FACT SHEET

# Uranium's role in global decarbonisation

## Who is Cauldron Energy?

Cauldron Energy Ltd (Cauldron) is an Australian mineral exploration and resource development company listed on the Australian Securities Exchange (ASX:CXU). The company focuses on exploring uranium, a resource that is critical to the nuclear power renaissance occurring globally.

Cauldron's flagship project is the world-class Yanrey Uranium Project located in northern Western Australia (WA), which encompasses three separate uranium deposits – Bennet Well, Manyingee South and Manyingee North. In addition, Cauldron holds several sand tenements in the Onslow region of WA.

Subject to policy change in WA, Cauldron proposes to mine uranium via the in-situ recovery (ISR) mining method at Yanrey.

**For further information, see our factsheet: 'In-situ recovery mining of uranium'.**

## How is uranium used?

Uranium has a wide range of uses. It is used for life-saving medical diagnoses and treatment of illnesses such as cancer. A small component is used for military purposes such as for naval propulsion for nuclear-powered submarines and for nuclear weapons, although Australian uranium cannot be used for military purposes under strict regulations governed by the Australian Safeguards and Non-proliferation Office (ASNO).

**For further information, see our factsheets: 'What is uranium and what is it used for?' and 'Peaceful use of uranium and global safeguards'.**

By far, the largest use of uranium is as fuel for civilian nuclear energy, which:

- Produces large amounts of electricity
- Provides reliable baseload power for countries with growing energy needs
- Has very low greenhouse gas emissions
- Supports global decarbonisation and climate goals.

**1,000 MW**
typical nuclear reactor

›

**500,000 pounds**
(227 tonnes) of $U_3O_8$ (uranium oxide) each year[3]

›

**Up to 1 million homes**
powered with reliable electricity

## How many countries generate nuclear energy?

Nuclear energy is generated in 31 countries, which operate a combined 440 nuclear reactors. These reactors generated about 2,700 terawatt-hours (TWh) of electricity in 2025, setting a new all-time record for global nuclear power generation.[1]

Many more countries use nuclear energy than generate it. Through regional grid connections (especially in Europe), many additional countries consume some nuclear-generated electricity indirectly, even without operating reactors themselves.[2] For example, Germany shut down its last reactors in 2023 but continues to import electricity from countries with large nuclear fleets, such as France and Sweden.

### 31 countries currently generating nuclear energy

1 United States
2 France
3 China
4 Russia
5 United Kingdom
6 South Korea
7 Canada
8 Ukraine
9 Germany
10 Japan
11 India
12 Sweden
13 Spain
14 Belgium
15 Switzerland
16 Pakistan
17 Italy
18 Finland
19 Czech Republic
20 Hungary
21 Belarus
22 Slovakia
23 South Africa
24 Bulgaria
25 Romania
26 Argentina
27 Netherlands
28 United Arab Emirates
29 Brazil
30 Mexico
31 Armenia

1. World Nuclear Association 2025. 'World Nuclear Performance Report'. Accessed November 2026. 2. World Nuclear Association 2026. 'Nuclear Power in the World Today'. Accessed September 2026. 3. World Nuclear Association 2026. 'World Nuclear Power Reactors and Uranium Requirements'. Accessed November 2026.

# Which countries generate the most nuclear energy?

The following countries were the world's five largest producers of nuclear energy in 2024, according to the World Nuclear Association[4]:

| Rank | Country | Nuclear electricity production 2024 (billion kWh) |
|---|---|---|
| 1 | United States | 782.0 |
| 2 | China | 417.5 |
| 3 | France | 364.4 |
| 4 | Russia | 202.1 |
| 5 | South Korea | 179.4 |

## Did you know?



The United States has **94** operating reactors with a combined capacity of **97 GWe**, the largest nuclear fleet of any single country.

It has committed to increase its nuclear capacity to **400 GWe** by 2050.

