ROSATOM





80 YEARS OF RUSSIAN NUCLEAR INDUSTRY

PERFORMANCE OF STATE ATOMIC ENERGY CORPORATION ROSATOM

2024

Prioritised topic of the report: ‘Contribution of the nuclear industry to ensuring safety, reliability and self-reliant technological development in Russia’









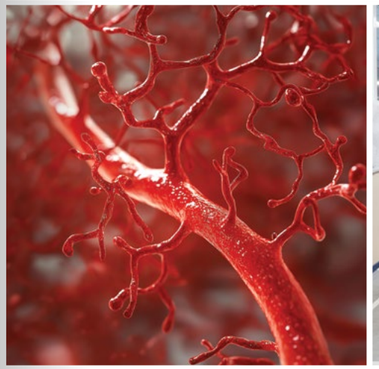
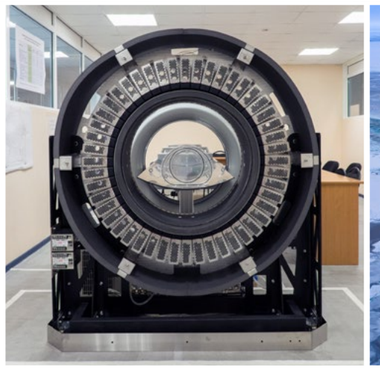





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STATEMENT OF THE CHAIRMAN OF THE SUPERVISORY BOARD

Dear colleagues,

In 2024, ROSATOM continued to accomplish strategic objectives set by the President and the Government of the Russian Federation in the most efficient way possible.

The state defence order, whose scope had expanded dramatically, was 100% fulfilled by ROSATOM's organisations. Performance against ROSATOM's key performance targets stood at 111.3%. The share of Russian nuclear power plants in the country's energy balance remains steady at 18.5%. The Russian nuclear-powered icebreaker fleet once again proved that it plays a key role in the development of the Arctic. A new record was set for cargo traffic and transit volumes.

Despite persisting international economic and political pressure, ROSATOM is successfully implementing international projects in 60 countries globally, including projects to build new nuclear power units abroad. The construction of new NPPs in Turkey, Egypt, China, Bangladesh, Hungary and other countries is progressing rapidly; agreement has been reached on the construction of the first exported Russian-design small nuclear power plant in Uzbekistan. All these initiatives help strengthen Russia's position as a global leader in the nuclear power industry.

ROSATOM achieved impressive results by diversifying its business and developing new businesses. Revenue from the sales of new products and solutions developed by ROSATOM increased by 34% year on year; innovative digital platforms, medical equipment and new energy solutions were launched on the market; a new wind farm was put into operation in the Stavropol Territory. All this reflects ROSATOM's commitment to sustainability principles.

Special mention should be made of ROSATOM's major contribution to the implementation of large-scale programmes aimed at providing social and economic support to nuclear towns and cities, including the city of Enerhodar, and ensuring the safe operation of Zaporozhye NPP.

ROSATOM remains a model of sustainable development and efficient management in a challenging economic and geopolitical environment. The results achieved by the Corporation have been made possible by its well-thought-out strategy, business diversification, an effective HR policy and adherence to the principles of social responsibility.

I am convinced that the well-coordinated work of our team, the adoption of breakthrough solutions and the unconditional fulfilment of all our commitments will provide a solid foundation for the achievement of our new strategic goals in 2025 and beyond.

I would like to express my sincere thanks to ROSATOM's management and all of the Corporation's employees for their professionalism, strong performance and significant contribution towards achieving national development goals, ensuring the technological sovereignty of the Russian Federation and enhancing its standing in the international arena.

Sergey Kirienko,
Chairman of the Supervisory Board of ROSATOM



ABOUT ROSATOM

GRI 2-1 State Atomic Energy Corporation Rosatom (hereinafter referred to as ROSATOM or the Corporation) is a diversified corporation owning assets and possessing competencies at all stages of the nuclear production chain: uranium exploration and mining, uranium conversion and enrichment, nuclear fuel fabrication, NPP design and construction, mechanical engineering, power generation, decommissioning of nuclear facilities, spent nuclear fuel and radioactive waste management.

The Corporation comprises over 500 organisations, including research institutes, the nuclear weapons division and the world's only nuclear-powered icebreaker fleet. ROSATOM is tasked with implementing a uniform government policy on nuclear power and fulfilling Russia's international commitments related to the peaceful use of nuclear energy and maintaining the non-proliferation regime.

ROSATOM is one of Russia's largest power generation companies and a leading player on global markets for nuclear technologies (NPP construction, uranium enrichment services, nuclear fuel fabrication, decommissioning, etc.). ROSATOM carries out numerous large-scale international projects and generates substantial overseas revenue.

The scope of the Corporation's business also includes the production of innovative nuclear and non-nuclear products, scientific research, development of the Northern Sea Route and environmental projects, including the creation of environmental technology parks and a state system for hazardous industrial waste management. ROSATOM is also developing new businesses. These include wind power, healthcare, digital products, infrastructure solutions, additive manufacturing and energy storage systems, process control systems and electrical engineering, environmental solutions, etc.

The Corporation's research activities are aimed at developing new solutions for the power industry and innovative technologies that will improve the quality of people's lives. ROSATOM's key project focused on new products for the nuclear power industry is the Proryv (Breakthrough) Project,[1] which is aimed at demonstrating the possibility of closing the nuclear fuel cycle using fast neutron reactors and developing the relevant technologies. A closed nuclear fuel cycle will significantly improve the efficiency of usage of natural uranium and will help solve the problem of nuclear waste accumulation and provide humankind with a reliable long-term source of clean energy.

The issues of limited natural uranium resources and the existence of deferred solutions for spent nuclear fuel (SNF) management can be addressed through the development and industrial implementation of closed nuclear fuel cycle technologies, which involve the fractionation of reprocessing products, and fast reactor technologies, which make it possible to replenish fissile materials and incinerate long-lived minor actinides with a high level of radioactivity. This also helps address the postponed issue of SNF accumulation: reprocessed uranium is recycled in thermal neutron reactors; plutonium and minor actinides are used in fast reactors; the amount of time required for residual waste to achieve radiological and radiation equivalence to natural uranium is reduced several-thousand-fold, and its amount is also drastically reduced.

1. The project forms part of the Comprehensive Programme 'Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2030'.

ROSATOM today

No. 1

in terms of NPP exports (22 large power units under construction in seven countries worldwide, accounting for 88% of the global market), with the Corporation's portfolio of overseas NPP construction projects comprising 33 large power units and 6 small power units in 10 countries globally

No. 1 › in the world in terms of uranium enrichment (39% of the global market)

No. 2 › in the world in terms of uranium reserves

No. 3 › in the world in terms of uranium production (15% of the market)

No. 3 › on the global nuclear fuel market (19%[1])

THE WORLD'S ONLY

nuclear-powered icebreaker fleet

18.5%
share in electricity generation in the Russian Federation[2]

580
organisations managed by the Corporation

RUB 865.9 BILLION
total personnel costs in 2024

RUB 36.44 BILLION
expenditure on environmental protection in 2024

418,000 PEOPLE number of employees of ROSATOM and its organisations

1. The calculation does not include 23 NPP power units (Japan, India) which were classified as in suspended operation as at 31 December 2024, according to data in the IAEA Power Reactor Information System (PRIS).
2. Within the Unified Power System of Russia.



80 YEARS OF RUSSIAN NUCLEAR INDUSTRY

1

STRATEGIC REPORT

Igor Kurchatov (1903–1960)

In the autumn of 1945, a group of physicists headed by Igor Kurchatov produced an extensive memo on nuclear issues, which provided a detailed description of potential applications of nuclear energy. On 16 May 1950, Joseph Stalin signed the Decree of the Council of Ministers of the USSR on Scientific Research, Projects and Experimentation Focused on the Peaceful Use of Nuclear Energy. Under Kurchatov's supervision, plans were developed for extensive use of nuclear energy in the country. Starting from 1950, Igor Kurchatov worked actively on the development strategy for the nuclear industry.

GRI 2-22

STATEMENT OF THE DIRECTOR GENERAL

Dear readers,

I would like to present to you ROSATOM's public report for 2024 (hereinafter referred to as the Report), which the Corporation prepares in accordance with Russian and international reporting standards in line with its commitment to the principles of openness, transparency and materiality.

In the reporting year, ROSATOM successfully accomplished all tasks set by the government and fulfilled all its obligations to foreign partners. The state defence order was 100% fulfilled. Performance of Russian nuclear power plants against the balance target for electricity output set by the Federal Antimonopoly Service stood at 100.7%. Nuclear power makes an important contribution to the implementation of the 'green' agenda as its share in Russia's energy balance remains at about 19%.

In 2024, the Corporation's revenue totalled RUB 3,087.7 billion, up by 20% year on year. The Corporation attaches great importance to improving its performance, reducing the lead time and the cost of its projects, and increasing labour productivity.

Major highlights of the year included the approval of the Energy Strategy of the Russian Federation until 2050 and the General Scheme for the Locations of Power Facilities until 2042 by the Government of the Russian Federation. These documents outline plans to increase the share of nuclear power generation to 25% by 2045, with 38 NPP power units to be commissioned by 2042. Their combined capacity will total 29.3 GW, which is comparable to the current combined capacity of Russian nuclear power plants. The decision to build two power units of Primorskaya NPP in order to support the development of the Far Eastern Federal District was an important step.

The construction of new NPP power units was underway both in the Russian Federation and abroad. Concreting was started at power unit No. 3 of Leningrad NPP-2, and site preparation for the construction of power units No. 1 and 2 of Smolensk NPP-2 was started. The fuel fabrication/refabrication module, which is the first stage of the Proryv Project, started pilot operation. It will produce fuel for the BREST-OD-300 reactor in Seversk, which will become the core of the world's first Generation IV nuclear energy facility.

In terms of overseas construction projects, I would like to highlight the start of concreting at power unit No. 4 of El Dabaa NPP in Egypt, the shipment of a reactor vessel and two steam generators for power unit No. 8 of Tianwan NPP in China, and the reactor vessel being moved into permanent position at power unit No. 4 of Xudapu NPP. A protocol was signed on the start of work at the construction site of the first overseas Russian-design small nuclear power plant in Uzbekistan.

As part of the Ecology National Project, the Infrastructure for the Management of Hazard Class 1 and 2 Waste Federal Project was completed in 2024, with ROSATOM being responsible for its implementation. This included the start of pilot operation of the Gorny and Schuchye state-of-the-art environmental technology parks in the Saratov and Kurgan Region, which use domestically developed technologies. The reclamation of the left-bank waste landfill in Magnitogorsk was completed. The Corporation continues to work in Usolye-Sibirskoe and Krasny Bor and at the site of the Baykalsk Pulp and Paper Mill.

In the reporting year, the Corporation set a new record in terms of cargo transportation along the Northern Sea Route (NSR) as cargo traffic grew by 4.5% compared to 2023 and reached 37.9 million tonnes. Cargo transit volumes also reached a new high of 3.1 million tonnes, which is almost 1.5 times more than in 2023. The construction and commissioning of new nuclear icebreakers is well underway: in 2024, the national flag was raised on the third follow-on Project 22220 nuclear icebreaker, *Yakutia*; the fourth icebreaker, *Chukotka*, was launched, and the keel of two new vessels, namely the fifth follow-on icebreaker, *Leningrad*, and a nuclear maintenance ship, *Vladimir Vorobyev*, was laid.

In 2024, ROSATOM expanded its footprint abroad, with projects currently underway in more than 60 countries globally. The 10-year portfolio of overseas orders reached USD 128.8 billion, while revenue from overseas projects increased by 10% year on year to USD 18 billion.

Significant progress was made in digitisation. Prototypes of quantum processors based on four main technological platforms were developed, including two 50-qubit quantum processors. The share of Russian software used in the Corporation reached 80%; competence centres were established in order to replace foreign digital solutions; digital twins were designed for NPPs, uranium mining and polymer composite production processes, which has helped improve the efficiency of production processes. Two new data centres, Moscow-2 and Innopolis, were launched. In addition, memoranda were signed with universities in Uzbekistan, and exchange programmes for specialists were launched with BRICS countries.

FESCO Transportation Group, which has been included in the scope of the Corporation, demonstrated strong performance in the reporting year. The company beat its own record as it increased the number of containers and well cars to 200,000 and almost 15,000 respectively. The Commercial Port of Vladivostok remains a leader in terms of container turnover in Russia for a fifth year in a row. These successes and an extensive network of assets and logistics services enable FESCO to remain an undisputed leader in terms of seaborne cargo imports into Russia.

2025 sees the 80th anniversary of establishment of the nuclear industry in our country. Accordingly, this report focuses not only on the achievements of the past year but also on the proud history of the Russian nuclear industry. The overarching theme of the anniversary year can be encapsulated by three words: 'pride, inspiration, dream'. We are proud of the great deeds of the founders of the nuclear industry and inspired by the achievements of the past generations of nuclear scientists and engineers, and we aspire to navigate new frontiers and extend the boundaries of what is possible.

Our successes are the product of the rich scientific heritage and the experience of several generations of nuclear scientists and engineers, extensive engineering and production capabilities, and human and intellectual capital in the industry. In the future, we will focus on achieving our strategic goals and will seek to become a global technological leader, develop our talent pipeline and continuously improve our business model.

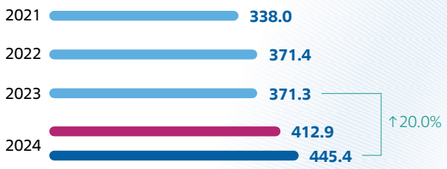
Alexey Likhachev,
Director General of ROSATOM



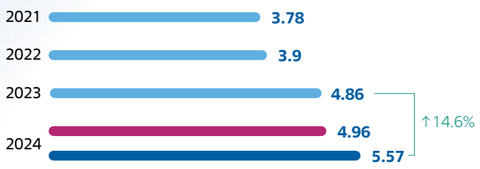
KEY RESULTS IN 2024

Key performance indicators set by the Supervisory Board

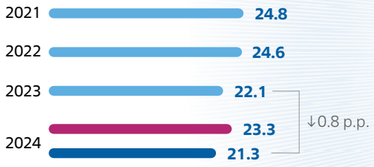
Adjusted free cash flow, RUB billion



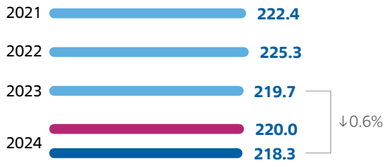
Consolidated labour productivity, RUB million/person



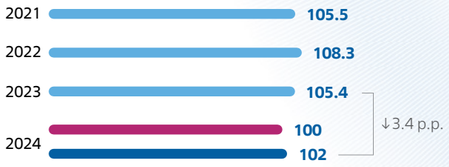
Unit semi-fixed costs (as a percentage of revenue), %



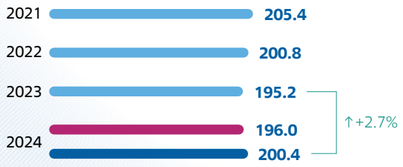
Power generation (NPPs + WPPs), billion kWh[1]



Performance against the targets of the investment programme of the Power Engineering Division, %



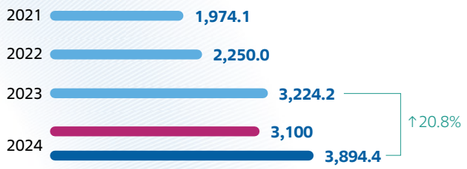
Portfolio of overseas orders covering the entire life cycle, USD billion



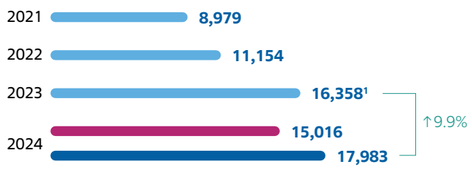
Target Actual

1. Starting from 2022, the indicator includes both nuclear and wind power generation.

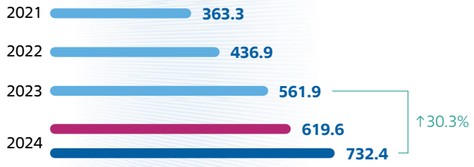
ROSATOM's 10-year portfolio of orders for new products (outside the scope of the Corporation), RUB billion



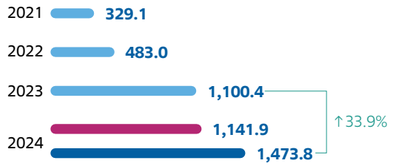
Foreign revenue, USD million



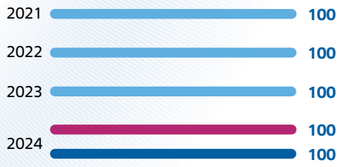
EBITDA, RUB billion



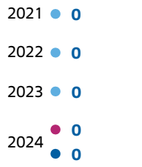
Revenue from new products (outside the scope of the Corporation), RUB billion



Fulfilment of government orders, %



Absence of events rated above level 2 on the INES scale in the industry



Target Actual

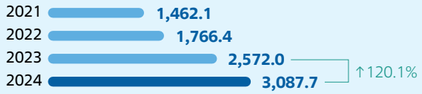
1. Actual figure for the purpose of presenting key performance indicators, adjusted to exclude the impact of foreign exchange differences.

