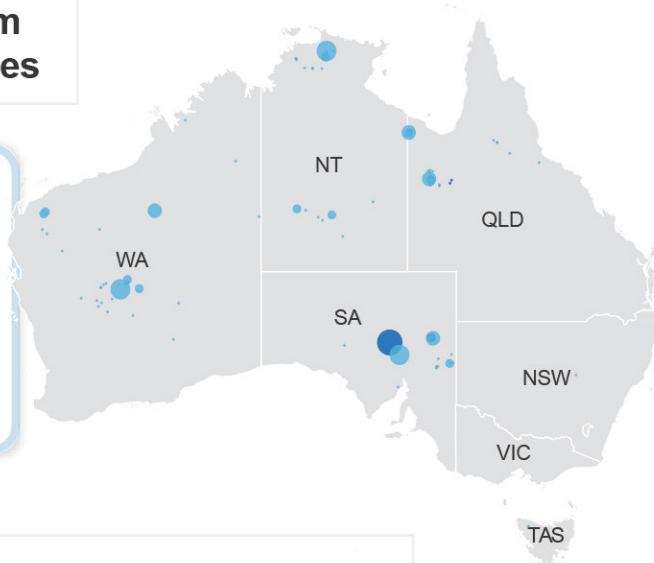




Uranium

Major uranium deposits, tonnes

- Deposit
- Operating mine
- <2,967
- 2,968–9,762
- 9,763–17,571
- 17,572–59,338
- >59,339



Uranium facts



Originally formed in supernovae more than **6 billion years ago**



Nuclear plants can supply electricity to **4-5 million people on only 2km² land**



Uranium powers around **450 nuclear plants, with 50 more under construction**



Nuclear has among the **lowest death and accident rates** of any power source

Consumer markets



27%
EU



26%
USA



21%
Others



15%
China



9%
Russia



2%
Japan

Australia's Uranium



Ranked 1st
for uranium
resources



3rd largest
uranium
producer in
the world



\$500m+
worth of
exports

9.1 Summary

- Uranium prices are forecast to lift from US\$51 a pound in 2022 to US\$60 a pound by 2024. Uranium shortfalls have become a prospect in the wake of years of low prices and underinvestment.
- Australian exports are forecast to decline to 4,500 tonnes in 2021–22. This is expected to rise to around 5,500 tonnes by 2023–24 as the Honeymoon mine reopens (see [Australia section](#)).
- Price and volume growth is expected to increase uranium export values from \$564 million in 2021–22 to around \$880 million by 2023–24.