Today: 97 GWe — 2050: 400 GWe

# Which countries rely most on nuclear energy?

While the United States and China generate the most nuclear energy overall, several smaller countries rely on it for a much larger share of their electricity. These include:

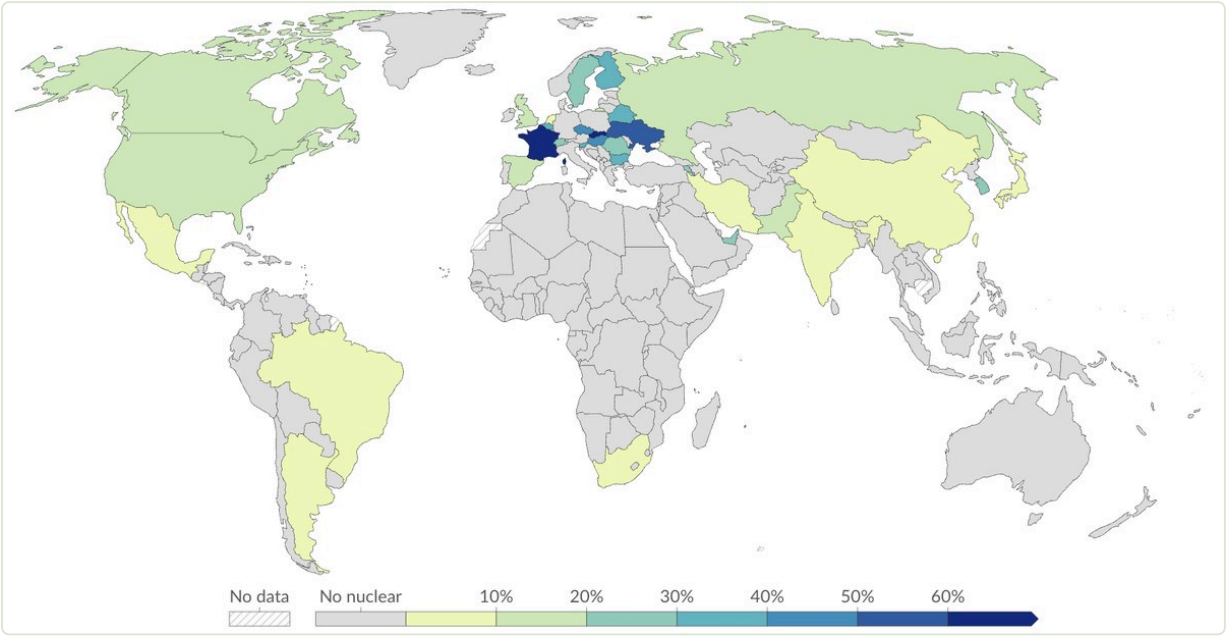
- France: 69% of electricity needs
- Slovakia: 66% of electricity needs
- Ukraine: 56% of electricity needs
- Czech Republic, Hungary, Finland, Slovenia, Bulgaria, Belarus, Belgium: 33–42% of electricity needs.[5]

# How much does nuclear energy contribute to decarbonisation?

Nuclear energy provides about 9% of global electricity generation, making it the second largest source of low-carbon power worldwide, and this contribution is expected to grow.[6]

Since commercial deployment began in the 1960s, nuclear power has avoided an estimated 64 gigatonnes of $CO_2$-equivalent emissions by displacing fossil fuel electricity generation.[7]

> **On average, each tonne of uranium used in nuclear power helps avoid around 30,000 tonnes of $CO_2$ emissions, equivalent to taking approximately 6,500 cars off the road for a year.**




*Share of electricity generation from nuclear (2025) (Source: Our World in Data)*

**4.** World Nuclear Association 2025. 'Nuclear generation by country'. Accessed November 2026. **5.** Our World in Data 2026. 'Share of electricity generation from nuclear 2025'. Accessed August 2026. **6.** World Nuclear Association 2026. 'Reactor Database'. Accessed August 2026. **7.** Kharecha, P.A. & Hansen, J.E. 2013. 'Prevented Mortality and Greenhouse Gas Emissions from Historical and Projected Nuclear Power'. Environmental Science & Technology, 47(9), 4889–4895.