Financial and Economic Performance[1]

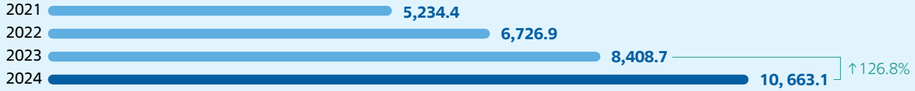
GRI 2-4
MED 1

Key financial results, RUB billion

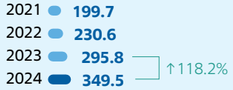
Revenue



Assets

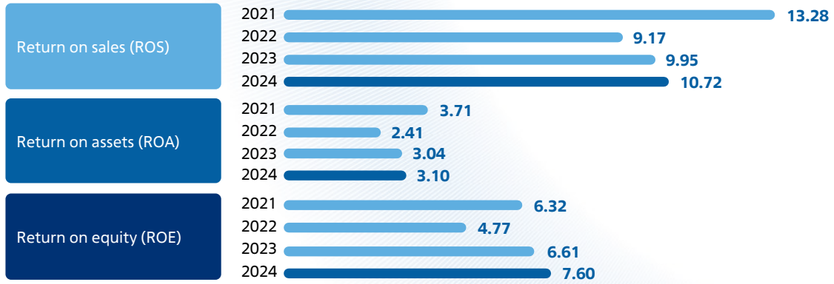


Intangible assets



A 20.1% increase in revenue compared to 2023 was driven mainly by an increase in revenue from the sales of transportation services, uranium-containing products and enrichment services, from NPP construction projects, the sales of purchased electricity and generated electricity, heat and capacity, as well as other energy resources.

Profitability ratios, %



Profitability ratios increased in 2024, primarily due to a year-on-year increase in profit in the reporting period.

1. Data have been provided on the part of the scope of IFRS consolidation of ROSATOM for which information is publicly available. Comparative data for 2023 have been recalculated due to the fact that the effect of fair value measurement of recognised assets and assumed liabilities of subsidiaries acquired in 2023 was recognised in 2024.

KEY EVENTS IN 2024



NPP construction

January

23 January. An official ceremony was held to mark the start of concreting of the foundation slab of power unit No. 4 at the construction site of El Dabaa NPP in Egypt.

March

14 March. A ceremony was held to mark the start of concreting at power unit No. 3 at the construction site of Leningrad NPP-2.

May

27 May. A package of documents was signed for the construction of a small NPP in Uzbekistan, including the world's first export contract for SNPP construction.

June

5 June. The 10UMA turbine was placed on the barring gear at power unit No. 1 of Kursk NPP-2.

August

A reactor vessel and two steam generators were shipped for power unit No. 8 of Tianwan NPP (China).

September

A protocol was signed on the start of work at the construction site of the small NPP (SNPP) to be built in Uzbekistan.

December The reactor vessel was moved into permanent position at power unit No. 4 of Xudapu NPP (China).

December **25 December.** The fabrication/refabrication module (FRM) started pilot operation; it will produce fuel for the BREST-OD-300 reactor (currently under construction), which is the first stage of the Proryv Project.



Wind power

March **4 March.** The second stage of the Trunovskaya WPP in the Stavropol Territory with installed capacity totalling 35 MW started to supply electricity to Russia's integrated power grid.

November **27 November.** An official ceremony was held to mark the concreting of the first foundation at the construction site of the Novolakskaya WPP in the Republic of Dagestan.

December An investment agreement providing for cooperation in wind power generation was signed with the Cabinet of Ministers of the Kyrgyz Republic.

December ROSATOM's Composite Materials Division launched the production of wind turbine blades for renewable energy generation at a site in Ulyanovsk.



Digital products

Prototypes of quantum processors based on four main technological platforms were developed, including two 50-qubit quantum processors.

The share of Russian software used in ROSATOM reached 80%; competence centres (ICCs and DCCs) were established in order to replace foreign solutions.

Digital twins were designed for NPPs, uranium mining (ISL) and polymer composite production processes, which has helped improve the efficiency of production processes.

Two new data centres (Moscow-2 and Innopolis) were launched.

Memoranda were signed with universities and organisations in Uzbekistan; exchange programmes for specialists were launched with BRICS countries.



Environmental protection

- ROSATOM completed the reclamation of the left-bank waste landfill in Magnitogorsk.
- The first two out of seven environmental technology parks, namely the Gorny and Schuchye facilities, started pilot operation; this will help provide basic infrastructure for advanced waste processing.
- The last batch of spent nuclear fuel was removed from the coastal maintenance base of the Navy in the CATF of Ostrovnoy (the village of Gremikha).
- More than 92% of buildings and structures were dismantled at the site of the defunct Usolyekhimprom enterprise in Usolye-Sibirskoye (Irkutsk Region).



Development of the Arctic and the NSR

- **January** — **26 January.** The keel of the fifth follow-on Project 22220 multipurpose nuclear icebreaker, *Leningrad*, was laid in Saint Petersburg.
- **October** — **6 October.** The fourth follow-on Project 22220 nuclear icebreaker currently under construction, *Chukotka*, was launched.
- **December** — **20 December.** The keel of a multipurpose nuclear maintenance ship, *Vladimir Vorobyev*, was laid in Saint Petersburg.
- **December** — **28 December.** The national flag was raised on the third Project 22220 nuclear icebreaker, *Yakutia*.



International cooperation

January	**29 January.** An intergovernmental memorandum was signed with Belarus on expanding strategic nuclear partnership.
February	**8 February.** An intergovernmental protocol to the agreement on the construction of additional NPP power units at the Kudankulam site and at a new site in India was signed; it provides for a change of payment currency.
March	**6 March.** The President of the Russian Federation Vladimir Putin held a meeting with the IAEA Director General Rafael Grossi.
March	**26 March.** An intergovernmental agreement was signed with Kyrgyzstan on the rehabilitation of areas affected by mining operations (including uranium mining).
May	**27 May.** An intergovernmental protocol was signed on the implementation of the world's first export-oriented project to build a small nuclear power plant in Uzbekistan.
August	**21 August.** An intergovernmental protocol was signed establishing a Russian-Chinese Subcommittee on Cooperation on the Northern Sea Route under the Russian-Chinese Commission on Preparing Regular Meetings of the Prime Ministers.



Personnel training

November	At the High-Tech 2024 International Competition of High-Technology Professions (11–15 November, Yekaterinburg), ROSATOM's team won medals across 21 competences.
November	A record high of 42 competences were represented at the 9th Atomskills 2024 Industry-Wide Professional Skills Competition.
November	The second cohort of Master's degree students graduated from MSU Sarov.



Sustainable development

June	Nuclear certificates were issued for the first time for three NPPs (Kalinin NPP, Balakovo NPP and Leningrad NPP-2) in the Russian national register of green certificates. In the past, certificates of this kind were issued only for renewable energy sources.



Ratings and rankings

- ‘Platinum’ category in the 2024 ranking of the best employers in Russia according to *Forbes*; the highest score, ‘platinum’, for two out of three ESG aspects, namely Environment and Corporate Governance (‘gold’ for the Employees and Society aspect).
- Top 5 in the 2024 ranking of the 70 largest corporate investors in Russia according to *Forbes* (with JSC Atomenergoprom ranked fourth).
- ROSATOM and JSC Atomenergoprom were assigned the AAA(RU) credit rating with a stable outlook.
- ACRA confirmed the ESG rating assigned to ROSATOM at ESG-2 (AA+) (out of 17 levels), which corresponds to a ‘very high score’ (the score remained unchanged compared to 2023).
- ROSATOM was included in the top group in the ranking of employers according to *RBC*.



Awards

- Winner of the Znanie. Award 2023 in the sphere of education in the Best Educational Company of the Year category (the results were announced in February 2024).
- The project titled ‘Adaptation to Climate Change: Upgrading Cooling Towers at Rostov NPP’ (Power Engineering Division) was ranked first in the Climate-Resilient Infrastructure category of the Green Eurasia International Climate Competition. The results were announced on 1 October 2024.
- The Corporation’s team won two gold medals in the BRICS Future Skills & Tech Challenge (in the Mechanical Design CAD, and Machine Learning and Big Data competences); the competition concluded on 27 September 2024 in Kazan.
- Two of the Corporation’s products, namely a charging station and a mobile cone beam CT scanner, won the Best Industrial Design of Russia Award in the Urban Design and Design of Medical Equipment categories respectively.
- Winner of the 1st National Award from the Russian Ministry of Construction, Housing and Utilities for Creating a Comfortable Urban Environment (in the category titled ‘For the Company’s Contribution to Creating a Comfortable Urban Environment in Its Host Towns and Cities’).
- Grand prix of the Leaders for Women Nationwide Competition (held as part of the 4th Eurasian Women’s Forum).

ROSATOM's Communications Department won in the Press Office of a Company in the Fuel and Energy Sector category of the Energy of Words 2024 International Media Contest.

An international educational project titled 'BIM Juniors. Become an Engineer of the Future' run by ROSATOM's Engineering Division won an award from Nizhny Novgorod in the Education category.

Winner of the Crystal Pyramid Award in the HR Team of the Year and Corporate University of the Year categories.

The Corporation was one of the winners of the 2024 ESG Excellence Award in the CSR Project of the Year category.

ROSATOM's report was ranked first in the competition of annual reports held by the RAEX rating agency in the Best Annual Report (Non-Financial Sector) category and was awarded a score of five stars ('The Highest Quality of Public Reporting').

ROSATOM's Industry Centre for Innovation Development won the GenerationS Innovation Award (a federal award for corporate innovation) in the Collaboration of the Year category.

ROSATOM's Industry Centre for Capital Construction won the 28th Nationwide Competition for the Best Building Company (in the Elite of Russia's Construction Sector category).

The Wind Power Division won the Vershina Nationwide Investment Award in the Most Sustainable Investment Project category.

The Corporation's Engineering Division won the 8th '1C: Project of the Year' Corporate Automation Competition in the 'Regional Projects. Asia' category.

14 nuclear towns and cities won the 9th National Competition for the Best Projects to Create a Comfortable Urban Environment.

1.1. ROSATOM's Mission and Strategy

1.1.1. Business context

Trends in the development of the nuclear industry

The development of the nuclear industry is influenced by a number of factors, including:[1]

- Global population growth from 8.1 billion people in 2024 to 8.5 billion people by 2030 and an increase in the share of urban population from 57.7% to 60.1%;
- Global GDP growth of around 3.3% per year;
- Growth of global electricity output and consumption. Global electricity output is expected to increase by ~21% compared to 2024 and reach 37,500 TWh as early as in 2030, with the Asia Pacific region accounting for two thirds of the growth;
- Accelerating greenhouse gas accumulation. In 2024, energy-related carbon dioxide emissions reached a new high of more than 37.8 billion tonnes. In 2024, emissions increased by 0.8% compared to 2023.

The development of low-carbon power generation, including nuclear power, is a necessary prerequisite for reducing emissions and achieving international climate targets. In 2024, amid geopolitical instability, rising inflation and disruptions in traditional energy supply chains, the global commitment to low-carbon and sustainable energy solutions was reaffirmed. The shared commitment to reducing emissions will significantly accelerate the electrification of the global economy, which will necessitate active development of all zero-carbon energy sources, including nuclear power generation.

The International Energy Agency forecasts an increase in net installed nuclear capacity from 398.2 GW[2] to 452 GW[3] by 2030.

Thermal power generation will yield to nuclear energy primarily due to price fluctuations and constraints on the fuel market, as well as CO_2 emissions, which have a negative impact on the environment and drive up the cost of energy since many countries have imposed CO_2 emission fees. Projects to install CO_2 capture and utilisation systems at thermal power plants in order to minimise emissions are expected to be developed in the future. However, current estimates show that an increase in the cost per kilowatt-hour (LCOE) of thermal power plants by more than 35–55% will make them uneconomical.

Due to these factors, nuclear power will remain in demand in the long term.

ROSATOM continues to give priority to the development of nuclear technologies, innovative non-nuclear technologies and related technologies that complement nuclear power generation and produce a multiplier effect across the industry as a whole.

The Corporation focuses on promoting nuclear products and leveraging existing market opportunities to unlock the potential of existing mature technologies. At the same time, as the Corporation strengthens its position on existing markets, it actively diversifies into both adjacent segments and promising innovative technologies.

Key criteria for a decision to develop a new business area include its expected commercial appeal for the industry in the long term and safety for people and the environment.

1. Data from the World Bank, the IMF, the IEA World Energy Outlook 2024 (Stated Policies Scenario), the IEA Global Energy Review 2025 and the IAEA.
2. The data take into account a new demonstration power unit with a capacity of ≈1,427 MW (net) put into operation in 2024 in the Shandong Province (China), which was not recorded in the IAEA Power Reactor Information System (PRIS) as at 31 December 2024 (https://pris.iaea.org).
3. IEA, World Energy Outlook 2024 (STEPS), net capacity (excluding consumption for own needs).

ROSATOM's competitive position

The competitiveness of services provided by ROSATOM is based on its unique facilities, technical capabilities and human resources, as well as the experience of coordinating R&D and design organisations. The Russian nuclear industry is one of the global leaders in terms of research and development in reactor design, capabilities and technologies in the nuclear fuel cycle and in the sphere of NPP operation. Russia has the most advanced enrichment technologies in the world; nuclear power plants with water-cooled water-moderated power reactors (VVERs) have proved their reliability over one thousand reactor-years of fail-free operation. In 2024, ROSATOM was the largest global market player in terms of the portfolio of overseas large NPP construction projects (33 power units).

