ROSATOM NEWSLETTER

01.

STORIES

02.

TRENDS

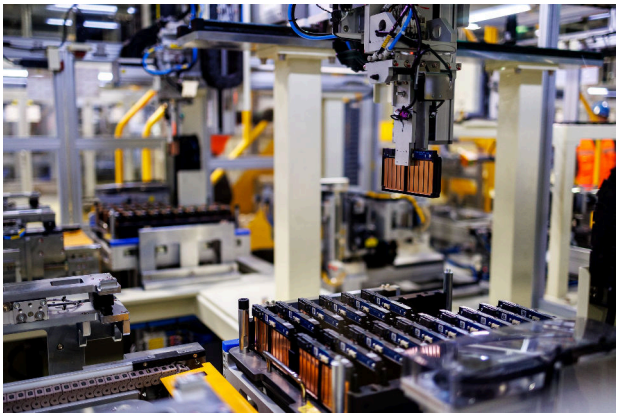
03.

REGIONAL STORIES

Storage Batteries at Industrial Scale

In late 2025, the Russian nuclear corporation launched the country's first large-scale production facility for lithium-ion batteries. This new factory has dramatically expanded Rosatom's capabilities to drive electric mobility both in Russia and internationally.

Rosatom's gigafactory, which commenced operations in the Kaliningrad Region in December, is a vertically integrated production facility. The production cycle encompasses slurry preparation, coating the active material onto metal foil to create an electrode web, and precision slitting and notching into specific shapes. The electrodes are then assembled into pouch cells, filled with electrolyte, and integrated into battery modules. The final stage involves full battery pack assembly, including the integration of advanced thermal management and battery management systems With nearly 90% of processes automated, the factory achieves a high-speed output of one cell per second.



Background

After evaluating 30 potential sites for the gigafactory, Rosatom selected the Kaliningrad Region for its preferential business environment. The construction agreement was signed in September 2021. On-site work began in October 2022; installation of utilities started in summer 2025, followed by production lines in the autumn.

The factory is currently in the pilot operation phase, during which its manufacturing systems and equipment are being fine-tuned. The facility is scheduled for full commercial commissioning in 2026. Another such gigafactory is being constructed by Rosatom in Moscow.

For Russia…

"The launch of the Kaliningrad gigafactory is an industrial breakthrough for Russia and a major contribution to the foundation of national technological sovereignty. Energy storage is a cross-cutting technology in Rosatom's portfolio of new non-nuclear businesses, enabling the deployment of end-to-end production chains and product ecosystems," said Rosatom Director General Alexey Likhachev at the launch ceremony. "This includes the lithium product chain — from mining raw materials to recycling spent batteries — and industrial cooperation in the new Electric Mobility business area."

The emergence of Russia's first large-scale domestic battery manufacturer will make Russian electric vehicle production more resilient by eliminating the risks associated with imports. Furthermore, in-house production allows for continuous technology improvement and innovation, such as testing new cathode and anode materials and electrolytes developed by Russian scientists and engineers.

...and for international partners

The launch of the gigafactory also enhances Rosatom's potential for cooperation with international partners. One of the closest collaborations in the energy storage segment is with Belarus. During the World Atomic Week held in September 2025, Rosatom signed a roadmap for cooperation on traction batteries with the Belarusian manufacturer of urban electric ground transport, BKM Holding (also known as Belkommunmash). The roadmap outlines plans for supplying Rosatom's lithium-ion batteries for BKM Holding's electric buses and for organizing a local factory for traction battery assembly in Belarus.

This roadmap builds upon the existing cooperation. In 2022, Rosatom supplied lithium-ion batteries for 97 trolleybuses manufactured by BKM Holding, which are now in passenger service in St. Petersburg.

4 GWh per year

is the gigafactory's production capacity (equivalent to manufacturing 50,000 EV traction batteries)

A holistic approach

Rosatom is developing electric mobility in Russia in a consistent, holistic manner. The Russian nuclear corporation manufactures electric vehicle charging stations (EVCS) and operates an EVCS network. Notably, this network is powered by carbon-free electricity generated by Russian nuclear power plants, which is certified by green certificates. Users of the Rosatom charging network can be confident that the electricity powering their vehicles is carbon-free "from generator to charging plug." Additionally, Rosatom is working on a project to build a plant in the Lipetsk Region for manufacturing traction electric drives, comprising an electric motor, gearbox, and inverter. Finally, Rosatom supports scientific research in battery chemistry and the development of new battery technologies.

Photo by: TVEL JSC (Fuel Company)

Targeting Diseases

Rosatom is a world leading supplier of medical isotopes that are used to fabricate radiopharmaceuticals for the diagnostics and treatment of severe medical conditions. The Russian nuclear corporation is also actively developing other areas of nuclear medicine and promoting international cooperation in this field.

Nuclear medicine encompasses various diagnostic and therapeutic applications. These include positron emission tomography (PET) and single-photon emission computed tomography (SPECT). In PET, a patient is administered a radiopharmaceutical that emits positrons, and the resulting gamma radiation is detected, allowing for the assessment of metabolic activity in tissues. SPECT is an imaging method using radiopharmaceuticals that emit photons, revealing functional changes in tissues and organs.

Advanced approaches to such diagnostics and treatment were discussed at the 4th Nuclear Medicine 2025 Congress in December, featuring representatives from Russia, Japan, India, Brazil, Saudi Arabia, the United States, and international organizations. Experts presented reports on the technical aspects of equipment operation, methodologies for interpreting results, and issues of image quality control.