# Is nuclear energy demand rising?

**Yes – sharply!**

Nuclear energy is undergoing a global resurgence driven by:

- Decarbonisation and net zero targets
- Growing electricity demand and the transition away from fossil fuels
- Rising energy demand driven by artificial intelligence and data centres
- Energy security
- Grid reliability
- Policy shifts and renewed government support.

## Decarbonisation and net zero targets

Countries around the world have set formal decarbonisation targets that require a rapid shift away from fossil fuels and a massive expansion of clean electricity. More than 130 countries have adopted net zero commitments, covering over 90% of global gross domestic product (GDP).[8]

These targets are embedded in national legislation, climate strategies, and investment frameworks across Europe, North America, Asia and the Middle East.

The European Union, United Kingdom, Canada, Japan, South Korea and Australia have all legislated net zero pathways, while China aims for carbon neutrality by 2060 and India targets net zero by 2070.[9]



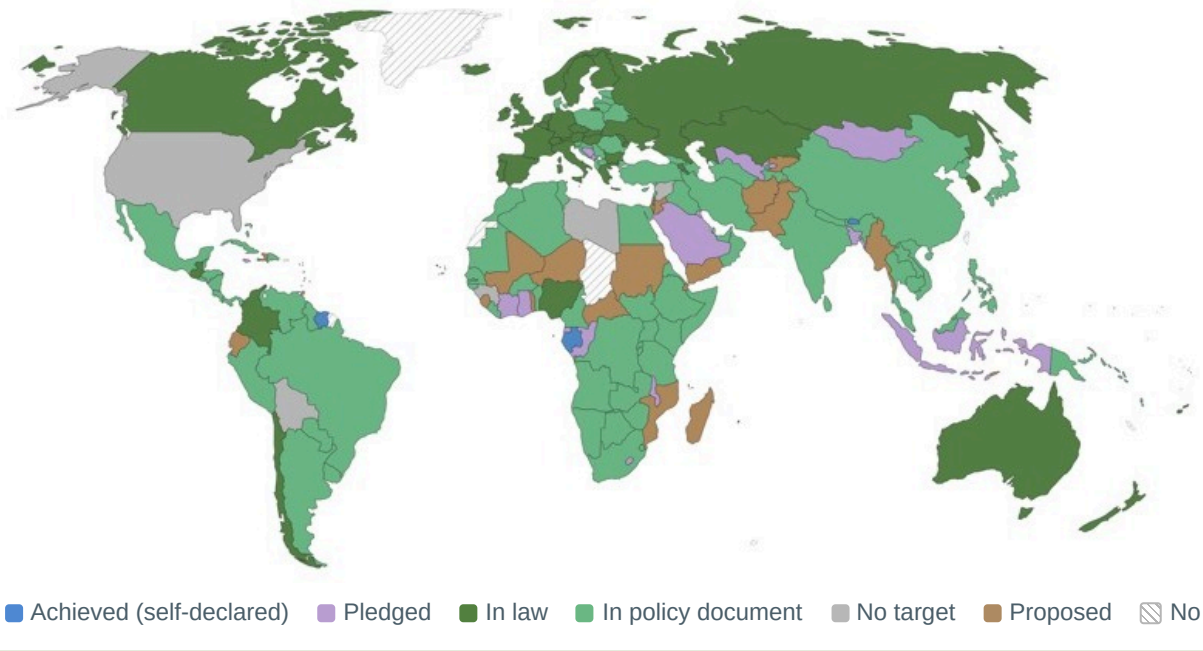
**'Without nuclear energy, it will be almost impossible to decarbonise by 2050' – Rafael Mariano Grossi, Director General, International Atomic Energy Agency.[10]**

## Growing electricity demand and the transition away from fossil fuels

Electrification of homes, transport, businesses and industry is driving unprecedented electricity demand.