ROSATOM's competitive advantages:

- Integrated offer for the entire NPP life cycle, which guarantees a competitive cost per kilowatt-hour (LCOE);
- Use of reference technologies meeting the highest safety standards;
- Assistance in securing funding (including under the BOO (Build – Own – Operate) scheme) and building project infrastructure (legal framework, employee training, community relations, etc.).

For details, see section 1.4. 'Markets Served by ROSATOM'.

1.1.2. Long-term strategic goals

ROSATOM's business strategy until 2030 has been developed based on the goals set by the government for the civilian branch of the nuclear industry; it was updated in 2024.[1]

ROSATOM's development is based on the long-term technological policy, which involves mastering new-generation nuclear energy technologies (including fast neutron reactors and the closed nuclear fuel cycle), strengthening the export potential of Russia's nuclear technologies (NPP construction abroad, rendering uranium enrichment and conversion services, nuclear fuel fabrication, etc.), as well as ensuring safety, reliability and self-reliant technological development in Russia.

ROSATOM's operations contribute to the implementation of the global sustainability agenda and to the achievement of the UN Sustainable Development Goals through the product line and efforts to ensure the sustainability of internal processes in terms of environmental, social and governance impacts.

For details, see section 1.2. 'Sustainable Development Management'.

1. The updated strategy was approved by ROSATOM's Supervisory Board on 22 April 2024.

ROSATOM's business strategy provides general guidelines for the long term, shapes the target vision for 2030 and sets a framework for development:

- ROSATOM makes an important contribution to economic development in the Russian Federation, including supporting GDP growth, increasing the number of high-technology jobs, improving the trade balance of the Russian Federation and efficiently providing electricity and heat supply for the country's economy.
- ROSATOM ensures that commitments under international treaties concluded by the Russian Federation, commitments arising from the country's membership of international organisations, and obligations related to the implementation of overseas NPP construction projects are fulfilled unconditionally, in full and within the established parameters in order to help create a favourable international climate to promote Russian nuclear technologies and enable the Corporation to retain its status of a reliable partner on the global market.
- ROSATOM seeks to maximise benefits from leveraging its research and technical capabilities and production capacities, which is reflected in tangible improvement of key financial and economic indicators. The Corporation develops and improves technological solutions that can improve performance in the short term, provide competitive advantages for its products in the long term and help build the reputation of a global technological leader.

The focus on the development of state-of-the-art technologies also determines ROSATOM's role as a leader in terms of national technological sovereignty, which involves achieving technological reliability and independence. By developing new product lines, ROSATOM will be able to meet a significant share of demand for new technological solutions in most key industries. Furthermore, the development of new solutions will rely primarily on domestically developed technologies that ensure stable and safe operations and help to prevent the risk of delays in project implementation caused by discriminatory measures taken by certain countries and organisations.

Further escalation of geopolitical tensions was a major external factor in 2024; it resulted in the tightening of restrictive policies of certain countries. Most countries responded to the crisis by closely focusing on energy security, diversifying the energy mix and increasing investment in clean energy sources.

For ROSATOM as a global player on the nuclear technology and wind power markets, this opens up opportunities for further expansion into international markets, primarily with product offers focused on low-carbon energy and targeted at emerging markets.

ROSATOM's strategy provides it with sufficient flexibility in its development to enable it to leverage the opportunities arising in the industry.

By 2030, ROSATOM intends to increase its revenue to RUB 5 trillion. This target is aligned with the goal of becoming a global technological leader, which requires the Corporation to expand the scale of its operations to match existing global technological leaders by expanding its geographic footprint and developing new products.

The vision also involves creating a governance system meeting international standards and easily adaptable to a changing environment; customer centricity, i.e. proactively identifying customer needs, and fully unlocking the potential of our employees by providing an environment for lifelong learning and developing programmes to attract the best talent.

ROSATOM has set itself four long-term strategic goals to be achieved by 2030:

- **To increase the international market share.** ROSATOM takes steps to strengthen its position on traditional nuclear power markets globally (NPP construction in Russia and abroad, sales of nuclear fuel cycle products) and focuses on international expansion in new areas of development to maximise economic benefits;
- **To reduce production costs and the lead time.** ROSATOM works to improve its operational and investment performance, including minimising costs at all stages of the value chain to ensure that products sold by the Corporation are competitive while strictly complying with safety requirements;
- **To develop new products for the Russian and international markets.** ROSATOM develops new energy and non-energy business areas to create new long-term growth points in the industry, reduce the negative impact of changes in the market environment in its traditional markets and maintain employment levels in its host communities;
- **To achieve global leadership in state-of-the-art technology.** ROSATOM supports the implementation of prioritised research and technology initiatives, develops, produces and continuously upgrades technological solutions and products based on them, and seeks to rank among the top five global companies in at least five advanced technologies included in the list of technologies prioritised for the development of the industry within the time horizon of its business strategy.

Necessary prerequisites for the implementation of the Strategy:

- Ensuring safe use of nuclear energy;
- Minimising the negative environmental impact;
- Non-proliferation of nuclear technologies and materials;
- Ensuring that the development of nuclear power is socially acceptable;
- Developing ROSATOM's innovative potential;
- Shaping a corporate culture focused on results and performance improvement;
- Ensuring that the state defence order is fulfilled;
- Ensuring full compliance with Russian legislation.

Key risks involved in the implementation of the Strategy:

- Economic risks (including financial risks, such as currency, interest rate and credit risks, etc.);
- Commercial risks (including risks associated with the nuclear fuel cycle product and service market, as well as reputational risks);
- Operational risks (including the risk of losing critical knowledge of existing and newly created products);
- Nuclear and radiation risks;
- Political risks;
- Technical (project) risks;
- Climate risks (including environmental risks and energy transition risks);
- Social risks.

For details, see section 1.14.2. 'Risk Management'.

1.2. SUSTAINABLE DEVELOPMENT MANAGEMENT

1.2.1. Key sustainable development results

GRI 3-3

The sustainable development agenda is incorporated into ROSATOM's Business Strategy. As part of an update to its Strategy until 2030, in 2024, ROSATOM defined the confirmed 'green' quality of its products and projects as one of the principles underlying its operations: *'In order to promote its competitive advantages, build the trust of its customers and enhance its brand, the Corporation aims to confirm the "green" quality of its product line at all levels and explicitly ensure compliance with the requirements of green regulation'* (approved pursuant to minutes No. 193 of the meeting of ROSATOM's Supervisory Board dated 22 April 2024).

Since 2020, ROSATOM has been a member of the UN Global Compact International Network. As part of its membership of the UN Global Compact Network, ROSATOM publishes sustainability reports on an annual basis and regularly participates in both national and international events hosted by the Network.

As part of the development of a system of green instruments in Russia, in 2024, a Russian platform for trading in certificates of origin of electricity (also known as green certificates) was launched at LLC Energy Certification Centre; its operation is governed by Federal Law No. 35-FZ of 26 March 2003 on the Electric Power Industry. These certificates are designed to support industrial consumers seeking to minimise the carbon footprint of their operations. Certificates that can be purchased on this platform include not only certificates for renewable energy but also nuclear certificates (i.e. certificates of origin of electricity confirming that it has been generated by NPPs). In 2024, the national trading platform registered Balakovo, Kalinin and Leningrad NPPs, which have a combined installed capacity of 9,000 MW, for the issue of nuclear certificates; this will make nuclear certificates available to large Russian industrial consumers seeking to offset Scope 2 greenhouse gas emissions. In 2024, nuclear certificates were used to confirm the consumption of low-carbon energy by Russian companies totalling more than 100 million kWh.

ROSATOM continues to apply green finance instruments. By year-end 2024, it had raised green loans totalling more than RUB 900 billion in the form of ESG loans and green bonds. The funds raised by the Corporation were used to refinance the Akkuyu NPP project in Turkey, wind farm construction projects in Russia and environmental projects.

ROSATOM regularly participates in various green initiatives and competitions in Russia and abroad. In 2024, projects implemented by ROSATOM's Power Engineering Division won two awards in the Green Eurasia International Climate Competition:

- The project to upgrade cooling towers at Rostov NPP (Volgodonsk, Rostov Region) was ranked first in the Climate-Resilient Infrastructure category;
- The project titled 'Roaming Operator of Charging Infrastructure for Electric Vehicles' was ranked second in the Green Transport category.

In 2024, as part of Russia's presidency of BRICS, ROSATOM, jointly with the Council of the Eurasian Women's Forum, launched the first international competition of women's environmental projects titled 'A Green Future'; it is aimed at identifying the best international corporate environmental practices, promoting and replicating them in BRICS countries. The finalists will be selected in the first half of 2025.

Green Future

1.2.2. Assessment of greenhouse gas emissions

ROSATOM assesses its greenhouse gas (GHG) emissions in accordance with the requirements of international standards and Russian legislation.

1.2.2.1. Assessment of greenhouse gas emissions in accordance with international standards

When calculating GHG emissions in accordance with international standards, the Corporation applies the Uniform Guidelines for the Calculation of GHG Emissions of ROSATOM and Its Organisations, which are aligned with international standards (ISO 14064-1,[1] ISO 14067,[2] the GHG Protocol) and approaches outlined in the IPCC Guidelines for National Greenhouse Gas Inventories. These Guidelines use global warming potential values from the IPCC Fifth Assessment Report;[3] energy indirect GHG emissions (Scope 2) are calculated using a location-based method.

2022 is used as a baseline year for the calculation of the Corporation's GHG emissions in accordance with international standards. 131 organisations of ROSATOM were included in the calculation in 2024 (2023: 114 organisations).

MED 20 **GHG emissions in ROSATOM's organisations,** '000 tonnes of CO_2e

Indicator	2022	2023	2024
Direct GHG emissions (Scope 1)	17,353	17,420	17,628
Energy indirect GHG emissions (Scope 2)	2,602	2,790	2,704
Total GHG emissions (Scope 1 and 2)	**19,955**	**20,210**	**20,332**

Between 2022 and 2024, there were no significant changes in the volume of GHG emissions in ROSATOM's organisations or their division into Scope 1 and 2 (emissions increased by 1.9% against 2022 as the baseline year). In 2024, GHG emissions (Scope 1 and 2) totalled 20,332,000 tonnes of CO_2e, including direct GHG emissions (Scope 1) totalling 17,628,000 tonnes of CO_2e. At the same time, specific direct GHG emissions are decreasing steadily amid faster-than-anticipated revenue growth.

Specific direct GHG emissions in ROSATOM's organisations,
'000 tonnes of CO_2e per RUB 1 billion



1. ISO 14064-1:2018 Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removal.
2. ISO 14067:2018 Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification.
3. IPCC Fifth Assessment Report (AR5).

There were also no significant changes in the breakdown of GHG emissions by key Division in 2024, with the major share of emissions (about 65%) produced by the Infrastructure Solutions Division, whose organisations manage heat supply systems in 20 Russian towns and cities (mainly coal- and gas-fired CHPPs) to ensure steady energy supply to consumers. FESCO Transportation Group, which specialises in shipping and was included in the scope of the Corporation in late 2023, ranked fifth among ROSATOM's Divisions in terms of GHG emissions in 2024.

Breakdown of total GHG emissions (Scope 1 and 2) by key Division of ROSATOM, '000 tonnes of CO_2e, %

Division	Total GHG emissions, '000 tonnes of CO_2e	Share, %
Infrastructure Solutions	13,309	65
Mining Division	2,562	13
Fuel Division	1,463	7
Mechanical Engineering Division	620	3
FESCO	574	3
Other	1,804	9
Total	**20,332**	**100**

Breakdown of direct GHG emissions (Scope 1) in ROSATOM's organisations by type of greenhouse gas

Greenhouse gas	Share, %
Carbon dioxide (CO_2)	98.2
Refrigerants (PFCs, HFCs)	1.0
Methane (CH_4)	0.5
Nitrous oxide (N_2O)	0.2
Sulphur hexafluoride (SF_6)	0.1

Carbon dioxide (CO_2) is the main greenhouse gas in the structure of the Corporation's direct GHG emissions, accounting for 98.2% of the total volume; its emissions are produced by stationary and mobile combustion of hydrocarbon fuels. Emissions of perfluorocarbons and hydrofluorocarbons (PFCs and HFCs, 1%) are caused mainly by their use in industrial refrigeration and air conditioning systems. Methane emissions (CH_4, 0.5%) are related to domestic wastewater management processes.

Breakdown of direct GHG emissions (Scope 1) in ROSATOM's organisations by source category

Source category	Share, %
Stationary fuel combustion	94.1
Mobile fuel combustion	4.0
Air conditioning	0.9
Wastewater management	0.3
Lime production	0.2
Sulphur hexafluoride emissions	0.1
Zirconium production	0.1
Other	0.3

1.2.2.2. Assessment of greenhouse gas emissions in accordance with the requirements of Russian legislation

Federal Law No. 296-FZ of 2 July 2021 on Limiting Greenhouse Gas Emissions establishes a regulatory framework for GHG emission control in the Russian Federation. As part of the national GHG emission accounting system, the threshold for direct GHG emissions for regulated organisations has been set at 50,000 tonnes of CO_2e per year. In order to define the boundaries of GHG emission accounting in accordance with Russian legislation, ROSATOM has set a more ambitious target of 20,000 tonnes of CO_2e per year or more; the scope of accounting includes organisations based in the Russian Federation.

The list of organisations required to assess GHG emissions and disclose the relevant information in accordance with Russian legislation includes 36 organisations of ROSATOM. In 2024, GHG emissions in these organisations totalled 17,667,000 tonnes of CO_2e.

Coefficients used for the 'stationary fuel combustion' category of GHG emission sources when calculating GHG emissions in accordance with the requirements of Russian legislation differ from those used for calculation in accordance with international standards, and a more limited range of GHG emission sources is used.

When managing GHG emissions, ROSATOM prioritises measures aimed at the physical reduction of GHG emissions, including by adopting and using energy-saving technologies and improving energy efficiency. Another priority in terms of ROSATOM's climate performance is to ensure long-term resilience to climate risks as part of NPP construction projects, adapt the current projects to climate change and incorporate the relevant measures into the strategic planning documents of ROSATOM and its organisations.

Direct GHG emissions in ROSATOM's organisations, '000 tonnes of CO_2e



1.2.3. Contribution to the climate agenda

In the context of sustainable development, it is important that the 'green' quality of nuclear power should be recognised in official documents at the national level.

Systematic efforts are underway in Russia to ensure that projects in the nuclear power industry are covered by green regulation:

- Since 2021, nuclear power has been classified as meeting the criteria for green projects (included in the Taxonomy of Green Projects) (Section I of the Criteria for Sustainable (Including Green) Development Projects in the Russian Federation);[1]
- The development of nuclear technology and the implementation of projects focused on nuclear power have been prioritised in the Strategy of Socio-Economic Development of the Russian Federation with Low Greenhouse Gas Emissions until 2050 (approved by Order No. 3052-r of the Government of the Russian Federation dated 29 October 2021);
- In 2023, nuclear power was listed among low-carbon power generation sources in the new version of Federal Law No. 35-FZ on the Electric Power Industry;
- In 2024, a national system for trading in green certificates of origin of electricity was launched in Russia; certificates available to Russian companies seeking to confirm the 'green' quality of energy that they consume include nuclear certificates (i.e. certificates of origin confirming that electricity has been generated by NPPs).[1]

The inclusion of nuclear power in the scope of national green regulation along with renewable energy sources helps maximise its climate performance. Nuclear power is currently labelled as 'green' in official documents of more than 30 countries as they develop green and climate regulations.

Nuclear power is characterised by one of the lowest levels of greenhouse gas emissions among existing power generation options and plays a crucial role in combating climate change.

