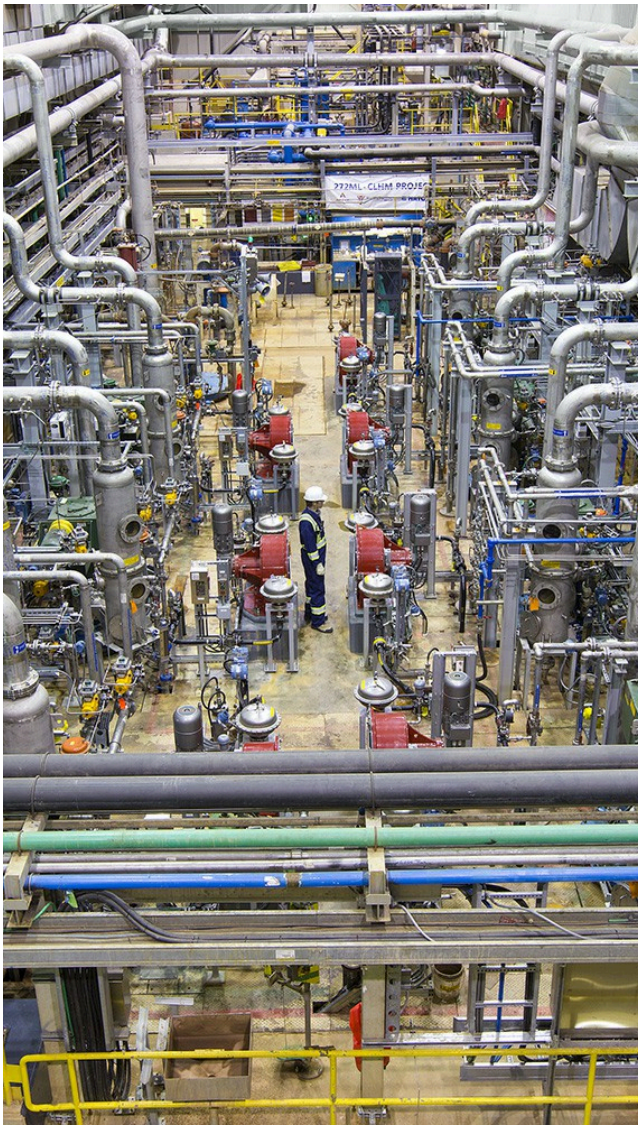
ROSATOM [360]

01.

STORIES

Rooppur Unit 1 Starts Generating Electricity
Russia's Small Reactors Gain Traction
Africa Warms to Nuclear





02.

TRENDS

Uranium Needs Investment



Rooppur Unit 1 Starts Generating Electricity

This autumn, the Rooppur NPP, which Rosatom is building in Bangladesh, passed two major milestones that bring the plant closer to full-power operation. Unit 1 was connected to the grid, and TVEL, Rosatom's Fuel Division, delivered the initial fuel load for Unit 2.



On 17 November 2026, Unit 1 of the Rooppur Nuclear Power Plant was connected to Bangladesh's national grid for the first time. Rosatom's Engineering Division is the project's general contractor and general designer. The first megawatts were delivered to consumers.

"Bringing Rooppur Unit 1 online is a landmark event for both our countries. Bangladesh gains a reliable, stable, and clean source of energy that will significantly reduce its dependence on hydrocarbon imports. Nuclear generation gives Bangladesh access to advanced technologies and supports the growth of its engineering expertise and scientific research. For Russia and Rosatom, this is another completed project that confirms our country's undisputed leadership in the global nuclear technology market," said Rosatom Director General Alexey Likhachev.

Rooppur Unit 1 achieved first criticality in October, establishing a self-sustaining controlled chain reaction in the reactor. In doing this, engineers strictly followed the design requirements and the start-up program, under the supervision of the plant operator, the general designer, the regulator, and the scientific oversight body.