9.2 World consumption

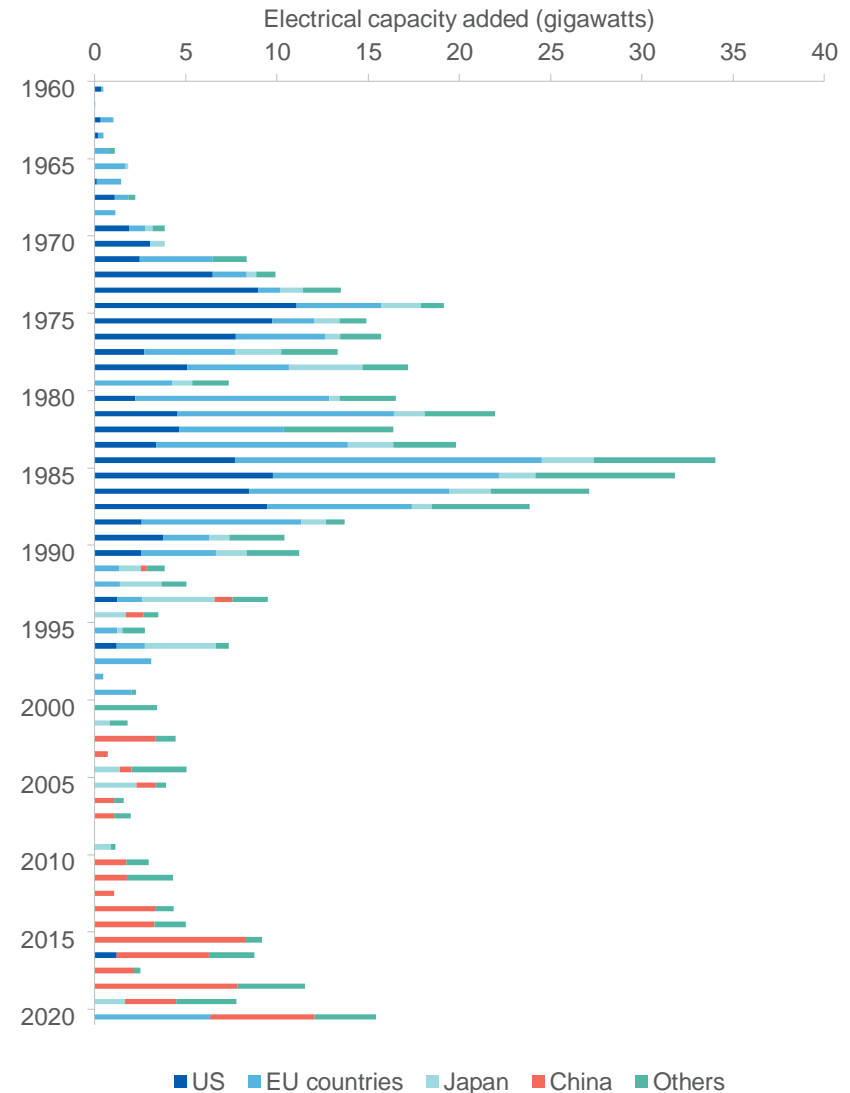
Market conditions have shifted as supply becomes tighter

Uranium prices have stabilised at just under US\$50 a tonne in recent months, following lifts in the September quarter 2021 and March quarter 2022. Prices have long been low, but appear now to be turning due to potential shortfalls in global supply.

With coal and gas prices currently extremely high, the prospects for nuclear deployment have improved: notably in Asia, but also in Africa, Eastern Europe and the Middle East (Figure 9.1). Policies aiming to phase out nuclear power in Japan and South Korea have recently been reversed. In its latest *Nuclear power and secure energy transitions* report, the IEA offers a relatively optimistic appraisal of the future of nuclear energy, noting that 19 countries now have nuclear reactors under construction. The report notes that the case for nuclear deployment has strengthened in light of increased focus on energy independence, reliability, and low-carbon energy.

South Korea's new government has extended its efforts to revitalise the country's nuclear industry, signing a Memorandum of Understanding with various significant stakeholders and manufacturers of nuclear energy equipment. The MoU aims to develop business support measures and underpin cooperation to improve the competitiveness of South Korea's large nuclear industry. The government has also announced that Shin Hanul Unit 1 has entered final testing and is expected to commence

Figure 9.1: Growth in world nuclear power generation



Source: International Energy Agency (2022); World Nuclear Association (2022); Department of Industry, Science and Resources (2022)

commercial operation in September. Three further APR-1400 reactors are also under construction at the site.

In China, unit 2 of the Zhangzhou nuclear power plant has moved closer to completion following the placement of three new steam generators. Engineers managed to hoist and place the second steam generator in less than three hours, with China's National Nuclear Corporation subsequently announcing that this was the fastest hoist 'in the history of nuclear power'. Several more reactors are also moving close to completion.

In the UAE, the newly built Barakah nuclear power plant, which comprises four large Korean APR-1400 reactors, is close to commencing full operation. Three of the four units are already operating, with the fourth recently concluding its hot functional testing. The final unit is scheduled to start operating in early 2023.

In India, Unit 3 of the Kakrapar nuclear power plant has been completed, and is set to start operating in late 2022. The reactor is the first of a planned batch of domestically designed 700 MWe heavy water reactors.