Another key focus was the use of new radionuclides, personalization of administered radioactivity doses, and prevention of side effects during treatment. Attention was also given to combined therapy methods, interdisciplinary collaboration, and professional training.

The Congress President and Director General of the Research Institute of Clinical and Experimental Radiology at the N.N. Blokhin National Medical Research Center of Oncology, Boris Dolgushin, detailed the specifics of boron neutron capture therapy. This method for treating malignant tumors involves administering a boron-10 compound that accumulates in cancer cells. The tumor is then irradiated with a neutron beam, which is captured by the boron nuclei, triggering a local nuclear reaction that destroys the cancer cell while sparing healthy tissue. The Blokhin Center is preparing to introduce this new technology, which was developed with Rosatom's involvement.

A recurring theme of the conference was Russia's transition toward personalized medicine, which aims to tailor individual treatment plans for each patient based on their genetic and other specific characteristics.

In November, Rosatom held a nuclear medicine seminar in Algeria. Algerian Minister of Energy and Renewable Energies Mourad Adjal noted that, on the President's instruction, the government is prioritizing the fight against cancer and the development of nuclear medicine. Rosatom experts presented the corporation's comprehensive capabilities for extending human life and improving its quality. These include the supply of medical isotopes and radiopharmaceuticals; prosthetic solutions utilizing additive manufacturing; the development and production of diagnostic and therapeutic equipment; the construction of medical infrastructure and multifunctional centers for processing medical and food products; and inbound medical tourism services.

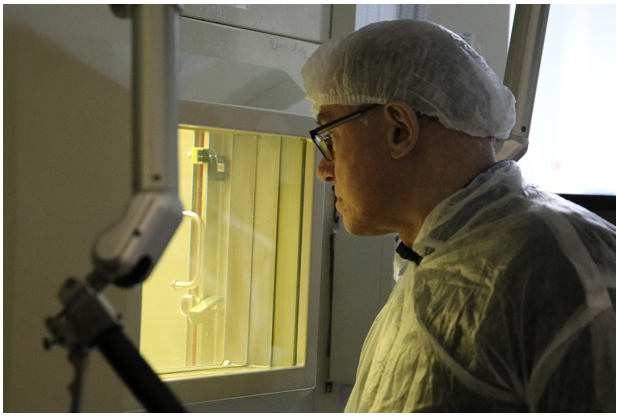
"We are ready to expand cooperation with our Algerian partners to make these solutions available in your country," said Igor Palamarchuk, Deputy Director General for the Middle East and North Africa at Rosatom.

Overall, Rosatom places significant emphasis on

fostering international scientific and expert cooperation aimed at developing new radiopharmaceuticals and medical devices, as well as organizing multicenter clinical trials.

Radiopharmaceuticals

Rosatom's activities in nuclear medicine cover the entire value chain spanning from producing medical radionuclides to introducing both proven and novel radiopharmaceutical solutions to international markets. A key priority is the production and export of medical isotopes and radionuclide products.



Rosatom has patented a technology for manufacturing a radioactive agent based on actinium-225. This alpha-emitting isotope is considered one of the most promising for cancer therapy. There are only four producers of Ac-225 in the world, and Rosatom is one of them.

Russia has registered a radiopharmaceutical drug based on Rosatom-produced radium-223, called Rakurs (^{223}Ra). It is used in radionuclide therapy for patients with prostate cancer and holds great promise for treating metastatic bone lesions from other primary tumors.

A drug for neuroendocrine tumors has been introduced in Russia. It contains lutetium-177, also produced by Rosatom. The compound octreotide in this drug binds to receptors on the tumor surface, while lutetium-177 delivers targeted radiation that destroys the tumor cells. This combination ensures minimal impact on surrounding healthy tissues.

Rosatom's nuclear medicine products and solutions are supplied to countries in Europe, Asia, Latin America, and the Middle East, aiding in the diagnostics and treatment of over 2.5 million patients annually. Rosatom's competitive advantage in the international market is its broad portfolio: generators of medical radionuclides, ready-to-use radiopharmaceuticals, and diagnostic kits for oncology, cardiology, nephrology, and endocrinology, as well as products for radioimmunoassay and labeled compounds for scientific and applied research. Building on these, Rosatom offers its international partners comprehensive solutions aimed at enhancing the quality of life.

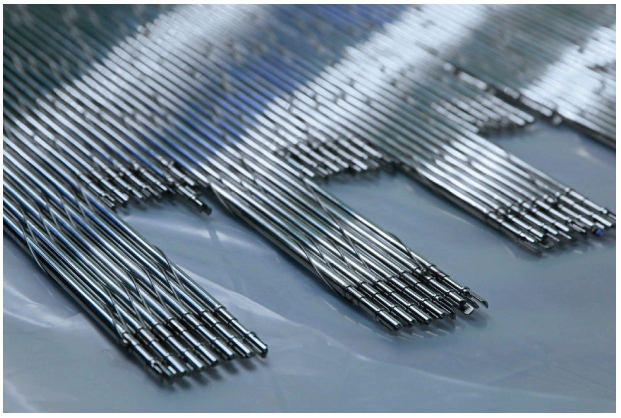
Photo by: Rosatom's Scientific Division

Fueling Progress

Rosatom has fabricated the reactor core for the world's most powerful nuclear icebreaker under construction, Rossiya, delivered modified nuclear fuel for a research reactor in Uzbekistan and the Kudankulam NPP in India, and conducted extreme-condition testing of fuel for a high-temperature gas-cooled reactor (HTGR). These milestones represent tangible steps in refining and developing new atomic technologies, paving the way for a new technological paradigm.

