under Construction

25 MWe

Lifetime CO_2 Avoided

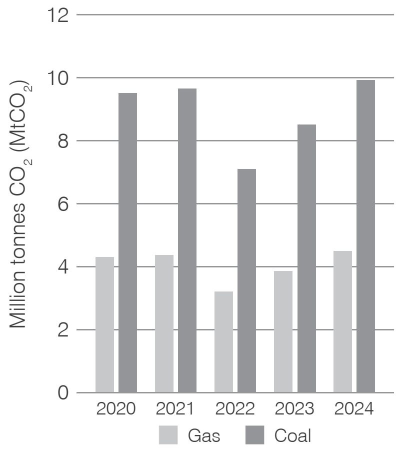
$MtCO_2$ cf. coal

Average nuclear capacity factor



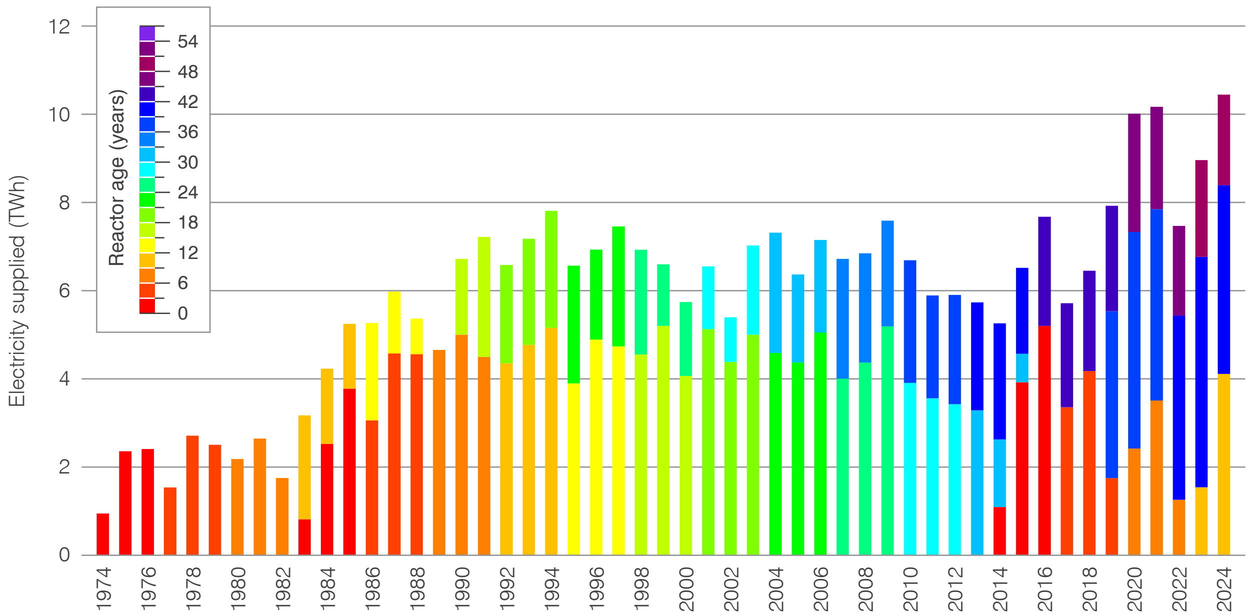
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



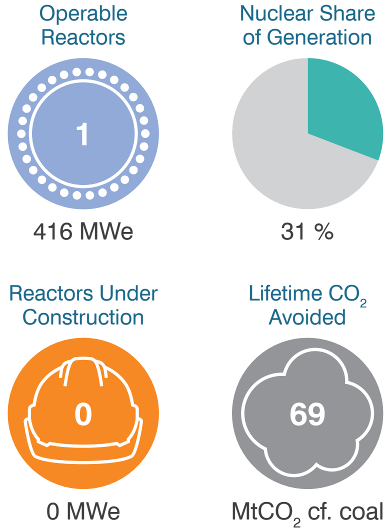
Source: World Nuclear Association, IAEA PRIS

Armenia

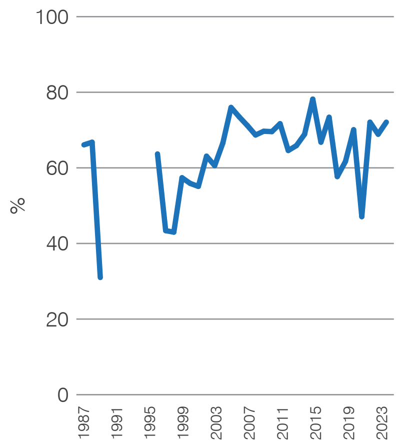
Armenia has one nuclear power plant at Metsamor, 30 km west of the capital Yerevan, consisting of two VVER-440 units. Unit 1 was connected to the grid in 1976, followed by unit 2 in 1980. Both units were taken offline in 1988 due to safety concerns following a major earthquake in the region earlier that year. Unit 2 was restarted in 1995 in the face of severe energy shortages.

In December 2023 Armenia and Russia signed a contract to modernize and extend the operating lifetime of Metsamor. The work is expected to be completed in 2026 and would allow the plant to generate electricity until 2036. In July 2024 work began to assess changes in the properties of the metal of the reactor vessel of the Metsamor unit as part of preparations for extending its operation.

The Armenian government intends to build a new nuclear unit at Metsamor. In July 2024 the Secretary of Armenia's Security Council, Armen Grigoryan, said that discussions with the USA were ongoing. The country has also long been in discussions with Russia about replacing the Metsamor nuclear plant.

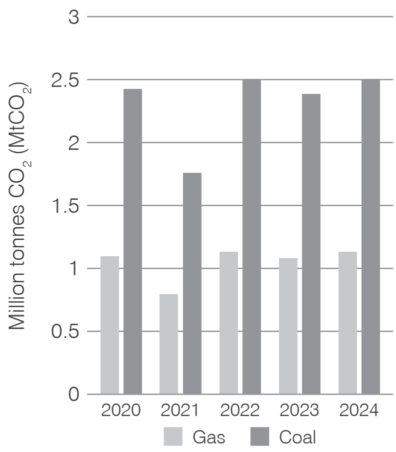


Average nuclear capacity factor



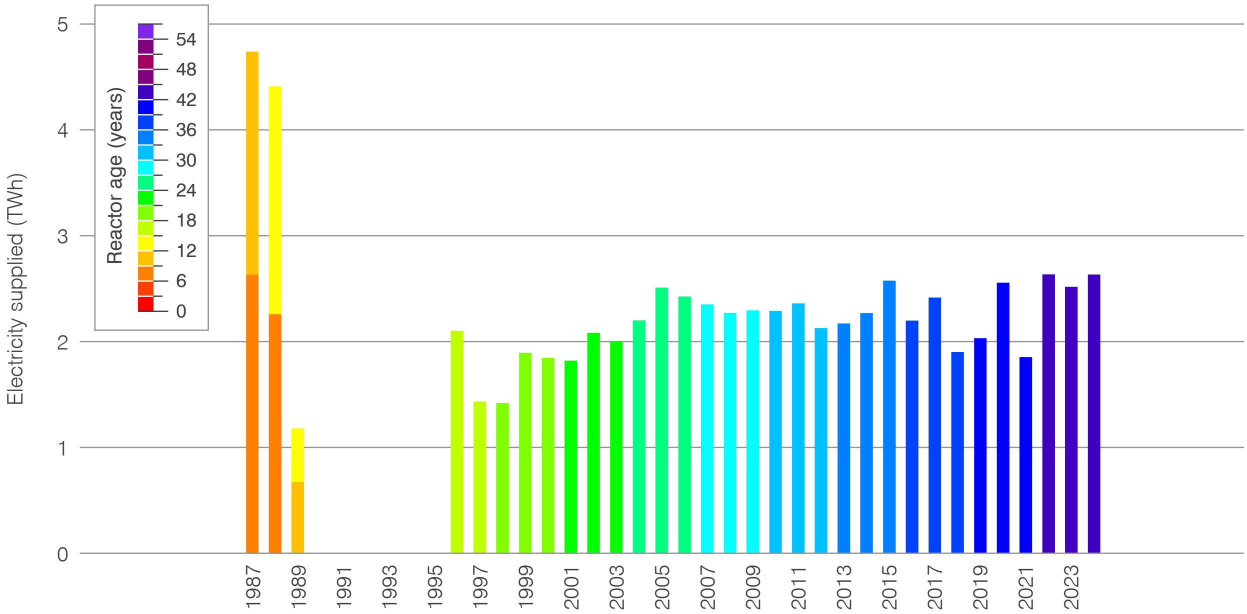
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

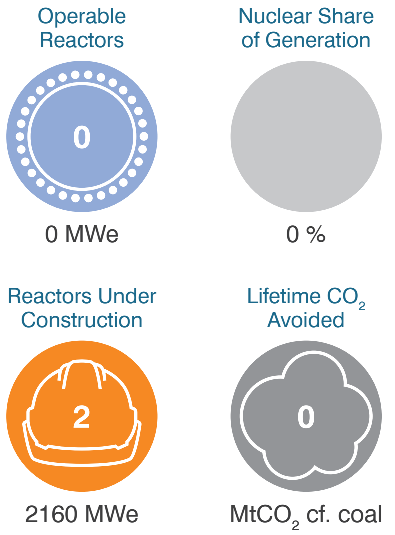
Bangladesh

Two VVER-1200 units are under construction in Bangladesh at Rooppur, on the east bank of the Padma River, about 160 km northwest of Dhaka.

Construction of unit 1 began in November 2017, followed by unit 2 in July 2018. The reactors are designated as V-523, which are based on the V-392M reactors at Novovoronezh II in Russia. Once completed, the two-unit plant is expected to provide about 9% of the country's electricity.

In October 2023 Bangladesh received its first delivery of nuclear fuel, marking the point when the Rooppur site became a nuclear facility.

Earlier, in October 2022 the government announced that the construction of Rooppur was running approximately one year behind schedule due to issues stemming from the COVID-19 pandemic and Russia's invasion of Ukraine. Unit 1 is now expected to start providing electricity to Bangladesh's national grid in 2026. In March 2025 hydraulic tests were completed, and the turbine was installed at Rooppur 1.



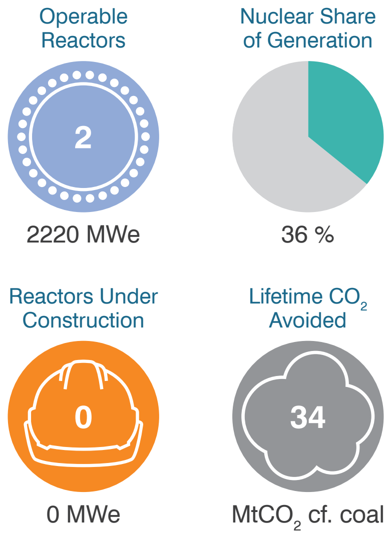
Belarus

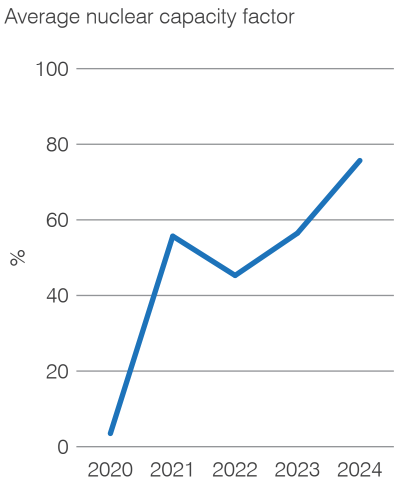
Belarus has two VVER-1200 reactors, located at Ostrovets, about 120 km northwest of Minsk. These reactors were the first VVER-1200s to be built outside of Russia. Unit 1 was connected to the grid in November 2020 and unit 2 in May 2023.

The plant provides about 35% of the country's electricity needs. At present the plant operates on a 12-month refuelling schedule. At a meeting between TVEL and Belarusian officials in April 2025, extending the time between fuel reloading at the plant to 18-24 months was discussed.

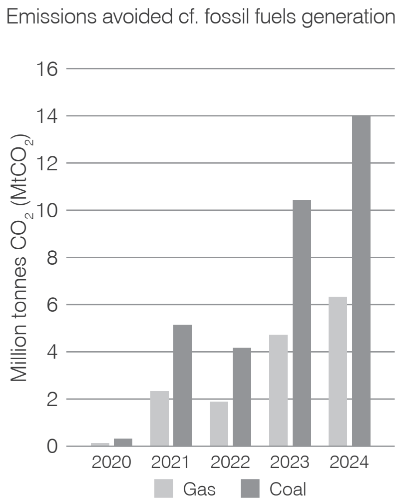
Belarus is considering the construction of either a second nuclear plant or a third unit at Ostrovets. In November 2024 the Ministry of Energy confirmed it was working on a feasibility study that it expected to conclude in 2025. In March 2025 President Alexander Lukashenko said that the country had "asked the Russians, if possible, to build a second power plant."

In October 2024 Russia's TVEL and the Belarusian Organisation for Radioactive Waste Management entered into an agreement to develop infrastructure for radioactive waste in Belarus. In June 2025 Belarus' Energy Minister Denis Moroz said that country was looking at three potential areas to locate its planned radioactive waste disposal facility: Grodno, Mogilev and Gomel.

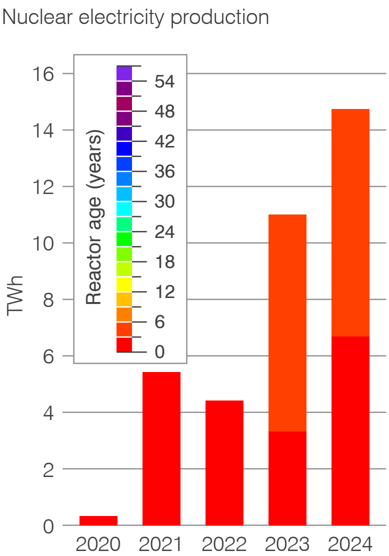




Source: World Nuclear Association, IAEA PRIS



Source: World Nuclear Association, IAEA PRIS



Source: World Nuclear Association, IAEA PRIS

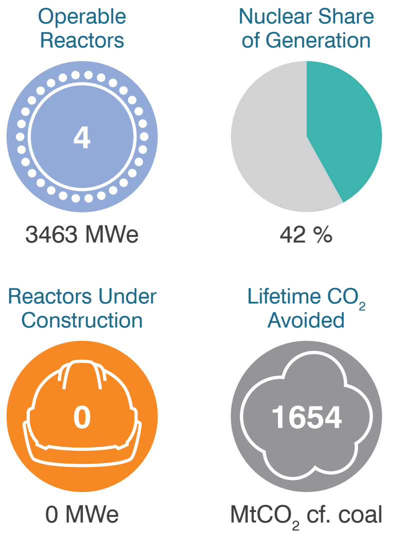
Belgium

Belgium has two nuclear power plants: Doel, a four-unit plant located 15 km northwest of Antwerp; and Tihange, a three-unit plant located about 25 km west-southwest of Liège. Four units (Doel 2&4 and Tihange 1&3) remain in operation.

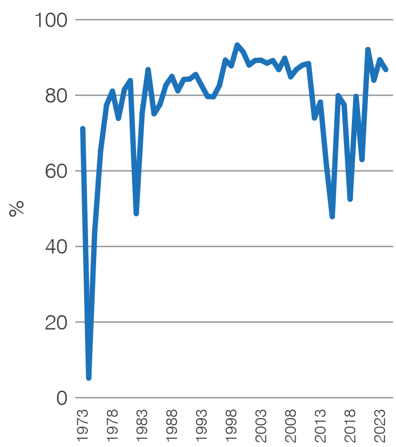
A decision was made in March 2022 to extend the operation of Doel 4 and Tihange 3 to 2035, delaying the country's earlier nuclear phase-out plans by a decade. The final agreement between the Belgian government and French utility Engie was signed in December 2023 but the European Commission (EC) in July 2024 opened an investigation into whether the support for lifetime extension was in line with its rules on state aid. In February 2025 the EC approved the plan. The deal, which was closed in March 2025, results in equal ownership of Doel 4 and Tihange 3 by the Belgian state and Engie as well as the transfer of future nuclear waste liabilities to the Belgian state.

Engie said that preparatory works for the 10-year extension of the two reactors "are in full progress" and the units are expected to restart in late 2025.

In May 2025 Belgium's parliament voted by a large majority to repeal the 2003 law for the phase-out of nuclear power. Under that policy, Doel 3 was closed in September 2022 and Tihange 2 at the end of January 2023. Doel 1 was originally set to shut down in 2015. However, the law was amended in 2013 and 2015 to allow Doel 1 to remain operational until February 2025. Unit 1 of the Tihange plant is set to shut down in October 2025 with Doel 2 following in December.

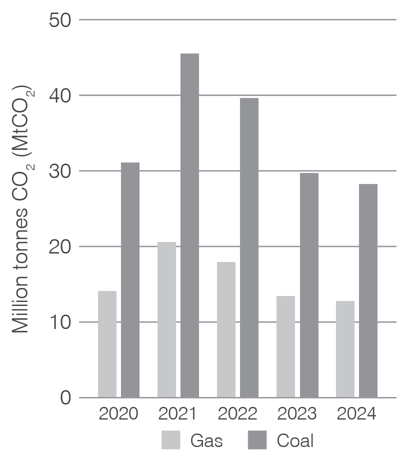


Average nuclear capacity factor



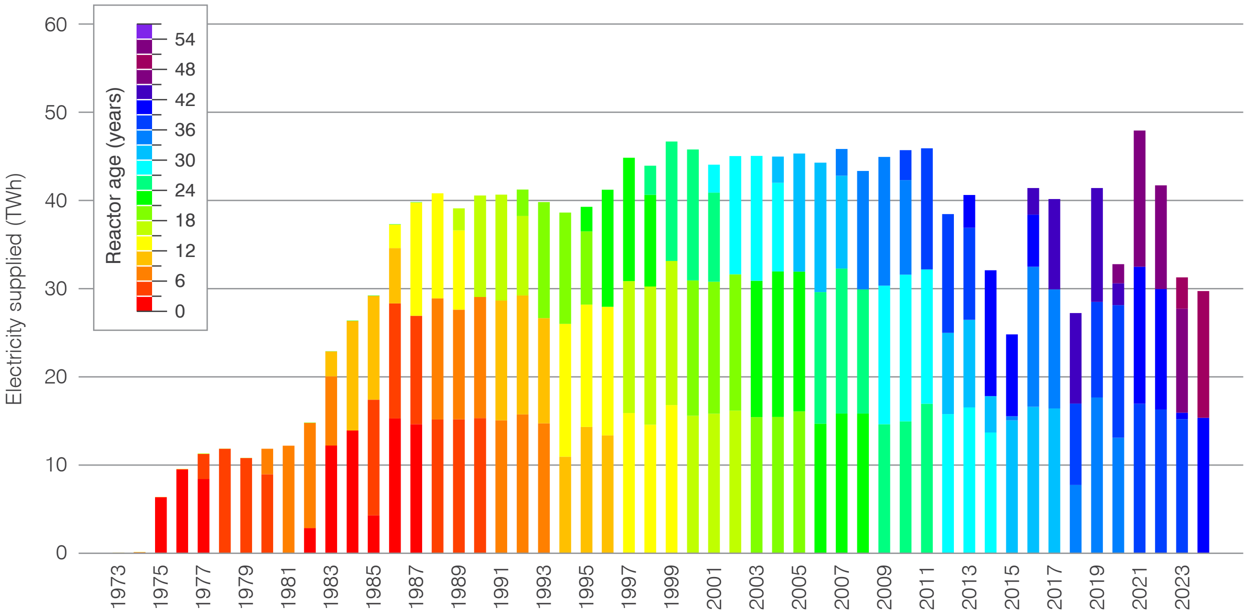
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Brazil

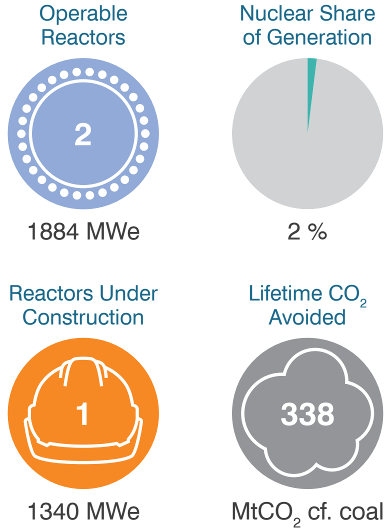
Brazil has two operating reactors with a combined capacity of 1884 MWe at Angra, 200 km west of Rio de Janeiro. Construction on a third unit was halted in April 2023.

A lifetime extension for Angra 1 was authorized by the National Nuclear Energy Commission in November 2024, permitting operations until 2055.

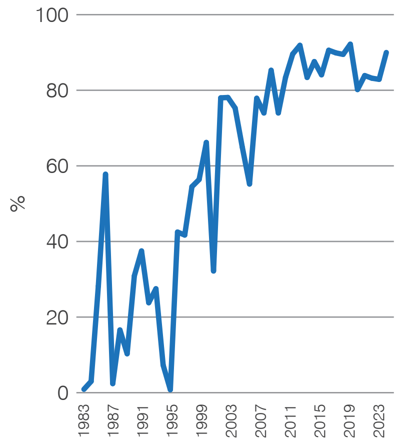
In January 2025 Eletronuclear and the Brazilian Society of Nuclear Medicine signed an agreement aimed at producing lutetium-177 at Angra 2.