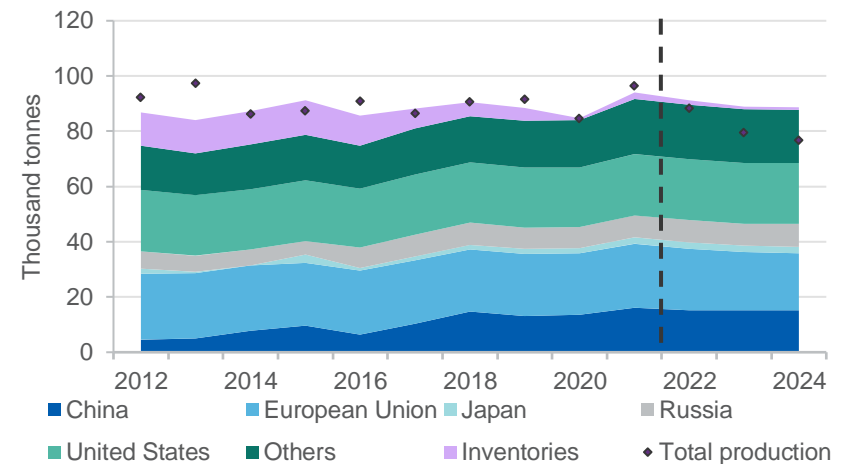
In the US, the newly passed *Inflation Reduction Act of 2022* includes significant measures to support nuclear power, including tax credits to support low or zero-carbon energy production, and funding to develop a domestic supply of High-Assay Low-Enriched Uranium fuel, which many Generation IV reactors are expected to need.

Reactor development has faced mixed conditions in Finland: test production at the new Olkiluoto 3 reactor has resumed, with the reactor on track to provide full power from September 2022. However, the proposed Hanhikivi power project has been cancelled, with the owners citing geopolitical uncertainties and issues with its Russian supplier.

In the UK, the Hinkley Point B1 and B2 reactors have completed their scheduled shut downs after 46 years of operation.

Uranium consumption is expected to hold largely steady in global terms during 2023 and 2024, with reactor closures and openings approximately balanced. Uranium requirements are expected to build from 2025.

Figure 9.2: World uranium consumption and inventory build (U3O8)



Source: International Energy Agency (2022); World Nuclear Association (2022); Ux Consulting (2022)

9.3 World production

Large suppliers are restoring production, but slowly

Years of low investment could make it challenging to scale production with demand over the medium-term. Many projects were placed in hiatus or paused during the long run of low prices after 2011, and will require significant time to reopen or finalise. However, progress is picking up.

In Niger, Global Atomic has reached a deal with the government to develop the Dasa project, which is a high-grade deposit located near existing facilities in Arlit. The project is expected to start producing in 2025. Also set to restart is Paladin's Langer Heinrich mine in Namibia, which is expected to become a major supplier by 2026.

Canada's large McArthur River mine, which has been in care and maintenance for several years, is expected to start producing again by the December quarter.

Despite this, most mine openings around the world remain years off, with overall supply expected to remain little changed over the outlook period.

9.4 Prices

Prices are expected to rise steadily, and potentially rapidly

Emerging supply pressures in the uranium market have reversed the price conditions of the last 11 years, with prices increasing in recent quarters and recently stabilising close to US\$50 a pound. Prices are expected to increase further over time, though ample inventories should curb any rapid spikes. Uranium mines typically take a long time to obtain approvals, potentially drawing out any supply shortages over the longer term, and creating a baseline for structurally higher prices over the rest of the 2020s (Figure 9.3).

9.5 Australia

Higher prices should boost export earnings despite a recent fall in volumes

Extra production and higher prices are expected to lift Australia's uranium export earnings from \$564 million in 2021–22 to around \$880 million by 2023–24 (Figure 9.4, Table 1).

On June 1, Boss Energy announced its final investment decision, and will restart its Honeymoon mine in South Australia. The mine is set to produce around 1100-1200 tonnes of uranium per year for at least 10 years, and production is provisionally expected to commence in late 2023 or early 2024.

A new mine is also in prospect, with Vimy Resources moving towards development of its Mulga Rock deposit. The deposit is substantial and could produce at least 1600 tonnes a year for at least 15 years. Output at the site could commence from 2025 or 2026.