In late 2025, the nuclear industry saw a historic first — the fabrication and acceptance of the initial reactor core for the first RITM-400 reactor plant destined for the nuclear icebreaker Rossiya. The two RITM-400 reactors are named after Russian epic heroes, Ilya Muromets and Dobrynya Nikitich. Each has a thermal power of 315 MW, outperforming any other marine reactor in the world.

Rossiya is the lead vessel of the Project 10510 series. With a total shaft power of 120 MW, this ship will be capable of breaking through ice over four meters thick. Upon commissioning, Rossiya will enable year-round navigation on the entire Northern Sea Route.



Density matters

Rosatom has supplied a new modification of nuclear fuel for the VVR-SM research reactor in Uzbekistan.

The abbreviation VVR-SM stands for the Russian phrase "upgraded serial water-cooled water-moderated reactor." The fuel assemblies were manufactured using dense uranium and uranium silicide fuel. Compared to standard fuel, this type offers superior performance characteristics: a higher uranium concentration extends the reactor's refueling interval.

These fuel deliveries are part of broader cooperation between Rosatom and Uzbekistan. It is worth recalling that the parties are preparing for the first concrete pour for a nuclear power plant featuring Russian-designed RITM-200N reactors in the Jizzakh Region of Uzbekistan. The contract to this effect was signed in May 2024 and marked the world's first export agreement for a small modular reactor (SMR) power plant (the construction of large-capacity Russian-design reactors is also under consideration).

Under extreme temperatures

Rosatom has completed extreme-condition testing of fuel samples for a high-temperature gas-cooled reactor (HTGR). Graphite cylinders containing uniformly distributed spherical fuel particles (compacts), developed by Rosatom researchers, were first irradiated under standard conditions to burnup depths of 4%, 8%, and 12% heavy atoms (h.a.). Compacts with 4% and 8% h.a. burnup were then irradiated for over 500 hours at temperatures around 1,600°C. Additionally, HTGR fuel samples with 8% h.a. burnup were irradiated at approximately 1,700°C for more than 380 hours.

“Reactor experiments and comprehensive post-irradiation studies supplement the extensive body of experimental data accumulated since 2021 under the HTGR fuel validation program. We can now state with confidence that the maximum design limits for operating domestic compacts, as incorporated into the HTGR design, have been confirmed,” noted Fyodor Grigoryev, the project coordinator at RosEnergoAtom.

18-month start

In December, Rosatom delivered the first batch of nuclear fuel via air for the initial core load of the VVER-1000 reactor at Kudankulam Unit 3 in India. Unit 3 will be the first-ever VVER-1000 reactor to commence operation with an 18-month refueling interval. Previously, Kudankulam Units 1 and 2 transitioned from a 12-month to an 18-month interval. This was made possible by supplies of advanced-design TVS-2M fuel assemblies, which ensure more reliable and cost-effective operation due to their robust design, new-generation anti-debris filters, and a higher uranium mass.

And also…

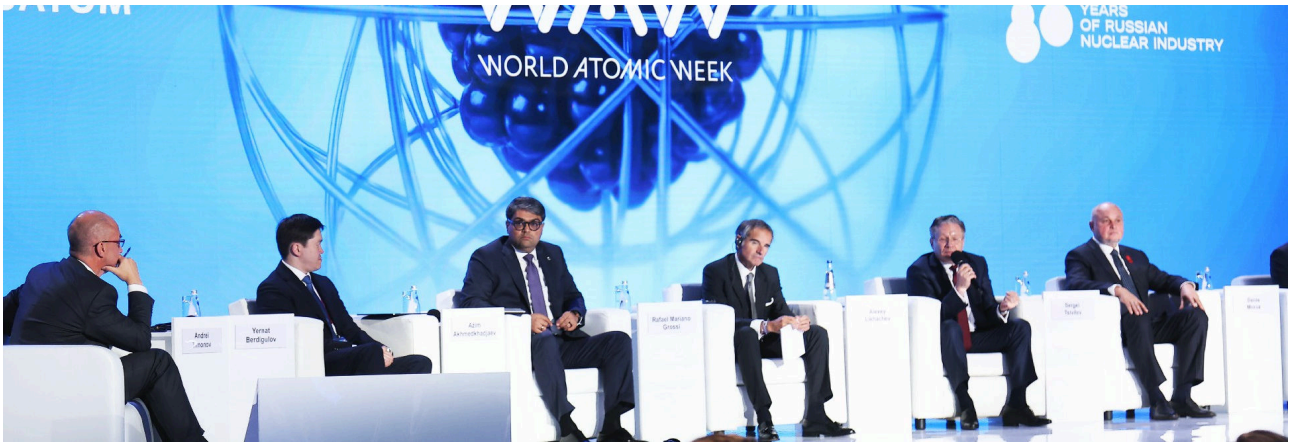
Employees of the Bochvar Institute, Mikhail Skupov and Alexey Glushenkov, were awarded the Vyzov (Russian for ‘Challenge’) Prize in the Engineering Solution category for developing an industrial production technology for nitride nuclear fuel. This fuel is intended for the BREST-OD-300 lead-cooled reactor, part of a Generation IV system.

These developments underscore Rosatom’s position at the forefront of scientific and technological exploration, consistently and systematically creating and refining nuclear fuel that enables safe, cost-effective power generation and advanced research.