In Russia, nuclear power makes up almost half of all low-carbon energy generated in the country, and nuclear power generation accounts for 18.5% of the total electricity output in the Unified Power System of Russia.

In late 2024, the General Scheme for the Locations of Power Facilities until 2042 was approved in Russia (by Order No. 4153-r of the Government of the Russian Federation dated 30 December 2024); it outlines plans to increase the share of NPPs in the structure of electricity generation to 24% by 2042.

In addition to clean nuclear power, since 2017, ROSATOM has been developing the wind power business. The Corporation's share on the Russian wind power market totals about 40% of installed capacity of wind power plants. By year-end 2024, ROSATOM had put nine wind farms with a total capacity of more than 1 GW into operation in Russia. ROSATOM's renewable energy solutions are also in demand in foreign markets.

Since 2021, ROSATOM's organisations have been offering consumers the 'green' quality of low-carbon nuclear and wind power in the form of free bilateral contracts, as well as certificates of origin of electricity, which became available in mid-2024. In 2024, the total volume of low-carbon nuclear and wind power covered by free bilateral contracts and green certificates issued by ROSATOM exceeded 7.8 billion kWh (a total of 28.4 billion kWh between 2021 and 2024). These green instruments are in demand among large Russian companies in the metals, oil and gas, electric power, retail and other sectors.

GRI 2-23
GRI 2-24
MED 35

1.2.4. Fulfilment of responsible business commitments

ROSATOM applies the Uniform Industry-Wide Policy on Sustainable Development, which sets out the objectives and key principles guiding the efforts of ROSATOM and its organisations in the sphere of health, safety and the environment, in the social sphere and in the sphere of corporate governance. In order to systematise sustainability initiatives in the Russian nuclear industry, ROSATOM applies and regularly updates the Uniform Industry-Wide Methodological Guidelines on the Management of Sustainability Initiatives.

Regulations concerning every aspect of sustainable development have been approved in the industry. They define the key principles underlying environmental, social and governance initiatives of ROSATOM and its organisations, as well as the mechanisms for implementing these principles. These regulations include the

Sustainable Development Policy

1. Approved by Decree No. 1587 of the Government of the Russian Federation dated 21 September 2021.

1. Similar green nuclear certificates are also applied in the UAE, Japan, France and the US.

Environmental Policy, the Social Policy, the Occupational Health and Safety Policy, the Human Rights Policy, the Code of Ethics and Professional Conduct (updated in 2024), the Uniform Industry-Wide Anti-Corruption Policy of ROSATOM and Its Organisations, the Uniform Industry-Wide Methodological Guidelines for the Calculation of Greenhouse Gas Emissions (updated in 2024), etc.

The Corporation's sustainable development initiatives involve continuous process improvement, the implementation of projects focused on health, safety and the environment and human rights, as well as personnel management and talent development. Tools used for measuring the Corporation's sustainability performance include ESG indicators. ROSATOM is developing its sustainability management system. It is considering setting short- and medium-term ESG goals for a number of functions and for ROSATOM's businesses.

ROSATOM's organisations are also adopting sustainability principles. Sustainability officers and employees responsible for individual aspects of sustainable development have been appointed in 22 Divisions in the industry; measures to improve sustainability maturity are developed and implemented on an annual basis. In 2024, employees responsible for data collection and the calculation of greenhouse gas emissions were appointed in 13 Divisions and 35 organisations; this was an important outcome of efforts to develop climate impact management capabilities.

Responsibility for impact management and the implementation of the Corporation's policies is allocated through a vertically integrated governance system, whereby key decisions are made by ROSATOM's executives, while day-to-day work is carried out by the Divisions and organisations within the framework established by approved regulations.

For details on the allocation of responsibility for impact management and the implementation of ROSATOM's policies, see the Annual Report for 2023, pp. 34–35.

The Corporation's representatives participate in public discussions on sustainable development on Russian and international platforms. In 2024, they participated in discussions focused on sustainable development and the climate agenda at the St. Petersburg International Economic Forum (SPIEF), the Eastern Economic Forum (EEF), the Russian Energy Week (REW), the UN Climate Change Conference (COP29), etc. ROSATOM also regularly participates in the work of a number of specialised international organisations, including the IAEA and the World Nuclear Association (WNA), focused on sustainable development and the climate agenda.

Employees in the industry are informed on a regular basis about sustainability priorities and objectives; workshops and other events are held, and surveys on sustainable development are conducted.

GRI 2-17 In order to develop sustainability competences, the Rosatom Corporate Academy provides face-to-face training on an annual basis. In addition, in 2024, a basic online training course on sustainable development was posted on the Corporation's online training platform, RECORD Mobile; it includes seven videos on prioritised sustainability initiatives in the industry. In 2024, more than 7,000 unique users in ROSATOM completed this online training course.

In order to systematise existing approaches to embedding sustainability principles and enable organisations in the industry to share their experience, a Library of Industry Sustainability Practices has been made available to employees.

ROSATOM adheres to the principle of maximum transparency and seeks to maintain a dialogue with stakeholders. ROSATOM publishes a Sustainability Report on an annual basis as a separate appendix to its public annual report. As part of ROSATOM's membership of the UN Global Compact International Network, the report is also published on the website of the UN Global Compact at https://www.unglobalcompact.org

1.2.5.Green product line

The nuclear industry is one of the most knowledge-intensive and high-technology sectors. In addition to nuclear power, the Corporation is also developing other product solutions for the energy transition, including wind power generation, hydrogen energy technology, energy storage systems and a number of other solutions. Nuclear technology also provides a basis for the development of solutions for nuclear medicine and isotope products, radiation processing technologies, environmental solutions, international logistics, etc.

As part of product line development, ROSATOM places special emphasis on environmental and climate performance of products and projects, and value creation for end users in terms of alignment with sustainability priorities.

As part of its efforts to ensure the 'green' quality of its product line, the Corporation reviews the ESG performance of its key product areas. To do so, the Corporation applies an internal ESG certification procedure, which involves businesses completing an ESG questionnaire containing 50 questions; a score is then assigned, and the Sustainable Development Department produces recommendations for improving ESG maturity. As part of the introduction of stricter internal requirements for the 'green' quality of ROSATOM's product line, in 2024, the lower limit for confirming 'sustainability' was set at 35 points.

31 product areas underwent certification in 2024, including onshore and floating small NPPs, wind farms, charging infrastructure for electric vehicles, etc.

1.2.6. ESG ratings

MED 39 Starting from 2020, ROSATOM regularly undergoes an independent ESG assessment. In 2024, the Russian Analytical Credit Rating Agency (ACRA) confirmed the Corporation's ESG rating at ESG-2 (AA+), which corresponds to a very high environmental, social and governance score (the assessment was solicited, and the Corporation participated in the rating process). The ESG score given to ROSATOM is informed by data on the performance of six of its key Divisions: the Mining, Engineering, Power Engineering, Mechanical Engineering, Fuel, and Sales and Trading Divisions.

The high ESG rating reflects the Corporation's strong environmental, social and governance performance compared to peer companies and regular updates to its internal policies and procedures on various aspects of sustainable development. During the year since the previous ESG assessment, ROSATOM updated the industry-wide Code of Ethics, and developed and approved methodological guidelines on managing nature and climate risks.

ESG rating assigned by ACRA

The ESG score remains consistently high and tends to improve. A slight decrease in the score for the E aspect in 2024 was due to a one-off decline in the environmental performance of individual Divisions caused by scheduled activities as part of their core operations.

Changes in the ESG rating assigned to ROSATOM by ACRA between 2022 and 2024

ACRA	2022	2023	2024
ROSATOM	ESG-3	ESG-2 ↑	ESG-2 —
E aspect	ESG-4	ESG-2 ↑	ESG-3 ↓
S aspect	ESG-5	ESG-3 ↑	ESG-2 ↑
G aspect	ESG-1	ESG-1 —	ESG-1 —

ROSATOM also achieves good scores in other ESG ratings and rankings, which are based primarily on publicly available information about the Corporation. In 2024, the Corporation ranked second among all Russian companies in the national EPS ('Environment, People, State') ranking of responsible businesses.

Other ESG ratings and rankings in 2024

ЭКГ рейтинг ответственного бизнеса	Arctic Russia Arctic & CSR	NCR
142 points (No. 2 in the overall ranking)*	**37.5 points** (ranked No. 2)	**Level I**
RAEX	Forbes	RSPP
63 points (ranked No. 17)	**Platinum** Best Employer	Responsibility and Transparency **B+** Sustainable Development Vector **B**

** For JSC Atomenergoprom*

For details on the Corporation's sustainability performance, see the Sustainability Report for 2024..

GRI 2-6

1.3. VALUE CREATION AND BUSINESS MODEL

ROSATOM manages the assets of the Russian nuclear industry at all stages of the nuclear fuel cycle, the cycle of NPP construction, operation and decommissioning and in other segments related to the use of nuclear energy. ROSATOM seeks to develop its business sustainably, including by increasing its total value for the Corporation and a wide range of its stakeholders. The term 'value' refers not only to products created, services rendered and financial results achieved by ROSATOM, but also to the combination of economic, social and environmental impacts of ROSATOM on its stakeholders, society as a whole and the environment.



ROSATOM defines the business model as a system that enables value creation in the short, medium and long term and is aimed at achieving strategic goals.

The business model is based on ROSATOM's long-term business strategy. It forms part of the business value chain, which also includes:

- Available capitals;
- A governance system aimed at ensuring the most efficient use of the capitals;
- Operating results and their contribution to the long-term increase in the capitals, which is measured by performance against the targets set in the strategy.

The business model gives special focus to the external environment because: a) some of ROSATOM's available capitals are obtained from the external environment, and many of its results are also related to it; b) the external environment is a source of risks and opportunities.

The diagram below represents an integrated process of value creation. ROSATOM's business model is at the core of this process; it determines the set of different activities and results that contribute to the change in main types of capital during the reporting period.

ROSATOM's capitals

ROSATOM's capitals are one of the main elements of the value chain. In the course of commercial and other activities, they are changed (increased, reduced, transformed), which generally creates value in the medium and long term.

The Corporation defines capitals as specific resources (reserves) of tangible and intangible assets that it uses in its operations. ROSATOM acknowledges that some of the available capitals (e.g. natural resources or public infrastructure) are owned jointly with other stakeholders. Accordingly, it takes a responsible approach to handling them. ROSATOM identifies six types of capital it uses: financial, manufactured, human, intellectual, social and relationship, and natural. An integral increase or decline in capitals causes an increase or decrease in value; therefore, ROSATOM attaches great importance to managing the capitals available to it and using them more efficiently.

GOVERNANCE SYSTEM • GOALS OF THE 2030 STRATEGY

1. To increase the international market share
2. To reduce production costs and the lead time
3. To increase the share of new products for the Russian and international markets
4. To achieve global leadership in state-of-the-art technology

Capitals available as at 31 December 2023

FINANCIAL CAPITAL
Adjusted free cash flow: **RUB 371.3 billion**
Revenue under IFRS: **RUB 2,572.0 billion**

MANUFACTURED CAPITAL
Number of power units in operation during the year: **35**
NPP capacity factor: **83.91%**

INTELLECTUAL CAPITAL
Intangible assets under IFRS: **RUB 295.8 billion**
Number of foreign patents obtained by ROSATOM: **3,391**

HUMAN CAPITAL
Average headcount: **343,200 people**
Personnel turnover rate: **11.12%**
Average training hours per employee: **55.18**

SOCIAL AND RELATIONSHIP CAPITAL
Level of support for nuclear power in Russia: **77%**
Taxes paid: **RUB 443.1 billion**

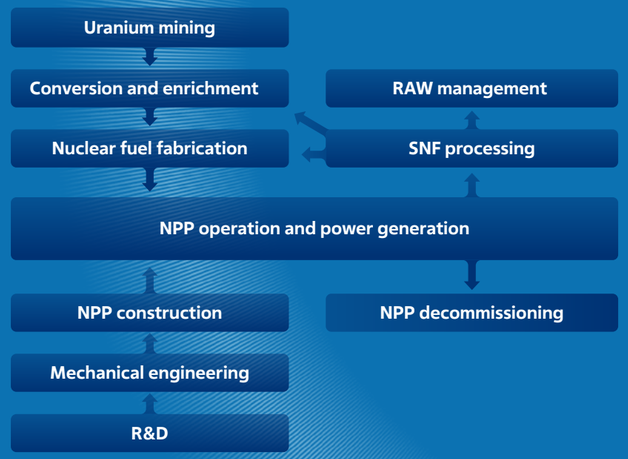
NATURAL CAPITAL
Water withdrawal from natural sources: **5,638.8 million m³**

Value creation in core businesses

First core

NWD › Atomflot › NRS

Second core



Third core

Radiation technologies › New businesses

Key products and results in 2024

- Revenue under IFRS: **RUB 3,087.7 billion**
- Share of innovative products and services in the total sales of products and services across the industry: **24.92%**
- Nuclear power generation in Russia: **215.52 billion kWh**
- Cargo traffic along the Northern Sea Route: **37.893 million tonnes**
- Uranium production in Russia: **2,738 tonnes**

Capitals available as at 31 December 2024

FINANCIAL CAPITAL
Adjusted free cash flow **↑19.9%**
Revenue under IFRS **↑20.05%**

MANUFACTURED CAPITAL
Number of power units in operation during the year **↓2.9%**
NPP capacity factor **↑2.03%**

INTELLECTUAL CAPITAL
Intangible assets under IFRS **↑18.2%**
Number of foreign patents obtained by ROSATOM **↑8.23%**

HUMAN CAPITAL
Average headcount **↑14.7%**
Personnel turnover rate **↑24.7%**
Average training hours per employee **↓5.8%**

SOCIAL AND RELATIONSHIP CAPITAL
Level of support for nuclear power in Russia **↑1.7%**
Taxes paid **↓1.51%**

NATURAL CAPITAL
Water withdrawal from natural sources **↑7.7%**

Value creation results

	Indicator	2022	2023	2024	2024/2023, %
	FINANCIAL CAPITAL				
	Adjusted free cash flow, RUB billion	371.4	371.3	**445.4**	↑19.9
MED 1	Revenue under IFRS, RUB billion	1,766.4	2,572.0	**3,087.7**	↑20.1
	MANUFACTURED CAPITAL				
	Number of power units in operation during the year,[1] pcs.	35	35	**34**	↓2.86
	Capacity factor of Russian NPPs, %	86.21	83.91	**85.61**	↑2.03
	INTELLECTUAL CAPITAL				
	Intangible assets under IFRS, RUB billion	230.6	295.8	**349.5**	↑18.2
	Share of innovative products in revenue, %	23.2	24.6	**24.92**	↑0.32
	Number of foreign patents obtained by ROSATOM, applications for foreign patents submitted and registered under the established procedure, registered trade secrets (know-how), pcs.	3,150	3,391	**3,670**	↑8.23
	HUMAN CAPITAL				
MED 25	Average headcount, '000 people	329.2	343.2	**393.5**	↑14.7
MED 33	Personnel turnover rate, %	10.6	11.12	**13.87**	↑24.7
MED 31	Average training hours per employee	40.95	55.18	**52.0**	↓5.8
	LTIFR	0.11	0.06	**0.07**	↑1.17
	SOCIAL AND RELATIONSHIP CAPITAL				
	Level of support for nuclear power in Russia, %	77	77	**78.3**	↑1.7
	10-year portfolio of overseas orders, USD billion	135.9	127.1	**128.8**	↑1.3
MED 7	Taxes paid, RUB billion	291.4	443.1	**436.4**	↓1.51
	NATURAL CAPITAL				
	Water withdrawal from natural sources, million m³	5,536.1	5,638.8	**6,075.3**	↑7.7

1. Excluding the floating thermal nuclear power plant.

Benefits provided to stakeholders in 2024

GOVERNMENT LEVEL

Tax payments to budgets of all levels: **RUB 436.4 billion.**
National projects and programmes involving ROSATOM:

- New Nuclear and Energy Technologies;
- Personnel;
- Youth and Children;
- Long and Active Life;
- New Technologies for Preserving Health;
- Environmental Well-Being;
- Efficient Transportation System;
- Industrial Support for Transportation Mobility;
- Data Economy and Digital Transformation of the State;
- Production and Automation Equipment;
- New Materials and Chemicals;
- Government Programme 'Development of the Nuclear Power and Industry Complex';
- Comprehensive Programme 'Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024'.

