

India's Uranium Quest: Securing Fuel for Nuclear Power Expansion

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India's Uranium Quest Latest News

- India has secured a long-term uranium supply deal with Australia, marking a key step toward operationalising the **India-Australia Civil Nuclear Cooperation Agreement**, signed nearly 12 years ago.
- The deal follows similar **long-term uranium agreements** with **Canada** and **Kazakhstan** signed earlier this year, reflecting India's push to diversify and secure fuel supplies for its nuclear power expansion.
- While the volume of **uranium oxide (yellowcake)** to be supplied and the duration of the agreement have not been disclosed, the deal is part of a broader strategy to secure fuel amid India's ambitious nuclear expansion plans.

India's Nuclear Power Targets

- India aims to expand its civil nuclear power capacity to **100 gigawatt-electric (GWe)** by **2047**.

- Last year, the government opened the tightly regulated civil nuclear sector to greater private participation to support this goal.

India's Current Uranium Sourcing

- Uranium, though a common element found worldwide, requires several processing stages before becoming usable nuclear fuel: Mining and milling; Conversion; Enrichment (where required); Fuel fabrication.
- India's indigenous Pressurised Heavy Water Reactors (PHWRs), which run on **natural uranium**, source fuel through a mix of domestic production and imports.
- In contrast, **enriched uranium** used in India's two Light Water Reactor (LWR) plants, **Tarapur** and **Kudankulam**, is **entirely imported**.

Domestic reserves

- India's uranium oxide reserves stand at around **4.3 lakh tonnes**, spread across 47 deposits in Andhra Pradesh, Telangana, Jharkhand, Meghalaya, Rajasthan, Karnataka, Chhattisgarh, Uttar Pradesh, Uttarakhand, Himachal Pradesh, and Maharashtra.
- The state-owned Uranium Corporation of India Ltd (UCIL) holds the mandate to mine and process uranium, operating major mines at **Jaduguda** and **Turamdih** (Jharkhand) and **Tummalapalle** (Andhra Pradesh).

The Supply Gap

- Despite these reserves, domestic sources meet the uranium requirement for only **2.4 GWe** out of **India's total 8.7 GWe nuclear capacity**; the rest depends on imports.
- A Ministry of Power committee, tasked with preparing a roadmap for 100 GW capacity by 2047, estimated that India will need an additional 8,029 tonnes of natural uranium and 1,045 tonnes of enriched uranium annually by 2047.

The NSG Waiver and Expanding Partnerships

- India's ability to import uranium was unlocked in 2008, when the Nuclear Suppliers Group (NSG) granted it a "clean waiver", making **India the only non-signatory** to the Nuclear Non-Proliferation Treaty (NPT) to enjoy such trading privileges.

Import Trends

- Between 2008-09 and 2024-25, India imported a total of 18,842.60 metric tonnes of uranium (as ore concentrate, natural uranium dioxide pellets, and enriched uranium dioxide pellets) for reactors under **IAEA** safeguards.
- In 2024-25, nuclear plants generated 56,631.48 million units of electricity, of which 39,180 million units came from imported uranium.
- The estimated requirement of imported natural uranium for operating and proposed safeguarded PHWRs is around 9,000 metric tonnes during 2025-2033.

Current and Emerging Suppliers

- India currently imports uranium from **Russia and Uzbekistan**.
- Cameco Corp. (**Canada**) signed a \$2.6-billion supply agreement in March; shipments are expected to begin next year.
- Kazatomprom (**Kazakhstan**), the **world's largest uranium producer**, agreed in February to sell a substantial volume to India. Both Cameco and Kazatomprom were major suppliers to India until 2020-21.
- **France** supplied uranium ores and concentrates in 2025-26, while the **US** supplied similar imports in 2024-25.

Why India Depends on Imports

- The core reason is economic: mining and processing domestic uranium into ore concentrate costs **three to four times** more than importing it internationally, largely due to the **poor grade of uranium ore found in India**.
- However, the Ministry of Power committee cautioned that the global push toward nuclear power could drive up international uranium prices in the coming years.
- It recommended that India consider **enhancing** domestic uranium production, even if costly, to maintain energy security, potentially through additional government equity infusion into UCIL to facilitate its expansion.

Conclusion

- India's push to diversify uranium imports, from Australia to Canada and Kazakhstan, reflects the reality that domestic reserves alone cannot sustain its 100 GWe nuclear ambition by 2047.
- Balancing import dependence with long-term investment in domestic uranium production will be central to ensuring both energy security and the pace of India's nuclear expansion.

Source: IE

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