Revisions to the outlook

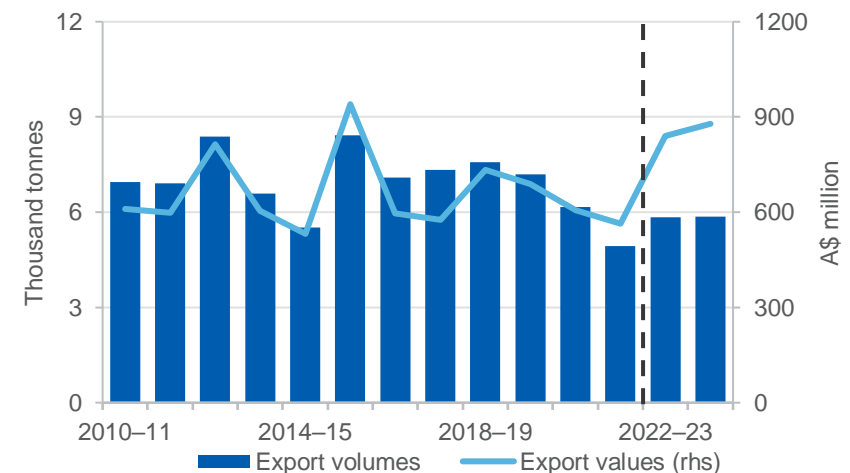
Export earnings forecasts for 2021–22 and 2022–23 have remained largely unchanged, with a small upward revision in 2022–23 offsetting a small downward revision in 2023–24. This reflects a slight frontloading in the timing of expected price movements.

Figure 9.3: Uranium price outlook



Source: Cameco Corporation (2022) Uranium Spot Price; Ux Consulting (2022) Uranium Market Outlook

Figure 9.4: Australia's uranium exports



Source: Department of Industry, Science and Resources (2022)

Table 9.1: Uranium outlook

World	Unit	2021	2022 ^s	2023 ^f	2024 ^f	Annual percentage change		
						2022 ^s	2023 ^f	2024 ^f
Production	kt	54.2	56.7	59.0	61.6	4.6	4.2	4.4
Africa ^b	kt	9.3	9.2	10.1	10.5	-0.5	9.6	3.8
Canada	kt	5.5	6.8	7.1	6.4	23.0	5.0	-10.0
Kazakhstan	kt	25.8	25.9	26.1	28.3	0.6	0.5	8.6
Russia	kt	3.3	3.3	3.7	3.9	0.0	12.2	3.6
Consumption	kt	91.7	89.5	87.9	87.7	-2.4	-1.8	-0.2
China	kt	16.1	15.1	15.1	15.2	-6.3	0.4	0.6
European Union 27	kt	23.1	22.3	21.1	20.6	-3.8	-5.3	-2.4
Japan	kt	2.4	2.4	2.4	2.4	0.0	0.0	0.0
Russia	kt	7.9	8.2	7.8	8.2	3.2	-5.0	5.7
United States	kt	22.2	22.0	22.2	22.2	-0.6	0.7	0.0
Spot price	US\$/lb	35.3	51.0	57.9	59.6	44.6	13.5	2.9
real ^c	US\$/lb	38.0	51.0	56.2	56.5	34.3	10.2	0.6
Australia	Unit	2020–21	2021–22	2022–23 ^f	2023–24 ^f	2021–22 ^s	2022–23 ^f	2023–24 ^f
Mine production	t	6,213	4,486	5,840	5,855	-27.8	30.2	0.3
Export volume	t	6,166	4,933	5,840	5,855	-20.0	18.4	0.3
– nominal value	A\$m	606	564	841	879	-6.9	49.1	4.5
– real value ^d	A\$m	678	604	841	843	-10.9	39.3	0.3
Average price	A\$/kg	98.3	114.4	144.0	150.1	16.3	25.9	4.2
– real ^d	A\$/kg	109.9	122.4	144.0	144.0	11.4	17.7	0.0

Notes: **b** Includes Niger, Namibia, South Africa, Malawi and Zambia; **c** In 2022 US dollars; **d** in 2021–22 Australian dollars; **s** estimate; **f** forecast; **r** Compound annual growth rate
Source: Department of Industry, Science and Resources (2022); Cameco Corporation (2022); Ux Consulting (2022) Uranium Market Outlook