CORPORATE LEVEL

- Nuclear power generation in Russia: **215.52 billion kWh.**
- Number of events rated above level 2 on the INES scale: **0.**

MED 4 – R&D costs: **RUB 7.5 billion.**

- Procurement from SMEs: **RUB 564.5 billion.** MED 26
- Average monthly salary: **RUB 137,190 per month.** MED 28
- Expenditure on corporate social programmes for employees: **RUB 21.7 billion.**

SOCIAL LEVEL

- Jobs created: **11,142.**
- More than **110,000** consumers covered by the Smart City platform.
- Expenditure on environmental protection: **RUB 36.44 billion.**
- Energy cost savings: **RUB 1.05 billion.**
- Total greenhouse gas emissions (Scope 1 and 2) in 2024 (in accordance with the international methodology): **20.332 million tonnes of CO_2e.**
- Waste processed by ROSATOM's enterprises: **31,006,900 tonnes.**

1.4. MARKETS SERVED BY ROSATOM

In 2024, ROSATOM ranked:

First in the world in terms of NPP exports (22 large power units under construction in seven countries worldwide, accounting for 88% of the global market), with the Corporation's portfolio of overseas NPP construction projects comprising 33 large power units and six small power units in 10 countries globally;

First on the global uranium enrichment market (39%);

Third in the world in terms of uranium production (15% of the market);

Third on the global nuclear fuel market (19%[1]).

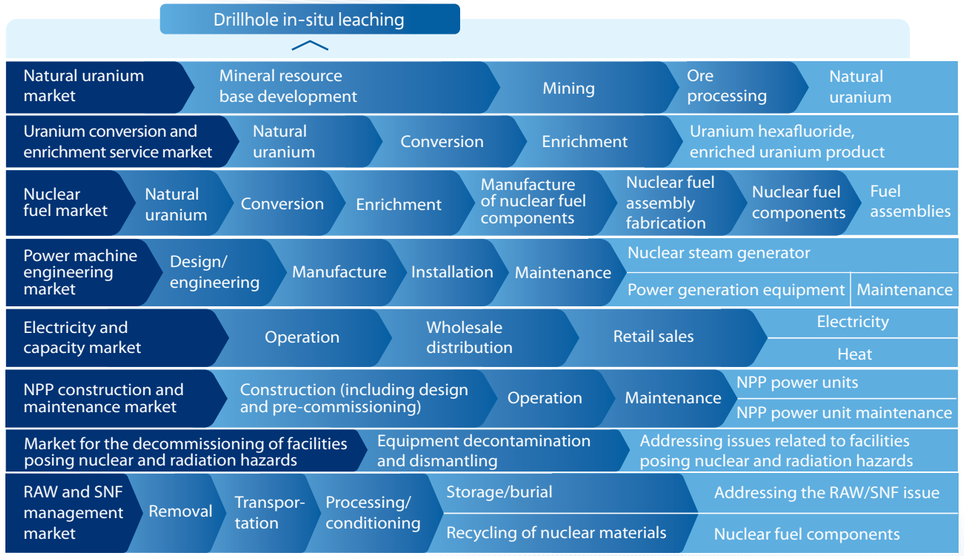
ROSATOM's vision is to become the flagship of national technological sovereignty and a global technological leader; this necessitates both developing in traditional segments and actively diversifying into new high-technology markets.

One of the key priorities of ROSATOM's business is to develop globally competitive products that are able not only to effectively replace imports, but also to become leaders on global markets (both traditional and new ones).

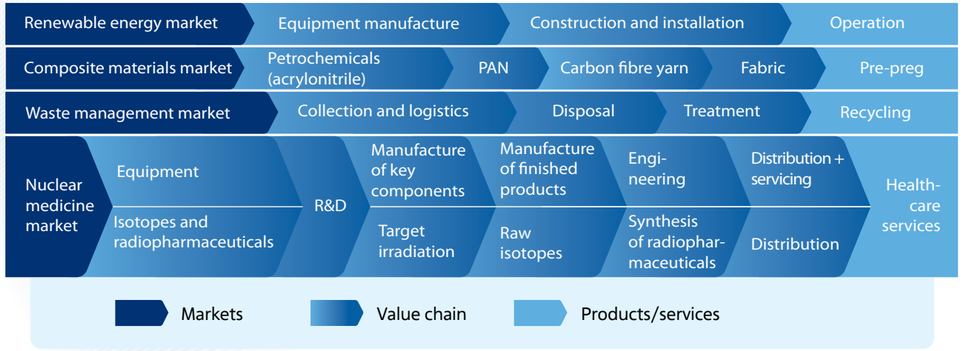
GRI 2-6

Markets served by ROSATOM and value chains

In the reporting year, there were no changes in the value chain, including the supply chain.



1. The calculation does not include 23 NPP power units (Japan, India) which were classified as in 'suspended operation' as at 31 December 2024, according to data in the IAEA Power Reactor Information System (PRIS).



1.4.1. Traditional markets

Natural uranium market

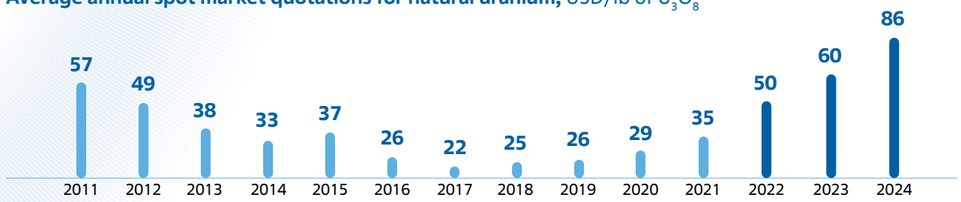
Forecast for changes in uranium demand by 2030

In 2024, global reactor demand for uranium totalled 68,700 tonnes.[1] Global demand taking into account commercial and strategic stockpiling not intended for current consumption is estimated at 73,800 tonnes.

In 2024, the spot uranium market was characterised by a high level of price volatility due to the fluctuating activity of market players. At the start of the year, quotations rose on market players' concerns regarding uranium supplies and an increased activity of financial investors. In February, spot prices rose to USD 107/lb of U_3O_8, reaching the highest level since August 2007. During the months that followed, quotations mostly trended downwards; as a result, by year end, spot prices dropped to USD 71.8/lb of U_3O_8.

According to UxC, in 2024, spot market quotations for uranium averaged USD 86.3/lb of U_3O_8, up by 43% year on year.

Average annual spot market quotations for natural uranium, USD/lb of U_3O_8



Sources: input data from UxC;[2] average values have been calculated by the Corporation's Mining Division.

1. Hereinafter, data on the uranium market from a report by UxC (UMO Q4 2024) are used.
2. UxC, LLC (UxC) is an independent international company specialising in market analysis, research and forecasting covering the entire nuclear fuel cycle (https://www.uxc.com/).

The uranium market fundamentals remain favourable. In the medium and long term, market prices for uranium are expected to rise due to additional demand from investors and a reduction in the 'liquid' portion of secondary sources. In the long term, price growth is expected to accelerate due to a rise in demand for uranium driven by the commissioning of new NPPs in China, India and other countries. According to the base case forecast of the World Nuclear Association (WNA), global reactor demand for uranium will increase to 83,800 tonnes by 2030 and to 129,900 tonnes by 2040.

Natural uranium market overview

According to UxC, in 2024, global uranium production increased by 7% to 58,900 tonnes.

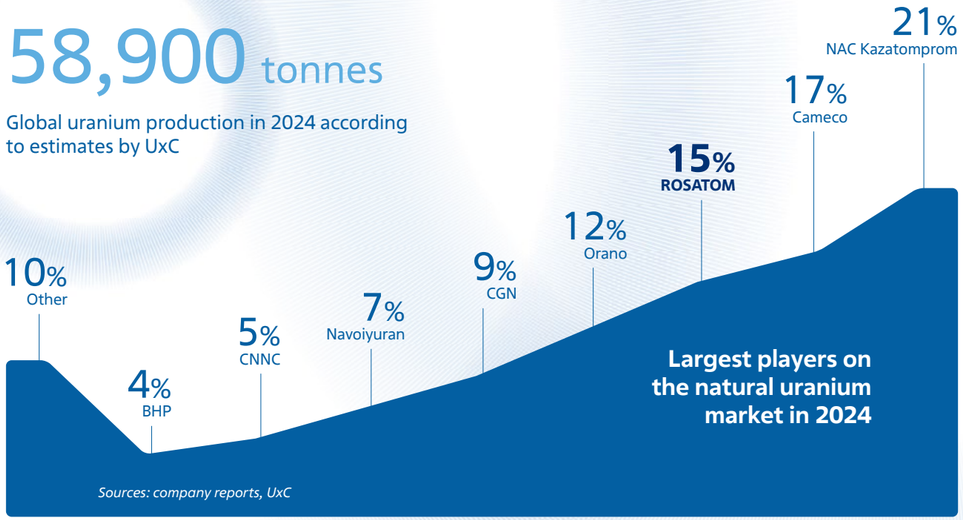
Nine major companies, namely NAC Kazatomprom (Kazakhstan), Cameco (Canada), two companies managed by ROSATOM, CNNC and CGN (China), Orano (France), Navoiyuran State Enterprise (Uzbekistan) and BHP (Australia – UK), accounted for about 90% of global production.

NAC Kazatomprom has been the largest uranium mining company globally since 2010 (21% of global production in 2024). By year-end 2024, Canada's Cameco (17% of global production) remained in second place as it increased production after relaunching the McArthur River mine in Q4 2022 (the mine was put on care and maintenance in 2018 due to an unfavourable market environment). At year-end 2024, ROSATOM ranked third among major companies (15% of global production).

Supplies from secondary sources (inventories of energy companies and some states, repreparation of depleted uranium hexafluoride, reprocessed uranium, etc.) in 2024 totalled 14,700 tonnes of natural uranium equivalent.

58,900 tonnes

Global uranium production in 2024 according to estimates by UxC



Sources: company reports, UxC

Uranium conversion and enrichment market

Products and services offered on the market include uranium hexafluoride (UF_6), uranium conversion services, uranium enrichment services and enriched uranium product (low enriched (up to 5%) and medium enriched[1] (5% to 20%) uranium).

Forecast for changes in demand for uranium conversion services by 2030

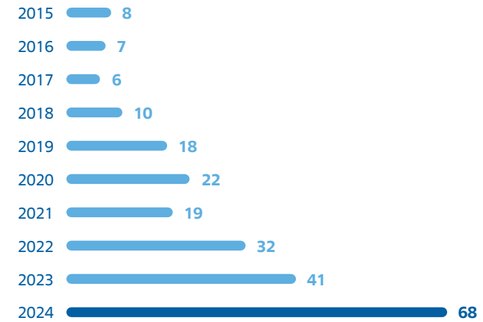
According to the base case scenario of the World Nuclear Association, in the reporting year, global reactor demand for uranium conversion services was estimated at 65,000 tonnes.

In 2024, average annual spot market quotations for uranium conversion services soared by 66%, while average annual long-term quotations rose by 33%.

The growth was driven by the following factors:

- An overall rise in interest in nuclear power accompanied by growing global demand for enrichment services;
- Growing concerns among market players regarding the availability of enrichment services amid politically motivated fragmentation of supply chains (see the subsection 'Forecast for Changes in Demand for Uranium Enrichment Services by 2030') and limited conversion capacities of Western producers.

Average annual spot market quotations for conversion services, USD/kg of uranium (average for the North American and European markets)



The development of nuclear power generation until 2030 will have a positive impact on the market for uranium conversion services. According to the base case forecast of the World Nuclear Association, global demand for conversion services may grow to 66,000 tonnes in 2025 and 81,000 tonnes by 2030.



1. Also termed HALEU (the abbreviation for High-Assay Low-Enriched Uranium) in foreign sources.

Forecast for changes in demand for uranium enrichment services by 2030

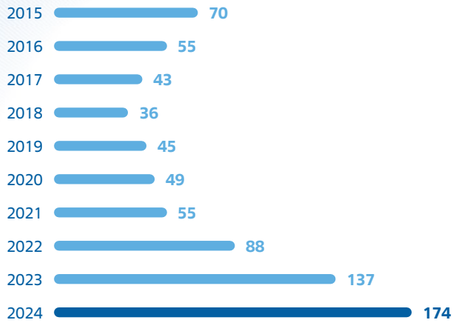
According to the World Nuclear Association, in 2024, global reactor demand for enrichment services totalled about 53 million separative work units (SWU).

In 2024, average annual spot market quotations for uranium enrichment rose by 27%, while long-term quotations increased by 11%.

The rise in quotations was driven by the following factors:

- An overall rise in interest in nuclear power accompanied by growing global demand for enrichment services;
- Growing concerns among market players regarding the availability of enrichment services provided by Russian companies following a ban on the import of Russian uranium products into the US starting from 2028 (which came into force in August 2024) and temporary restrictions on enriched uranium supplies from Russia to the US or under export contracts concluded with persons registered under the US jurisdiction until the end of 2025 (pursuant to Decree No. 313 of the Government of the Russian Federation dated 9 March 2022), as well as limited enrichment capacities of Western producers.

Average annual spot market quotations for enrichment services, USD/SWU



The development of nuclear power generation until 2030 will have a positive impact on the market for uranium enrichment services. According to the base case forecast of the World Nuclear Association, global demand for enrichment will grow to 54 million SWU in 2025 and 66 million SWU by 2030.

Uranium conversion and enrichment market overview

Along with ROSATOM, key players on the global market for uranium conversion services include Orano (France), Cameco (Canada), CNNC (China) and ConverDyn (US).

The main players on the global market for uranium enrichment services include ROSATOM (39% of the global market), URENCO (UK, Germany, Netherlands; 31%), CNNC (China, 16%) and Orano (France, 13%). Together, these companies control more than 95% of the market. At present, all players use modern gas centrifuge technology for uranium enrichment.