Combined with the shift away from fossil fuels, this could increase global electricity demand by 50 to 100% by 2050. This would require the world to build an entire second electricity system on top of the one we already have – a scale of expansion not seen since the post-war industrial boom. This is exactly why zero-emissions baseload sources like nuclear become strategically essential.[11]

### Status of net-zero carbon emissions targets




*Data source: Net Zero Tracker (2026). Chart: Our World in Data (CC BY). Includes net-zero targets and other emissions-reduction targets, not strictly net-zero.*

**8.** International Energy Agency 2026. 'State of Energy Policy 2026'. Accessed September 2026. **9.** Our World in Data 2026. 'Status of net-zero carbon emissions targets'. Accessed September 2026. **10.** United Nations 2026. 'Without nuclear energy, it will be almost impossible to decarbonise by 2050, UN atomic energy chief'. Accessed November 2026. **11.** BloombergNEF 2026. 'New Energy Outlook 2025'. Accessed September 2026.

## Rising energy demand driven by artificial intelligence and data centres

Artificial intelligence (AI) and data centres are creating unprecedented demand for electricity. The International Energy Agency (IEA) projects that global data centre electricity consumption will more than double by 2030. As countries seek to meet this demand while reducing emissions, reliable sources of low-carbon electricity are becoming increasingly important.

The scale of anticipated growth is significant. There are already more than 11,700 data centres worldwide, with the United States hosting almost half of them. Industry estimates suggest the world may need to add around 150 gigawatts (GW) of new data centre capacity over the next decade, requiring the construction of hundreds of new large-scale facilities.

Unlike many other electricity users, AI data centres require a continuous, around-the-clock power supply. As a result, major technology companies including Microsoft, Google, Amazon and Meta have announced investments and agreements linked to nuclear energy. Collectively, these companies have contracted or committed to almost 10 GW of nuclear generating capacity, reflecting growing recognition of nuclear energy's role in supporting the digital economy while maintaining low greenhouse gas emissions.[12, 13, 14]

> **AI users now generate more than 2.5 billion prompts every day, driving rapid growth in the digital infrastructure and electricity needed to support AI.**

PITT STREET RESEARCH

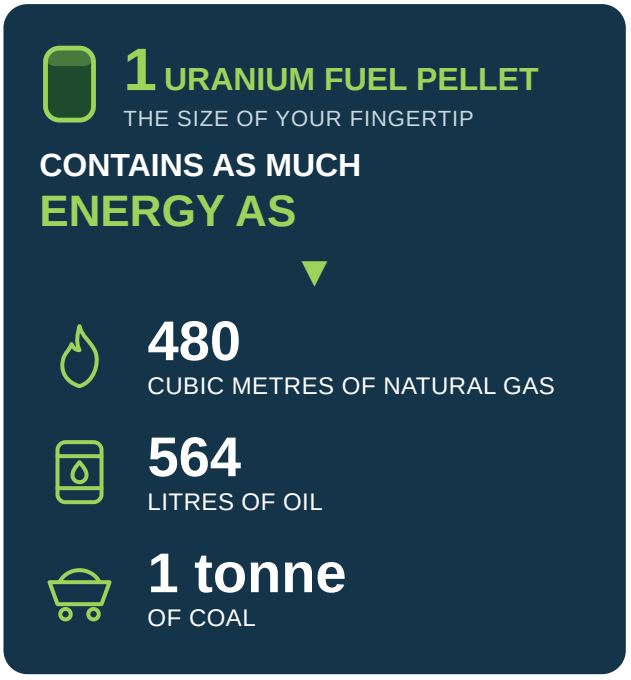
**For further information, see Feeding the Machines: Uranium in the Age of AI | Pitt Street Research | 27 August 2026. Or listen to a summary of the report on Spotify.**

## Energy security

Geopolitical instability has made secure, energy-dense and long-term storable fuels like uranium strategically important.