Following grid connection, the unit will undergo a gradual power ascension to nominal output during the pilot operation phase.

Fuel on Site

In late October, nuclear fuel for the initial core load of Unit 2 arrived at the Rooppur site. The fuel assemblies were manufactured by the Novosibirsk Chemical Concentrates Plant (part of Rosatom's Fuel Division). The fuel was transported from Russia to Bangladesh on a cargo flight, then by road from the country's capital Dhaka to the site under special security arrangements.

At the site, the containers holding the fuel assemblies were placed in a dedicated fresh nuclear fuel storage facility, where the fuel underwent mandatory incoming inspection — visual and instrumental checks to confirm compliance with technical documentation. A joint commission representing the Bangladeshi customer, the general contractor, and the manufacturer carried out the inspection in strict accordance with nuclear and radiation safety regulations.

Fresh nuclear fuel for Rooppur's first-ever refueling, at Unit 1, was delivered to Bangladesh earlier. This operation will take place once the reactor has completed its first year of operation. Several more deliveries are scheduled before the end of the year.



Rooppur is a two-unit nuclear power plant with VVER-1200 reactors and a total installed capacity of 2,400 MW. Located 160 km from Dhaka, the plant features Rosatom-designed active and passive safety systems, including a core catcher, a passive core flooding system, and an emergency core cooling system.

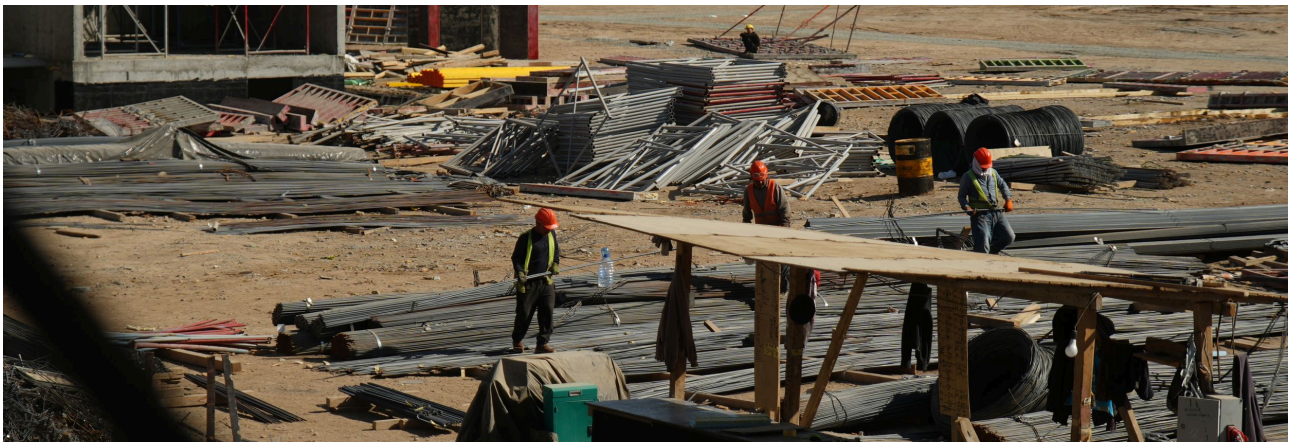
Both units are also equipped with an Operator Information Support System, known as OISS. Based on a digital twin — a live virtual model of the unit — this system is being used in the commissioning operations at Unit 1 and will later be deployed on Unit 2. OISS consolidates scattered process data into a user-friendly format. It analyzes readings from 360 systems, flags deviations, and prompts the operator with recommendations on selecting from more than 80 procedures, including those for emergency situations.

The plant is being built under a general contract signed on December 25, 2015. The project uses Generation III+ technology and fully complies with current international safety requirements.