A study by Brazil's National Bank for Economic and Social Development concluded that the cost of abandoning construction of the part-built Angra 3 nuclear power unit could be about BRL21 billion (USD3.7 billion). By contrast Eletronuclear estimated the cost of completing the project at around BRL23 billion, of which BRL12 billion had been invested.

In February 2025 the National Energy Policy Council (CNPE) postponed its decision on resuming construction of unit 3. Also in February, Eletronuclear announced a restructuring plan aimed at improving governance and the economic viability of its nuclear projects, and pushed back its target commissioning date for Angra 3 to 2031.

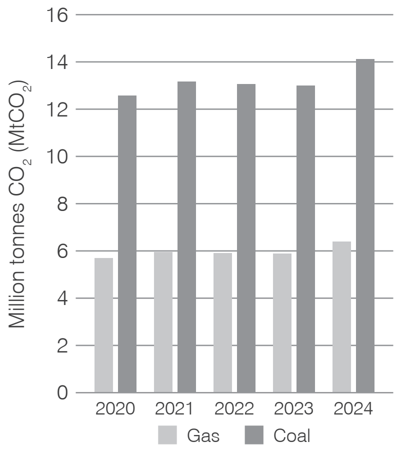


Average nuclear capacity factor



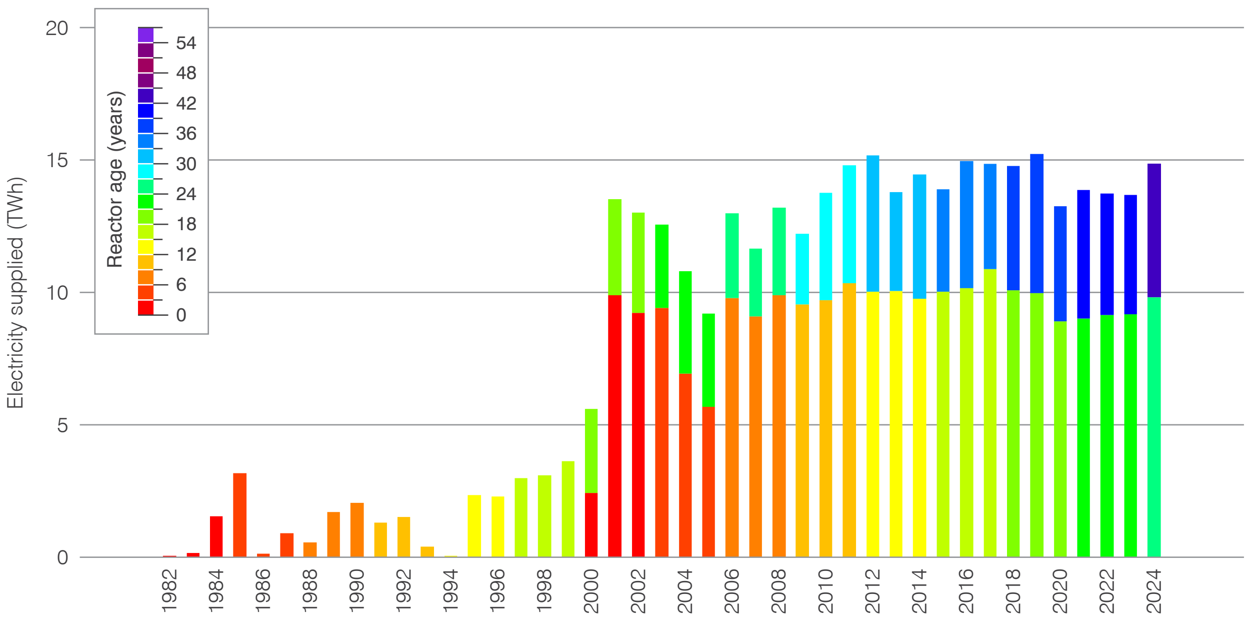
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Bulgaria

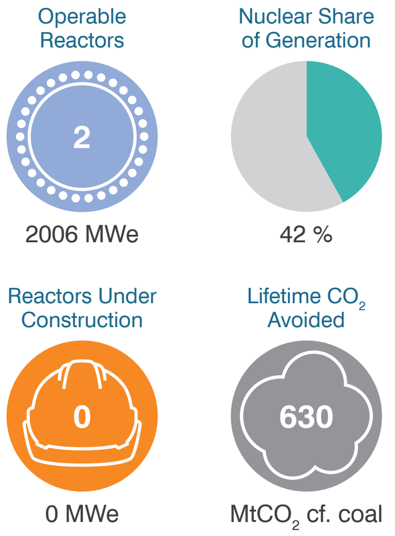
Bulgaria has one nuclear power plant, Kozloduy, located on the river Danube about 110 km north of Sofia. It has two operating VVER-1000 reactors, with a combined capacity of 2006 MWe. Four VVER-440 units were shut down in the 2000s as a condition of the country joining the European Union.

In January 2023 the energy minister set out an energy strategy that includes plans for two new reactors at Kozloduy and two at Belene. The strategy outlines the continued use of coal until 2030 before reducing its use to zero by 2038.

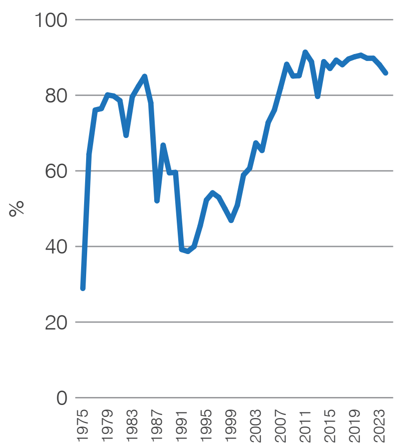
The same month, the National Assembly voted by 112 to 45, with 39 abstentions, in favour of a draft decision asking ministers to negotiate with the US government for a new AP1000 unit at Kozloduy.

In October 2023 the Council of Ministers in Bulgaria gave the go-ahead for construction of two AP1000 units at Kozloduy. In January 2024 companies interested in being involved in the plant construction were invited to express their interest. In February it was announced that five companies had done so.

In December 2022 Bulgaria signed a 10-year deal with Westinghouse to supply fuel for Kozloduy 5. The first batch of Westinghouse VVER fuel was loaded into the reactor in May 2024, and the unit restarted from its annual scheduled shutdown in June.

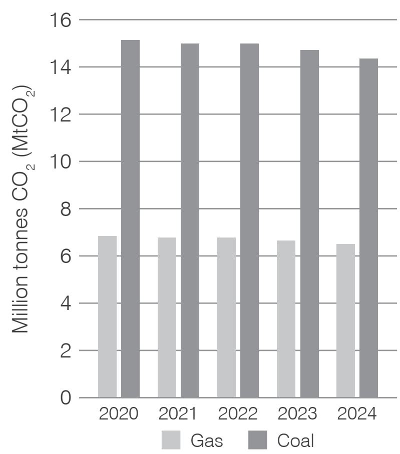


Average nuclear capacity factor



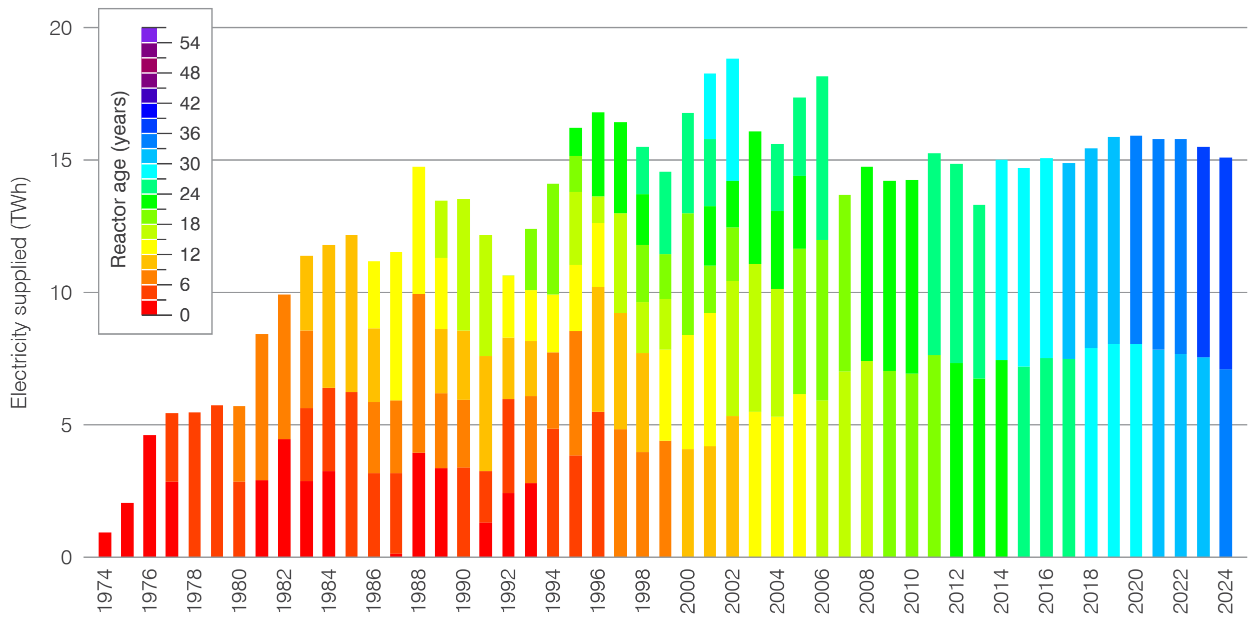
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Canada

Seventeen reactors operate at four plants in Canada; 16 are in Ontario at the Bruce, Darlington and Pickering plants, and one is in New Brunswick.

Refurbishment programmes are underway at Bruce and Darlington. Six of the eight units at Bruce are being refurbished between 2020 and 2033. At Darlington, units 1-3 have been returned to service, with unit 4 due to restart in 2026.

The four operating units at Pickering are due to go offline for refurbishment after the end of 2026 and are expected to return to service in the mid-2030s.

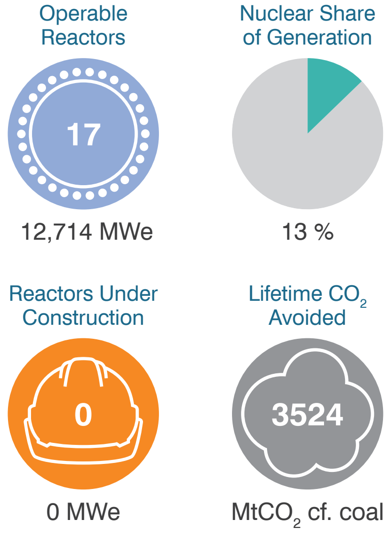
In April 2025 the Canadian Nuclear Safety Commission issued a construction licence authorizing OPG to construct a BWRX-300 reactor at Darlington. Provincial approval followed in May, as well as the award of contracts to Aecon Kiewit Nuclear Partners and AtkinsRéalis company Candu Energy. Four BWRX-300 reactors are planned at the site.

Bruce Power has begun a federal impact assessment for its proposed Bruce C project, which aims to build up to 4.8 GWe of new capacity at the Bruce site.

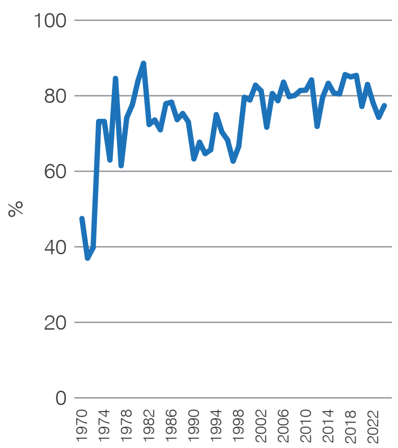
In New Brunswick, NB Power, in partnership with ARC Clean Technology Canada, has applied for a site preparation licence for an SMR.

SaskPower in June 2024 said it has identified two potential sites for deployment of a BWRX-300 unit, both in the Estevan area of the uranium mining province of Saskatchewan. Separately SaskPower, Westinghouse and Cameco signed an agreement in June 2024 to evaluate deploying Westinghouse reactor technology.

Energy Alberta has submitted its initial project description to the Impact Assessment Agency of Canada for the proposed 4.8 GWe Peace River Nuclear Power Project.

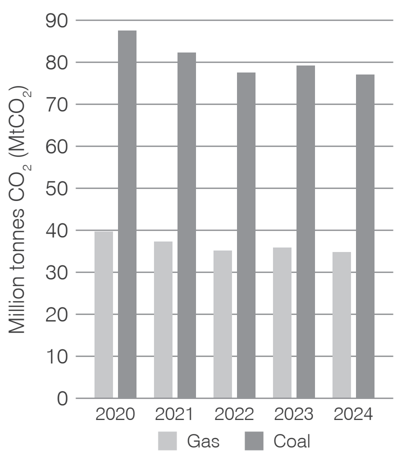


Average nuclear capacity factor



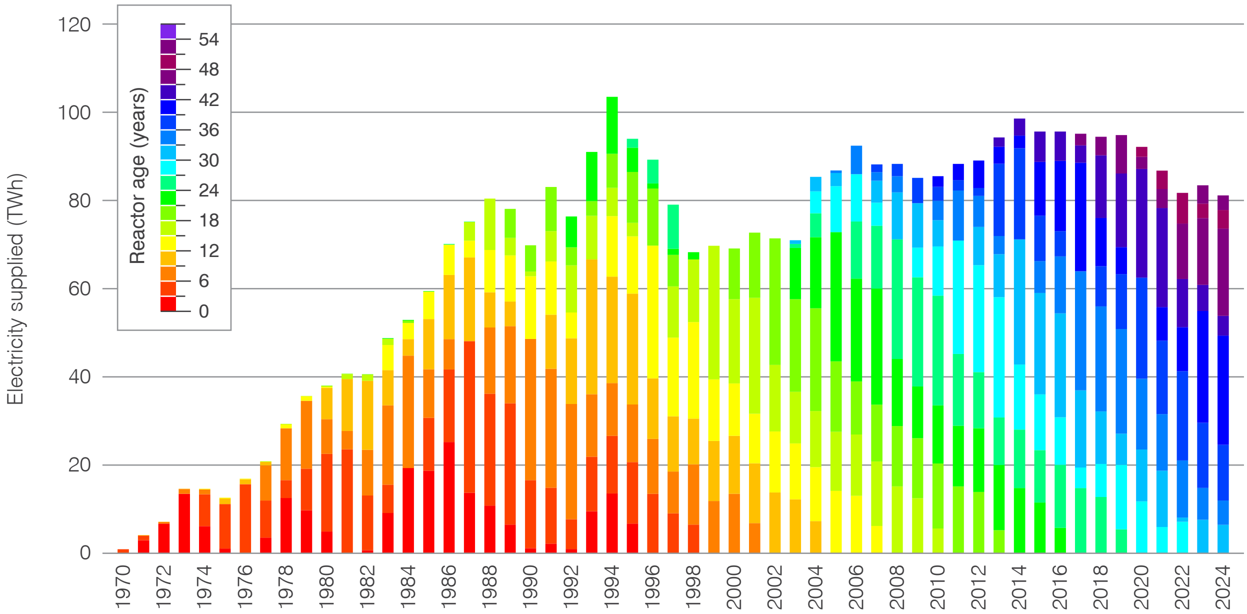
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

China, mainland

Mainland China has 58 operable reactors with a total capacity of 57 GWe, primarily at sites along its southeast coastline. It also had 32 reactors under construction as of 31 July 2025, totalling 34 GWe.

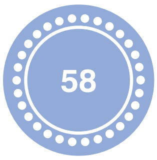
In October 2024 the country's first CAP1400 reactor was connected to the grid. The CAP1400 is an enlarged version of the Westinghouse AP1000 PWR.

In November 2024 unit 1 of CNNC's Zhangzhou project in Fujian province was connected to the grid. It is the first of four Hualong One reactors under construction at the site.

Six reactors commenced construction during 2024 (Zhangzhou 3, Lianjiang 2, Xudabao 2, Shidaowan 1, Ningde 5 and Zhangzhou 4). As of 31 July, construction of a further three units has commenced in 2025 (Lufeng 1, Shidaowan 2, Taipingling 3).

In August 2024 China's State Council approved five nuclear projects with a total of 11 reactors: Xuwei Phase I, Lufeng Phase I, Zhaoyuan Phase I, San'ao Phase II and Bailong Phase I – with a total of 11 reactors. Groundworks for unit 1 at Bailong began in January 2025. In April 2025 the Council approved a further five projects comprising 10 reactors – Fangchenggang Phase III, Haiyang Phase III, Sanmen Phase III, Taishan Phase II and Xiapu Phase I.

Operable Reactors



56,930 MWe

Nuclear Share of Generation

5 %

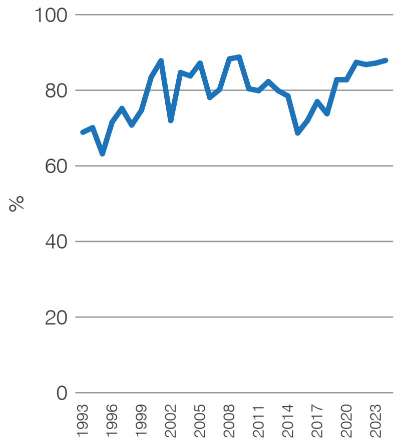
Reactors Under Construction

35,355 MWe

Lifetime CO_2 Avoided

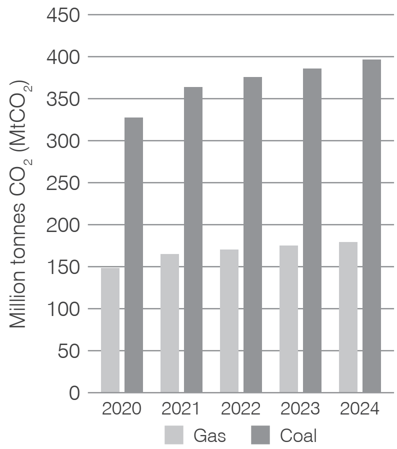
$MtCO_2$ cf. coal

Average nuclear capacity factor



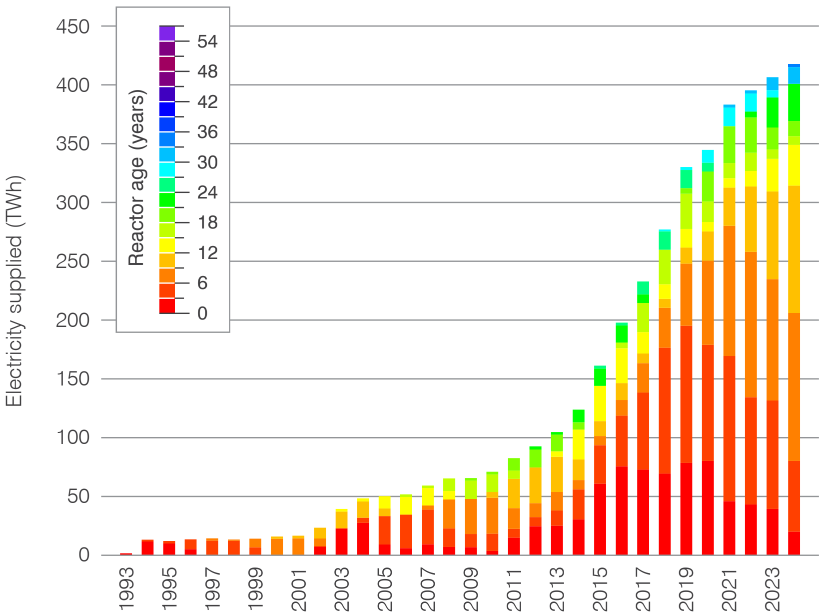
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

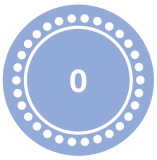
Taiwan, China

Taiwan shut down its last reactor, Maanshan 2, on 17 May 2025. Days later a proposal to hold a referendum on restarting the Maanshan plant was passed in Taiwan's Legislative Yuan. The referendum is due to take place on 23 August.

Taiwan has been progressively phasing out its nuclear reactors following the election of Taiwan's Democratic Progressive Party (DPP) in January 2016. The DPP's policy of creating a "nuclear-free homeland" by 2025 stated that the country's reactors would be shut down as their 40-year operating licences expire.

A referendum held in November 2018 called for the government to cancel the amendment, but the policy remained in effect.