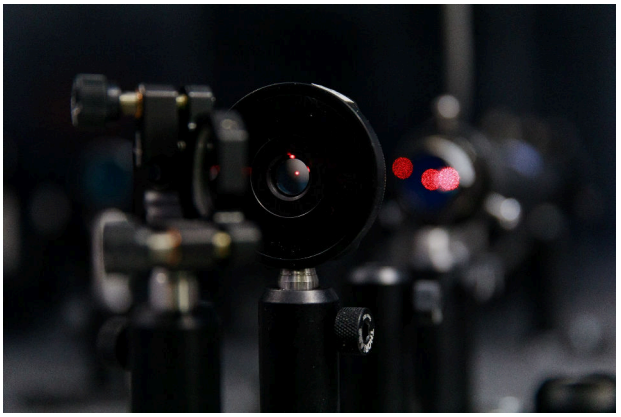
Photo by: NZHK, MCC, Strana Rosatom newspaper

80 Years and Moving Forward

In 2025, Russia's nuclear industry celebrated its 80th anniversary. The jubilee's central theme — Pride. Inspiration. Dream — captured the spirit of the occasion: pride in the achievements of previous generations, inspiration drawn from today's accomplishments, and the dream of new possibilities unlocked by nuclear technologies. The road ahead includes creating quantum computers, developing the Northern Sea Route, exploring space and, most importantly, advancing new construction projects with a focus on Generation IV systems designed to close the nuclear fuel cycle.



The anniversary year's premier event was the World Atomic Week (WAW) forum, which brought together over 20,000 participants from 118 countries. Attendees included heads of state, leaders of global nuclear organizations, experts, diplomats, students, entrepreneurs, and many others. The forum featured an exhibition of achievements by Russia's and allied nations' nuclear industries, the "Knowledge. The First" educational marathon, and the second "Composites Without Borders" youth festival. "We are proud to say that only Russia today possesses end-to-end competencies across the entire nuclear technology chain, and nuclear power plants built to Russian designs are the most sought-after in the world thanks to their safety and resilience," Russian President Vladimir Putin declared at the forum.



To mark the anniversary, a new visual identity was introduced, inspired by the modern quantum mechanical model of the atom. In this model, electrons surrounding the nucleus exhibit both particle- and wave-like behavior, described in quantum mechanics as a probability cloud. These models are inherently diverse — often resembling intricate flowers or butterflies.

Quantum computers

Rosatom is engaged in developing quantum processing units (QPU) across multiple physical platforms. For a deeper dive into quantum computing, listen to The Second Quantum Revolution episode on the AtomPro podcast. At year's end, research teams within Rosatom's Quantum Project had successfully completed validation experiments. Two teams developing ion-based QPUs — one using ytterbium, the other calcium — presented prototypes of 70-qubit quantum computers, executing one- and two-qubit operations on them. The ytterbium-ion prototype demonstrated high operational fidelities: 99.98% for single-qubit and 96.1% for two-qubit gates.

Days later, a research group from the Quantum Technology Center at the Moscow State University's Physics Department — also part of the Quantum Project — scaled up its prototype rubidium neutral-atom quantum computer to 72 qubits, achieving a two-qubit gate fidelity of 94%.

Nuclear construction sites

Thinking a century or more ahead is intrinsic to the nuclear industry. Rosatom builds power plants with a 60-year design life, extendable further. Factoring in construction and decommissioning, their lifecycle spans roughly a century.

In Russia, Rosatom is constructing six Generation III+ large power units. Work has also commenced on building two units of the Kola II Nuclear Power Plant in the Murmansk Region, featuring innovative VVER-S reactors with a capacity of 600 MW each.

Construction is equally active abroad. In Bangladesh, fuel loading has begun in the reactor of Rooppur Unit 1. In Egypt, the reactor pressure vessel has been installed at El Dabaa Unit 1. The reactor pressure vessel has been delivered to the site of Akkuyu Unit 4. Hungary has issued a permit for the first concrete pour at Paks Unit 5. Agreements have been signed to construct large power units in Uzbekistan and Kazakhstan.

A critical goal for the global nuclear industry is the development of Generation IV systems. In Seversk (Tomsk Region), construction is underway on a power unit with the BREST-OD-300 lead-cooled fast-neutron reactor. In 2025, workers installed the metal shell of the reactor's central cavity — which will house the nuclear fuel — and positioned the surrounding peripheral cavity shells. The first-of-its-kind nuclear fuel — mixed uranium-plutonium nitride (MUPN) fuel with a liquid sodium sublayer — has been manufactured for this reactor. An analytical simulator for the power unit has been commissioned, and a full-scope simulator has passed comprehensive tests; it will be modified and fine-tuned until April before being shipped to Seversk.

Rosatom will also build another Generation IV system — Unit 5 with the BN-1200M sodium-cooled fast reactor at the Beloyarsk NPP in the Sverdlovsk Region. Preparations for this construction project have already begun. The Mining and Chemical Plant has been selected as the fuel manufacturer for this facility: it has extensive experience producing mixed uranium-plutonium oxide (MOX) fuel on which the BN-1200M reactor will operate.

The development of new small modular reactor (SMR) power units is also of global importance. Rosatom is working on a project for an SMR plant in Yakutia. In Uzbekistan, excavation has begun for the reactor building of the first overseas SMR plant with RITM-200N reactors. Rosatom has already started manufacturing steel billets for the first reactor pressure vessel, which will be shipped to Uzbekistan.

Adding wind…

In December 2025, the first stage of the Novolakskaya Wind Farm in Dagestan began supplying electricity to the Russian national grid. With a current capacity of 152.5 MW, it will reach 300 MW upon completion of the second stage, delivering an average annual output of 879 million kWh. The total capacity of Rosatom's wind farms has reached 1.2 GW.