Oil and gas supply is routinely disrupted by tensions in the Middle East, including risks to tanker traffic through the Strait of Hormuz, where around 20% of globally traded oil passes through a narrow maritime chokepoint. Russia's weaponisation of gas exports to Europe in 2022 caused energy prices to surge and forced several countries to restart coal-fired generation.[15, 16, 17, 18]

Unlike oil and gas, which require continuous delivery through pipelines, ports and shipping routes, nuclear power plants can maintain years of fuel inventory on-site. The energy density of uranium is exceptionally high, with a single uranium fuel pellet (about the size of a fingertip) containing as much energy as approximately one tonne of coal, 564 litres of oil or 480 cubic metres of natural gas.[19, 20]




This extraordinary energy density enables large quantities of fuel to be stored securely in a very small physical footprint, supporting long-term fuel security and strengthening resilience against supply disruptions and geopolitical instability.

> **Nuclear fuel can be stored for many years on-site, providing a strategic energy reserve that is difficult to replicate with fossil fuels.**


**12.** International Energy Agency 2026. 'Data centre electricity use surged in 2025, even with tightening bottlenecks driving a scramble for solutions'. Accessed November 2026. **13.** International Atomic Energy Agency 2026. 'Data centres, artificial intelligence and crypto currencies eye advanced nuclear to meet growing power needs'. Accessed November 2026. **14.** Stocks Down Under 2026. 'Feeding the Machines: Uranium in the Age of AI'. Accessed November 2026. **15.** International Energy Agency 2026. 'Strait of Hormuz Factsheet'. Accessed November 2026. **16.** United States Energy Information Administration 2025. 'Amid regional conflict, the Strait of Hormuz remains a critical oil chokepoint'. Accessed November 2026. **17.** European Commission 2023. 'New reports highlight 3rd quarter impact of gas supply cuts'. Accessed November 2026. **18.** International Energy Agency 2022. 'World Energy Outlook 2022'. Accessed November 2026. **19.** World Nuclear Association 2026. 'How is uranium made into nuclear fuel?'. Accessed November 2026. **20.** Krško Nuclear Power Plant 2026. 'High energy density of uranium is one of the key advantages of nuclear energy'. Accessed November 2026.

## Grid reliability

Nuclear energy also plays an important role in electricity system reliability. Unlike weather-dependent generation sources, nuclear power plants operate continuously and can provide electricity around the clock regardless of weather conditions. Modern nuclear power plants typically achieve capacity factors above 90%, making them among the most reliable sources of electricity generation in the world. The average United States nuclear reactor produces electricity more than 92% of the time, significantly higher than coal, gas, wind or solar generation. Utility-scale wind generation in the United States typically operates at around 34% capacity factor and solar at around 24%.[21, 22]

The IEA has noted that growing electrification, increasing reliance on electricity and more frequent extreme weather events are heightening the need for secure and resilient power systems. As countries transition away from fossil fuels, maintaining a stable supply of reliable electricity is becoming a central energy policy challenge.[23]

The International Atomic Energy Agency (IAEA) similarly recognises that nuclear power can contribute to the reliability and resilience of electricity grids, particularly as electricity demand grows and energy systems become increasingly dependent on low-carbon generation sources.[24]

## Policy shifts and renewed government support

Nuclear is now formally recognised as a 'green' or sustainable energy source in the European Union, United Kingdom, United States, Canada and other jurisdictions. Importantly:

- The European Union added nuclear to its 'Sustainable Finance Taxonomy' in 2022
- The United Kingdom included nuclear in its 'Green Financing Framework' in 2025
- The United States provides clean energy production tax credits for nuclear under its *Inflation Reduction Act 2022*
- The Green Party of England and Wales voted in 2026 to end its longstanding opposition to nuclear power, recognising nuclear fission as a low-carbon technology with a potential role in the transition to a net zero energy system.[25]

This policy alignment is unlocking hundreds of billions of dollars in investment and enabling nuclear to play a central role in global decarbonisation strategies.