Operable Reactors



0 MWe

Nuclear Share of Generation

5 %

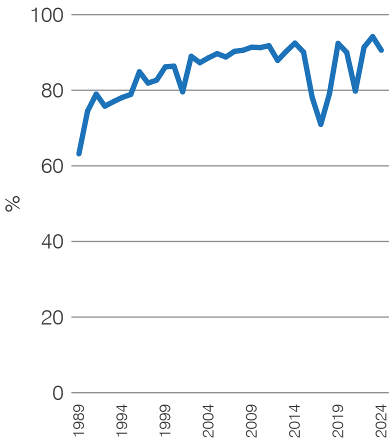
Reactors Under Construction

0 MWe

Lifetime CO_2 Avoided

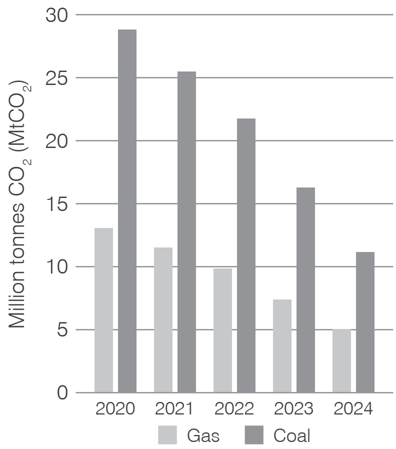
$MtCO_2$ cf. coal

Average nuclear capacity factor



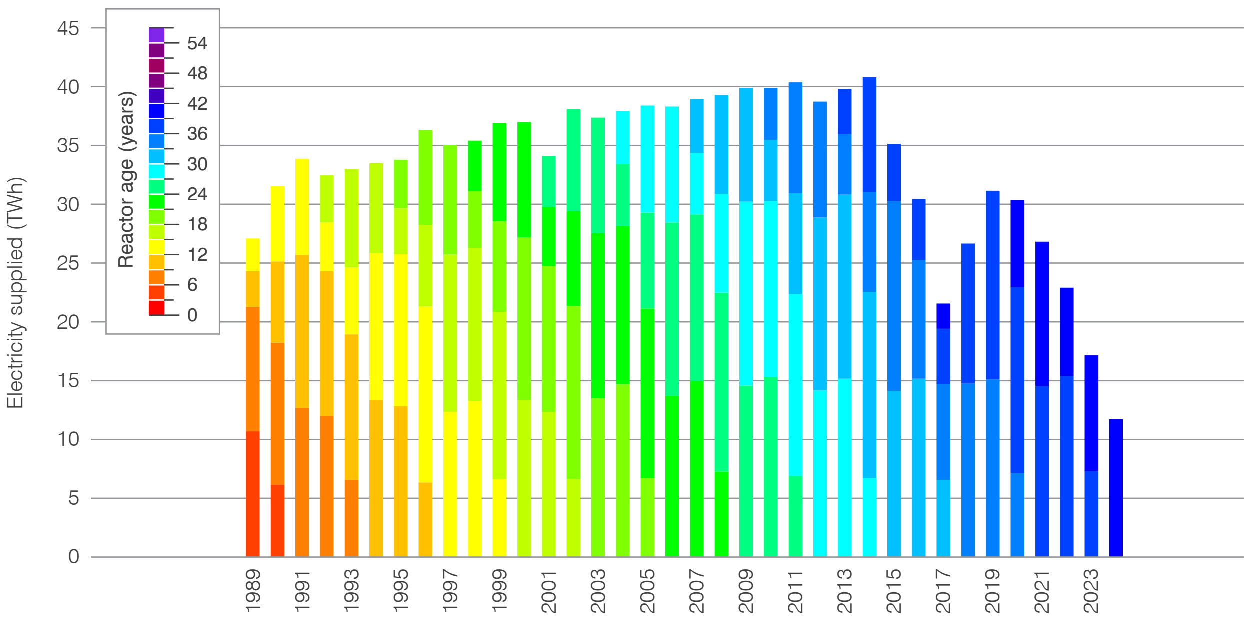
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Czechia

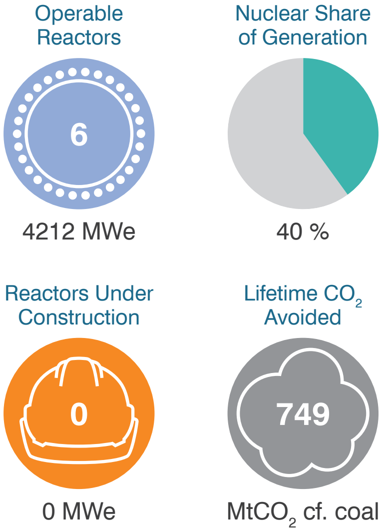
Czechia has six operable reactors providing about 40% of the country's electricity: two VVER-1000 units at Temelin, 100 km south of Prague; and four VVER-440 units at Dukovany, 30 km west of Brno. The government's January 2025 National Energy and Climate Plan states that the share of generation provided by nuclear should rise to 68% by 2040.

In July 2024, KHNP was selected as the preferred bidder for up to four reactors – units 5&6 at Dukovany and units 3&4 at Temelin. The Czech government subsequently took an 80% stake in the new-build company, Elektrárna Dukovany II, to secure financing and strengthen national oversight.

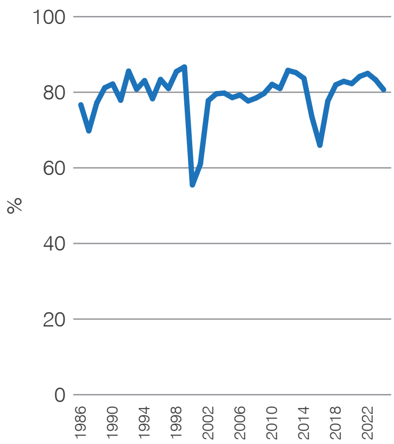
On 4 June 2025, KHNP and the Czech government signed a $18.6 billion contract for the construction of two APR-1000 reactors. Construction of the first unit is expected to begin in 2029, with trial operations targeted for 2036.

ČEZ is also planning to deploy small modular reactors. In September 2024 Rolls-Royce SMR was selected after assessing seven potential technology suppliers. In October ČEZ took a 20% stake in Rolls-Royce SMR. In April 2025 ČEZ selected Amentum to deliver environmental impact assessment reports related to proposals for Rolls-Royce SMRs at Temelin, as well as the Tušimice coal-fired power station, which is due to be retired in 2030.

ČEZ is diversifying its nuclear fuel supplies. It signed contracts with Urenco in November 2024 for enriched uranium supply, and Kazatomprom in April 2025 for the supply of uranium concentrate. In mid-2025, Westinghouse delivered reloads of VVER-1000 and VVER-440 fuel for Temelín and Dukovany, respectively.

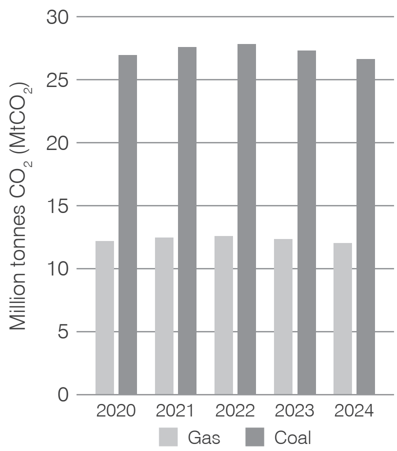


Average nuclear capacity factor



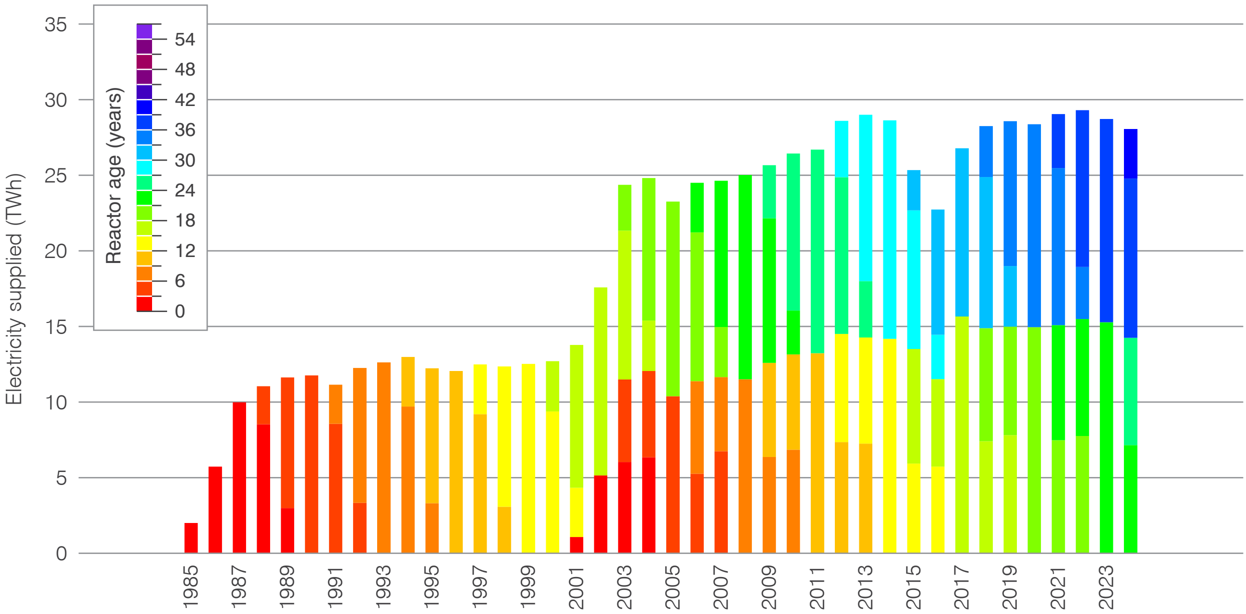
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



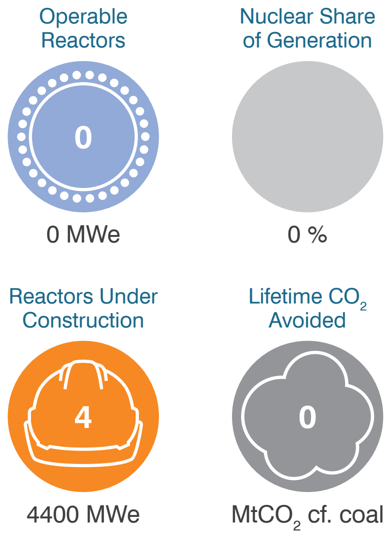
Source: World Nuclear Association, IAEA PRIS

Egypt

Four VVER-1200 units are under construction in Egypt at El Dabaa, on the north Mediterranean coast, 140 km west of Alexandria.

In November 2015 an intergovernmental agreement was signed with Russia to build and operate the four reactors, including fuel supply, used fuel management, training and development of regulatory infrastructure. Construction of El Dabaa 1 commenced in July 2022, followed by unit 2 in November 2022, unit 3 in May 2023, and unit 4 in January 2024.

Egypt's aim is for 9% of electricity to be generated by nuclear by 2030, which would be achieved by the operation of the first two units by that time, directly displacing oil and gas.



Finland

Finland has two nuclear power plants: Loviisa, a two-unit VVER-440 plant, located 80 km east of Helsinki; and Olkiluoto, about 220 km northwest of the capital, with twin BWR units and an EPR.

In February 2023 the Finnish government approved Fortum's operating lifetime extension request for an additional 20-year term, which would extend the operation of Loviisa 1&2 until the end of 2050. The units started up in 1977 and 1980, respectively. In May 2024 Fortum awarded a contract to Doosan Škoda Power to refurbish the low-pressure turbines at Loviisa as part of its modernization programme.

Teollisuuden Voima Oyj (TVO) is preparing to extend the operational lifetimes and uprate units 1&2 at its Olkiluoto plant. In January 2024 it submitted an environmental impact assessment to the Ministry of Economic Affairs and Employment. In April 2025 TVO signed a €75 million loan agreement with the Nordic Investment Bank to finance the upgrade work.

Fortum launched a feasibility study in October 2022 to explore the possibility of new nuclear in Finland and Sweden, examining different large and small modular reactor designs together with vendors. In March 2025 it announced that it would continue to collaborate with EDF (EPR), Westinghouse-Hyundai (AP1000) and GE-Hitachi (BWRX-300). In June 2025 Fortum signed early work agreements with EDF and Westinghouse-Hyundai regarding the potential deployment of their respective reactor designs.

Operable Reactors

4369 MWe

Nuclear Share of Generation

39 %

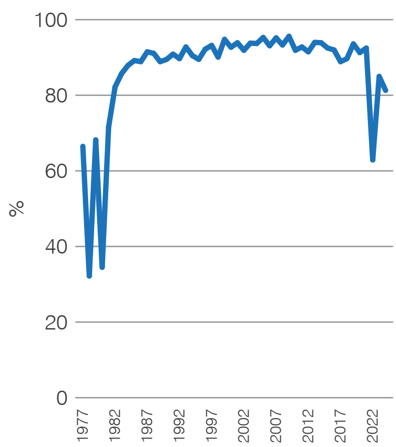
Reactors Under Construction

0 MWe

Lifetime CO_2 Avoided

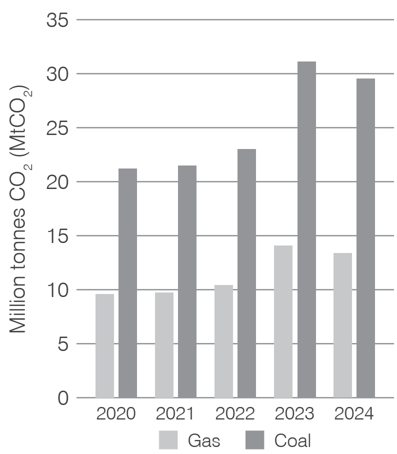
$MtCO_2$ cf. coal

Average nuclear capacity factor



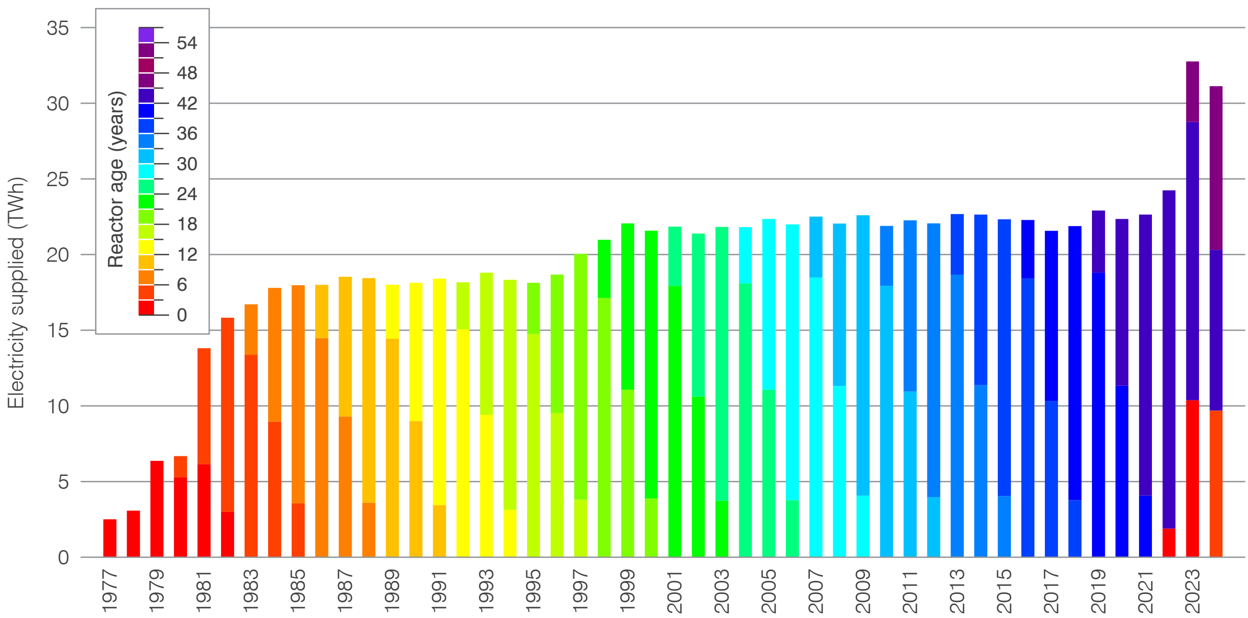
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

France

France has 57 operable reactors with a total capacity of 63 GWe at a variety of coastal and inland sites. In December 2024 the Flamanville 3 EPR was connected to the grid, the country's first new reactor to be commissioned since 1999.

In March 2023 France's parliament formally approved the government's nuclear investment plan to construct six EPR2 units at three sites at an estimated cost of €52 billion. The cost has since been revised to €67.4 billion, with EDF expected to make a final investment decision in 2026.

In January 2025 France's auditor highlighted challenges for the EPR2 programme and recommended that a final investment decision should be withheld until financing is secured "and the detailed design studies are progressing in line with the trajectory targeted for the milestone of the first nuclear concrete." Following the report, in March 2025 France's Nuclear Policy Council – headed by President Emmanuel Macron – agreed that a subsidized government loan should be issued to state-owned power utility EDF to cover at least half the construction costs of six EPR2 reactors.

In June 2025 a strategic contract was signed between the major French industrial companies, the government and trade unions aimed at coordinating the country's nuclear industry for the operating lifetime extensions of current reactors and the construction of new ones. In July 2025 the French regulator confirmed that EDF's 1300 MWe reactors can operate beyond their original 40-year design lifetime.

Operable Reactors

57

63,000 MWe

Nuclear Share of Generation

67 %

Reactors Under Construction

0

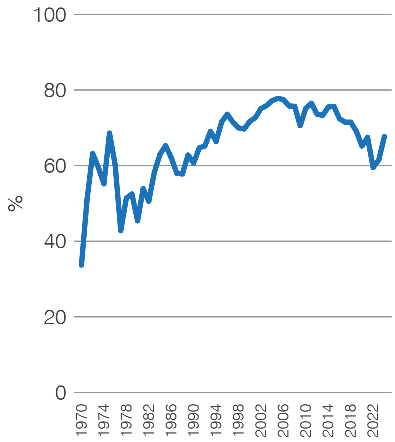
0 MWe

Lifetime CO_2 Avoided

14,490

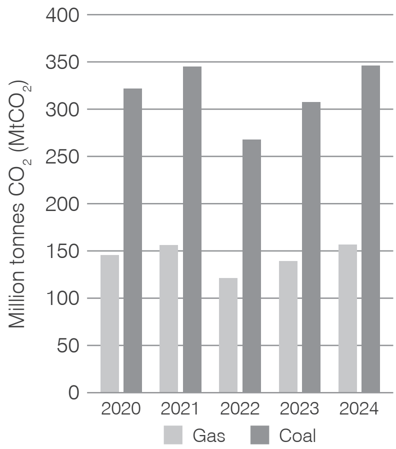
$MtCO_2$ cf. coal

Average nuclear capacity factor



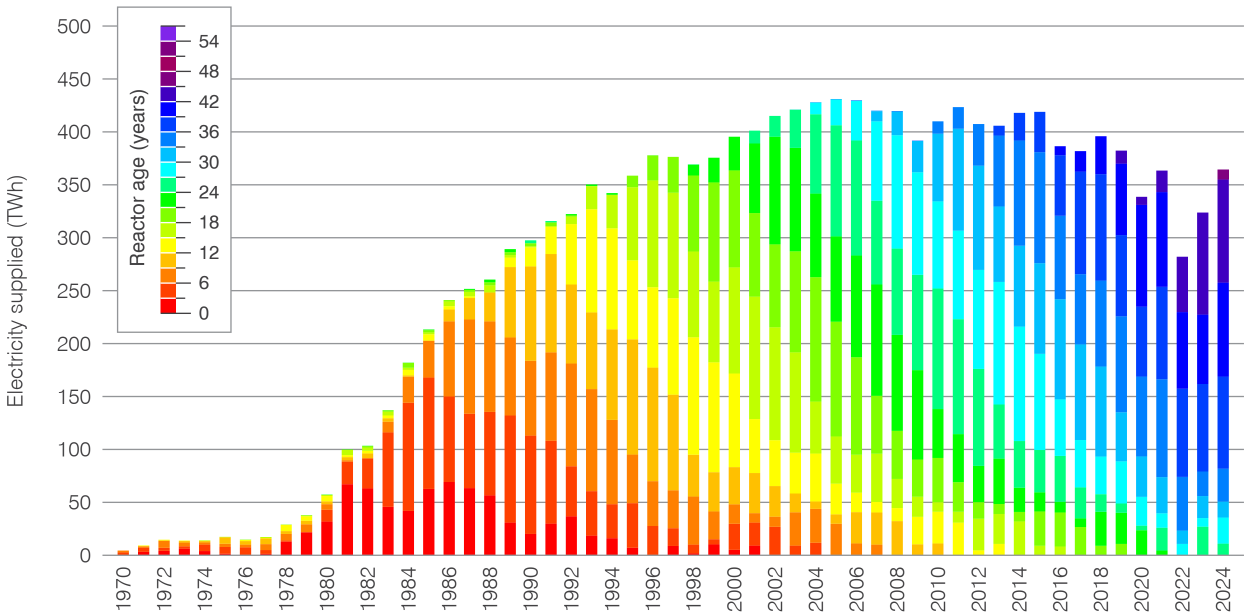
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Hungary

Four VVER-440 reactors operate at the Paks nuclear power plant, 100 km south of Budapest, with a combined capacity of 1916 MWe. The plant generates around half of the electricity produced in Hungary, but supplies around one-third of electricity demand, as the country relies heavily on imported electricity.

The four units at Paks started up between 1982 and 1987. Their design lifetime was for 30 years but that was extended in 2005 by 20 years, to between 2032 and 2037. In December 2023 the operator of the plant notified the European Union of the country's intention to further extend the operating lifetime of the four units to 70 years.

In August 2022 the Hungarian Atomic Energy Authority (HAEA) issued a construction licence for two VVER-1200 units at Paks II, to be built by Rosatom. In April 2023 the government announced its intention to continue with the project, despite the conflict in Ukraine and the European Union's sanctions against Russia. In May 2023 the European Union approved an amended contract with Rosatom. Preparatory groundworks began at the Paks II site in July 2023 and were completed in April 2025. First concrete is expected in 2026.