Rosatom has supplied the first components (nacelles, hubs, generators, towers, and blades) for the construction of the Kok-Moinok Wind Farm (100 MW) in Kyrgyzstan's Issyk-Kul Region.

…and uranium

In Tanzania, Rosatom has launched a pilot uranium processing plant at the Nyota deposit (Mkuju River Project) to test extraction and processing technologies. The data obtained will inform engineering decisions for a full-scale uranium processing plant with a capacity of up to 3,000 tonnes of uranium per year.

In Russia, development of the Dobrovolnoye deposit in the Kurgan Region has commenced, with uranium mining company Dalur having shipped its first batch of uranium products.

Contributing to Arctic development…

In November 2025, the keel was laid for the sixth Project 22220 nuclear icebreaker, Stalingrad. Four icebreakers of this series are already operating in the Arctic, proving their status as workhorses for icebreaker escorts.

In 2025, 23 transit voyages were completed via the NSR (up from 14 in 2024). The volume of transit cargo grew by 3.82%, reaching a record 3.2 million tonnes. A landmark event was the successful completion of the first-ever transit container voyage from China to Europe via the Northern Sea Route. A container ship with 25,000 tonnes of cargo completed the journey from Ningbo (China) to Felixstowe (UK) in just 21 days, compared to 40 days via the southern route. For more on the Northern Sea Route, listen to the AtomPro podcast.

Another key indicator: by the end of 2025, Rosatom companies had manufactured 12 RITM-series reactors for the Russian nuclear icebreaker fleet. More are on the way: 14 small reactors for icebreakers and land-based/floating power units are at various stages of production. In 2025, 3D printing technology was introduced for manufacturing RITM-200 components: a part of the pump for the marine reactor plant was produced using additive manufacturing, a practice set to expand further in reactor construction.

…and space exploration

Rosatom researchers have developed a laboratory prototype of a plasma propulsion engine based on a magnetoplasma accelerator with enhanced thrust (at least 6 N) and specific impulse (at least 100 km/s). The engine, when operating in a pulsed mode, achieves an average power of 300 kW, unmatched by any existing technology. Such engines could accelerate spacecraft to very high speeds and use fuel dozens of times more efficiently, potentially reducing a Mars mission's duration from 6–9 months to 30–60 days.

Furthermore, Rosatom is developing carbon fiber for the space industry based on isotropic and mesophase pitches, which is resistant to thermal deformation. It will significantly improve the performance of composite materials used in specialized equipment. Unique properties of this fiber will be valuable for creating large satellite system reflectors, structural elements and radiator panels for long-duration space stations and deep-space missions, orbital structures, and heat removal systems based on carbon-carbon composites with high thermal conductivity.

Sun on Earth

The first of four Russian test stands for vacuum, thermal, and functional testing of key diagnostic systems of the International Thermonuclear Experimental Reactor (ITER) has been delivered to the construction site under Rosatom's coordination. The next stage involves testing under near-real conditions. The test stand — one of the most complex and science-intensive systems under Rosatom's responsibility — underscores its leadership in megascience-class technologies. For more on the ITER project, listen to the AtomPro podcast.

Clean and safe

Finally, Rosatom puts much effort into ensuring that nuclear technologies remain safe for people and the environment — a prerequisite for their global recognition and acceptance.

Rosatom signed a contract with the Belarusian NPP for the safe management of the plant's spent nuclear fuel. This is the world's first contract implementing the balanced nuclear fuel cycle concept, which aims to minimize waste and maximize the use of energy contained in natural uranium.

Rosatom has finalized a technology for processing liquid radioactive sodium coolant, enabling the safe decommissioning of fast reactors using such coolant. Key advantages include the absence of

gaseous emissions, explosion and fire safety, and a short, single-stage process.

Rosatom scientists have successfully completed the first stage of testing an experimental high-sensitivity analyzer for xenon and krypton radionuclides in air. The device can detect traces of unauthorized nuclear tests and accidents at nuclear facilities. Scientists have also developed the world's first technology for simultaneously extracting three platinum group metals from spent nuclear fuel — metals that complicate the vitrification of high-level waste. Their extraction improves the quality and safety of the resulting glass. Additionally, Rosatom researchers have completed the first phase of design work for a molten salt research reactor.

The successes and achievements of 2025 not only reinforce Rosatom's position in the global nuclear technology market but also broaden international recognition of nuclear energy's transformative potential. Nuclear technologies deliver reliable electricity, unite scientists across borders, drive breakthrough discoveries, and improve lives across our planet.

Photo by: Rosatom State Corporation, Rosatom Renewable Energy, NIIEFA JSC, Atomflot FSUE, Kursk NPP, Strana Rosatom newspaper

Knowledge, Technology, People

In 2025, cooperation between Rosatom and Indonesia reached a new level. Russian and Indonesian delegations were active at the key business events in both countries. Social and cultural initiatives also flourished, ranging from the participation of Indonesians in the Icebreaker of Knowledge educational expedition to a professional women's community meeting in Jakarta. Here are the main highlights of the past year.

The expert dialogue in 2025 focused on discussing large-scale nuclear generation and small modular reactor (SMR) solutions for Indonesia. Rosatom participated in the country's key industry events to present its technologies in this field. In late November, Rosatom took part in Southeast Asia's largest energy exhibition, Electricity Connect 2025, held in Jakarta.

Rosatom's booth, displaying nuclear solutions relevant to the Southeast Asian region, was visited by leading Indonesian businessmen and government officials, including Darmawan Prasodjo, CEO at Indonesia's national electricity company PT PLN, Dadan Kusdiana, Secretary General of the National Energy Council, and other guests.