Nuclear fuel fabrication market

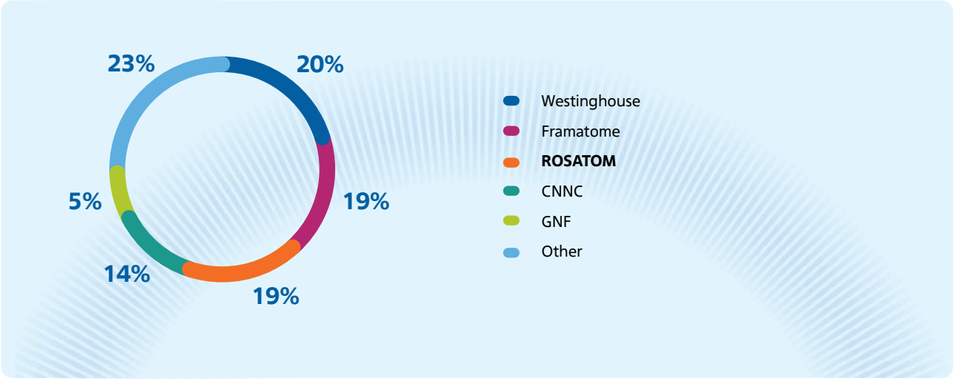
According to ROSATOM's estimates, in 2024, the global nuclear fuel market capacity totalled about 10,400 tonnes of heavy metal (tHM), with fuel for light-water and other reactors requiring uranium enrichment accounting for ~7,200 tHM (including ~1,300 tHM of fuel for water-cooled water-moderated power reactors (VVERs)) and fuel for heavy-water reactors accounting for ~3,100 tHM.

As the reactor fleet will be expanding, the demand for fabrication services may increase to 11,200 tHM by 2030, including 1,400 tHM for VVER reactors.

Global suppliers on the fabrication market include Westinghouse (with a market share of 20%), Framatome (with a market share of 19%), ROSATOM (19%[1]), CNNC (14%) and Global Nuclear Fuel (5%).



Shares of players on the nuclear fuel fabrication market



In the reporting year, Russian nuclear fuel fully met the demand of Russia and a number of customers, including Slovakia, the Czech Republic, Hungary and Finland, for reactor fuel.

Entering new nuclear fuel markets

A batch of nuclear fuel for reactor start-up at power unit No. 2 of Akkuyu NPP in Turkey was produced and shipped in a timely manner as part of one of the Corporation's largest overseas projects.

A batch of fuel for reactor start-up was produced and delivered for power unit No. 1 of Kursk NPP-2 equipped with a VVER-TOI reactor unit, which is currently under construction.

Nuclear fuel for the second reactor unit of the *Akademik Lomonosov* floating thermal nuclear power plant was delivered via the Northern Sea Route to Pevek, Russia's northernmost town. Empty transportation casks were returned for the first time from Pevek to the manufacturing plant; this marked the completion of the full reloading cycle for the reactor units at the FTNPP.

1. The calculation does not include 23 NPP power units (Japan, India) which were classified as in 'suspended operation' as at 31 December 2024, according to data in the IAEA Power Reactor Information System (PRIS).

Fuel assemblies comprising fuel elements with MOX fuel containing minor actinides were supplied for testing in the core of the BN-800 reactor.

The latest batch of uranium and aluminium components of nuclear fuel was supplied for the ETRR research reactor in Egypt under the long-term contract with the Egyptian Atomic Energy Authority (EAEA).

For details, see section 1.12. 'Research and Innovations'.

Power machine engineering market

Power machine engineering plays a key role in supporting industry and a comfortable life. In 2024, Russian industry expanded by 4.6%, with the manufacturing sector growing by 8.5%. In 2024, the production of steam turbines increased by 34.1% year on year.[1]

Given the need to modernise and upgrade existing fixed assets in the energy industry, as well as the projected need for energy supplies for the growing economy in the context of import substitution efforts, the Russian power machine engineering market is expected to grow. The approved General Scheme for the Locations of Power Facilities until 2042 outlines plans to commission power generation equipment with a total capacity exceeding 88 GW, including NPP capacities totalling about 29 GW, which will support the development of the market for power generation equipment in Russia in the long term.

ROSATOM's Mechanical Engineering Division is a leader in Russia's power machine engineering sector. ROSATOM's organisations forming part of this Division comprise a fully integrated production cycle; they manufacture equipment for nuclear and thermal power generation, the oil and gas sector, shipbuilding and the metals industry. Special focus is given to the production of reactor equipment, with equipment produced by the Division currently used at about 19% of NPP power units globally and all Russian-design NPPs.[2]

The Division's key competitive advantage consists in the fact that it controls all stages of the production chain, from special steel production to the manufacture of finished equipment. This helps ensure high product quality and reliability. Streamlined production processes enable the Division to efficiently participate in new NPP construction projects, upgrade existing power generation facilities and provide services.



1. Estimates based on data from the Federal State Statistics Service.
2. With a VVER design.

NPP construction and operation market

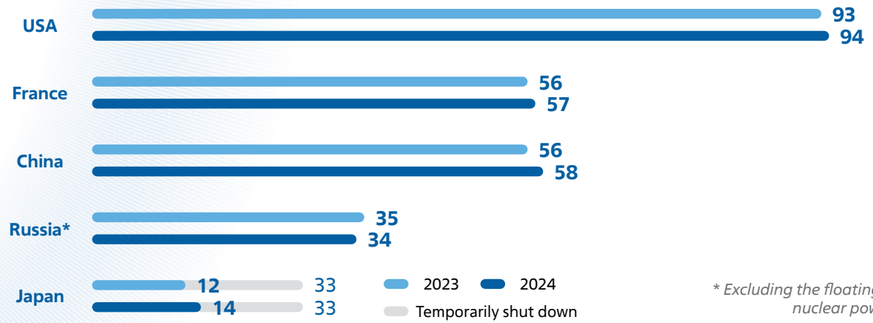
In recent years, key trends in the development of the global energy market include heightened scrutiny of environmental aspects of the electric power industry and an increase in the share of zero-carbon power generation in the global energy mix. Countries seek to reduce the share of power plants using fossil fuels, such as coal and gas, and to develop renewable energy sources, such as solar and wind power plants, etc. Despite a surge in renewable power generation, its stability in the absence of expensive energy storage systems remains an unresolved issue. Nuclear power generation is currently one of the most reliable, cheapest and most environmentally friendly sources of electricity. The International Energy Agency forecasts that by 2030, the global installed capacity of NPPs will reach 452 GW,[1] which reflects steady growth of nuclear power generation.

In 2024, nuclear power accounted for about 9% of global electricity generation. According to the IAEA, in 14 states, more than a quarter of electricity demand is met by nuclear power generation. Countries with the largest share of nuclear power generation include France (64.8%), Slovakia (61.3%) and Hungary (48.8%).[2]

According to the IAEA,[3] as at 31 December 2024, 441 power reactors with a total capacity of 398.2 GW were in operation (including the suspended Japanese reactors). Another 62 reactors were under construction. In 2024, 34 power units of 10 NPPs and the two-reactor power unit of the *Akademik Lomonosov* floating thermal nuclear power plant (FTNPP) were in operation in Russia, with their installed capacity totalling 28.6 GW.

In 2024, ROSATOM ranked second among nuclear power generation companies globally in terms of installed NPP capacity, surpassed only by the French EDF. Russia ranks fourth in the world in terms of the number of NPP power units in operation.

Leading countries by the number of operating NPP power units in 2023 and 2024



** Excluding the floating thermal nuclear power plant.*

1. IEA, World Energy Outlook 2024 (STEPS), net capacity (excluding consumption for own needs).
2. IAEA, 2024: Nuclear Power Reactors in the World.
3. The data take into account a new demonstration power unit with a capacity of ≈1,427 MW (net) put into operation in 2024 in the Shandong Province (China), which was not recorded in the IAEA Power Reactor Information System (PRIS) as at 31 December 2024 (https://pris.iaea.org).

Light-water reactors (VVER, PWR, BWR, LWGR) are the main type of reactors currently in operation in the world. They make up more than 90% of the global market (as a percentage of the total installed capacity).

According to the IAEA, new nuclear power generation capacities connected to the grid globally in 2024 totalled 8.2 GW.[1] At present, demand for NPP construction comes primarily from Asian countries, which is due to rapidly growing electricity consumption in this region. ROSATOM is taking active steps to expand its footprint on the international market as a leader in terms of the number of overseas NPP construction projects.

Overseas NPP servicing market

ROSATOM provides NPP maintenance services covering the entire life cycle: it provides personnel training and supplies equipment for training centres, provides engineering and technical support at the commissioning and operation stages, carries out maintenance, repairs and upgrades, supplies spare parts and equipment and extends the service life of NPPs.

Key end markets in this segment include foreign countries where there are Russian-design power units in operation or under construction, namely Armenia, Bangladesh, the Republic of Belarus, Bulgaria, Hungary, Egypt, India, China and Turkey.

In the reporting year, the portfolio of power units serviced by the Corporation comprised 48 Russian-design NPP power units abroad.

Furthermore, the Corporation is a market leader in China, Bulgaria and Armenia, acting as a general contractor for life extension, scheduled preventive maintenance and equipment modernisation at NPPs equipped with VVER reactors.

ROSATOM's rivals on this market include national operators and local service companies forming part of or partnered with local energy corporations, as well as large international companies (Framatome, Engie, Westinghouse, AFRY, etc.).

To consolidate its position on the NPP servicing market, the Corporation has initiated and continues its localisation efforts in key regions by creating partnerships and joint ventures with local market players, establishing subsidiaries or developing branches.

ROSATOM is exploring localisation opportunities in other regions of operation (Turkey, Egypt, Bangladesh, etc.) and plans to develop a line of NPP servicing products by 2030.

For details, see chapter 2 'Business Development Report'.



1. The data take into account a new demonstration power unit with a capacity of ≈1,427 MW (net) put into operation in 2024 in the Shandong Province (China), which was not recorded in the IAEA Power Reactor Information System (PRIS) as at 31 December 2024 (https://pris.iaea.org).

1.4.2. New markets

Market for RAW and SNF management, processing and disposal

By the end of 2024, the volume of spent nuclear fuel (SNF) accumulated globally totalled about 350,000 tonnes of heavy metal (tHM). Most countries have chosen to postpone SNF management efforts, which necessitates long-term SNF storage due to a lack of available permanent disposal facilities and processing capacities. Every year, around 10,000 tHM of SNF is produced globally, of which less than 2,000 tHM is sent for processing. An increase in the amount of accumulated SNF encourages the development of the waste processing and temporary waste storage market.

Key players on the SNF storage market are Holtec (US), Orano, GNS (Germany) and SKB (Sweden).

ROSATOM promotes its own radioactive waste (RAW) and SNF management solutions as part of an integrated offer for a balanced nuclear fuel cycle. The Corporation's basic solution in the field of SNF management involves spent fuel processing.

Orano and ROSATOM are the leaders on the SNF processing market.

ROSATOM's development plans include expanding its SNF processing capacities. The development of this market is closely linked to the improvement of the relevant technologies and the use of regenerated SNF processing products in the nuclear fuel cycle. A reduction in the cost of processes and improved efficiency of separation of SNF components will significantly increase processing volumes.

The market for permanent disposal of SNF and high-level waste (HLW) is still at an early stage of development. There are no operating HLW disposal facilities at present. The possible use of deep repositories is being actively examined by the countries that have chosen the policy of direct SNF disposal: Sweden, Finland, the US and Canada.

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Electricity and capacity market in the Russian Federation

Expansion on the electricity and capacity market in the Russian Federation remains one of ROSATOM's top priorities. The Corporation is one of the key power generation companies in Russia, and the local market serves as a platform for testing technological solutions prior to their global rollout.

In 2024, electricity consumption in the Unified Power System of Russia totalled 1,165.9 billion kWh as against 1,138.3 billion kWh in the previous year (up by 2.4%).

Nuclear power plants maintained their role in terms of meeting base load demand in the Unified Power System of Russia, with nuclear power generation totalling 215.52 billion kWh in 2024 (including 215.16 billion kWh in the Unified Power System of Russia). In the reporting year, the Corporation managed to remain a leader among power generation companies, with the share of nuclear power generation in the country's total electricity output (in the Unified Power System of Russia) totalling 18.5%. ROSATOM's key goal remains to ensure safe and reliable operation of NPPs and remain a leader in terms of its share in electricity output in the country's energy mix.

ROSATOM is a major player on the thermal power market. Power generation capacity of thermal power plants (TPPs) managed by the Corporation totalled about 4 GW, while their heat generation capacity exceeded 19,500 Gcal/h.

In 2024, power generation and net heat supply at the TPPs totalled 14.1 billion kWh and 26.8 million Gcal respectively (2023: 13.3 billion kWh and 24.5 million Gcal respectively).

The TPPs and boiler houses supplied power and heat to regions of the Far Eastern, Siberian, Ural and Central Federal Districts.

In addition, ROSATOM builds and operates wind power plants in Russia. The portfolio of wind power plants to be built by ROSATOM totals about 1.7 GW, with slightly more than 1 GW already put into operation. In 2024, electricity output from ROSATOM's WPPs totalled 2.75 billion kWh (2023: 2.27 billion kWh; 2022: 1.96 billion kWh).

In addition to NPP, TPP and WPP operation, the Corporation also sells electricity. ROSATOM's electricity sales companies provide services to more than 63,000 organisations and 2 million households in five regions. In 2024, electricity sales totalled 18.4 billion kWh (up by 1% year on year).

Renewable energy market

The global renewable energy market continues to demonstrate a consistently strong growth in terms of both capacity additions and investment. The International Energy Agency forecasts that by 2030, total installed renewable energy capacity globally may double and reach 9.8 TW, with the capacity of new onshore and offshore wind power plants (WPPs) totalling 1 TW and the capacity of new solar power plants (SPPs) totalling 4 TW.[1]

In 2024, global investment in the energy transition totalled USD 2.08 trillion, including USD 728 billion invested in renewable energy.[2]

The renewable energy market is highly competitive and consolidated. In 2023, 84% of new WPPs were built by the top 10 wind turbine manufacturers, with only five companies (Goldwind, Envision, Vestas, Windey and Mingyang) accounting for 55% of capacity additions. The share of Chinese manufacturers in the wind power sector will reach 68% in 2025,[3] and the price gap with European manufacturers has already reached 84%.[4] In the solar power sector, 52% of the market is controlled by four manufacturers (JinkoSolar, Trina Solar, LONGi and JA Solar), with over 80% of solar panels produced in China.

ROSATOM positions itself on the global market as a renewable energy project developer and offers its capabilities in the sphere of comprehensive implementation of projects to build renewable energy facilities. In accordance with the Strategic Programme titled 'Renewable Energy: Foreign Markets', the target portfolio of ROSATOM's overseas renewable energy projects totals 400 MW in 2025 and is projected to reach 5 GW by 2030. Among other things, the Corporation plans to expand its international business by diversifying into new segments of the renewable energy market, namely the SPP and offshore WPP segments, while simultaneously expanding its footprint in the onshore WPP segment in target markets in the CIS countries, Southeast Asia, Africa and the Middle East.

In terms of the development of renewable energy in the Russian Federation, according to the General Scheme for the Locations of Power Facilities until 2042 approved by Order No. 4153-r of the Government of the Russian Federation dated 30 December 2024, renewable energy capacities are expected to expand by about 17 GW by 2042.

As part of the Wind Power Strategic Programme, ROSATOM successfully builds wind farms in the Russian Federation. Following competitive selection as part of the programme to support the use of renewable energy based on capacity supply agreements on the wholesale market, ROSATOM has formed a portfolio of projects with a total capacity of approximately 1.7 GW.

In 2024, the Corporation completed the construction of the second stage of the Trunovskaya WPP (35 MW) in the Stavropol Territory and started the construction of the Novolakskaya WPP with a total installed capacity of 300 MW in the Republic of Dagestan.

1. IEA, World Energy Outlook 2024 (STEPS).
2. BNEF, Energy Transition Investment Trends 2025.
3. Global Wind Energy Council (GWEC), Global Wind Report 2024.
4. Wood Mackenzie, Wind Turbine OEMs financial analysis/ Wind energy capital cost (CAPEX) database.