Photo by: Atomstroyexport JSC (ASE)

Russia's Small Reactors Gain Traction

Rosatom is the global leader in small-scale nuclear generation solutions. This status was underscored by the first-ever export contract for electricity supply from floating power units (FPUs), signed with an Indonesian company. Earlier, the Russian nuclear corporation secured the world's first export deal to build a small modular reactor (SMR) plant in Uzbekistan, where site work is now in full swing.



At Russian Energy Week on October 16, Rosatom and Indonesia's PT Pembangkit Listrik Nuklir signed an agreement to supply electricity to Indonesian consumers. Two PEB-100 floating power units, with a combined capacity of 200 MW, will deliver power to Halmahera Island in North Maluku. The deal marks Rosatom's first export project to supply electricity from floating power units. It's also the world's first electricity sales agreement between two countries that do not share a border, according to Rosatom Director General Alexey Likhachev. "We are selling electricity to the other side of the world. Our unique solution makes this approach replicable as well," he said.

The two PEB-100 floating power units will be equipped with RITM-series reactors. RITM-200 reactors have been operating aboard Russia's nuclear-powered icebreakers since 2020, demonstrating their efficiency, reliability and safety. Indonesian consumers are expected to receive the first electricity five years after the main terms of the power supply contract take effect. The arrangements cover the entire lifecycle of the power units.

"Cooperation between Rosatom and Indonesia is developing very rapidly. Our recent meeting with President Prabowo Subianto confirmed that the world's largest archipelagic state is steadily advancing toward stronger energy security and carbon neutrality," Likhachev commented on the signing.

"As national investors, we see supporting Indonesia's energy transition as both our priority and our responsibility. It is essential to emphasize that this is a commercial B2B project, funded by private investment without drawing on Indonesia's state budget. We are honored to take part in this historic partnership," said Yudi Utomo Imardjoko, CEO of PT Pembangkit Listrik Nuklir.

"I am confident the global business community will view it as a compelling example of how the private sector can, with consistent government support, initiate large-scale infrastructure projects in nuclear generation capable of transforming a nation's economy. Beyond electricity supply, we are discussing the start of a long-term partnership," Likhachev emphasized.



Land-based SMRs

In October, Likhachev visited the construction site of the integrated nuclear power plant being built in Uzbekistan's Jizzakh Region. Concrete pouring for

the foundation slab of the first small-capacity power unit has been underway since June 4, with foundation work scheduled for completion by the end of 2026.

Alongside the plant, a satellite town is under construction to house more than 30,000 future plant employees and their families. The town will feature comprehensive social, educational, medical, and public infrastructure. An industrial cluster is planned 25 kilometers from the plant site.

The day after touring the site, Likhachev met with Uzbek President Shavkat Mirziyoyev. He briefed the president in detail on the completion of key project milestones, near-term production targets, and the construction of the plant's satellite town. The two parties also discussed prospective areas of cooperation in nuclear medicine, additive manufacturing, and the training of local engineering and research personnel. Likhachev thanked the president for his personal attention to the development of Uzbekistan's nuclear industry and his support for joint initiatives, reaffirming Rosatom's commitment to broader collaboration.

The Jizzakh facility is being built under the world's first export contract for an integrated nuclear power plant, which will combine two large-capacity power units of 1,000 MW each and two 55 MW small modular reactors. Once fully operational, the plant will meet up to 14% of the country's electricity demand.

Floating Units for Africa

Russian small-scale nuclear generation solutions — particularly floating power units — are drawing interest worldwide, including in Africa. Speaking after the Russia-Africa Summit, Likhachev said: "Our floating nuclear power units drew enormous interest. Of Africa's 54 states, 38 have access to the sea. Most of them have grid infrastructure that, by our standards, is modest and suited to medium- and small-capacity generation. As many as nine countries expressed strong interest in the technology. We are already in substantive discussions on projects for Egypt, Tanzania, Togo, and Namibia."