"Growing electricity demand across many regions of the country can be effectively met by large and small nuclear power plants, including floating power units. Rosatom possesses unparalleled experience and the necessary time-proven technologies to provide Indonesia with a comprehensive solution that will allow for developing nuclear energy in accordance with the needs of a growing economy," said Vladimir Aptekarev, Deputy Head of Rosatom's Mechanical Engineering Division, speaking at one of the sessions.

In September, Rosatom took part in an international nuclear energy workshop organized by PT PLN. According to Anna Belokoneva, Head of Rosatom's office in Indonesia, floating power units providing electricity to remote territories could be the optimal solution for Indonesia, which has over 17,000 islands, and so could land-based large or small nuclear power plants.

In June, the St. Petersburg International Economic Forum (SPIEF) hosted the Russia-Indonesia Business Dialogue attended by business community representatives from both countries. Andrey Nikipelov, Deputy Director General for Mechanical Engineering and Industrial Solutions at Rosatom, spoke about the advantages of nuclear energy in general and small modular reactors (SMRs) in particular. "Nuclear energy offers a solution where one does not have to choose between sustainable power and environmental concerns. Large and small-scale nuclear generation can provide reliable green energy for both people and the country's industry, and Rosatom has unparalleled expertise in building and operating such power facilities," Andrey Nikipelov noted.

The year's most important practical outcome was the signing of a Memorandum of Understanding

(MoU) on cooperation in conducting a preliminary feasibility study for the construction of Russian-designed nuclear power plants in Indonesia. The document was signed in September at the World Atomic Week international forum. The memorandum outlines further steps in expanding Russian-Indonesian cooperation to evaluate options for integrating nuclear power into Indonesia's energy mix.

From Jakarta to the North Pole

Along with business activities, Rosatom and Indonesia strengthened their social and cultural ties. Last autumn, Jakarta hosted an open dialogue on the role of women in the nuclear industry. The event brought together delegates from 20 countries, including representatives of the nuclear and tech sectors, and medical, educational, and scientific organizations.

"Today's dialogue serves as a bridge connecting institutions, industries, and, most importantly, people — women scientists, engineers, innovators, and policymakers who believe that technology should serve humanity. Our cooperation reflects the growing role of women in shaping the future of high-tech industries, from nuclear energy to digital technologies," noted forum co-organizer Geni Rina Sunaryo, Head of the Women's Potential Development Department at the Indonesian Nuclear Society (HIMNI).

One of the past year's highlights was the well-deserved second place taken by a team from Indonesia in the final of the Global HackAtom international student hackathon organized by Rosatom. The national stage was held in July in Jakarta at the Polytechnic Institute of Nuclear Technology under the auspices of the National Research and Innovation Agency (BRIN). Fifteen teams from nine universities participated in the in-person part. The winning team, Tahu Sumedang from Padjadjaran University, traveled to Moscow in September for the Global HackAtom final, which was dedicated to nuclear-powered space exploration. The Indonesian team proposed a concept for applying nuclear technologies to maintain circadian rhythms during long-distance space travel. The jury praised the project, awarding the team second place.

Another second place went not to students, but to fishermen competing at the international fishing tournament organized by Rosatom. The tournament took place in Türkiye, near the Akkuyu NPP construction site, with fourteen amateur anglers from seven countries participating. Indonesian anglers Aiptu Hamzah Basri and Mulyadi Umar from Kendari (the province of Southeast Sulawesi) caught 6.5 kg of fish, earning the silver medal. During the tournament, the fishermen had the opportunity to visit the nuclear plant under construction, talk with local residents, and verify the safety of nuclear technologies for themselves.

Finally, participating in the Icebreaker of Knowledge 2025 international Arctic expedition organized by Rosatom became an unforgettable experience for student Priya Wicaksono and Professor Topan Setiadipura from Indonesia. In August 2025, they traveled to the North Pole aboard the 50 Let Pobedy nuclear icebreaker. On board were 66 high school students from 21 countries, accompanied by experts, including renowned researchers and science communicators from various fields. "This experience effectively strengthened my conviction that human civilization needs nuclear energy," Topan Setiadipura said.

Photo by: Rosatom International Network, Kalinin NPP, Strana Rosatom newspaper

Future Energy in Action

The year 2025 brought Bangladesh closer to a historic event, the launch of its first nuclear power plant. The pace of work was intense at the site of Rosatom-led construction of the Rooppur NPP, with Unit 1 undergoing a series of crucial tests that demonstrated its reliability and safety. Meanwhile, the country continued to strengthen its national nuclear industry. Let's revisit the key milestones of the year.

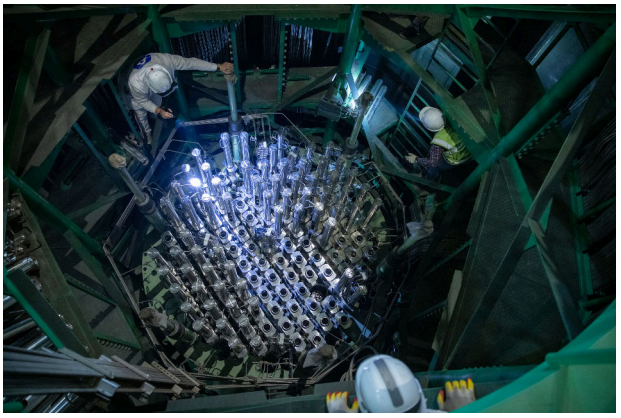
In August, Unit 1 of the Rooppur Nuclear Power Plant passed a crucial stage of cold and hot functional tests in preparation for the commissioning operations: steam heated to 200°C was blown at a pressure of 2.0 MPa through the fresh steam pipes in the turbine building. This process aims to clean the steam lines of any residual moisture, industrial contaminants, and mechanical particles.