> Taiwan shut down its last operating nuclear reactor at the Maanshan Nuclear Power Plant in May 2025 as part of its long-standing nuclear phase-out policy. However, within a year, the Taiwanese Government had begun the process of assessing reactor restarts, and in 2026 Taiwan's Nuclear Safety Commission completed its review of plans to restart Maanshan. The policy shift reflects growing concerns about energy security, rising electricity demand from advanced industries, and the challenge of maintaining reliable low-carbon power supplies.



*Maanshan Nuclear Power Plant, Taiwan (Source: Taipower)*

# Global response to increased demand for low carbon electricity

- **Record generation**: nuclear electricity production reached 2,700 TWh in 2025, the highest ever recorded. Nuclear energy currently avoids about 1.3 gigatonnes (Gt) of $CO_2$ every year.[26, 27]
- **Large construction pipeline**: 79 new reactors (representing 78 GW of new nuclear capacity) are currently under construction across 15 countries, one of the largest build programs in 30 years.[28]
- **Global pledge to triple nuclear**: 38 countries have signed the 'Triple Nuclear Pledge' launched at COP28 to triple nuclear energy capacity by 2050, confirming nuclear's central role in global climate strategy.[29]

**21.** United States Department of Energy 2021. 'Nuclear power is the most reliable energy source and it's not even close'. Accessed November 2026. **22.** Duke Energy Nuclear Information Centre 2021. 'Capacity factor – it's a measure of reliability'. Accessed November 2026. **23.** International Energy Agency 2025. 'Reliability. The new era of electricity has heightened the need for secure and resilient power systems'. Accessed November 2026. **24.** International Atomic Energy Agency 2025. 'Reliability and resilience of the electrical grid for and with nuclear power plants'. Accessed November 2026. **25.** The Guardian 2026. 'Green party drops longstanding opposition to nuclear power'. Accessed November 2026. **26.** World Nuclear Association 2026. 'Reactor Database'. Accessed August 2026. **27.** World Nuclear Association 2026. 'World Nuclear Performance Report 2025'. Accessed September 2026. **28.** World Nuclear Association 2026. 'World Nuclear Performance Report 2025'. Accessed September 2026. **29.** ForoNuclear 2026. '38 countries support the goal to triple global nuclear energy by 2050'. Accessed September 2026.

Nuclear energy currently avoids

**1.3 Gt $CO_2$**

every year

This is more than Japan's annual emissions of about 1.1 Gt.

This is equivalent to removing

**300 million**

petrol cars from the road

Roughly the entire car fleet of the United States, European Union and India combined.

**2,700 TWh**

produced annually

Nuclear is already one of the world's largest sources of clean electricity – more than all global wind generation in 2023.

Sources: Global Carbon Project (2023); IEA (2023); WEO (2022); EPA; European Environment Agency; Government of India.




*Triple Nuclear Pledge at COP28, United Arab Emirates, 2023*

## How is growth in the nuclear industry achieved?

Growth in nuclear energy is driven through a combination of extending and enhancing existing reactors, bringing dormant capacity back online, and deploying new technologies.

1. **Life extensions of existing reactors**
   Many nuclear power plants are operating well beyond their original design life. While reactors were typically licensed for 40 years, many have been extended to 60 years, some are licensed to operate for up to 80 years, and research is underway to support safe operation for as long as 100 years, providing decades of additional low-carbon electricity from existing assets.

2. **Restarting idled reactors**
   Countries are returning previously shut down or long-idled reactors to service where safety, economics and energy security objectives support their restart. This approach can add substantial generation capacity more quickly than building entirely new facilities.