By year-end 2024, nine wind farms with a total capacity of 1,035 MW were in operation. Plans for 2025 include the commissioning of the Novolakskaya WPP in the Republic of Dagestan.

Taking into account wind power capacities commissioned in the Russian Federation, ROSATOM's share on the Russian wind power market totals about 40%.

For details, see chapter 2 'Business Development Report'.

Nuclear medicine market

Nuclear medicine is a high-technology branch of healthcare which uses the following in order to diagnose and treat various diseases:

- medical isotopes and radiopharmaceuticals;
- certain types of medical equipment.

In 2024, the global market for isotope products totalled USD 8.5 billion, with radiopharmaceuticals accounting for more than 75% of the market (USD 6.4 billion). About 70% of radiopharmaceuticals are used for diagnostics, while the remaining 30% are used for the treatment of diseases. The radiopharmaceuticals market is growing rapidly (it has doubled over the past 10 years), while the markets for raw isotopes are already largely established. The combined market for isotopes and radiopharmaceuticals is projected to reach USD 12.6 billion by 2030.

ROSATOM's research and production capabilities also enable it to develop an offer of nuclear medicine equipment. The combined global market for main types of nuclear medicine equipment totals USD 21 billion and is projected to grow to USD 36 billion in 2030.

In the coming years, the development of nuclear medicine in Russia will be driven primarily by a national project titled 'Long and Active Life', which will become a successor to the Healthcare National Project. As part of the project, funding will continue to be provided for the federal target programme titled 'Fighting Cancer'. Other growth drivers will also include nuclear medicine procedures being prescribed more often as part of high-technology healthcare services, as well as the development of healthcare infrastructure and, more specifically, the construction of nuclear medicine centres specialising in radionuclide diagnostics and therapy. In a number of Russian regions, steps are being taken or plans have been developed to provide existing healthcare institutions with state-of-the-art nuclear medicine equipment for diagnostics and therapy.

The Corporation has initiated projects to create a network of radionuclide therapy and nuclear medicine centres in Russia and abroad, which will provide high-quality healthcare services to patients.



The Corporation is a major supplier of isotopes and radiopharmaceuticals for nuclear medicine in Russia. 30% of the world's reactor units producing medical radioisotopes are located in Russia. ROSATOM accounts for 25% to 50% of global radioisotope production (for some types of radioisotope products, its share totals 100%). The Corporation's long-term goal is to rank among the top five global suppliers of isotope products for medical applications, including brand-name radiopharmaceuticals and generic drugs.

ROSATOM is a major player on the market for medical device sterilisation using radiation processing technologies.

The Corporation also develops medical equipment for diagnostics and therapy. By 2030, it plans to launch mass production of brachytherapy equipment and MRI scanners. The Corporation is examining the possibilities for producing equipment for radiation therapy, CT and SPECT/CT scanners, and cyclotron and therapy facilities.

For details, see chapter 2 'Business Development Report'.

Market for cargo transportation along the Northern Sea Route

Mineral extraction, oil and gas production in the Arctic are projected to grow significantly, resulting in an increase in cargo traffic along the Northern Sea Route (NSR) from 37.89 million tonnes in 2024 to 109.1 million tonnes in 2030.

Actual cargo traffic and targets until 2030, million tonnes



Global cargo traffic can become a driver for further growth of cargo transportation along the NSR in the long term (after 2030). According to ROSATOM's forecasts, if the current growth rate is maintained, the target volume of cargo traffic along the NSR may total 150.6 million tonnes in 2035.

Cargo transportation along the NSR provides a number of advantages compared to traditional routes via the Suez and Panama Canals (the distance between Northern Europe and East Asia is reduced by up to 39%, while the distance between the western coast of North America and Northern Europe is reduced by up to 28%).

For details, see section 1.8. 'Development of the Arctic'.

GRI 3-3

Waste management market

ROSATOM is supporting the development of an integrated system for the management of hazard class 1 and 2 waste in Russia. In 2024, this initiative formed part of the Infrastructure for the Management of Hazard Class 1 and 2 Waste Federal Project included in the Ecology National Project.

As part of the Federal Project, ROSATOM is developing an integrated system for hazard class 1 and 2 waste[1] management:

- An information system for tracking this waste and monitoring its management;
- The relevant waste management infrastructure.

As from 1 March 2022, new rules for the management of hazard class 1 and 2 waste came into force in Russia. An organisation of ROSATOM which has been appointed federal operator responsible for the management of hazard class 1 and 2 waste collects, transports, processes, recycles and treats these types of waste across Russia.

Waste-generating enterprises that have their own hazard class 1 and 2 waste management capacities are registered in the federal state information system for tracking hazard class 1 and 2 waste and monitoring its management (FGIS OPVK) and submit information on the entire life cycle of hazardous waste, from its generation to the confirmation of its processing at specific facilities. Waste-generating enterprises that do not have their own hazard class 1 and 2 waste management capacities are registered in the FGIS OPVK system and conclude a contract with the federal operator, which provides the full range of the relevant waste management services on a turnkey basis.

At year-end 2024, more than 116,000 users from more than 62,000 organisations operating on the hazard class 1 and 2 waste management market (waste-generating organisations and operators providing hazardous waste transportation and management services) were registered in the system.

In addition, as part of the Federal Project, ROSATOM is developing infrastructure for hazard class 1 and 2 waste processing, namely a network of environmental technology parks to be equipped with the best state-of-the-art safe technological solutions. In 2024, two of them (the Gorny and Schuchye facilities) were built.

ROSATOM is building seven modern industrial facilities (environmental technology parks), four of which are based on former chemical weapons destruction sites (the Gorny facility in the Saratov Region, the Schuchye facility in the Kurgan Region, the Maradykovsky facility in the Kirov Region and the Kambarka facility in the Udmurt Republic), while the remaining three are greenfield facilities (the Western Siberia facility in the Tomsk Region, the Vostok facility in the Irkutsk Region and the RG Centre facility in the Nizhny Novgorod Region). They will have a total throughput of up to 232,000 tonnes of waste, which will enable the safe management of hazardous waste using state-of-the-art capacities and the best available technologies.

In fact, this will provide a resource base for a new circular economy in Russia. The design and selection of process lines is underpinned by the principle that recycling of hazard class 1 and 2 waste is a priority, in line with the current government policy on waste management.

In 2024, two facilities, Gorny and Schuchye, started pilot operation. As part of the Circular Economy Federal Project, another five facilities are expected to start pilot operation: Vostok, Western Siberia, Maradykovsky, Kambarka and RG Centre.

For details, see chapter 2 'Business Development Report' and chapter 5 'Safety Report'.

1. Hazard class 1 and 2 waste includes mixtures of inorganic salts, oxides, hydroxides, acids (waste from the metals, manufacturing and mechanical engineering industries), mercury-containing waste (mercury-vapour lamps and mercury thermometers, as well as mercury-containing industrial waste); effluents from industrial enterprises, organic waste, mixed and composite organic and inorganic waste.

1.5. INTERNATIONAL COOPERATION

Key results in 2024

- Five intergovernmental agreements were concluded, including intergovernmental protocols on the implementation of the world's first export-oriented project to build a small nuclear power plant in Uzbekistan and on the establishment of a Russian-Chinese Subcommittee on Cooperation on the Northern Sea Route.
- An official ceremony was organised to mark the start of concreting at power unit No. 4 of El Dabaa NPP, with the leaders of the two countries participating in the ceremony via video conferencing.
- Assistance was provided to the Russian Ministry of Finance in amending intergovernmental agreements on the provision of government loans for the construction of Russian-design NPPs abroad. As a result of these joint efforts, in December 2024, the provision of funding for the El Dabaa NPP construction project in Egypt was resumed.
- A meeting was arranged between the President of the Russian Federation Vladimir Putin and the IAEA Director General Rafael Grossi to discuss matters related to ensuring the safety and security of Zaporozhye NPP.

ROSATOM's international activities are aimed at expanding cooperation in the peaceful use of nuclear energy in order to promote Russian technologies and enable the Russian nuclear industry to consolidate its position on the global nuclear energy market.

In 2024, these efforts were carried out amid unprecedented large-scale illegitimate sanctions imposed by unfriendly countries. ROSATOM prioritised matters related to nuclear safety and security and focused on fulfilling all its international commitments and meeting contractual schedules agreed with customers.



1.5.1. Expanding the international legal framework for cooperation

In 2024, ROSATOM continued to take steps to expand the international legal framework for cooperation and to provide support for major overseas projects.

22 intergovernmental and interdepartmental agreements were signed (18 in 2023; 17 in 2022).

Strengthening the international legal framework for cooperation

Algeria	A road map for cooperation in the peaceful use of nuclear energy was signed with the Ministry of Energy and Mines of Algeria; it outlines future initiatives covering a wide range of areas.
Armenia	An intergovernmental memorandum was signed on strategic partnership in the field of nuclear medicine. Under the document, the parties will examine the possibilities for implementing new joint projects in this area.
Republic of Belarus	An intergovernmental memorandum was signed on expanding strategic partnership in the peaceful use of nuclear energy and in related high technology; it formalises arrangements concerning the agenda for the future bilateral cooperation. Pursuant to the memorandum, a Comprehensive Russian-Belarusian Programme for Cooperation on Nuclear Non-Energy and Non-Nuclear Projects was developed and signed in March 2024; it establishes specific cooperation objectives. In November 2024, a protocol was signed to include new projects focused on digitisation and telecommunications technologies in the scope of the Comprehensive Programme. As part of the Union State, action plans for the implementation of the Guidelines for Implementing the Provisions of the Treaty Establishing the Union State for the period from 2024 through 2026 were developed and approved; they establish key objectives related to promoting integration between Russia and Belarus in the peaceful use of nuclear energy and research and technical cooperation.
Vietnam	A memorandum was signed concerning the implementation schedule of the project to build a Nuclear Research and Technology Centre (NRTC) in Vietnam; it outlines key activities until 2027.
India	A protocol to the intergovernmental agreement dated 5 December 2008 on the construction of additional NPP power units at the Kudankulam site and at a new site in India was signed; it provides for a change of currency for payments made using the customer's own funds from US dollars to another currency, as agreed by the parties.
Iraq	A framework memorandum of cooperation was signed with the Iraqi Atomic Energy Commission; it provides for the establishment of a joint working group in order to discuss specific projects and for the drafting of a new intergovernmental agreement on the peaceful use of nuclear energy.

Kyrgyz Republic 	An intergovernmental agreement was signed on cooperation in the rehabilitation of regions of the Kyrgyz Republic affected by mining operations (including uranium mining). The document will enable environmental improvement and efficient use of sites and promote social and economic development. In order to implement the provisions of the agreement, a Road Map for Cooperation in 2024 and 2025 was signed. A Comprehensive Cooperation Agreement was signed with the Ministry of Energy of the Kyrgyz Republic in order to strengthen cooperation in the development of the energy industry.
China 	A protocol to the intergovernmental agreement dated 27 June 1997 on the establishment and the organisational basis of a mechanism for regular meetings between the Heads of Government of Russia and China was signed, which establishes a Russian-Chinese Subcommittee on Cooperation on the Northern Sea Route, and a road map was signed for the implementation of the interdepartmental comprehensive long-term cooperation programme for fast neutron reactors and closing the nuclear fuel cycle signed on 21 March 2023.
Mongolia 	A road map was signed for exploring the possibility of building a small nuclear power plant (SNPP) in Mongolia. The document establishes key objectives of the project for the period from 2024 through 2026, including in terms of personnel training and the development of nuclear infrastructure and the regulatory framework.
Nicaragua 	A trilateral memorandum of cooperation in personnel training and development in the field of nuclear medicine and related areas was signed by ROSATOM, the FMBA of Russia and the Ministry of Health of Nicaragua. The document will make it possible to arrange the training of highly qualified specialists to support the implementation of the project to build a Nuclear Medicine Centre in Managua.
Republic of the Congo 	Memoranda of cooperation in the peaceful use of nuclear energy and in hydropower generation were signed.
Serbia 	An interdepartmental memorandum of cooperation in the field of nuclear medicine was signed, providing a framework for a dialogue with Serbian partners concerning the establishment of a nuclear medicine centre (a cancer centre).
Sahel countries	Road maps were signed in order to establish cooperation in the peaceful use of nuclear energy, and memoranda were signed with Burkina Faso and Mali on personnel training and development for the nuclear power industry, shaping a positive public perception of nuclear power, and cooperation in the development of nuclear infrastructure.
Tajikistan 	A Joint Action Plan was approved for the period from 2024 through 2026; it establishes the procedure and conditions for the implementation of initiatives to rehabilitate areas affected by mining operations (including uranium mining).
Uzbekistan 	An intergovernmental protocol was signed on the implementation of the world's first export-oriented project to build an SNPP in Uzbekistan.

1.5.2. Support for major overseas projects

In 2024, the Corporation continued to provide support for the implementation of major overseas projects, primarily those focused on the construction of Russian-design NPPs and Nuclear Research and Technology Centres.

Despite the special conditions related to external restrictions, ROSATOM fulfils all its international commitments to build Russian-design nuclear facilities abroad in full.

Bangladesh



Amid domestic political events that unfolded in Bangladesh in 2024, ROSATOM focused primarily on ensuring the safety of specialists from nuclear organisations in their places of residence and employment, and on ensuring the security of facilities at the Rooppur NPP construction site. ROSATOM engaged with the country's new political leaders in order to secure support for this strategic project.

The Corporation, jointly with the Russian Ministry of Finance, maintained a dialogue with the government of Bangladesh on a range of issues related to financing for the construction of Rooppur NPP.

Bolivia



The construction of the Nuclear Research and Technology Centre (NRTC) in Bolivia is nearing completion. As part of preparations for the delivery of nuclear fuel for the research reactor, a draft intergovernmental agreement on spent nuclear fuel management was prepared and agreed with the partners.

Assistance with interbank settlements with the Bolivian customer was provided to the general contractor responsible for the project. ROSATOM, jointly with the Federal Environmental, Industrial and Nuclear Supervision Service of Russia (Rostekhnadzor), engaged with the Bolivian regulator in order to obtain a licence for the operation of the research reactor.

A series of meetings between ROSATOM's Director General and the President of the Plurinational State of Bolivia Luis Arce was held via video conferencing.

Hungary



The construction of the second stage of Paks NPP in Hungary was ongoing. During 2024, preparations were underway at the site to start the concreting of the foundation slab of power unit No. 5; the process of amending the EPC contract for the construction of new power units No. 5 and 6 was initiated, with amendments related to the project cost and schedule.

Simultaneously, fresh nuclear fuel was delivered for power units No. 1–4 of Paks NPP, and maintenance was carried out to support the extension of the service life of the NPP. In December 2024, the Hungarian Parliament adopted an amendment to the law on nuclear energy, whereby the service life of Paks NPP may be extended by 20 years, until 2052–2057.

Vietnam



As part of the project to build a Nuclear Research and Technology Centre (NRTC) in Vietnam, ROSATOM continued to carry out the contract for the development of a feasibility study and the selection of a site for the NRTC.

The senior executive of the Russian nuclear industry held meetings with the Prime Minister of the Socialist Republic of Vietnam Phạm Minh Chính in June 2024 in Hanoi and in October 2024 at the BRICS Summit in Kazan; the meetings involved a detailed discussion of the entire agenda for bilateral nuclear cooperation.