Photo by: Rosatom International Network, Strana Rosatom newspaper, Rosatom State Atomic Energy Corporation

Africa Warms to Nuclear

On October 28–29, Moscow hosted the 3rd Russia-Africa Summit, with Rosatom serving as title partner. The corporation signed three cooperation documents with Togo, Uganda, and Rwanda on the sidelines of the summit, while at the sessions, Rosatom executives discussed key priorities for African nations, including power and water supply, nuclear infrastructure development, deployment of floating power units, and workforce training for the nuclear industry.



Signed documents

Rosatom Director General Alexey Likhachev and Togo's Minister-Delegate for Energy Robert Koffi Messan Eklo signed a memorandum of understanding on cooperation in the peaceful uses of nuclear energy. The two parties plan to establish working groups to assess the feasibility of projects involving energy and non-energy applications of nuclear technologies, and to define steps aimed at developing workforce capacity and building public support for nuclear energy in Togo.

"We are ready to offer our partners solutions in energy, healthcare, and agriculture. One promising avenue is floating nuclear power units for reliable, low-carbon power supply. We will also assist with workforce training and nuclear infrastructure development. For Togo, nuclear technologies can serve as a powerful driver of socioeconomic development and improved quality of life," Likhachev commented.

Rosatom also signed a roadmap with Uganda's Ministry of Energy and Mineral Development. The document sets out plans to review Uganda's nuclear infrastructure needs and outline the steps that will lead to negotiations on a site survey contract for the proposed nuclear power plant in the country's Nakasongola District.

A third agreement, a memorandum of understanding with the Rwanda Atomic Energy Board, commits the two parties to identifying the national nuclear infrastructure needs and development priorities. "We are jointly working on projects for a small modular reactor (SMR) plant and a Nuclear Science and Technology Center, and we are training local professionals. We see our role as helping Rwanda build a solid foundation for the peaceful uses of nuclear energy to benefit the country's energy sector, science, and economy," Likhachev noted.

Floating Power Units and Water Desalination

The session titled "Nuclear Technologies in Africa: Gaining Momentum for the Future" covered the first steps a country takes in establishing a nuclear industry, the use of national expertise and resources, and the potential of nuclear technologies in energy, nuclear medicine, agriculture, and science. Floating power units received particular attention: following the signing of the world's first export agreement for electricity supply from such units in Indonesia, Rosatom is seeing strong interest in the technology across Africa.

"Nuclear power in Africa has moved from discussion to construction, and that is exactly what we are talking about with Rosatom today. Let us now move to transformation: electricity for our homes, medicine for our hospitals, jobs for our young people, and sovereignty for the continent," said session moderator Lassina Zerbo, chairman of the Rwanda Atomic Energy Board and advisor to the President of Rwanda.

At the session titled "Clean Water for the Countries

of the African Continent: The Socioeconomic and Technological Dimension," Ksenia Sukhotina, CEO of Rosatom Infrastructure Solutions, outlined Rosatom's approach to building integrated water-and-energy clusters that simultaneously address water and power supply needs. Integrating electricity generation and desalination capacity reduces the cost of water treatment and ensures guaranteed offtake for the power generated. "Water can act as a natural battery. During the overnight dip in power demand, the cluster redirects capacity to desalination and pumps water into storage tanks. This balances the grid and reduces the need for extra energy storage. In addition, shared engineering services, laboratories, and digital resource management lower operating costs," Sukhotina said.

Russia's nuclear industry has decades of experience with such integrated projects. In the Soviet era, the BN-350 fast-neutron reactor plant diverted part of its power output to desalinate Caspian seawater for the city of Aktau. In 2025, an advanced desalination complex was commissioned at the Akkuyu NPP in Türkiye, and a similar facility is being planned for the El Dabaa NPP in Egypt.