3. **Power uprates**
   Utilities can increase the output of existing reactors through equipment upgrades, modernisation and operational improvements. Power uprates provide additional electricity from existing infrastructure without requiring new reactor construction.

4. **New large-scale reactor construction**
   Significant growth is occurring through the construction of new reactors, particularly in countries such as China and India, which are expanding nuclear generation to support rising electricity demand, economic growth and decarbonisation goals.

5. **Advanced reactors, small modular reactors (SMRs) and microreactors**
   Next-generation nuclear technologies are being developed for a wider range of applications. These include SMRs and microreactors, which can provide flexible, scalable energy solutions for electricity generation, industrial processes, mining operations, remote communities and hydrogen production.

**Reactor operating life**

| | |
|---|---|
| Typically licensed for | **40 years** |
| Many have been extended to | **60 years** |
| **Some are licensed to operate for** | **up to 80 years** |
| Research is underway to support safe operation for as long as | **100 years** |

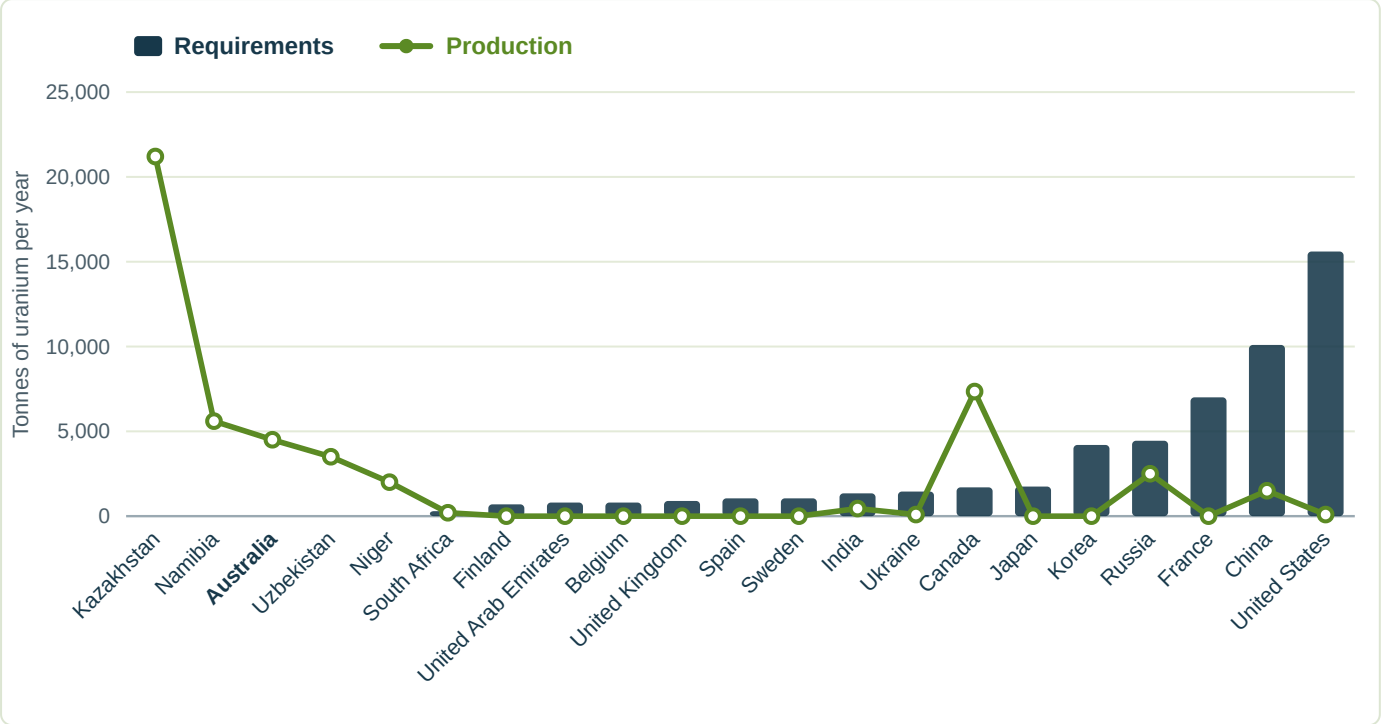
# Growing uranium demand

The rapid expansion of nuclear power has significant implications for uranium demand. As countries build new reactors, extend the operating lives of existing facilities and pursue commitments such as the COP28 pledge to triple global nuclear capacity by 2050, uranium requirements are expected to increase substantially over coming decades.

At the same time, existing uranium production sources are expected to face depletion and declining output, while secondary supplies, stockpiles and recycled material are expected to play a diminishing role in meeting long-term demand. Industry forecasts indicate that future uranium requirements are likely to exceed currently committed mine supply, creating a need for new uranium projects and investment across multiple jurisdictions.

This emerging supply gap highlights the importance of developing new, responsibly managed uranium mines capable of supporting global decarbonisation objectives and energy security needs. Regions with significant uranium resources are well positioned to contribute to future supply.

> **Industry forecasts indicate that additional uranium production will be required to meet projected long-term demand.**