Operable Reactors

1916 MWe

Nuclear Share of Generation

47 %

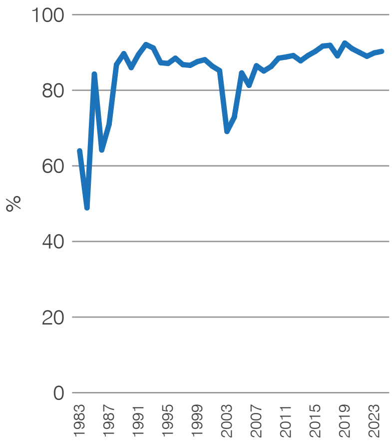
Reactors Under Construction

0 MWe

Lifetime CO_2 Avoided

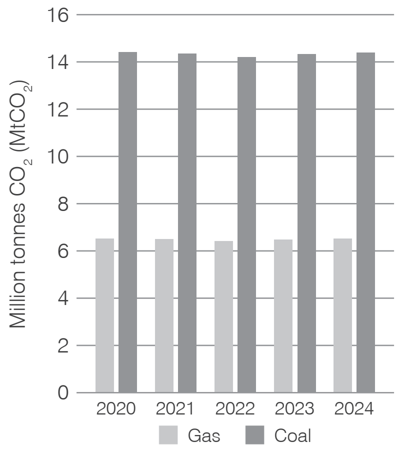
$MtCO_2$ cf. coal

Average nuclear capacity factor



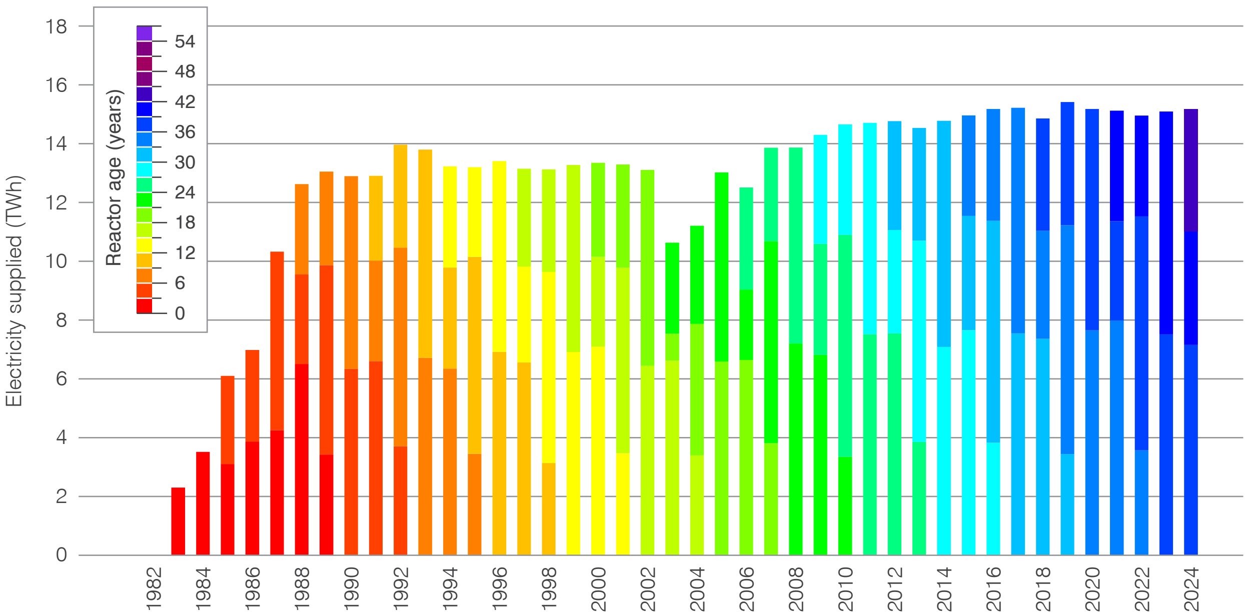
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

India

India has 24 reactors at seven nuclear power plants located both inland and along the coast. The majority of reactors are indigenously designed pressurized heavy water reactors (PHWRs).

In March 2025 the third Indian-designed 700 MWe pressurized heavy water reactor (PHWR) was connected to the grid at Rajasthan. This follows the first two PHWR-700 units that commenced operation at Kakrapar in 2021and 2024. India has a further 700 MWe PHWR unit under construction at Rajasthan, and the government has sanctioned construction of a further ten: Kaiga 5&6 in Karnataka; Gorakhpur 3&4 in Haryana; Chutka 1&2 in Madhya Pradesh; and Mahi Banswara 1-4 in Rajasthan. In April 2025 an EPC (engineering, procurement and construction) contract for Kaiga 5&6 was awarded to Megha Engineering & Infrastructure, and in May India's regulator gave siting consent for the four units planned at the Mahi Banswara site. Four Russian-designed reactors are also under construction at Kudankulam.

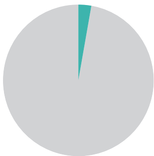
In April 2023 the government announced plans for nuclear to account for nearly 9% of India's electricity by 2047, up from around 3% currently. In February 2025 the country's Minister of Finance Nirmala Sitharaman said that this would require the "development of at least 100 GW of nuclear energy by 2047."

The government is also pursuing SMRs. In January 2025 NPCIL issued a request for proposals from private entities to finance and build a fleet of SMRs. In February 2025 a "nuclear energy mission for research & development of small modular reactors (SMRs) with an outlay of Rs. 20,000 crore," [about $2.3 billion] was announced with the aim of developing at least five SMRs by 2033.

Operable Reactors

7943 MWe

Nuclear Share of Generation



3 %

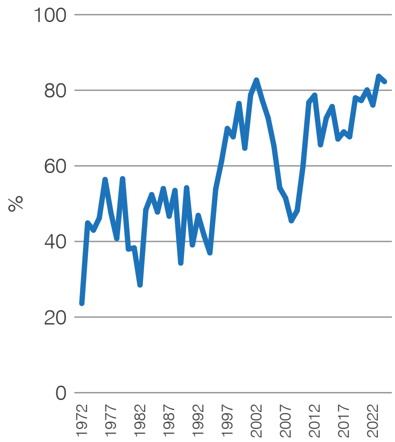
Reactors Under Construction

5398 MWe

Lifetime CO_2 Avoided

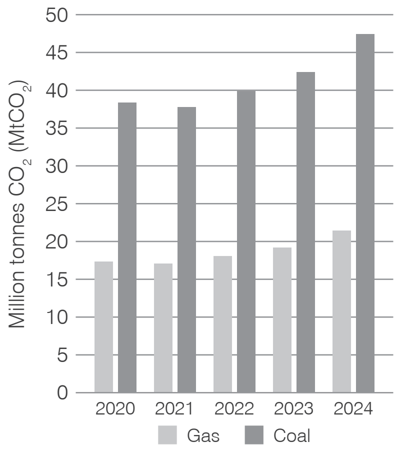
$MtCO_2$ cf. coal

Average nuclear capacity factor



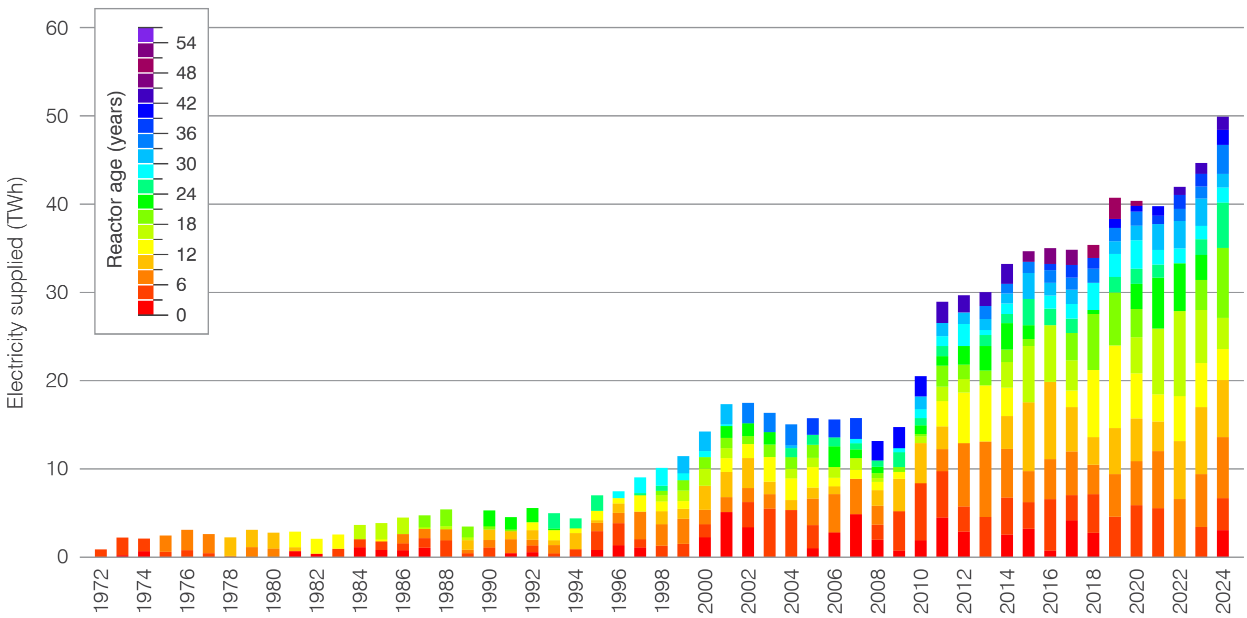
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Iran

A single VVER-1000 unit is in operation in Iran on the Persian Gulf coast at the Bushehr site, about 180 km southwest of Shiraz.

Construction commenced on a second VVER-1000 at Bushehr in 2019. A further VVER-1000 is planned at the site, and in April 2024 the head of the Atomic Energy Organization of Iran (AEOI) said that first concrete would be poured in May, but this has not yet taken place.

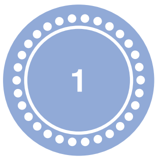
Earlier, in August 2023 the head of the AEOI announced that the country aims to increase its nuclear power generation capacity to 20 GWe over the next 20 years. This announcement was followed up by the announcement of the start of site work in Hormozgan, which the AEOI said will host four reactors.

Since 2002 Iran has been the subject of International Atomic Energy Agency (IAEA) inquiries concerning its possible development of nuclear weapons. In June 2024 the IAEA board of governors adopted a resolution calling on Iran to fully cooperate with the Agency, including giving it access to locations and material for nuclear safeguards verification activities. On 12 June 2025 the IAEA's board of governors formally declared Iran in breach of its non-proliferation obligations for the first time in 20 years.

On 13 June 2025 Israel launched a military operation targeting Iran's nuclear and military sites. On 16 June the IAEA confirmed that the Bushehr nuclear power plant had not been targeted or affected by the attacks.

On 21/22 June the USA conducted a series of aerial attacks on the sites of Fordow, Natanz and Esfahan. Again, no impact on the Bushehr nuclear power plant was reported.

Operable Reactors



915 MWe

Nuclear Share of Generation

2 %

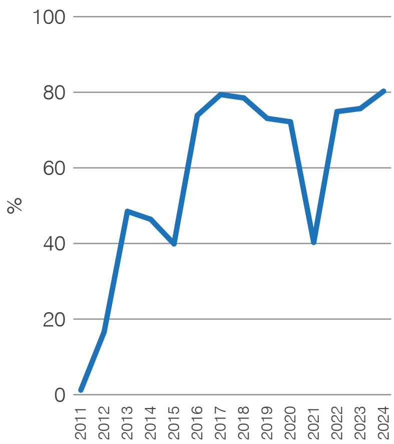
Reactors Under Construction

974 MWe

Lifetime CO_2 Avoided

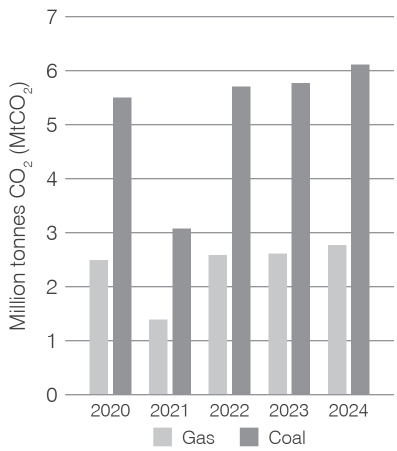
$MtCO_2$ cf. coal

Average nuclear capacity factor



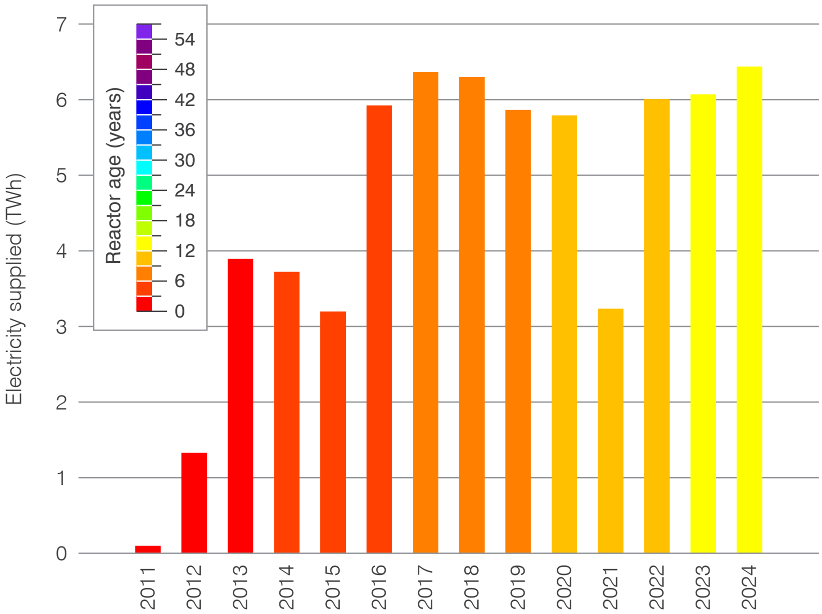
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Japan

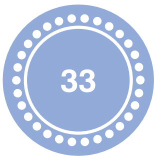
Following the March 2011 tsunami and subsequent accident at the Fukushima Daiichi plant, all reactors in Japan have had to get regulatory approval to restart.

In December 2022 the government adopted a policy of maximizing the use of existing reactors by restarting as many of them as possible, whilst also developing advanced reactors to replace those that are shut down. Since then, four units have restarted – Takahama 1 (August 2023), Takahama 2 (September 2023), Onagawa 2 (October 2024) and Shimane 2 (December 2024). Further units are expected to return to service in 2025.

In April 2025 the Nuclear Regulatory Agency (NRA) approved a draft report that concluded Tomari 3 meets new regulatory standards, a prerequisite for its restart. In June 2025 Tepco announced that it had begun loading fuel in Kashiwazaki-Kariwa 6. Fuel loading at unit 7 took place in 2024, but it has not yet restarted.

Earlier in February 2025 Japan's latest Basic Energy Plan outlined the country's aim to "make maximum use of nuclear power," with about 20% of the country's total electricity generation in fiscal year 2040 to come from nuclear.

Operable Reactors



31,679 MWe

Nuclear Share of Generation

8 %

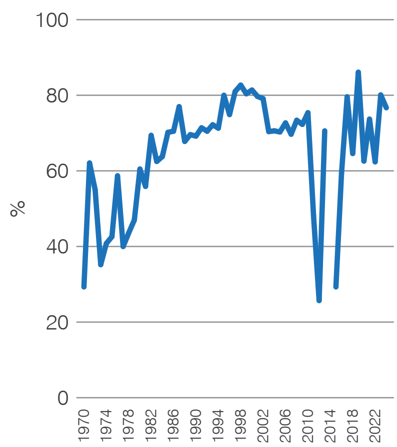
Reactors Under Construction

2653 MWe

Lifetime CO_2 Avoided

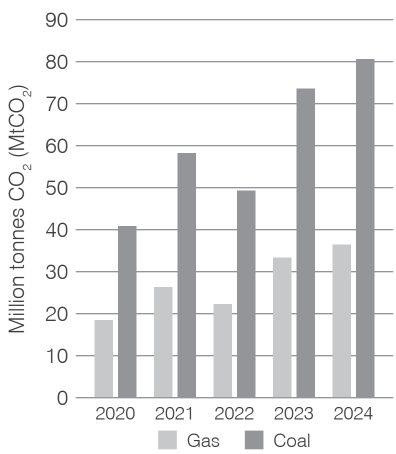
$MtCO_2$ cf. coal

Average nuclear capacity factor



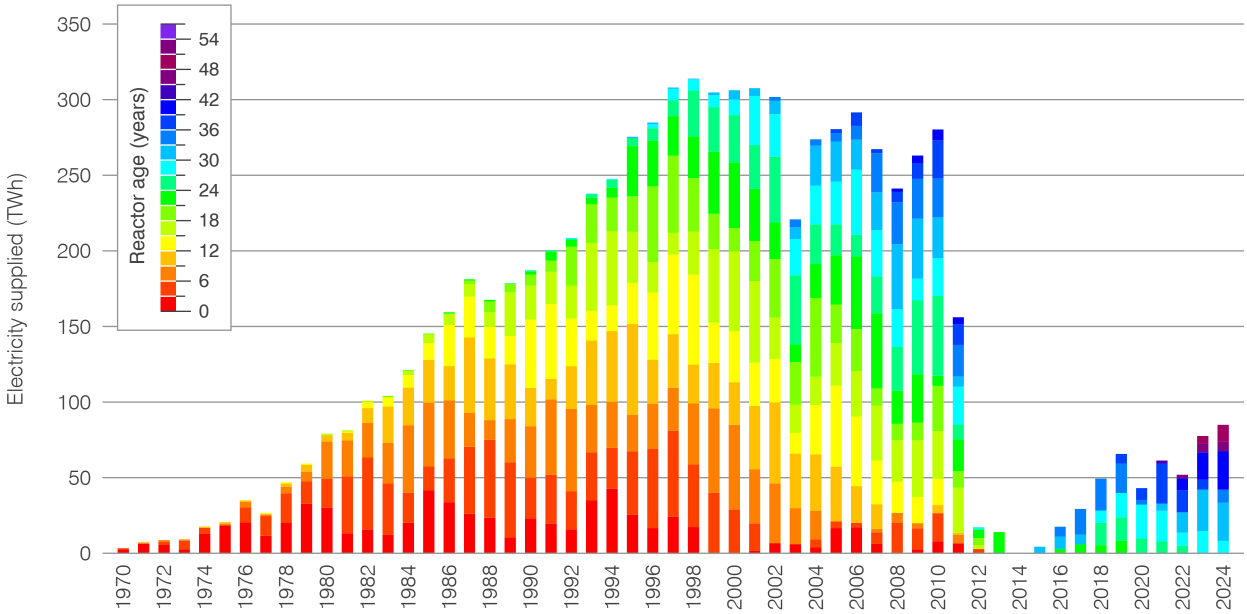
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

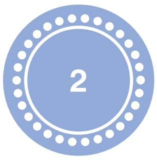
Mexico

Mexico has two operable nuclear reactors located on the east coast of the country, 300 km east of the capital, Mexico City. Laguna Verde 1 began commercial operation in 1990 and unit 2 in 1995.

In July 2020 the Mexico energy ministry approved a 30-year extension of the operating licence for Laguna Verde 1. This would allow the reactor to operate until 2050. In August 2022 Laguna Verde 2 was granted an extension to its operating licence, to April 2055.

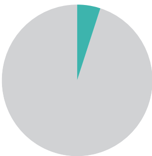
In May 2025 Nissan Mexicana signed a two-year contract with the Federal Electricity Commission of Mexico to obtain 90% of the electricity required for its three manufacturing plants from Laguna Verde.

Operable Reactors



1552 MWe

Nuclear Share of Generation



5 %

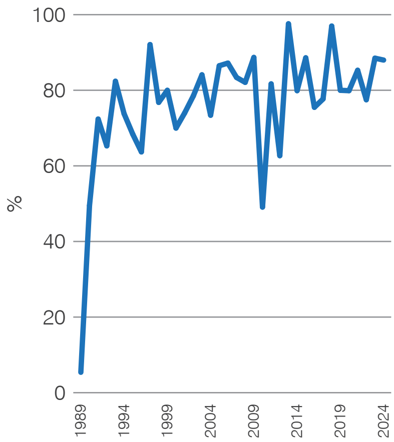
Reactors Under Construction

0 MWe

Lifetime CO_2 Avoided

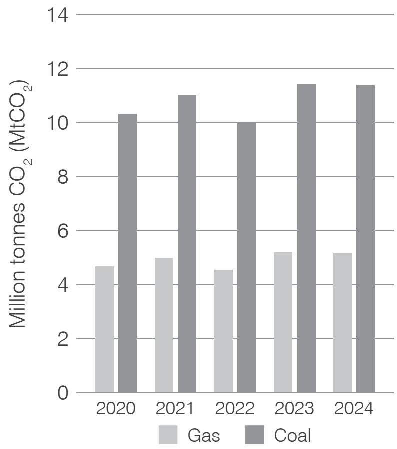
$MtCO_2$ cf. coal

Average nuclear capacity factor



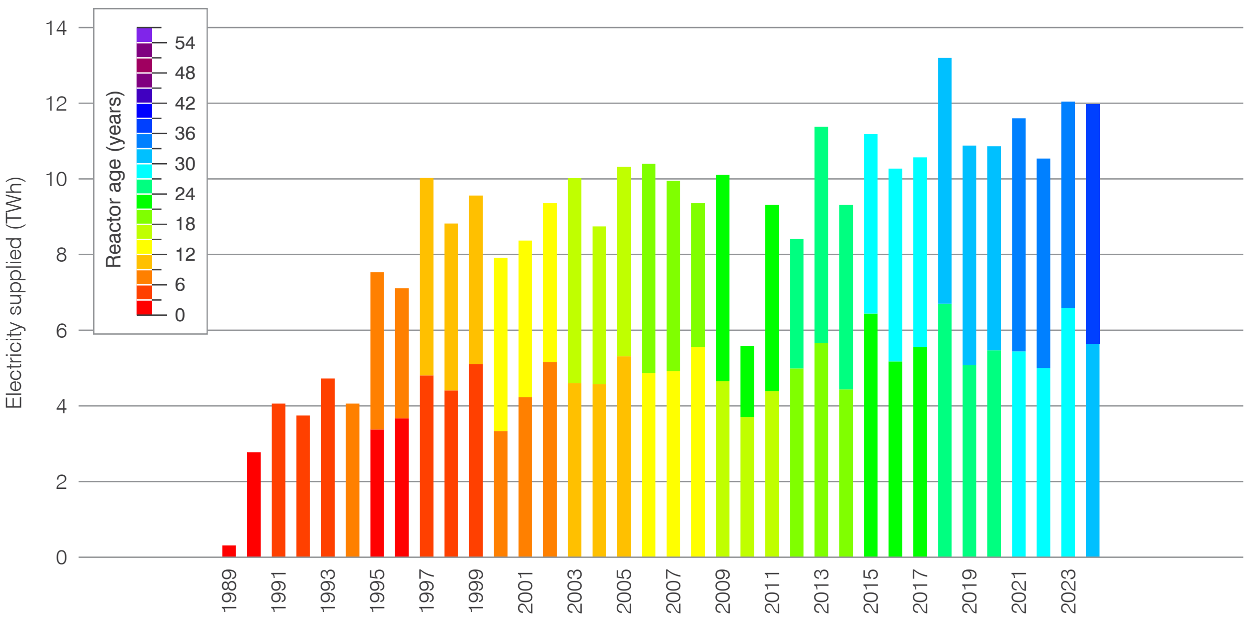
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

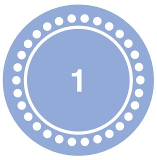
Netherlands

A single 485 MWe PWR is operating at Borssele, about 70 km southwest of Rotterdam.