The preceding month, July, saw the successful hot functional testing of the reactor at Unit 1, a pivotal step toward first criticality. During the tests, the reactor was gradually heated up, while engineers methodically assessed the performance of key components — pumps, pipelines, and heat exchangers — under these conditions. Hot functional testing demonstrates whether the reactor systems are ready to function under near-real conditions and how precisely all mechanisms operate.

Earlier at Unit 1, engineers conducted pressure and strength tests on the reactor containment building. The tests confirmed full compliance with design specifications and the highest safety standards.

In June, step-up transformers and auxiliary transformers were successfully commissioned. The step-up transformers are among the most critical components of the power unit: they convert 24kV voltage generated by the turbine generator into 400 kV, enabling electricity to be fed into the national grid.

In March, hydraulic pressure tests were completed on the primary coolant systems and equipment of Unit 1, and the turbine was installed. Technicians performed control checks to confirm the alignment accuracy and high quality of the turbine build. Concurrently, a 50-tonne overhead crane for Rooppur Unit 2 was shipped from Russia. Advanced 16-tonne and 32-tonne electric gantry cranes had previously been delivered to the port of Novorossiysk (Russia).



Simultaneously, an all-around emergency response drill was launched at the Rooppur construction site. Response teams practiced actions to localize and mitigate the consequences of a simulated radiation accident on the plant's premises.

World Atomic Week

In late September, a delegation from Bangladesh participated in the World Atomic Week (WAW) international forum held in Moscow. The country's representatives discussed the development of conventional nuclear power and learned about Rosatom's new business ventures, while young

professionals — graduates of Rosatom's partner universities — had the opportunity to network with peers from around the world.

Bangladesh is the second South Asian country set to have its own nuclear power plant. Stable and reliable nuclear energy is essential for the nation, noted Sama Bilbao y León, Director General of the World Nuclear Association (WNA): power consumption in Bangladesh is growing very rapidly, at about 7% per year. Ensuring universal access to electricity is critical for accelerated economic development. Therefore, the launch of the Rooppur NPP with two reactors totaling 2,400 MW will be a game-changer. "Rooppur represents a revolutionary opportunity for Bangladesh. It is a story of success!" Bilbao y León concluded.

In addition to participating in the WAW business program, forum guests eagerly explored the exhibition dedicated to the Rooppur project. They learned about key project milestones and also discovered Bangladesh culture and traditions. Furthermore, the visitors had the chance to sample dishes from traditional Bangladeshi cuisine in the Nuclear Power Countries' Cuisines themed zone.

Educational initiatives

In December, Bangladesh hosted a large-scale Science Festival. Its main attraction was an "atomic bus" – a mobile educational hub designed with a popular science theme. Representatives from the Bangladesh Atomic Energy Commission and Rosatom toured towns in the Pabna district, meeting with local residents, answering their questions, and dispelling common myths about nuclear energy.

In October, over 600 university and high school students from Bangladesh took part in the final of the Precise Energy Olympiad, an international competition organized with Rosatom's support. The competition covered three main subject areas: physics, chemistry, and mathematics, and also included a creative team contest focused on solving real-world engineering tasks.

In August 2025, the sixth Rosatom-supported Icebreaker of Knowledge expedition for students aged 14–16 set sail. The nuclear icebreaker 50 Let Pobedy carried 65 students, including a representative from Bangladesh, to the North Pole. All of them were winners of open Russian and international competitions. Bangladesh submitted a record 841 applications for the competition, which saw around 4,000 participants from 20 countries.

"I first heard about this expedition from my school teacher and immediately decided to enter the competition. Fortunately, I won the chance to travel to the North Pole. I was deeply inspired to be here," Mahmoud Al Abdullah, an expedition member from Bangladesh, shared his story.

In April, members of the Bangladeshi team excelled at the annual AtomSkills championship for working and engineering professions, securing 1st, 2nd, and 3rd places in various categories. In 2025, AtomSkills brought together over 2,000 professionals. For five days, representatives from 16 Rosatom divisions, major companies' teams, and students competed in the professional and student leagues for the title of the best in their occupation.

Photo by: Rosatom State Corporation, ASE JSC, "Knowledge Icebreaker" educational project

Akkuyu on the Homestretch

For the Akkuyu project, 2025 was the year of multi-faceted progress. Critical equipment for all four power units was delivered and installed at the site. Active business cooperation between Turkish and Russian nuclear professionals continued, with important social and cultural initiatives launched. Overall, Türkiye's first nuclear power plant project, the Akkuyu NPP, entered the homestretch in 2025.

In mid-March, engines of all four primary coolant pumps were run at idle at Akkuyu Unit 1, an important phase of the pre-commissioning operations preceding the first criticality. Engineers inspected the lubrication and bearing cooling systems, as well as the monitoring, control and diagnostics systems.

The main overhead crane with a lifting capacity of 350 metric tons was commissioned in the turbine hall of Unit 2. Additionally, a pressurizer was installed at the same unit.

The installation of primary coolant pumps (PCPs) in the reactor building marked the completion of the main equipment installation phase for the reactor plant of Unit 2.

In late March, a seawater desalination facility was put into operation on the plant site. Desalinated water will be used for utility needs and fire safety systems. Seawater is first evaporated in the specialized evaporators and then condensed to produce high-purity distillate, which is then processed into ultrapure chemically demineralized water. It may also be possible to produce high-quality potable water in the future.