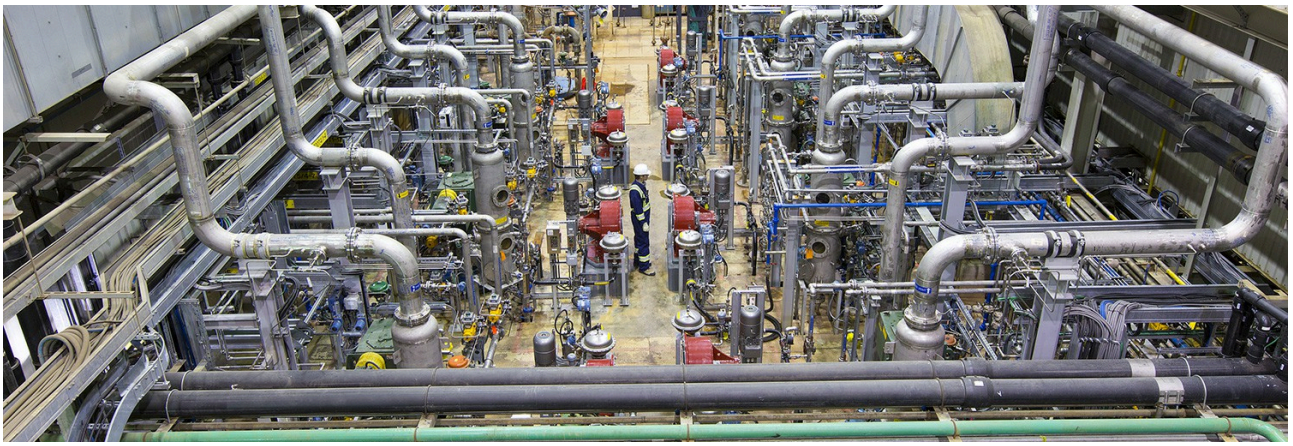
The session "The Mission of Women in Russia and Africa in Building Trust and Global Cooperation" focused on expanding women's participation in nuclear energy, including in technical and leadership roles. "By pooling the experience and resources of our countries, we can create new opportunities for women at every stage of their careers in the nuclear industry," emphasized Elsie Pule, chief coordinator of the BRICS Nuclear Platform.

Rosatom cooperates with 29 of Africa's 54 countries. Its largest project on the continent is the four-reactor El Dabaa Nuclear Power Plant in Egypt. The Russian nuclear corporation is also pursuing mining projects in Tanzania, Namibia, and Mali. Under its education programs, 370 students from 26 African countries are studying in Russia, with more than 100 additional students from 17 countries expected to enroll next academic year. Since the launch of the program for nuclear and related disciplines at Russian universities, around 1,000 study places have been allocated in total.

Photo by: Strana Rosatom newspaper, Rosatom Infrastructure Solutions, Kirill Kazachkov

Uranium Needs Investment

A new edition of the Red Book — Uranium 2026: Resources, Production and Demand — was published in mid-September. Its authors conclude that identified uranium resources are sufficient to meet reactor requirements through 2050 and beyond. But keeping supply chains reliable will require more investment in exploration, mine construction and bringing reserves into production.



The report is prepared and published every two years by the OECD Nuclear Energy Agency (NEA) and the IAEA. The Red Book offers a comprehensive review of the global uranium market's key dimensions, a statistical analysis of the industry, and 46 country reports describing exploration, the resource base, uranium production and reactor requirements in each of the countries mentioned. This latest edition analyses nuclear power growth projections to 2050 and long-term trends in uranium supply and demand. It covers the period from January 1, 2023 to January 1, 2025, and also includes information relating to 2025 and 2026.

$970 million

Global investment in uranium exploration in 2024

Prospecting and exploration

Investment in uranium exploration grew across 2023 and 2024, reaching USD 970 million in 2024. The upward trend began in 2021, when investment stood at USD 490 million — meaning the figure has almost doubled in four years. Preliminary data put 2025 investment at USD 930 million, but several of the largest spenders, including the United States and

billion, which would mean exploration investment is still rising.