In December 2022 the Netherlands government earmarked the Borssele site as the most suitable location for the construction of two new large reactors. KHNP, EDF and Westinghouse have been awarded contracts to conduct feasibility studies, but in March 2025 KHNP withdrew from the selection process. A week later, the Dutch regulator concluded that the feasibility studies submitted by EDF, Westinghouse and KHNP suggest that all three designs would meet necessary safety requirements. Amentum is evaluating the feasibility studies on behalf of the government.

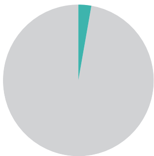
In November 2024 a joint report by NRG-Pallas and TNO concluded that SMRs could play an important role and contribute to the Dutch energy transition. The study concluded: "Two to more than 13 SMRs (of 150 MWe) can be deployed with room for further expansion of this number in 2050." A separate study by NRG-Pallas, commissioned by Dutch province Gelderland, identified four regions in the province as suitable for hosting SMRs. The province aims to designate two locations for an SMR in 2027.

Operable Reactors



482 MWe

Nuclear Share of Generation



3 %

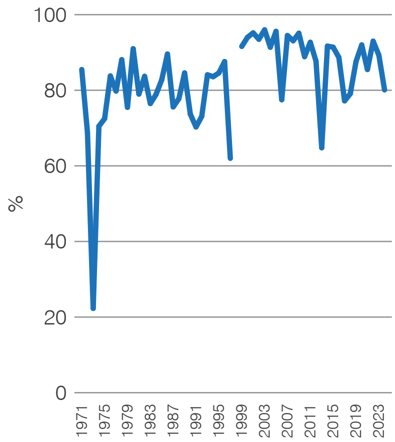
Reactors Under Construction

0 MWe

Lifetime CO_2 Avoided

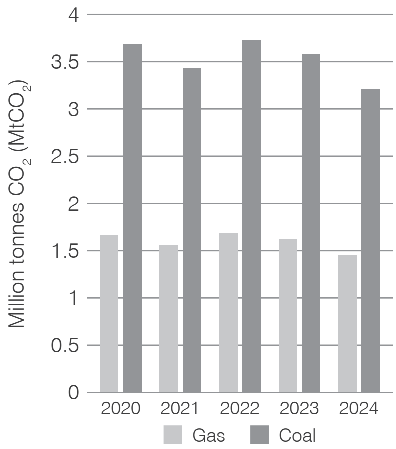
$MtCO_2$ cf. coal

Average nuclear capacity factor



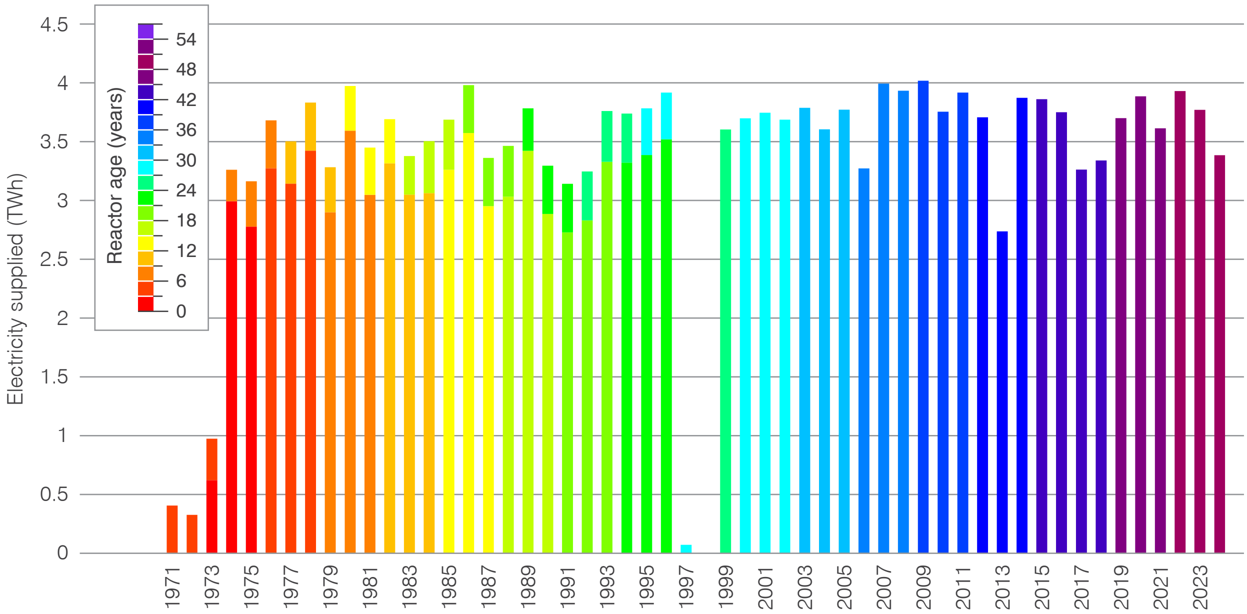
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Pakistan

Pakistan has six operating nuclear power reactors supplied by China at two sites: Chashma, inland 200 km southwest of Islamabad; and Karachi, on the coast about 30 km west of the city of Karachi.

The four units at Chashma are CNP300 models, based on the Qinshan 1 reactor in China. The first reactor was connected to the grid in 2000 and the fourth unit in 2017.

The Karachi nuclear plant is the site of the country's first nuclear power reactor, a 90 MWe (net) Canadian PHWR that operated between 1971 and 2021. The two operating units at Karachi are HPR1000 models, also known as Hualong One. Unit 2 at the plant was connected to the grid in 2021, followed by unit 3 in 2022.

In June 2023 it was announced that the Pakistan Atomic Energy Commission had signed a $4.8 billion deal with China National Nuclear Corporation (CNNC) to construct an HPR1000 reactor as unit 5 at Chashma. First nuclear concrete was poured in January 2025. CNNC is providing 85% of the estimated $3.7 billion required for the construction.

Operable Reactors

3262 MWe

Nuclear Share of Generation

17 %

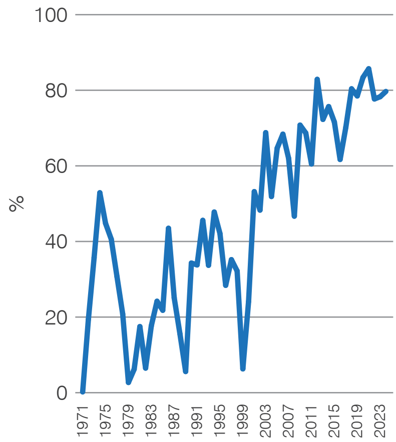
Reactors Under Construction

1117 MWe

Lifetime CO_2 Avoided

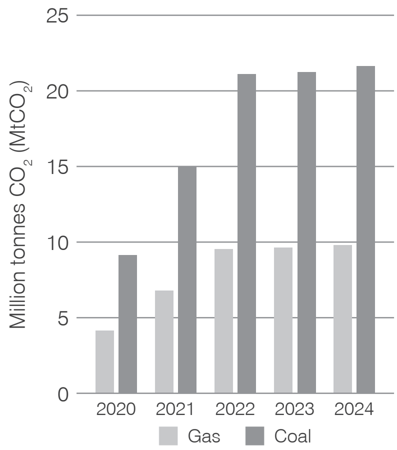
$MtCO_2$ cf. coal

Average nuclear capacity factor



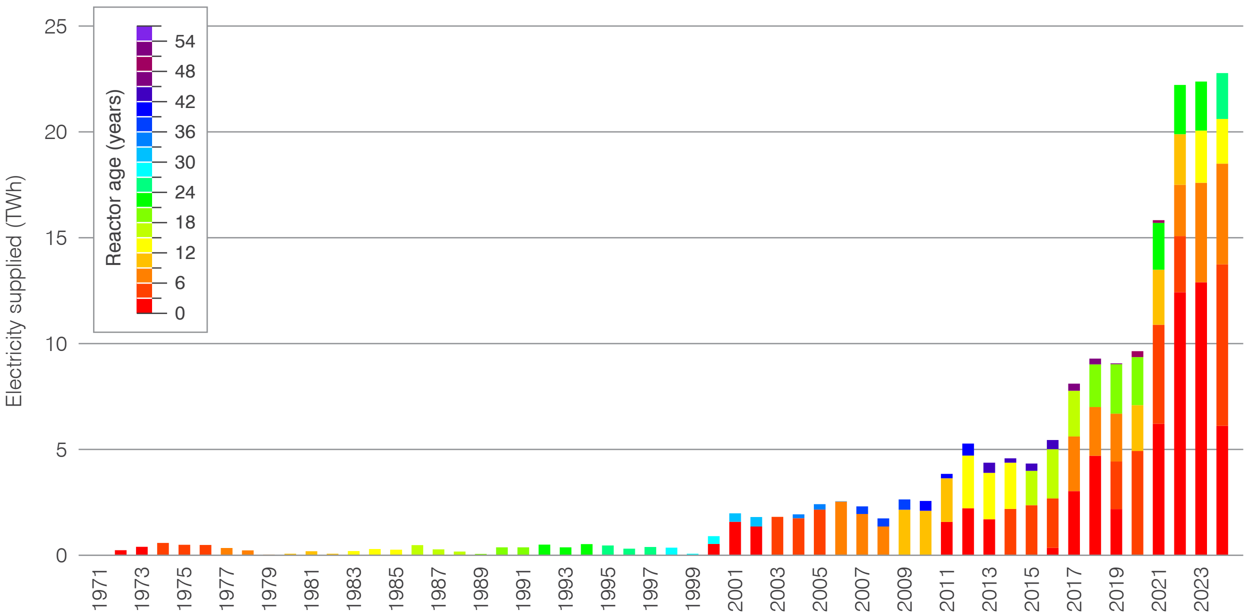
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

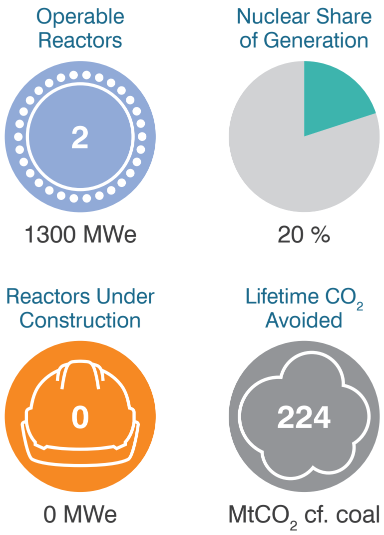
Romania

Two CANDU-6 PHWRs operate at the Cernavoda plant, 150 km east of Bucharest. In addition to electricity, the plant provides district heating to the adjacent town of Cernavoda.

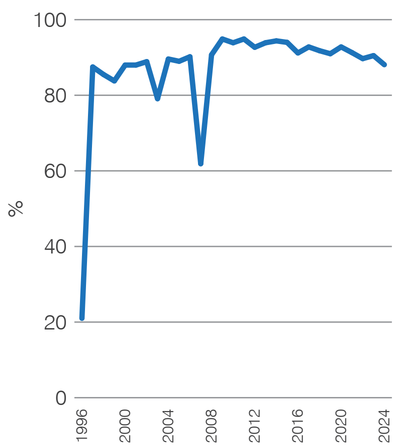
Cernavoda was originally planned to be a five-unit plant. In June 2023 the Romanian government and Nuclearelectrica signed a support agreement that allows for the restart of the project to complete Cernavoda 3&4. In November 2024 an EPC contract was signed with the FCSA Joint Venture including Fluor, AtkinsRéalis, Ansaldo Nucleare and Sargent & Lundy Energie. Nuclearelectrica now expects the two units to enter commercial operation in 2030 and 2031 respectively.

Cernovoda 1, which started operation in 1996, is to be upgraded to allow the reactor to operate for an additional 30 years, to 2060. In October 2023 Korea Hydro & Nuclear Power announced it had signed an agreement with Canada's Candu Energy and Italy's Ansaldo Nucleare to jointly carry out the refurbishment works. Separately, in December 2024, Nuclearelectrica signed an EPC contract with a consortium of KHNP, AtkinsRéalis's Candu Energy, Canadian Commercial Corporation and Ansaldo Nucleare for the estimated €1.9 billion refurbishment.

A NuScale small modular reactor plant is planned at Doicești in Romania's Muntenia region. In May 2023 the USA, along with multinational public-private partners from Japan, South Korea and the United Arab Emirates, announced funding for the project. In July 2024 Nuclearelectrica and project company RoPower Nuclear signed a contract with Fluor for the project, and in October the US Exim Bank approved a $98 million loan for pre-project services.

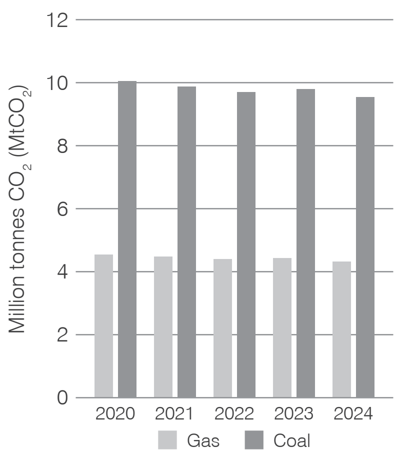


Average nuclear capacity factor



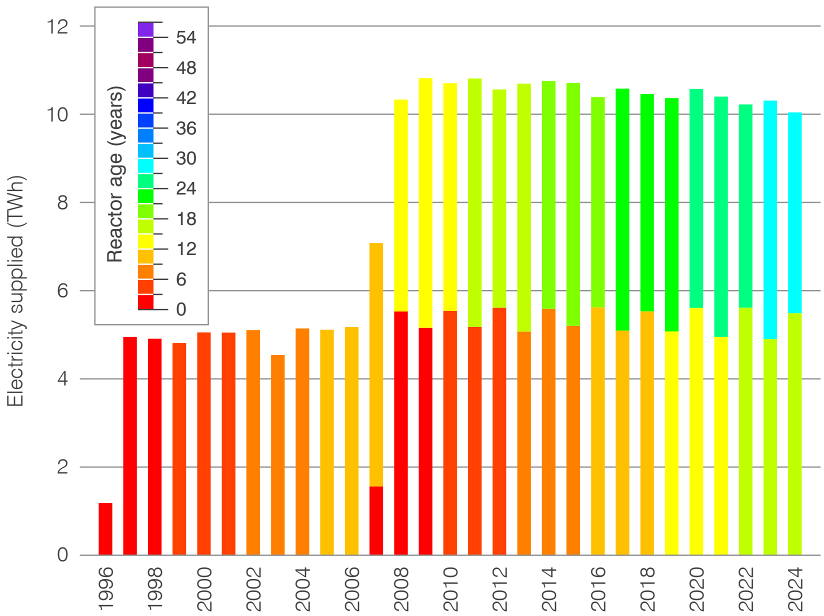
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Russia

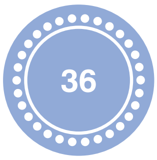
There are 36 operable reactors in Russia, with the majority in the west of the country. Seven reactors are under construction: two VVER-1200 units at the Kursk power plant; two VVER-1200 units at Leningrad; two RITM-200S reactors destined for the Cape Nagloynyn project; and a demonstration lead-cooled fast reactor, BREST-OD-300, in Seversk.

As of July 2025, a total of 20 VVER reactors were under construction outside of Russia in Bangladesh (2), China (4), Egypt (4), India (4), Iran (1), Slovakia (1), and Turkey (4). Rosatom has agreements in place with Hungary and India for the construction of further reactors and is in discussion with other countries.

In September 2024 Russia's draft energy plan set out the country's nuclear expansion plans, outlining as many as 34 new nuclear power units to be constructed by 2042. The plan includes a mix of large and small reactors, and replacement of existing units as well as new locations. It proposed that by 2042 the share of electricity generated by nuclear power will have increased from 18.9% to 23.5%.

In March 2025 Rostekhnadzor issued location licences for the proposed third and fourth units at the Kursk II nuclear power plant, allowing preparatory work to begin for construction. Also, in March first concrete was poured for Leningrad II-4 (also referred to as unit 8).

Operable Reactors



26,802 MWe

Nuclear Share of Generation

18 %

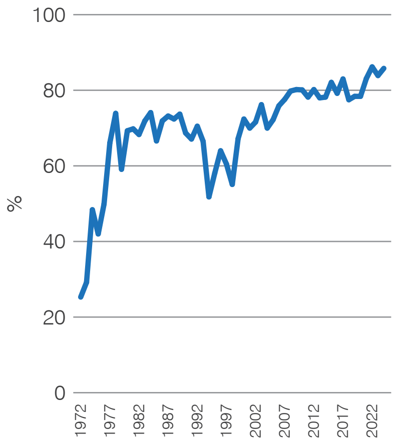
Reactors Under Construction

4903 MWe

Lifetime CO_2 Avoided

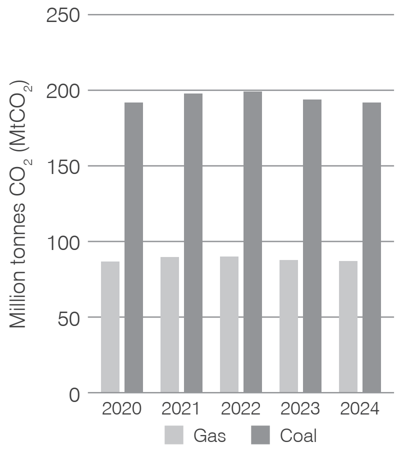
$MtCO_2$ cf. coal

Average nuclear capacity factor



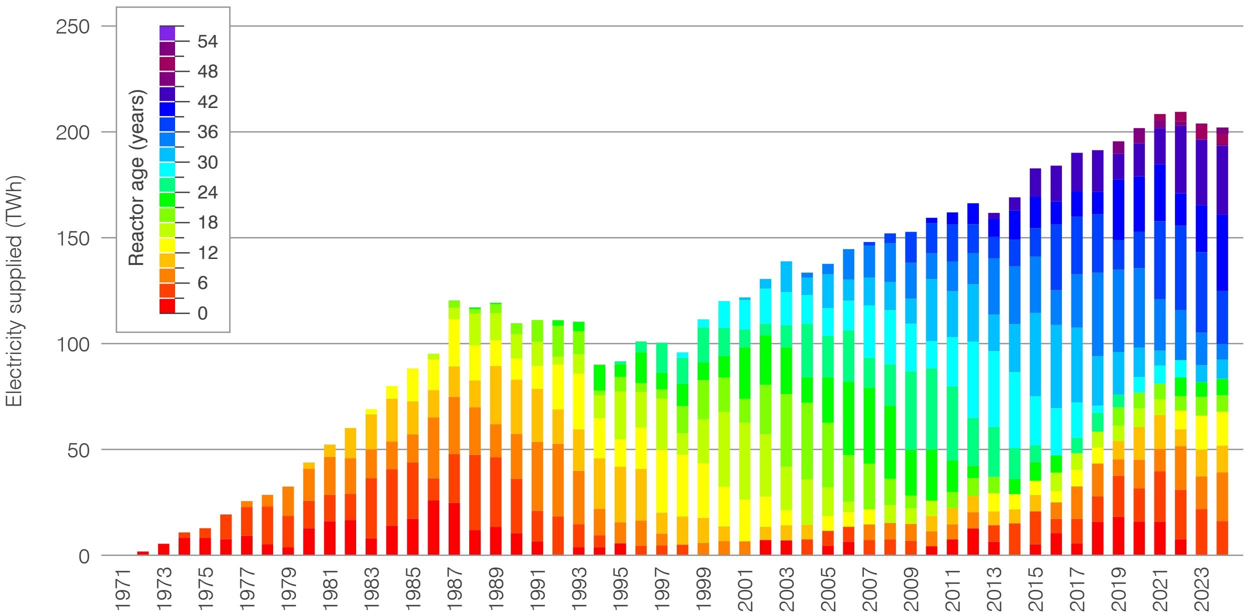
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Slovakia

Slovakia has five operable VVER440/V-213 nuclear reactors: two at Bohunice V2, 140 km northeast of Bratislava; and three at Mochovce, 100 km east of Bratislava. Mochovce 3 was grid connected in January 2023. Unit 4 at that site is under construction; hot testing began in March 2025.