*Uranium production versus reactor requirements by country. Approximate values, redrawn from Uranium 2024: Resources, Production and Demand (Red Book 2024), OECD Nuclear Energy Agency (NEA) and International Atomic Energy Agency (IAEA).*

Many of the world's largest nuclear energy producers rely on uranium imported from a relatively small number of uranium-producing countries, highlighting the strategic importance of secure uranium supply chains.




*Tom Koutsantonis, Global Uranium Conference, Adelaide, October 2025*

> **"This is the industry that will lead the decarbonisation charge. This is the industry that will decarbonise energy."**

**Tom Koutsantonis**, South Australian Treasurer and Minister for Energy and Mining, speaking about uranium mining[30]

**30.** Cauldron Energy 2026. 'Supplementary Submission to the Economics and Industry Standing Committee: Inquiry into the role of Western Australia in the global effort on decarbonisation', Section 7.1. Accessed November 2026.

# Western Australia's role in uranium supply and global decarbonisation

Western Australia can play a pivotal role in global decarbonisation. The State has large, shallow sandstone-hosted uranium deposits capable of supplying fuel for zero-emissions nuclear power as nations commit to tripling nuclear capacity by 2050.

Western Australia already supports the clean-energy transition through iron ore, critical minerals and renewable resources. Allowing uranium mining would extend this leadership by enabling WA to export a stable, carbon-free fuel essential for decarbonising heavy industry, data centres and global electricity systems.

Modern uranium mining projects can be developed with small footprints, low water use and strong environmental safeguards. With appropriate regulation, WA can supply responsibly sourced uranium that meets the highest international standards, supporting global climate goals while creating regional jobs and investment.



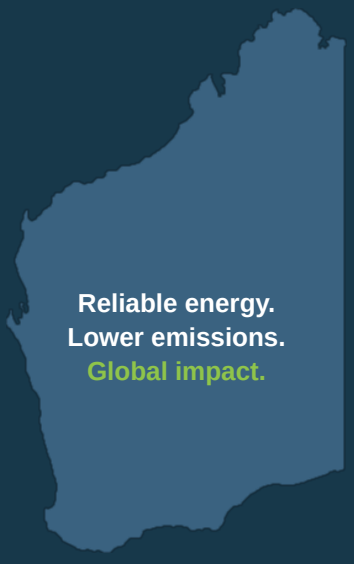
*Exploration drilling, Yanrey Uranium Project, Western Australia*

**Mining and exporting uranium is the highest impact activity WA can do to help global decarbonisation.**

## Western Australia uranium exports could offset about

**415** million tonnes of $CO_2$ per year

That's about **4.5×** WA's entire annual emissions




## Contact us

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