The growth is also physical, not just financial. Exploration and development drilling totaled about 8,500 km in 2023–2024, 27% more than in the preceding two years. Nearly 20% of that total was development drilling. The Red Book notes: "During the 2023-2024 period, Uzbekistan, China, Kazakhstan and the United States accounted for 31%, 28%, 12% and 11% of total drilling, respectively, while Namibia, Canada and India collectively contributed a further 16%."

Russia is working its existing deposits, building and commissioning new mines, and exploring prospective areas. Development of the Dobrovolnoye deposit in the Kurgan Region began in 2025. In Buryatia, mining has started at Dybrynskoye, Namarusskoye is being prepared for commissioning, and a license has been obtained to develop Tetrakhskoye. In Transbaikalia, Mine No. 6 is under construction to work new flanks of existing deposits and the new Shirondukuyskoye deposit. The Elkonskoye deposit in Yakutia is being prepared for development. Meanwhile, a "Uranium of Russia" program is being drafted.



In October 2026, a decision was taken to build a hydrometallurgical plant in Transbaikalia to process uranium and uranium-molybdenum ores from the Argunskoye and Zherlovoye deposits. The plant will have two independent production lines, each rated at 5,500 tonnes of U_3O_8 per year. It is also expected to process concentrates from Rosatom's other deposits in Russia and abroad.

8.1 million tU

Identified recoverable resources at costs below US$260/kgU as of 1 January 2025

Resources

As of January 1, 2025, world uranium resources had grown to 8.1 million tonnes of uranium (tU), up 2.1% from the previous edition of the Red Book. Reasonably assured resources account for 61% of this total, and inferred resources for the remaining 39%. All fall within the <USD 260/kgU cost category, which contains three lower-cost categories nested inside one another like matryoshka dolls. In the <USD 130/kgU category, total identified recoverable resources stand at 5.9 million tU — virtually unchanged from two years earlier.

Resources in the <USD 80/kgU category rose 3.5%, mainly on new data from Canada. Growth in the <USD 40/kgU category was 2.1%, driven by successful exploration at several deposits in Kazakhstan. China saw substantial changes in the <USD 130/kgU and <USD 260/kgU categories, up 20% and 19% respectively, again largely on successful exploration. US identified recoverable resources in the <USD 260/kgU category also increased, because the Red Book team incorporated inferred resource estimates based on publicly available data. According to the Red Book, Russia's total recoverable uranium resources as of January 1, 2025 stood at 650,387 tU.

The authors note that the global shift of resources into higher-cost categories continued. They also recorded re-estimates that reduced the resource base: "Re-estimates of mineral resources in Botswana and Namibia resulted in significant and moderate reductions, respectively, in the higher cost categories."

Another important trend flagged in the report is that the share of the lowest-cost resources (<USD 40/kgU) is gradually shrinking as mining, processing and development costs rise and low-cost deposits are progressively depleted.

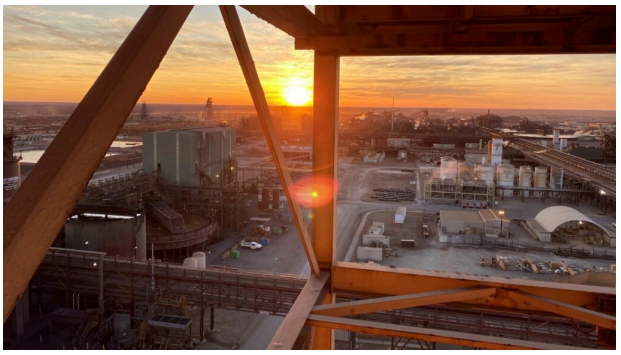
61,924 tU

Global production of natural uranium in 2024

Production

Natural uranium production from primary sources (mines) rose about 20% in 2023–2024 compared with 2021–2022, from 96,851 tU to 116,487 tU. In 2024 alone, output reached 61,924 tU. The report says: "This increase marks a clear reversal of the previous downward trend observed from 2017, which bottomed out in 2021, and is expected to continue in the near and medium term due to favorable market conditions, the restart of previously idled mines and the development of new production capacity."