In July 2024 Slovenské Elektrárne signed a contract with Framatome for the long-term supply of fuel to the VVER-440 reactors at its Bohunice and Mochovce plants, starting from 2027.

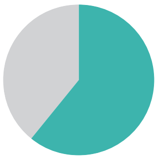
In May 2024 the government approved a plan for a new 1.2 GWe unit near the existing Bohunice plant. Slovakia signed a memorandum of understanding in June 2023 with a range of partners – US Steel Košice, the Slovak Electricity Transmission System, VUJE, the Office of Nuclear Supervision and the Slovak Technical University in Bratislava – to support development of SMRs. According to a schedule from the Ministry of Economy a contractor is expected to be chosen in the first half of 2027.

Slovakia was one of the first recipients of support through the US-funded Project Phoenix. The initiative aims to support energy security and climate goals by creating pathways for coal-to-SMR plant conversions. In February 2024 Slovenské Elektrárne said that staff from Project Phoenix implementation partner Sargent & Lundy had visited its Bohunice and Mochovce nuclear power plants and the Nováky and Vojany coal-fired plants to carry out field surveys. In October 2024 Slovakia was awarded a grant from the USA's Nuclear Expediting the Energy Transition (NEXT) project for help in selecting a site for the construction of SMRs.

Operable Reactors

2302 MWe

Nuclear Share of Generation



61 %

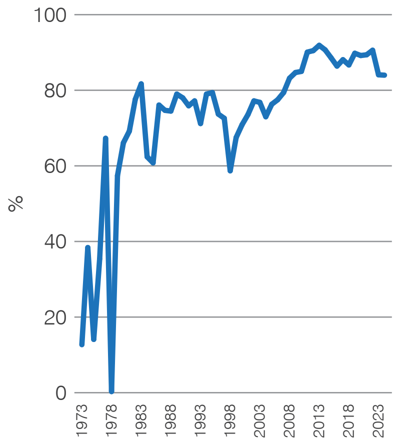
Reactors Under Construction

440 MWe

Lifetime CO_2 Avoided

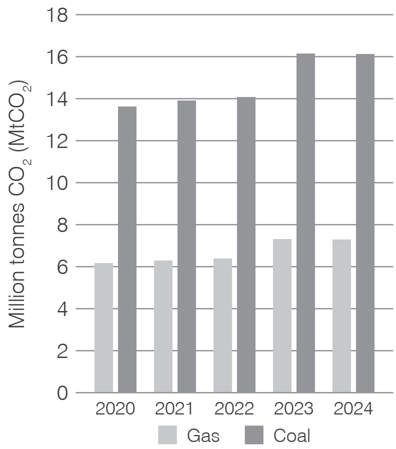
$MtCO_2$ cf. coal

Average nuclear capacity factor



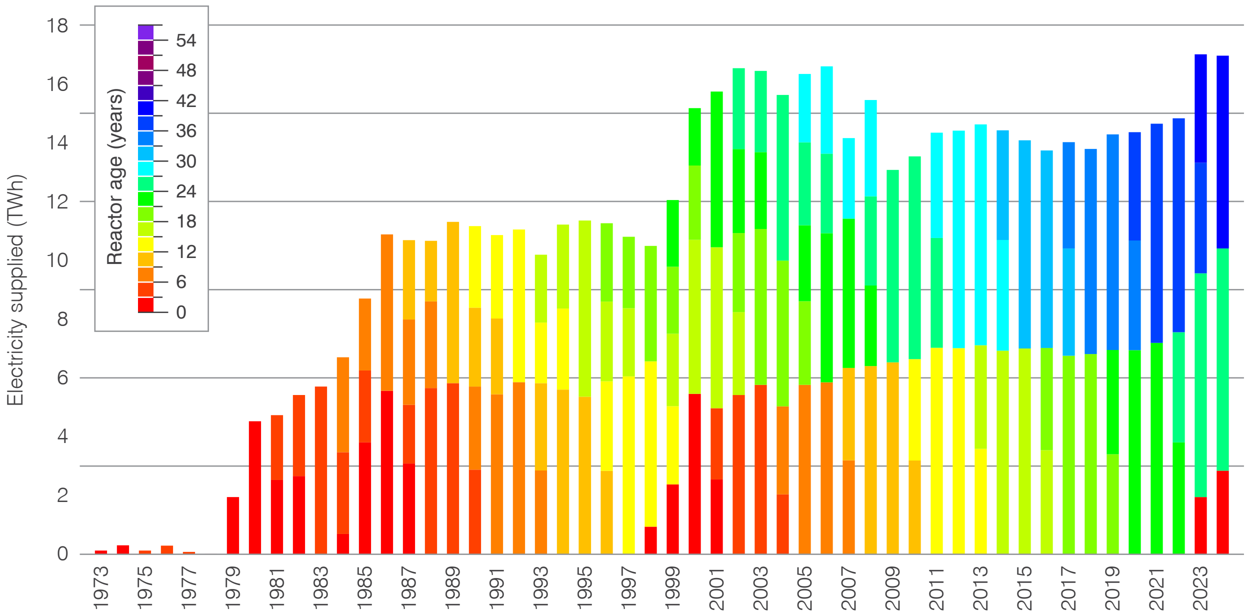
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



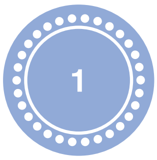
Source: World Nuclear Association, IAEA PRIS

Slovenia

Slovenia has a single reactor operating at Krško, about 40 km northeast of Zagreb. It is a two-loop Westinghouse PWR with a net capacity of 688 MWe. The plant's operating company Nuklearna Elektrarna Krško (NEK) is jointly owned by Slovenian state-owned company GenEnergija and Croatian state-owned company Hrvatska Elektroprivreda (HEP).

Slovenia has plans to build a new nuclear power plant – the JEK2 project – with a capacity of up to 2400 MWe. It is to be sited near the existing plant at Krško. A nationwide referendum on nuclear energy was to take place in November 2024 but was cancelled and may now be staged later in the project process before a final investment decision is made. Westinghouse and EDF began siting and feasibility studies for the project in March 2025. KHNP had been involved in discussions in 2024 but decided not to proceed. Alongside work on the JEK2 project, GEN Energija is studying the deployment of SMRs.

Operable Reactors



696 MWe

Nuclear Share of Generation

35 %

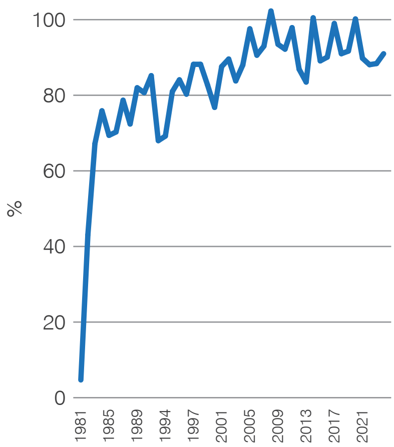
Reactors Under Construction

0 MWe

Lifetime CO_2 Avoided

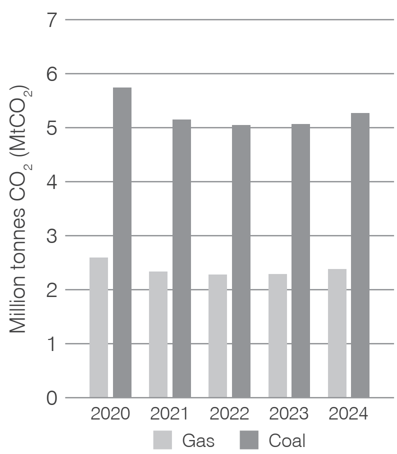
$MtCO_2$ cf. coal

Average nuclear capacity factor



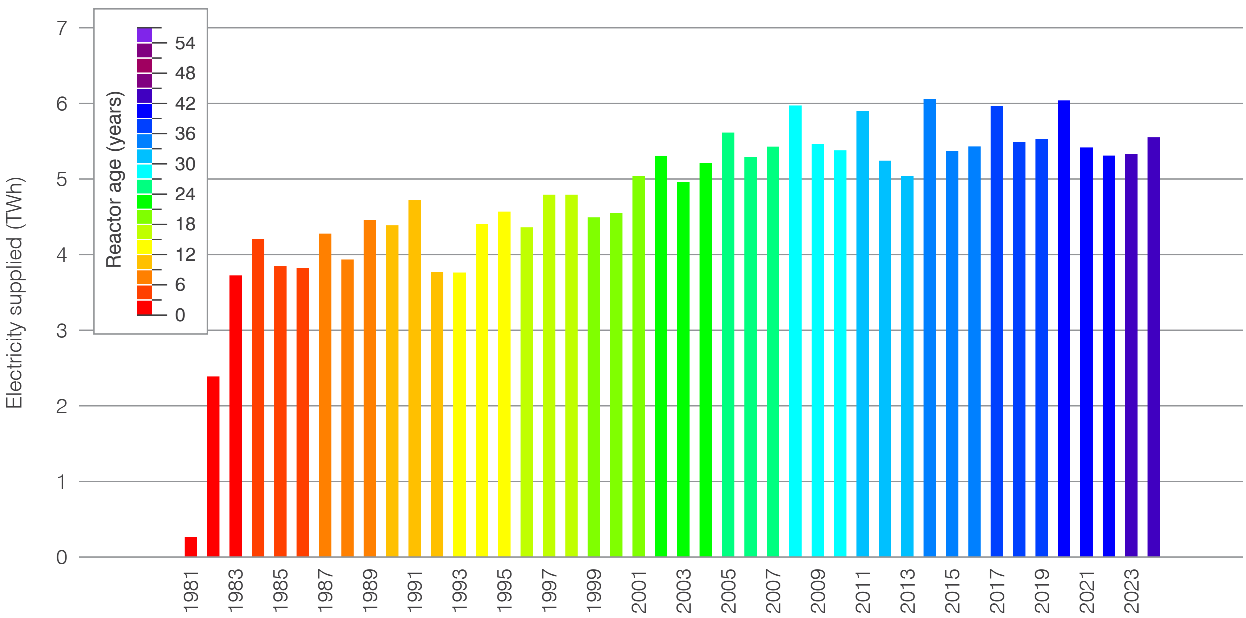
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

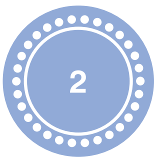
South Africa

South Africa has a single nuclear power plant at Koeberg, 30 km north of Cape Town. The plant's two reactors, connected to the grid in 1984 and 1985, have a combined capacity of 1854 MWe.

Refurbishment of the two units at Koeberg, including the replacement of the reactors' steam generators, began in 2022 and concluded with the return to service of unit 2 in January 2025. The work has extended the operating lifetime of the plant by 20 years.

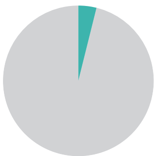
Earlier in December 2023 South Africa's Department of Mineral Resources and Energy (DMRE) said it was proceeding with the procurement of 2500 MWe of new nuclear capacity, but in August 2024 the procurement process was paused. The Minister of Energy and Electricity Kgosientsho Ramokgopa said that the process had come under legal pressure on the grounds that public comments had not been sought and the procedure had not been fair. He emphasized that nuclear remains part of the government's plans for energy security but added that it is "happy" to delay the process "to allow for each and every party in the country that wants to add a voice in how we are going to procure this process … to be given the opportunity to be able to make that submission."

Operable Reactors



1854 MWe

Nuclear Share of Generation



4 %

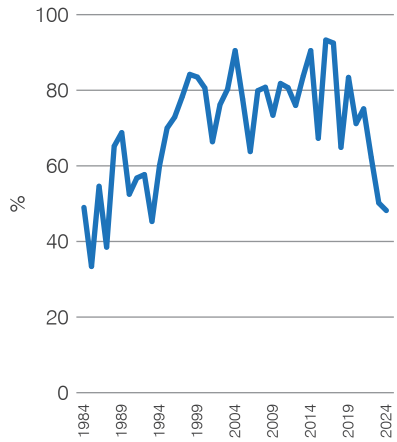
Reactors Under Construction

0 MWe

Lifetime CO_2 Avoided

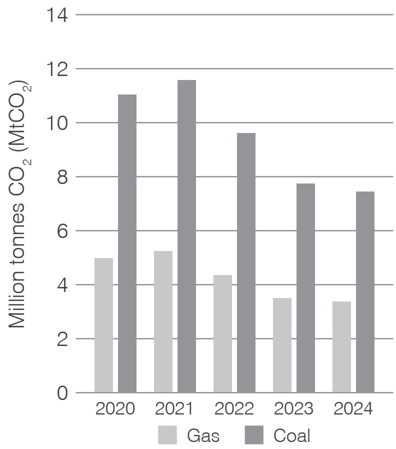
$MtCO_2$ cf. coal

Average nuclear capacity factor



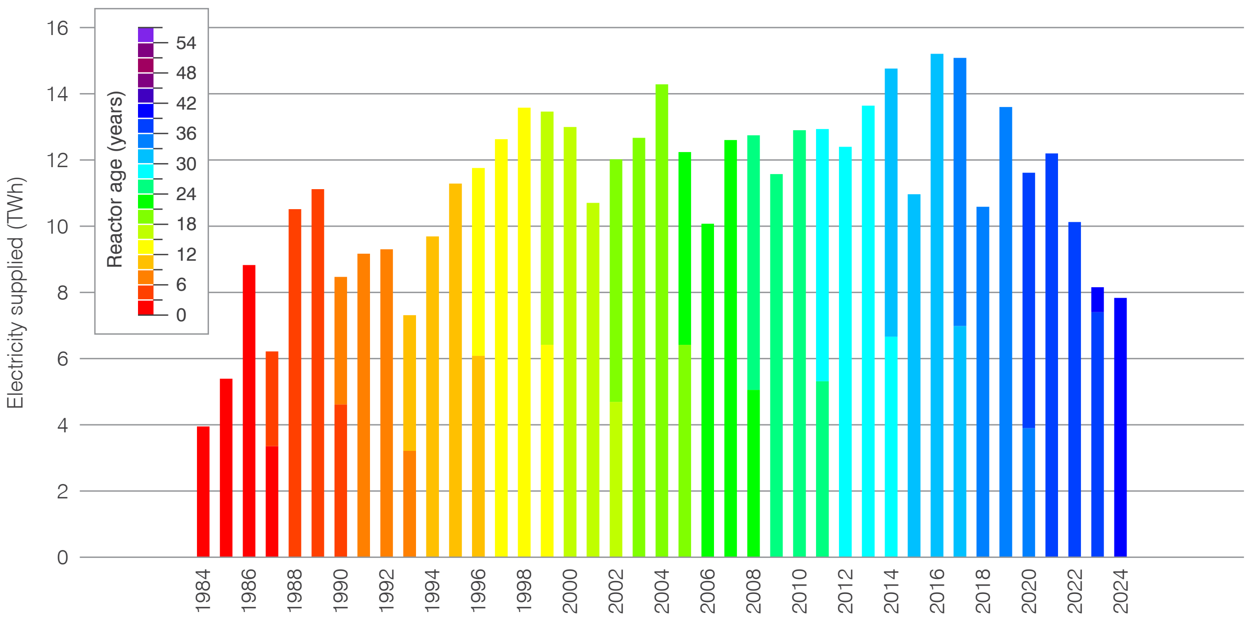
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

South Korea

There are 26 reactors operating in South Korea, providing more than a quarter of the country's electricity. Two APR-1400 units are under construction, with further units planned.

In March 2022 President Yoon Suk-yeol was elected on a platform that rejected his predecessor's nuclear phase-out policy.

In June 2023 the government approved the project implementation plan for Shin Hanul 3&4, allowing Korea Hydro & Nuclear Power (KHNP) to restart preliminary construction. In December 2023 a consortium led by Hyundai Engineering & Construction was selected as the contractor for the construction of the main facilities of the two units. A construction permit was issued in September 2024, and first concrete was poured for unit 3 in May 2025.

In July 2023 it was announced that the country's Ministry of Trade, Industry and Energy would review the need for new nuclear power. The committee noted the "recent mid- to long-term changes in power supply and demand conditions," with the need for growing capacity fuelled by the increase in electric vehicles, expansion of data centres and investment in semi-conductor and battery manufacture. In February 2025 it found that the country would need two new large reactors and 700 MWe of small modular reactor capacity by 2038 – in addition to the large reactors already under construction or planned.

In June 2025 a new president, Lee Jae Myung was elected. He has expressed support for extending the operating lifetimes of existing reactors but is sceptical on the case for new reactors.

Operable Reactors

25,609 MWe

Nuclear Share of Generation

32 %

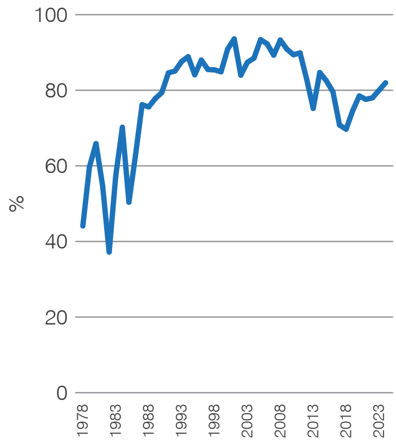
Reactors Under Construction

4020 MWe

Lifetime CO_2 Avoided

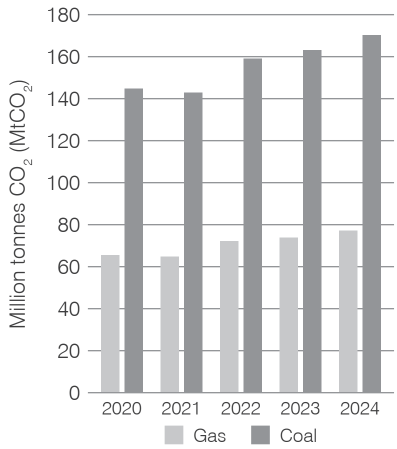
$MtCO_2$ cf. coal

Average nuclear capacity factor



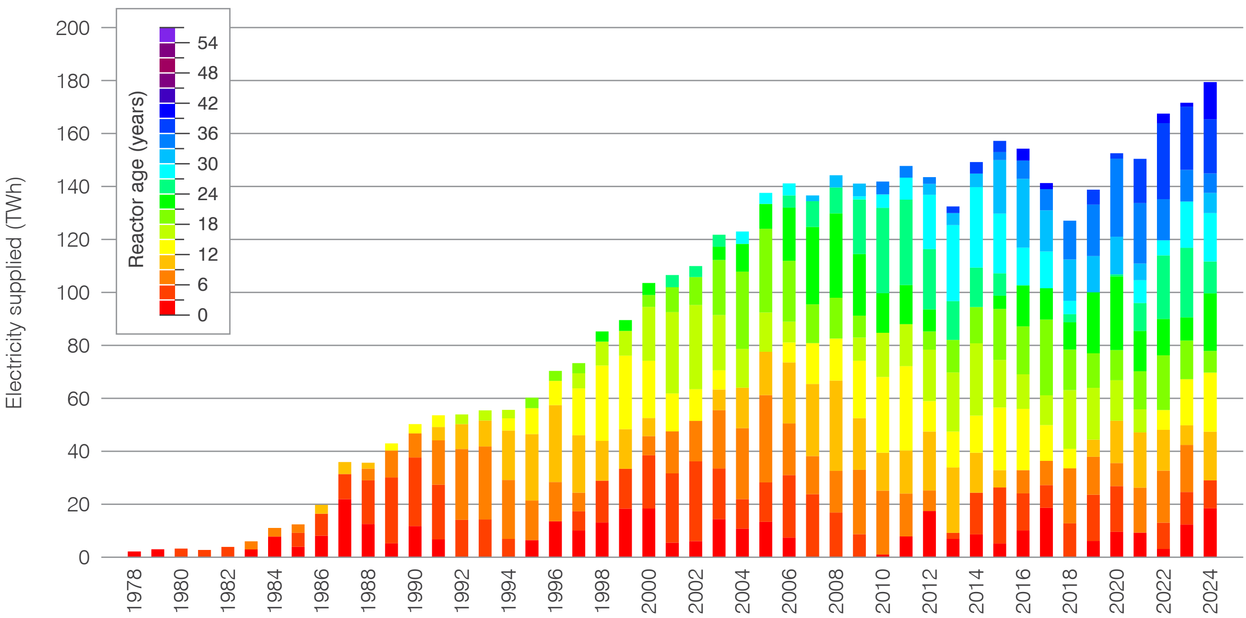
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



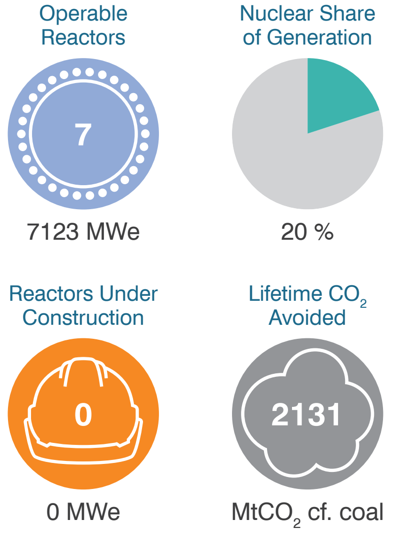
Source: World Nuclear Association, IAEA PRIS

Spain

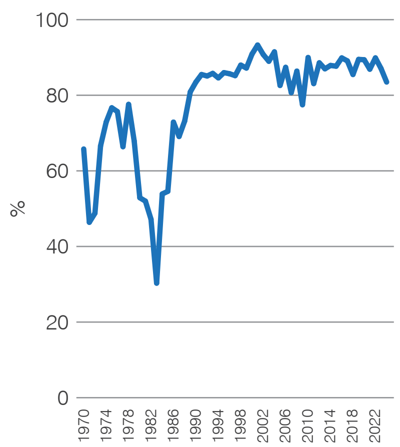
Spain has seven operable nuclear reactors at five sites across the country, all of which started up in the 1980s. With a combined capacity of 7123 MWe, the units generate over 20% of the country's electricity.