In June, electric motors for the technical water supply pumps were started up at the coastal pumping station of Unit 1. This system will provide water to the cooling equipment buildings and the central compressor station.

In late July, concreting of the walls was completed for the turbine hall of Unit 3.

In late October, 42,000 items of the instrumentation and control (I&C) system equipment for the first power unit were delivered to the Akkuyu site. The shipment included control cabinets, controllers, computing modules, and auxiliary components.

In November, a reactor pressure vessel (RPV) for Unit 4 was delivered to the Akkuyu construction site. Together with the RPV, a containment airlock for Unit 3 and a pressurizer for Unit 4 arrived at the site.

In December, nominal voltage from the external power grid was supplied to some of the 400 kV gas-insulated switchgear (GIS) systems at the site. This operation is intended to confirm that the GIS equipment is ready to receive and transmit electricity generated by Akkuyu Unit 1 to Türkiye's national power grid.

Beyond the construction site

To ensure that Türkiye's Akkuyu NPP operates reliably and for a long time, Russian nuclear engineers are developing advanced solutions for the nuclear plant. Rosatom Automated Control Systems (RASU) successfully integrated a turbine control and protection system and an upper-level block system (ULBS) for Akkuyu. A European-manufactured turbine to be installed at Akkuyu uses the international OPC protocol for data exchange (the Russian upper-level system uses the DTS protocol). RASU engineers have developed a 'translator' that converts signals collected from the turbine sensors and detectors into the DTS standard and transmits them to the operating personnel.

In June, Akkuyu NPP lab technicians completed a training course ahead of their upcoming ISO 17025 certification.

In early August, a delegation from Turkish ministries and agencies led by Deputy Minister of Energy and Natural Resources Zafer Demircan paid a two-day visit to the site. Members of the delegation held meetings with the Nuclear Regulatory Authority, Rosatom, Akkuyu Nuclear JSC, and major contractors.

Business activity

The role of nuclear energy in the green energy transition was discussed at the 10th Carbon Summit held in Istanbul in April. Polina Lyon, Chief Sustainability Officer at Rosatom, presented proprietary nuclear energy solutions designed to reduce greenhouse gas emissions. "We hope that nuclear energy will be included in Türkiye's green taxonomy as green and sustainable since this will lay a solid foundation for the country to meet its international commitments on carbon neutrality by 2053," Polina Lyon noted.

In July, Rosatom took part in the Nuclear Power Plants 7th Expo and 11th Summit (NPPES 2025) held in Istanbul and drawing more than 1,400 delegates and 212 companies. The Russian nuclear corporation showcased its advanced large and small-scale nuclear power technologies, multifunctional nuclear science and technology centers based on research reactors, and logistics solutions. A separate event was dedicated to the 80th anniversary of the Russian nuclear industry. According to Boris Arseev, Rosatom's Director for International Business, Rosatom holds roughly 90% of the global market for overseas construction of large nuclear power plants. "Thanks to combining vast experience and a wide range of competencies, Rosatom offers not just a product, but an entire ecosystem, including infrastructure development, personnel training, and assistance in developing science and education," the speaker emphasized.

The Akkuyu NPP project was in the focus of attention at the World Atomic Week (WAW) international forum held in Moscow in late September. Thousands of guests visited the exhibition dedicated to the plant under construction. Turkish representatives took part in all key events of the forum.

During the opening ceremony, a video link connection launched the ceremonial shipment of the latest VVER-1200 reactor vessels — for Akkuyu Unit 4 in Türkiye and El Dabaa Unit 1 (Egypt). Turkish Deputy Minister of Energy and Natural Resources, Zafer Demircan, highlighted the important role of nuclear power in the country's energy mix. "Thanks to the nuclear plant, we will be able to meet 10% of our electricity demand and reduce carbon emissions by 35 million tons per year," he said.

Social and cultural ties

As in years past, Akkuyu Nuclear JSC handed over food packages to local authorities for 1,200 families in the Gülnar and Silifke districts of the Mersin Province during the holy month of Ramadan.

Throughout the year, the construction site was visited by school and university students, and representatives of public organizations. For instance, in April, high school students and teachers from the Aydıncık High School (Mersin Province), and heads of the Aydıncık District Education Directorate, visited the site, followed in November by groups of students from the country's leading Hacettepe University (Ankara).

On the eve of the National Sovereignty and Children's Day, Akkuyu Nuclear held a celebration for schoolchildren in the region: they launched 81 kites

into the sky, representing the number of provinces in Türkiye.

Ahead of May 19, the Commemoration of Atatürk, Youth, and Sports Day, Rosatom organized a meeting between two generations of Turkish nuclear professionals, employees from Akkuyu Nuclear JSC and students from Silifke Vocational School, which trains technical personnel for in-demand nuclear industry roles.

Employees working at the Akkuyu NPP site do not stand aside when help is needed. In August, professional firefighters and volunteers of the firefighting team — 80 people in total — helped extinguish a large forest fire covering around 6,000 hectares near the towns of Kırtıl and Taşucu.

In late October, the third international fishing tournament was organized by Rosatom in the Mersin Province near the Akkuyu construction site. It brought together 14 amateur anglers, experts, and journalists from seven countries.

Türkiye was also the final destination for the international Sails of the Spirit initiative supported by Rosatom. The initiative aims to build an international community that recognizes the value of the additional abilities a person develops by adapting to limitations through effective socialization.

Photo by: Rosatom State Corporation, Akkuyu Nuclear JSC