Mines with a combined design capacity of about 9,400 tU per year have recently restarted or are in the process of restarting. The fate of a further 11,750 tU per year of idled capacity remains uncertain: production there was suspended roughly a decade ago, and restarting after such a long hiatus is costly and complex. "It is therefore reasonable to assume that only part of this remaining idled capacity will ultimately return to production, and likely at levels below the nominal listed capacity," the authors note.



Kazakhstan remained the leading producer over the two-year period, with about 38% of world output. Canada (22%), Namibia (21%), Australia and Uzbekistan (8% each) completed the top five. Russia ranked sixth with 5%. According to the Red Book, it produced 2,738 tU in 2024.

Demand

As of January 1, 2025, the world had 441 commercial power reactors in operation, with a combined electrical capacity of 398 GWe. Fueling them requires about 64,500 tU per year. The number of units, their combined capacity and the associated uranium requirements are all expected to grow over the coming decades. The Red Book assesses two growth scenarios: “Taking into account changes in policies announced in several countries and nuclear programs as of 1 January 2025, world nuclear capacity by 2050 is projected to increase to 565 GWe in the low demand case, and to 916 GWe in the high demand case, an increase compared to 2024 capacity of around 42% and 130% respectively. Accordingly, world annual reactor-related uranium requirements are projected to rise to between around 84 800 tU/yr and 143 900 tU/yr by 2050.” The size of the reactor fleet in 2050 — and hence uranium demand — will depend on electricity demand growth, the economic competitiveness of nuclear against other generation sources, financing decisions for new build, supply chain resilience, and acceptance of nuclear energy by the public and governments, the report notes.

Is There Enough Uranium?

In 2024, uranium from natural sources covered 96% of reactor requirements, up 11 percentage points from 2022. The remainder came from various secondary sources. The authors are emphatic: “While secondary sources will continue to supply a portion of uranium demand, it is crucial to bring new facilities online from planned and prospective production centers and to sustain exploration efforts to identify additional resources.”

Scaling up exploration and mining matters over the long run, not just in the short term. Under the high-demand case, the global reactor fleet would consume roughly 46% of identified recoverable resources in the <USD 130/kgU category and about 33% of those in the <USD 260/kgU category — that is, of all resources currently counted — by 2050. Beyond 2050, even if the fleet stays flat, cumulative uranium requirements would exceed currently identified resources — by 2080 in the high case and by 2120 in the low case.

The Red Book authors see closing the nuclear fuel cycle and recovering uranium from unconventional sources, notably black shales and phosphates, as ways to broaden the raw material base for nuclear fuel. But securing supply both before and after 2050 will require a sharp increase in investment to bring identified resources into production. Investment growth and new mining technologies depend on prices investors find attractive: “For sustained uranium supply, both consumers and producers must ensure a stable framework for uranium exploration, mining and transportation, supported by pricing mechanisms that encourage long-term investments. Sustained, adequate uranium prices are essential to support both new projects and ongoing exploration, as global uranium demand could more than double by 2050 in a high-demand scenario and increase by 42% in a low-demand case.”

Rosatom is working on two fronts to secure more raw material for nuclear fuel: expanding its uranium resources, and bringing depleted uranium and fissile materials from spent nuclear fuel into the fuel cycle. Rosatom leads in developing and deploying closed fuel cycle technologies. This is the goal of the Proryv (Breakthrough) project, under which a power unit with the BREST-OD-300 reactor and an adjacent facility for spent fuel reprocessing and fabrication of new fuel assemblies are being built in Seversk, Russia. By design, closing the fuel cycle will reduce natural uranium requirements over time.

Photo by: BHP, Orano, Kazatomprom, Rössing Uranium Limited, U.S. Nuclear Regulatory Commission