Until 2011 it was planned that operation of Spain's reactors would end in the 2020s as operating lifetimes would be limited to 40 years. That restriction was removed, but at the end of 2023 the government confirmed that it would phase out nuclear power between 2027 and 2035.

However, in February 2025 the Spanish Congress approved a proposal, presented by the People's Party, to reverse the phase-out policy. Later that month 32 companies involved in the Spanish nuclear industry, including Empresarios Agrupados-GHESA (EAG), Framatome, GDES, GE Vernova, IDOM and Westinghouse, signed a manifesto calling for the long-term operation of the country's plants.

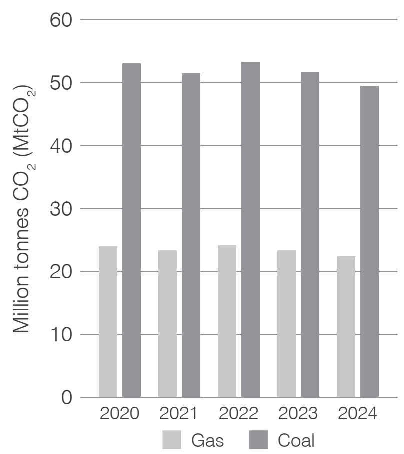


Average nuclear capacity factor



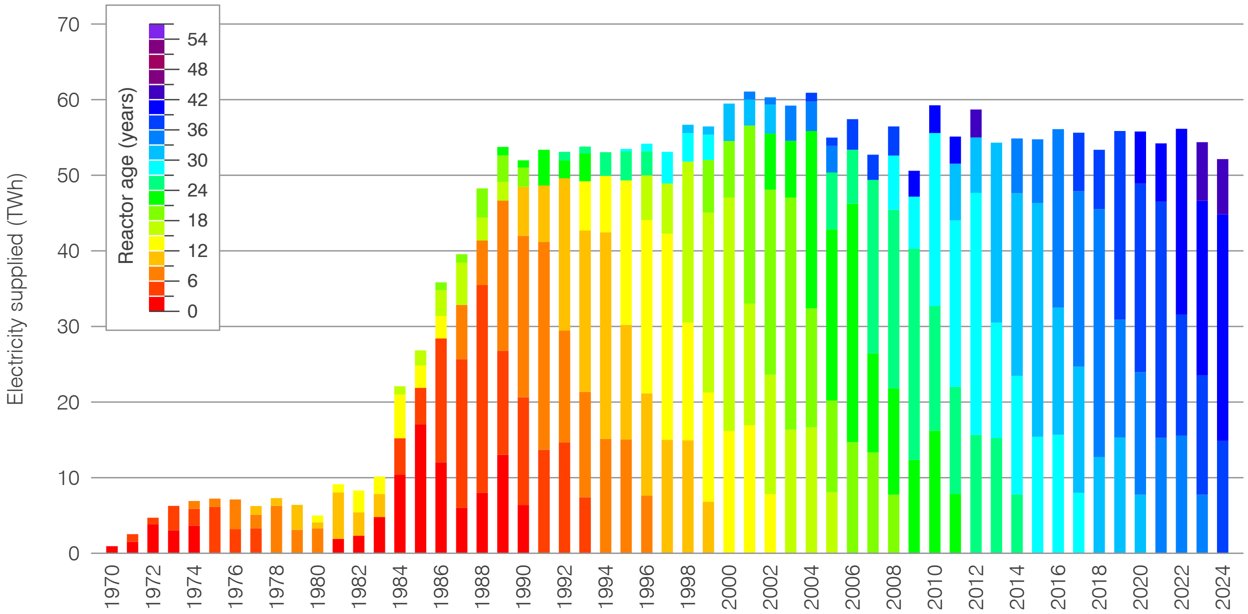
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

Sweden

There are six reactors operating in three locations in Sweden: Ringhals, 50 km south of Gothenburg; Oskarshamm, 220 km south of Stockholm; and Forsmark, 120 km north of Stockholm.

In January 2023 the government announced that it was preparing legislation that would scrap both the country's limit of ten reactors and the requirement to only build new nuclear reactors at locations where they already exist. In November 2023 the government announced plans to construct two large-scale reactors by 2035 and the equivalent of 10 new reactors, including small modular reactors, by 2045.

In August 2024 a Swedish government study into financing and risk sharing models proposed that state aid should be given to companies for investment in new nuclear power. In March 2025 the government proposed providing state loans to finance four new reactors, as well as contract-for-difference arrangements to reduce market risk during routine operation. The proposal was passed by Sweden's parliament in May 2025.

In February 2025 Swedish SMR project development company Kärnfull Next secured land rights for the project to build SMRs in the municipality of Valdemarsvik in Östergötland county. Also in February Kärnfull Next announced feasibility studies would be conducted at two sites in Karlshamn municipality, southern Sweden. The company is working with reactor companies and utilities including GE-Hitachi and Fortum to develop and package ready-to-build projects.

In addition to new build, operating lifetime extensions to 80 years for existing plants are being explored. In September 2024 the owners of the Oskarshamn nuclear power plant began a preliminary study on what measures could be taken to extend the operating lifetime of unit 3 from 60 to 80 years. Separately, the owners of the Forsmark plant have announced they are assessing extending the operating lifetimes of the plant's reactors from 60 to 80 years.

Operable Reactors

7008 MWe

Nuclear Share of Generation

29 %

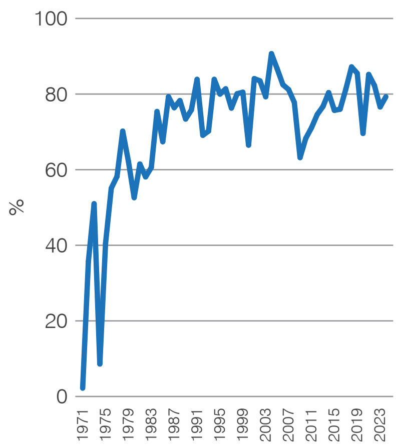
Reactors Under Construction

0 MWe

Lifetime CO_2 Avoided

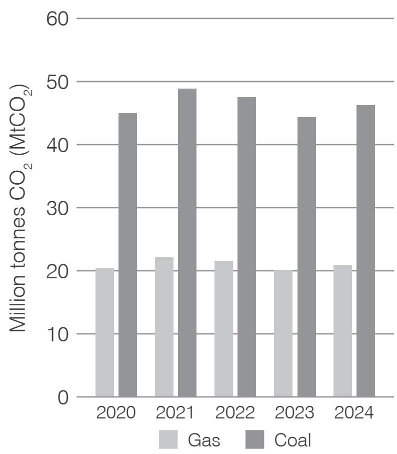
$MtCO_2$ cf. coal

Average nuclear capacity factor



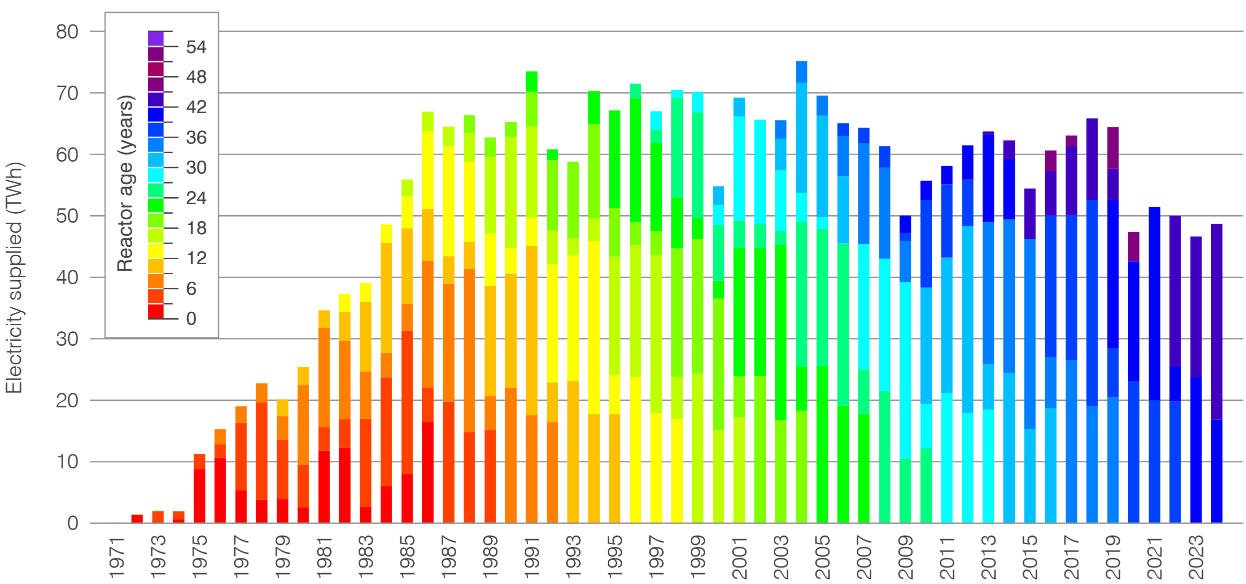
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



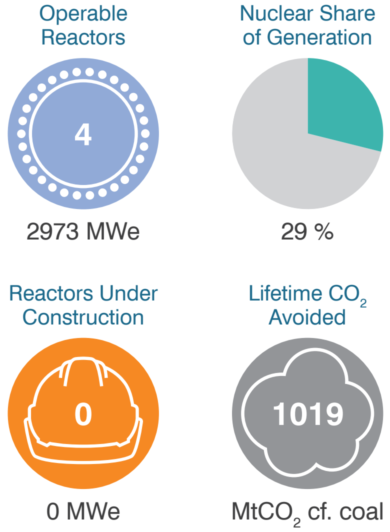
Source: World Nuclear Association, IAEA PRIS

Switzerland

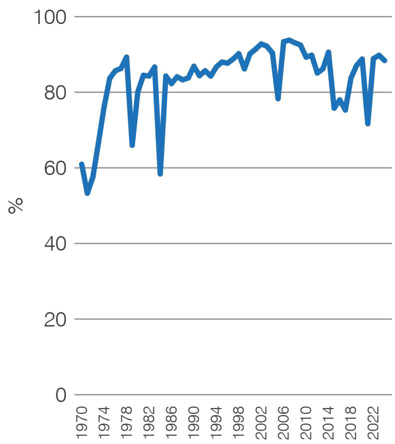
Switzerland has two reactors at Beznau, 30 km southwest of Zurich, one at Gösgen, 40 km southwest of Zurich and one at Leibstadt, 40 km northwest of Zurich. Together they generate up to 40% of the country's electricity.

The country has had a policy of gradual withdrawal of nuclear power, introduced in response to the March 2011 accident at the Fukushima Daiichi plant. No new reactors were to be built, but existing reactors may remain in operation as long as the regulator considered them safe. However, in August 2024 the Swiss government said it would seek to lift the ban, stating that all clean energy sources will be needed to meet expected electricity demand while also meeting climate targets. More than half of the nearly 20,000 respondents to an online poll in September 2024 supported the government's plan.

In December 2024 Axpo announced that it plans to invest CHF 350 million (approximately $390 million) to enable Beznau, the country's oldest nuclear plant, to operate beyond 60 years.

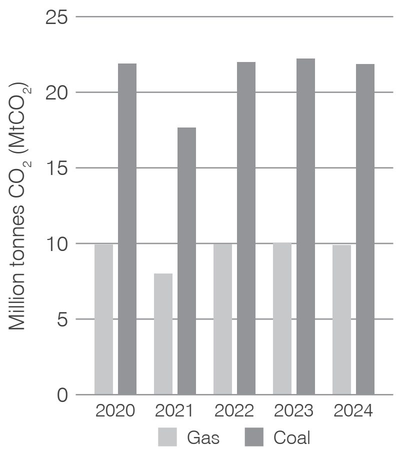


Average nuclear capacity factor



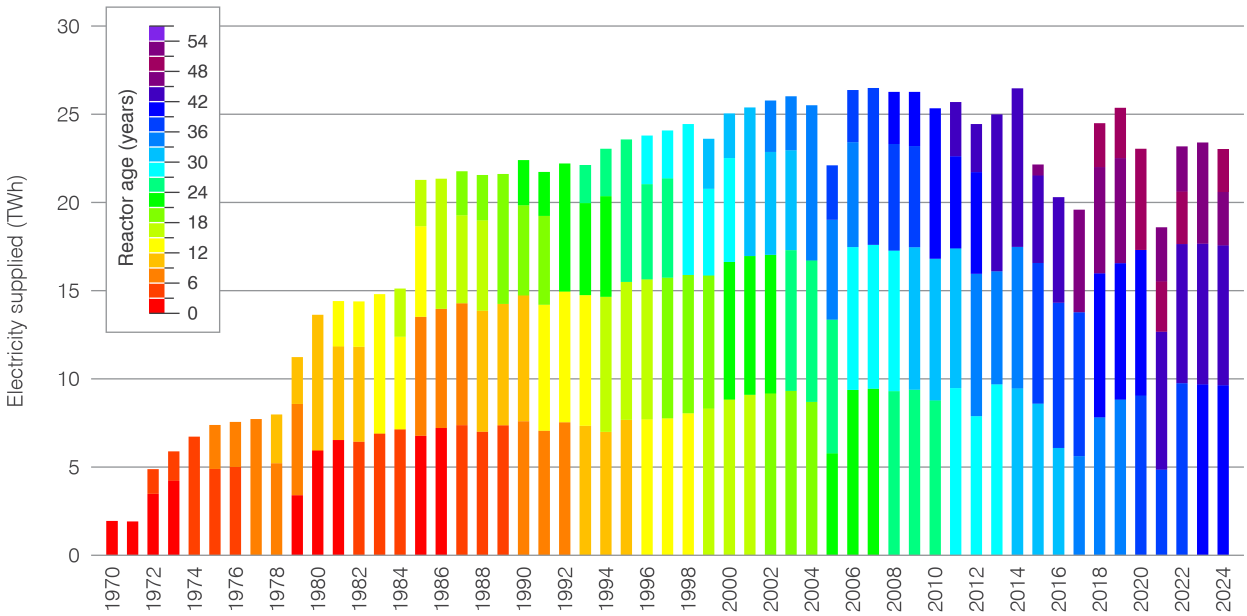
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production

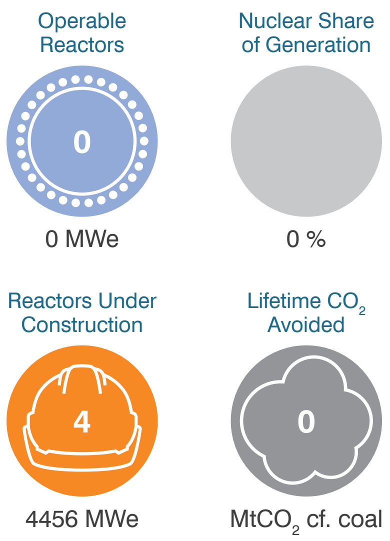


Source: World Nuclear Association, IAEA PRIS

Turkey

The Akkuyu nuclear plant, under construction on Turkey's southern coast, 120 km southwest of Mersin, comprises four 1114 MWe VVER-1200 reactors. Construction of the fourth unit commenced in August 2023, and commissioning work for unit 1 began in April 2024. The four reactors are expected to come online between 2025 and 2028.

Turkey has been in talks with Russia, China and South Korea over its planned second and third nuclear power plants. In comments made in July 2023 Turkey's energy minister said the country is also talking to organizations in the USA and UK regarding small modular reactors (SMRs).



Nuclear electricity production

Ukraine

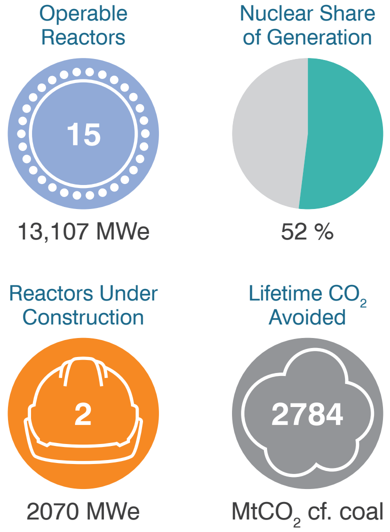
All 15 reactors in Ukraine are VVER units. Rovno and Khmelnitski are in the west of the country, and South Ukraine and Zaporizhzhia in the south.

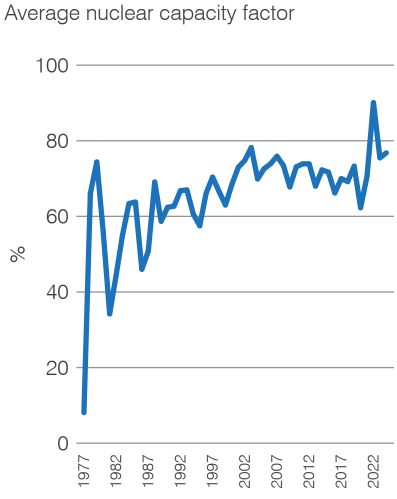
Since January 2023 teams of nuclear safety and security experts from the International Atomic Energy Agency (IAEA) have been stationed at Ukraine's nuclear power plants and the Chernobyl site. All units at Zaporizhzhia – which is occupied by Russian military forces – have not generated electricity since September 2022, and have been in cold shutdown since April 2024.

In June 2024 IAEA Director General Rafael Mariano Grossi said there "was an understanding" that the Zaporizhzhia plant's reactors would not be restarted during the conflict.

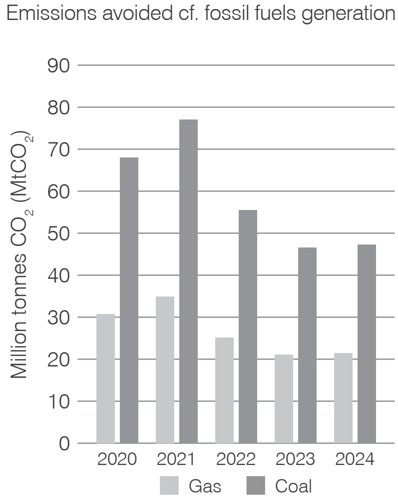
In April 2025 the current director of Zaporizhzhia, Yuriy Chernichuk, said that he expects Russian licences for operation of all units to be obtained by the end of 2027. Ukraine in response said that any talk of restarting the units is a violation of nuclear and radiation safety standards.

Despite the ongoing conflict, Ukraine has taken steps to move forward with plans for new nuclear capacity. In August 2024 Energoatom said it had land transferred to it as part of steps which could lead to a new four-unit nuclear power plant at the Chyhyryn site. In March 2025 Ukraine's president signed a law to facilitate the purchase of equipment from Bulgaria's discontinued Belene project for use in the two part-built units at Khmelnitsky.

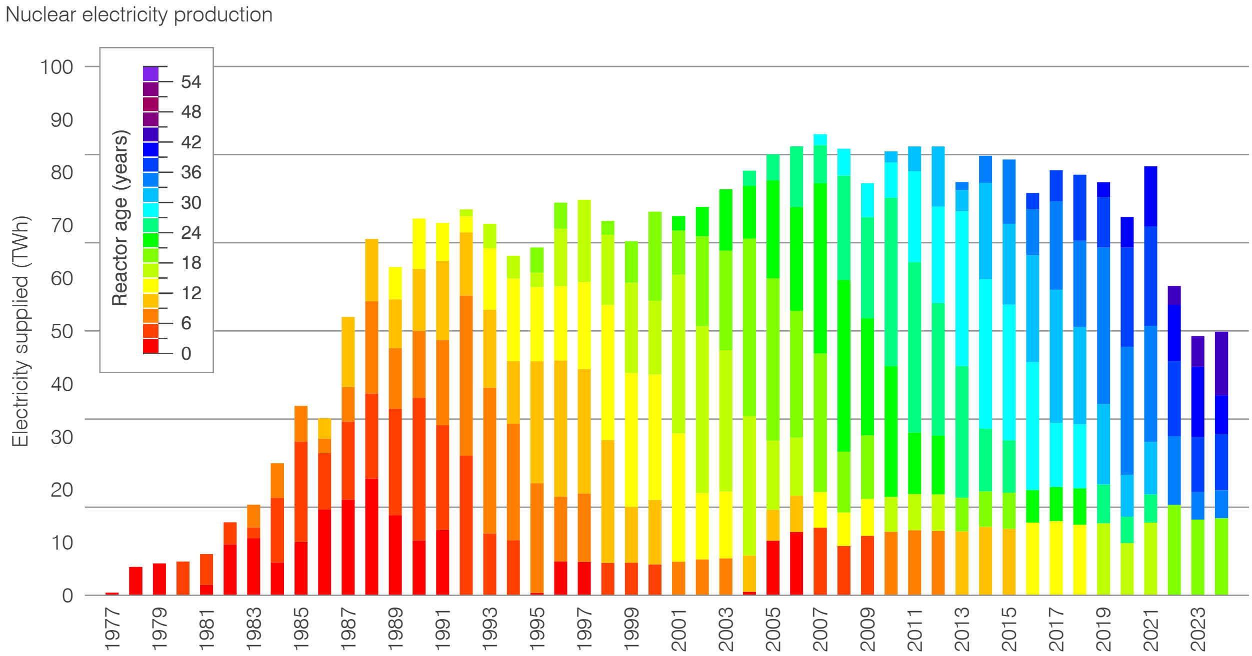




Source: World Nuclear Association, IAEA PRIS



Source: World Nuclear Association, IAEA PRIS



Source: World Nuclear Association, IAEA PRIS

United Arab Emirates

The United Arab Emirates (UAE) has four operable nuclear power reactors at its Barakah nuclear power plant, located 230 km west of Abu Dhabi. It is the first nuclear power plant in the Middle East.

Barakah 1 produced first power in August 2020, followed by unit 2 in September 2021, unit 3 in October 2022 and unit 4 in March 2024. Now fully operational, the four units supply some 20-25% of the UAE’s electricity.

The Barakah One Company PJSC – a joint venture between Emirates Nuclear Energy Corporation (ENEC) and Korea Electric Power Corporation (KEPCO) – completed the AED 8.9 billion ($2.4 billion) refinancing of the project in July 2023.

In November 2024 ENEC and the government-owned diversified energy group ADNOC announced they would evaluate the deployment of advanced nuclear technology to support the UAE's energy diversification strategy and would investigate using excess heat from the Barakah nuclear power plant in ADNOC's oil and gas operations.

Operable Reactors

5348 MWe

Nuclear Share of Generation

22 %

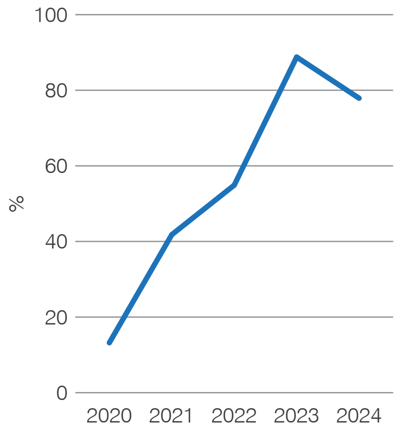
Reactors Under Construction

0 MWe

Lifetime CO_2 Avoided

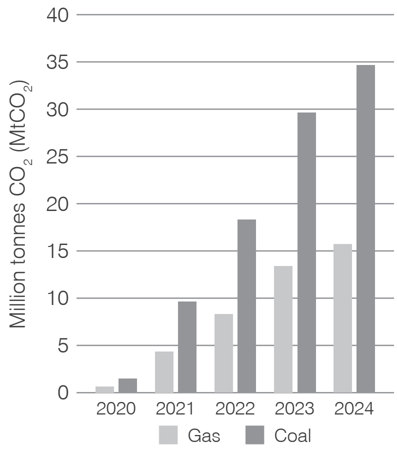
$MtCO_2$ cf. coal

Average nuclear capacity factor



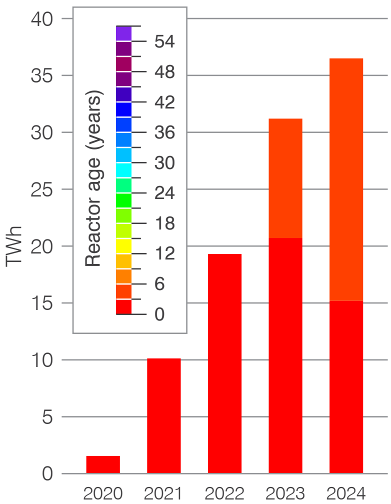
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

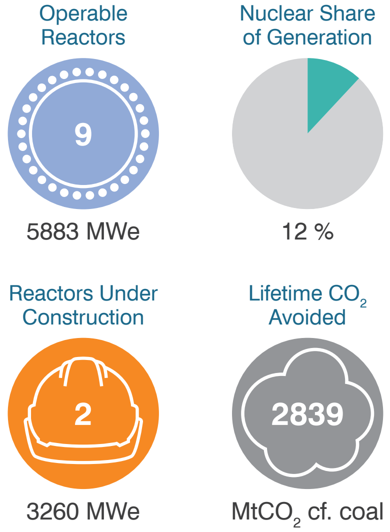
United Kingdom

The UK has nine operable reactors at five sites; eight are advanced gas-cooled reactors (AGRs), with one pressurized water reactor (PWR) at Sizewell. In January 2024 EDF announced it would invest a further £1.3 billion (approximately $1.7 billion) in the UK's operating plants over the following two years and planned to further extend the operating lifetimes of the AGR plants. In December 2024 EDF announced that Heysham I and Hartlepool would operate until March 2027, and Heysham II and Torness would operate until March 2030.

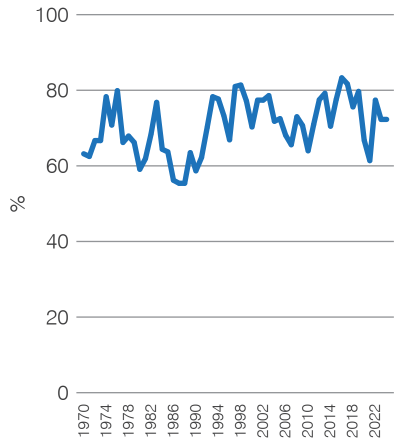
Two EPR units are under construction at Hinkley Point. In January 2024 EDF said that they are now unlikely to be operational before 2030. In the same announcement EDF said the estimated cost of the project had increased to between £31 and 34 billion (in 2015 prices, approximately $47-52 billion) – up from £26 billion ($40 billion), as estimated in 2022. In December 2024 the first reactor vessel was installed.

A second pair of EPR reactors are planned at Sizewell. In June 2025 the UK government committed £14.2 billion (approximately $19.3 billion) towards the project, and in July EDF said it would invest up to GBP 1.1 billion, taking a 12.5% stake. Also, in June 2025 the government announced that following a two-year competition Rolls-Royce SMR had been selected as the preferred bidder to construct the UK's first SMRs.

Earlier in February 2025 the UK government announced plans to reform planning requirements and regulatory rules as part of measures to streamline the process of constructing new nuclear power plants in England and Wales.

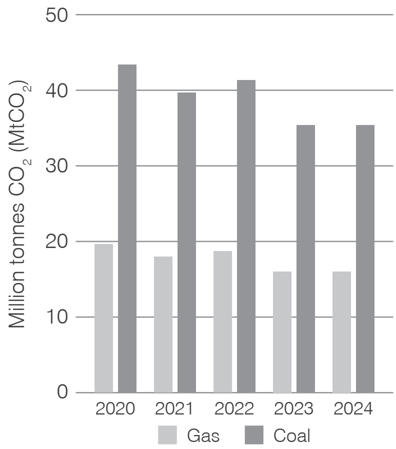


Average nuclear capacity factor



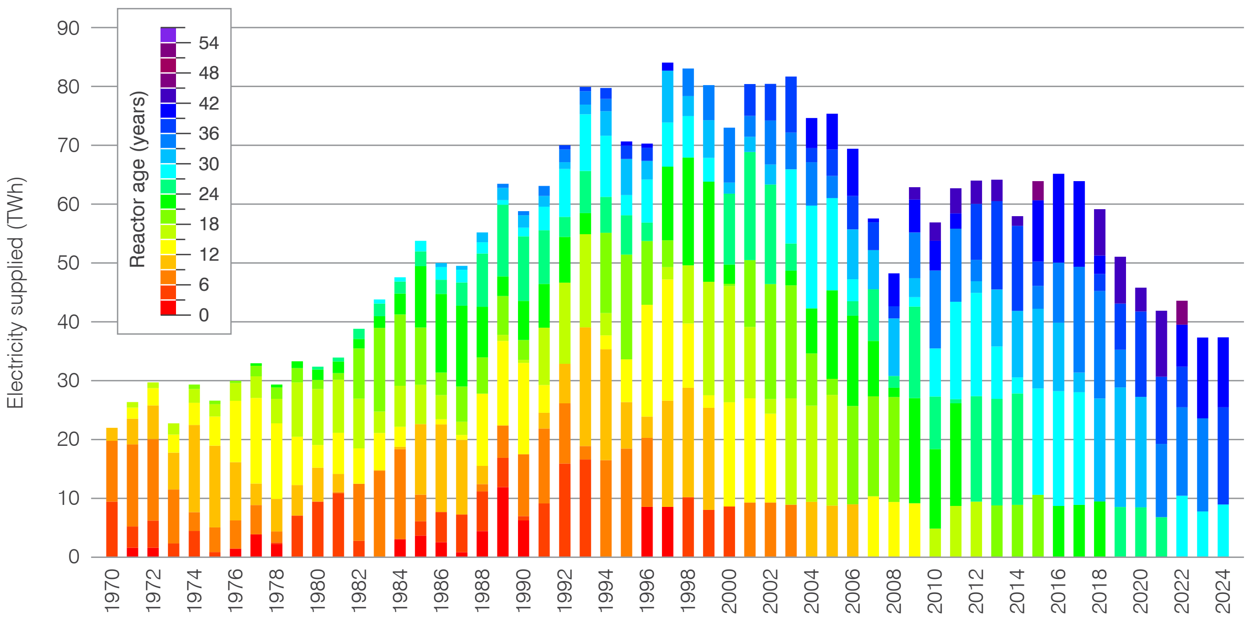
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

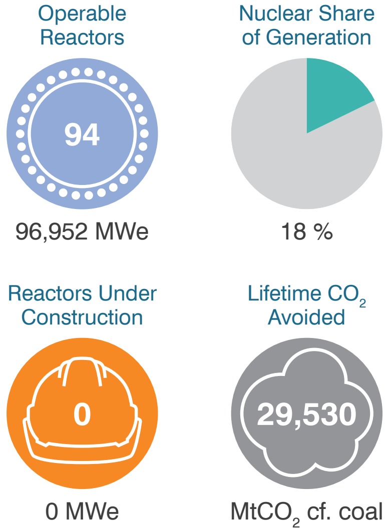
United States of America

The USA has 94 operable reactors with a combined capacity of 97 GWe, the largest nuclear fleet of any single country.

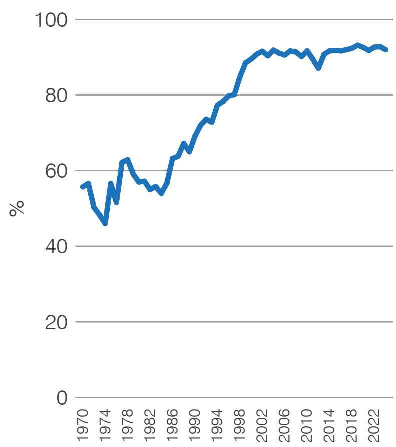
In May 2025 President Donald Trump signed executive orders to increase US nuclear energy capacity to 400 GWe by 2050.

In August 2024 North Anna 1&2 were awarded 20-year subsequent licence renewals, extending their operating lifetimes to 80 years. Other subsequent licence renewals to 80 years of operation were granted in 2025 to: Monticello (in January 2025); Oconee 1-3 (in April 2025); and in July 2025 VC Summer 1 also received a licence to operate for up to 80 years. Earlier in September 2024 the US Nuclear Regulatory Commission (NRC) restored the extended licences for Turkey Point 3&4 (to 2052 and 2053, respectively) following a supplemental environmental review. The NRC had initially approved the extensions in 2019.

Increasing demand for clean and reliable power is driving progress towards the restart of reactors previously shut down. In September 2024 Constellation signed a 20-year power purchase agreement (PPA) with Microsoft that will enable the restart of Three Mile Island 1, five years after it was shut down. In the same month the US Department of Energy finalized a $1.52 billion loan guarantee for Holtec International's project to recommission the single-unit Palisades plant. In June 2025, Meta signed a 20-year PPA with Constellation securing the long-term operation of Clinton 1.

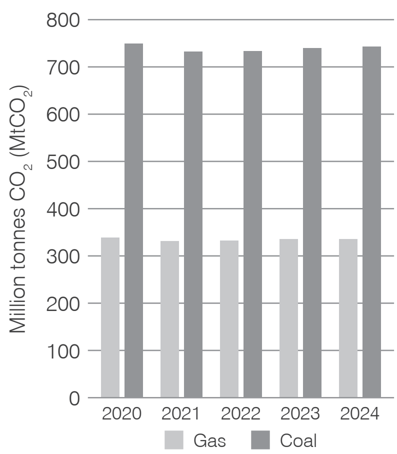


Average nuclear capacity factor



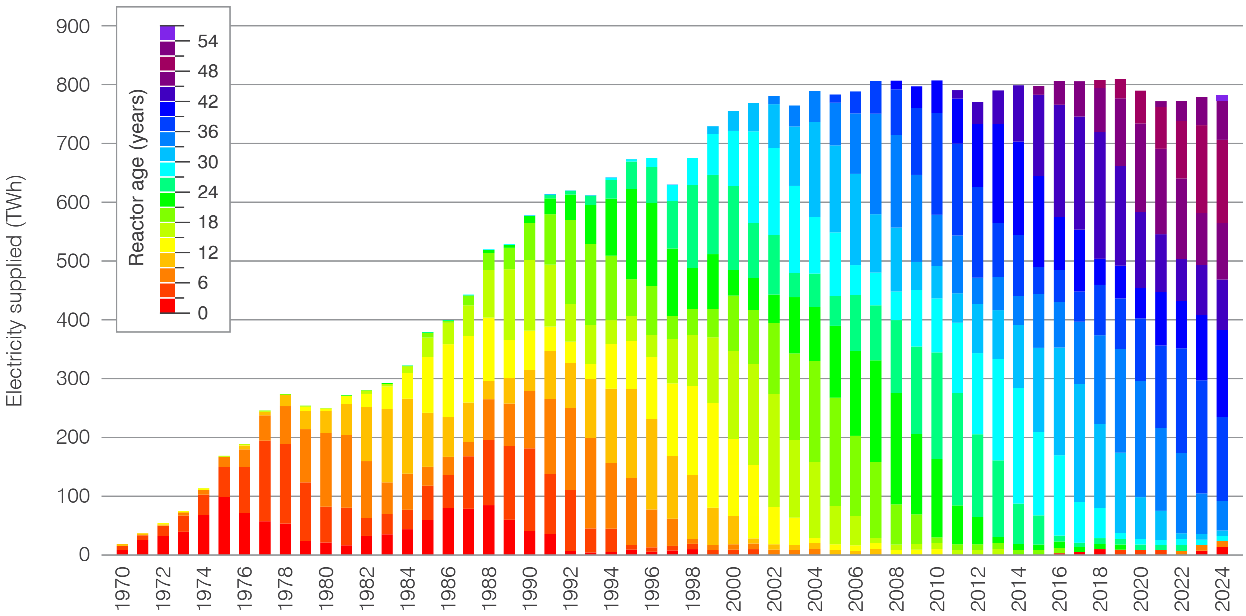
Source: World Nuclear Association, IAEA PRIS

Emissions avoided cf. fossil fuels generation



Source: World Nuclear Association, IAEA PRIS

Nuclear electricity production



Source: World Nuclear Association, IAEA PRIS

4 Nuclear reactor global status

15 August 2025

Grid Connections 1 January - 15 August 2025

	Location	Model	Net Capacity (MWe)	Grid Connection
Rajasthan 7	India	PHWR-700	630	17 March 2025

Construction Starts 1 January - 15 August 2025

	Location	Model	Net Capacity (MWe)	Construction Start
Lufeng 1	China	CAP1000	1161	24 February 2025
Leningrad II-4	Russia	VVER-1200/V-491	1101	20 March 2025
Shidaowan 2	China	Hualong One	1134	8 May 2025
Shin Hanul 3	China	APR-1400	1340	20 May 2025
Taipingling 3	China	Hualong One	1116	10 June 2025
Jinqimen 1	China	Hualong One	1120	10 August 2025

Permanent Shutdowns 1 January - 15 August 2025

	Location	Model	Net Capacity (MWe)	Permanent Shutdown
Doel 1	Belgium	Westinghouse 2-loop	445	14 February 2025
Maanshan 2	Taiwan, China	Westinghouse 3-loop	936	17 May 2025

5 Director General's concluding remarks

Sama Bilbao y León,
Director General
World Nuclear Association

The new record of 2667 TWh generated from nuclear energy in 2024 is a testament to what nuclear power can deliver. However, to meet our global energy and climate goals, it is a record that needs to be broken again and again, every year, by increasingly larger amounts.

There are two actions that would deliver this growth. The first is to maximise the contribution of the existing fleet, achieving high standards of performance and extending operations. The second is rapidly accelerate the pace of new build.

Since 2012, nuclear generation has increased by an average of 25 TWh each year. To double nuclear output by 2050 we will need an average increase of 100 TWh every year, and 200 TWh annually to triple it.

While that may seem daunting, it is not unprecedented. The world saw nuclear generation grow by more than 100 TWh annually throughout much of the 1980s, with a remarkable 213 TWh added in 1985.

To achieve an increase in generation of 200 TWh would require around 28 GWe of new nuclear capacity to be brought online. However, only around 11 GWe per year is expected to come online over the next five years. If we are to fulfil the goals set by 31 governments to triple global nuclear capacity by 2050, we must commence a new era of accelerated nuclear construction.

With the fastest construction times for new reactors currently being around five years, the decisions we make today will shape the world's energy systems of the 2030s and beyond. That is why now is the time for the nuclear industry, governments, the finance community and other major stakeholders to work together to implement expansive new nuclear build programmes.

In March 2025 a new coalition of major energy users – including Amazon, Google, Meta, Dow and Allseas – added their voices to the call to triple nuclear capacity. Their support sends a clear message: the calls for a major expansion of nuclear capacity are coming not just from policymakers and energy-hungry countries, but from the potential customers who wish to take advantage of nuclear's unique offer.

The new record set for nuclear generation marks a rallying point and a call to action. The challenge ahead is immense, but so is the opportunity. With the backing of bold global industry leaders, forward-thinking governments, and an increasingly engaged public, the path to tripling nuclear capacity is not only achievable; it is necessary. This is our chance to build a cleaner, more secure energy future for everyone everywhere, powered by reliable, low-carbon nuclear energy.

Background information

Acknowledgement

World Nuclear Association is grateful to the International Atomic Energy Agency (IAEA) for access to its Power Reactor Information System (PRIS) database, and use of its data in the preparation of this report.

Definition of Capacity Factor

Capacity factors are calculated as the percentage obtained by dividing a reactor's actual electricity output by the output expected if the reactor operated constantly at 100% of its net capacity. When calculating capacity factors, those reactors that do not generate any electricity during the calendar year are not included. For reactors that start-up or shut down during a calendar year the capacity factor for that year is calculated based on the electricity output that would have been generated were they to operate at 100% output for the fraction of the year in which they were in an operable status.

Reactor Statuses

The IAEA PRIS reactor database has a status type – Suspended Operation – differentiated from its Operating status. As of 15 August 2025, this status has been assigned to 19 reactors in Japan, which have not restarted since their outage after the 2011 accident at Fukushima Daiichi. It has also been assigned to four reactors in India: Madras 1, Rajasthan 1, Tarapur 1 and Tarapur 2.

World Nuclear Association uses the Operable status for reactors categorized by IAEA as Suspended Operation or Operable, with the exception of Rajasthan 1, which we consider to be in Permanent Shutdown status.

Ukraine

Performance data for reactors in Ukraine have not been provided to the IAEA PRIS database for 2022, 2023 and 2024. Estimates for output from Ukraine reactors are based on other data sources, principally data published in Energy Institute's 2025 Statistical Review of World Energy.

Abbreviations

BWR	Boiling water reactor
CO_2	Carbon dioxide
FNR	Fast neutron reactor
FOAK	First-of-a-kind
g	gram
GWe	Gigawatt (one billion watts of electric power)
HTGR	High-temperature gas-cooled reactor
IAEA	International Atomic Energy Agency
LWGR	Light water cooled graphite moderated reactor
MWe	Megawatt (one million watts of electric power)
PHWR	Pressurized heavy water reactor
PRIS	Power Reactor Information System database (IAEA)
PWR	Pressurized water reactor
SMR	Small modular reactor
TWh	Terawatt hour (one trillion watt hours of electricity)
VVER	Vodo-Vodyanoi Energetichesky Reaktor (a PWR)

Geographical Categories

Africa
Egypt, South Africa

Asia
Armenia, Bangladesh, China mainland and Taiwan, India, Iran, Japan, Kazakhstan, Pakistan, South Korea, Turkey, United Arab Emirates (UAE)

East Europe & Russia
Belarus, Russia, Ukraine

North America
Canada, Mexico, United States of America (USA)

South America
Argentina, Brazil

West & Central Europe
Belgium, Bulgaria, Czechia, Finland, France, Hungary, Italy, Lithuania, Netherlands, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom (UK)

Further Reading

World Nuclear Association Information Library
https://world-nuclear.org/information-library

World Nuclear Association Reactor Database
https://world-nuclear.org/nuclear-reactor-database/summary

World Nuclear News
https://www.world-nuclear-news.org

International Atomic Energy Agency Power Reactor Information System
https://pris.iaea.org/pris/home.aspx

World Nuclear Association is the industry organization that represents the global nuclear industry. Its mission is to promote a wider understanding of nuclear energy among key international influencers by producing authoritative information, developing common industry positions, and contributing to the energy debate, as well as to pave the way for expanding nuclear business.

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