Following the decision made in November 2024 by the Vietnam government to resume the implementation of nuclear energy projects in the country, in December 2024, the first round of expert consultations was held concerning the resumption of the implementation of the project to build a large Russian-design NPP in Vietnam.

Egypt



A ceremony was held to mark the start of concreting at power unit No. 4 of El Dabaa NPP, with the leaders of the two countries participating in the ceremony via video conferencing. This marked the transition of the project to build an NPP comprising four power units from the preparatory stage to full-scale implementation.

In August and November 2024, ROSATOM's Director General and the Prime Minister of Egypt Mostafa Madbouly conducted negotiations in Egypt on specific matters.

India



The construction of power units No. 3–6 of Kudankulam NPP was ongoing.

In February 2024, senior nuclear industry executives of the two countries held a meeting at the NPP site. In May 2024, the Indian delegation made a return visit to the construction site of the Proryv Project in Seversk. The negotiations focused on the agenda for future bilateral cooperation.

The latest meeting of senior nuclear industry executives of the two countries took place in September 2024 at the IAEA General Conference in Vienna.

China



Nuclear energy projects envisioned by the strategic package of documents signed in 2018 were underway, namely the construction of power units No. 7 and 8 of Tianwan NPP and power units No. 3 and 4 of Xudapu NPP with Russian-design VVER-1200 reactors, the supply of equipment for the Chinese experimental fast neutron reactor (CFR-600), as well as the supply of nuclear fuel for these reactors.

Contact was maintained at the level of senior nuclear industry executives of the two countries. In July 2024, the 28th meeting of the Russian-Chinese Nuclear Subcommittee was held in Beijing, and in November 2024, the 1st meeting of the Subcommittee on Cooperation on the Northern Sea Route was held in Saint Petersburg.

Myanmar



A draft intergovernmental agreement on SNPP construction in Myanmar was agreed with the Myanmar party. The Russian party completed internal government procedures required for the signing of the document. Arrangements were made with the partners to sign the agreement as soon as practicable.

Meetings of senior industry executives of the two countries were organised as part of the Atomexpo International Forum in Sochi in March 2024 and the Russian Energy Week International Forum in Moscow in September 2024.

Turkey



Despite sanctions, the Akkuyu NPP construction project was ongoing.

Priority was given to pre-commissioning operations at power unit No. 1. In late 2024, fresh nuclear fuel was delivered for power unit No. 2.

Simultaneously, ROSATOM maintained a dialogue with its partners in order to shape a regulatory framework for the construction of another Russian-design NPP at a new site in Turkey.

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1.5.3. Cooperation with international organisations

Commitments to pay contributions to the IAEA and the OECD NEA in 2024 using funds from the federal budget were met in full within the scope of ROSATOM's competences.

Implementation of the industry-wide programme to train Russian personnel for international organisations continued in cooperation with the IAEA, the World Association of Nuclear Operators (WANO) and the ITER Organisation. In 2024, four Russian specialists from the pool of experts formed as part of the programme were hired by specialised international organisations.

International Atomic Energy Agency (IAEA)

In 2024, ensuring the safety and security of Zaporozhye NPP (ZNPP) remained the primary focus of ROSATOM's cooperation with the IAEA. Preparations were made for the meeting between the President of the Russian Federation Vladimir Putin and the IAEA Director General Rafael Grossi, which took place on 6 March 2024. Three rounds of interdepartmental consultations with the IAEA were held. Visits of Rafael Grossi to ZNPP (on 7 February and 4 September 2024) and to Kursk NPP (on 27 August 2024) were organised in cooperation with the Russian Ministry of Defence and the Federal National Guard Service. A system was established for promptly informing the IAEA Secretariat and the international community about the actual situation at ZNPP.

In 2024, Russian experts participated in all key specialised international events hosted by the IAEA (about 1,000 specialists, more than 300 events, including via video conferencing), including those focused on formulating international rules and standards in the field of nuclear energy.

ROSATOM, jointly with the Russian Ministry of Foreign Affairs and Rostekhnadzor, countered attempts by unfriendly countries to undermine Russia's legitimate standing in the IAEA.

ROSATOM played a key role in the 68th session of the IAEA General Conference. Resolutions adopted following the conference accommodate the interests of the Russian nuclear industry.



Russian expertise was strongly represented at the first IAEA International Conference on Small Modular Reactors and Their Applications. Employees of ROSATOM and its organisations took part in events under the Convention on Nuclear Safety and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

24 training events on various nuclear topics (including online events) were held in Russia under the auspices of the IAEA; more than 380 specialists from member states of the IAEA completed training.

Three agreements were concluded with the IAEA on expanding Russia's participation in major programmes and projects focused on developing nuclear infrastructure, combating cancer and providing support for IAEA safeguards. Collaboration continued as part of the Technical Cooperation Programme, the Nuclear Security Fund and the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO).

Nuclear Energy Agency of the Organisation for Economic Cooperation and Development (OECD NEA)

Although the OECD Council decided to suspend Russian membership in the OECD NEA as from 11 May 2022, in 2024, the Corporation continued to participate in joint projects that are relevant to the Russian nuclear industry and engage with international institutions which maintain a professional and non-politicised attitude.

Going forward, ROSATOM's approach to participation in projects under the auspices of the OECD NEA will depend entirely on whether the legitimate rights and powers of Russian representatives are safeguarded as part of these projects.

Commission of the CIS Member States on the Peaceful Use of Nuclear Energy

In 2024, work forming part of the Intergovernmental Target Programme for Remediation of Lands in CIS Member States Affected by Uranium Mining Operations was completed in the Kyrgyz Republic with assistance from ROSATOM within the scope approved for the relevant design solutions.

Preparatory work was completed as part of the second stage of reclamation efforts in Tajikistan.

On 24 May 2024, the Framework for Cooperation between the CIS Member States on Hazardous Waste Management and Cleaning Up Legacy Sites Causing Environmental Damage and the related Plan of Prioritised Measures for the period from 2024 through 2029 were approved at a meeting of the Council of Heads of State of the CIS.

Pursuant to the resolutions of the CIS Economic Council dated 20 September 2024 and 29 November 2024, three documents aimed at further promoting cooperation in the peaceful use of nuclear energy were approved.

In December 2024, the anniversary 25th meeting of the Commission of the CIS Member States on the Peaceful Use of Nuclear Energy was held at the Andrey Sakharov Cultural and Education Centre Mayak Academy in Nizhny Novgorod. The meeting approved a number of documents, two of which await approval by the Council of Heads of State of the CIS and five await approval by the CIS Economic Council.



1.5.4. Strengthening the nuclear non-proliferation regime and export control

In 2024, further steps were taken to enhance the export control system in ROSATOM and its organisations.

53 export control specialists in 27 organisations of ROSATOM involved in international trade underwent training and obtained certification from the FSTEC of Russia (2023: 39 specialists in 24 organisations; 2022: 34 specialists in 19 organisations).

In accordance with the Uniform Industry-Wide Export Control Code of ROSATOM and Its Organisations Engaged in International Trade as Part of the International Business Group of Processes, 270 draft contracts (arrangements, agreements) were reviewed (2023: 263 draft contracts; 2022: 318 draft contracts). The findings of the review were sent to organisations in the industry.

1.5.5. Developing the network of ROSATOM's representative offices affiliated with embassies and trade missions abroad

ROSATOM's representatives continued to work in Russian embassies and trade missions in 12 foreign countries and under the Permanent Mission of the Russian Federation to International Organisations in Vienna (Austria). They provided comprehensive support for the implementation of ROSATOM's overseas projects.

1.5.6. Challenges in the reporting period and mechanisms for addressing them

Amid unprecedented political and economic sanctions pressure on Russia, ROSATOM jointly with the relevant ministries and government agencies implemented compensatory measures across a number of areas that are of key importance for the industry, including import substitution, financial support and international transportation.

As part of implementation of Decree No. 311 of the Government of the Russian Federation dated 9 March 2022 on Measures for Implementing Decree No. 100 of the President of the Russian Federation dated 8 March 2022, 507 lists of items exported by ROSATOM's organisations and their contractors from the Russian Federation to Russian-design nuclear facilities under construction abroad under intergovernmental agreements were submitted to the Federal Customs Service of Russia in 2024 (559 lists were submitted to the Federal Customs Service of Russia in 2023, and 499 lists were submitted in 2022).

Decree No. 1544 of the Government of the Russian Federation dated 14 November 2024 on Amending Decree No. 313 of the Government of the Russian Federation dated 9 March 2022, which was drafted by ROSATOM, was approved; following its adoption, temporary restrictions on enriched uranium export to the US were introduced, with individual deliveries allowed under one-time licences issued by the FSTEC of Russia.

1.5.7. Plans for 2025 and beyond

ROSATOM will continue to develop the contractual and legal framework in order to enable the Russian nuclear industry to secure its foothold in its traditional countries of operation and to enter the market in new countries amid large-scale sanctions imposed on the Russian Federation by a number of unfriendly countries.

Special emphasis will be placed on negotiating the conditions for the launch of projects to build Russian-design NPPs in Kazakhstan, Vietnam and Myanmar with partners.

ROSATOM continues to promote Russian approaches to Generation IV nuclear technology and small-scale nuclear power generation on the IAEA platform.



1.6. PERFORMANCE OF GOVERNMENT FUNCTIONS

1.6.1. Performance of the Nuclear Weapons Division

Fulfilment of the state defence order and cooperation with the Russian Ministry of Defence

As part of the implementation of the state armament programme and the fulfilment of the state defence order, ROSATOM's Nuclear Weapons Division (NWD) cooperates with the Russian Ministry of Defence and Russian nuclear forces in order to maintain and expand the ammunition stockpiles of the Russian Armed Forces (in terms of both scope and quality) at a level that ensures the implementation of Russia's nuclear deterrence policy.

ROSATOM and its NWD organisations fulfilled the state defence order for 2024 in full (100%).

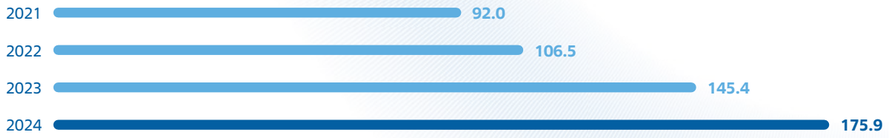
Operations in the civilian sector

In 2024, the NWD took steps to increase the output of high-technology civilian and dual-use products in accordance with List of Instructions No. Pr-2346 from the President of the Russian Federation dated 5 December 2016.

Pursuant to these instructions, in the reporting year, the NWD continued to implement the industry-wide diversification programme (hereinafter referred to as the Programme). Targets set as part of the Programme were met. Moreover, NWD organisations provide support to the state in achieving technological sovereignty and make an important contribution to a number of national projects, such as the Efficient Transportation System, New Materials and Chemicals, Data Economy and Digital Transformation of the State, Environmental Well-Being, New Nuclear and Energy Technologies, and Modern Technologies for Preserving Health.

To make further progress in the civilian segment, the NWD has implemented and will implement initiatives pursuant to Decree No. 309 of the President of the Russian Federation dated 7 May 2024 on the National Development Goals of the Russian Federation until 2030 and for the Future until 2036, which involve increasing the contribution of organisations forming part of the military–industrial complex to national projects supporting Russia's technological sovereignty and leadership.

Consolidated revenue from other products of the NWD, RUB billion



Measures to improve the performance of NWD organisations

Experimental, testing, manufacturing and technological capabilities of the NWD are being developed under the established procedure in accordance with strategic planning documents; this includes the standardisation of nuclear weapons products. There is no risk of loss of nuclear weapons technologies.

ROSATOM's NWD is a leader in the Russian Federation in terms of identifying and registering intellectual property rights over research and development results; 286 decisions were made in 2024 concerning the form of legal protection of intellectual property (IP) for military, special and dual-use applications.

Technologies and samples of military products developed by the NWD are the result of innovative R&D. The Russian Federation represented by ROSATOM and the contractor have a joint right to obtain documents of title for 95% of IP for military, special and dual-use applications.

There have been no instances of loss of title over solutions developed by the NWD, which ensures Russia's technological sovereignty. All items of intellectual property are used in production operations. 49 items of intellectual property have been commercialised.

Contribution of the NWD to ensuring safety, reliability and self-reliant technological development in Russia

An updated programme of development of the National Centre for Physics and Mathematics (NCPM) was approved in 2024; it includes the NCPM's research programme.

Work under the research programme covers 10 disciplines in the sphere of fundamental physics and mathematics. 55 institutes of the Russian Academy of Sciences and Russian universities are involved in cooperation in scientific research.

The implementation of the research programme produced the following key results:

- A demonstration sample of a 10^{16} bit/s analogue photonic computing device was produced;
- Key components of digital twins were developed for a number of high-technology industrial products, such as components of a diesel engine and electromagnetic processes in the antenna unit of an aircraft;
- A nuclear frequency standard was established based on the Th-229 nuclear transition;
- A magnetic phase diagram was developed for rare-earth intermetallic compounds at ultra-high magnetic field strengths (up to 500 T) and for the 'cold' isentropic profile of ammonia at a pressure of up to 4.5 Mbar.



1.6.2. Law drafting

The Corporation plans its law drafting activities taking into account government priorities and strategic development objectives of the industry. In 2024, the primary focus was on formalising the Corporation's role in ensuring the technological independence of critical information infrastructure in the Russian Federation. Federal Law No. 170-FZ of 8 July 2024 on Amending the Federal Law on State Atomic Energy Corporation Rosatom was adopted.

The Federal Law introduces major amendments reflecting the Corporation's power to issue bonds, providing protection for the Corporation's special reserve funds against inflationary processes and establishing a provision making it possible to put these funds into the Corporation's bank accounts.

In 2024, the Corporation assisted in drafting Federal Law No. 523-FZ of 28 December 2024 on Technological Policy in the Russian Federation and on Amending Certain Laws of the Russian Federation, which gave the Corporation the right to formulate proposals concerning technological policy with regard to the use of nuclear energy and the Northern Sea Route.

In the sphere of taxation, amendments were made to Federal Law No. 259-FZ of 8 August 2024 on Amending Parts One and Two of the Tax Code of the Russian Federation and Certain Laws of the Russian Federation on Taxes and Duties. The amendments enable employees working at overseas nuclear facilities to retain the tax resident status.

As part of international initiatives, a protocol with Egypt (Federal Law No. 394-FZ of 23 November 2024) on the provision of loans for NPP construction in the Arab Republic of Egypt was ratified.

To enable the efficient use of property situated within the boundaries of priority development areas established in closed administrative and territorial formations (CATFs), including its use in business operations, Federal Law No. 35-FZ of 26 February 2024 was adopted, which takes into account the special characteristics of the industry.

In the reporting year, the Corporation continued to participate in initiatives to improve legislation on the use of nuclear energy, with a focus on:

- Developing a legal framework regulating nuclear fusion reactors and installations at the design stage and in operation, including those containing nuclear materials, special non-nuclear materials and radioactive substances designed for use in light-atom fusion reactions;
- Preserving the existing mechanism for federal government supervision of the use of nuclear energy and government monitoring of the safety and security of transportation of nuclear materials, radioactive substances and products made from them (in terms of compliance with requirements for organising and providing special transportation), except for nuclear materials transferred as part of products to the Russian Ministry of Defence, and licensing supervision of operations of organisations involving the use of nuclear materials and radioactive substances when using nuclear energy for defence purposes, including the development, production, testing, transportation, operation, storage, dismantling and disposal of nuclear weapons and military nuclear power systems;
- Legal regulation of matters related to the design, construction and renovation of nuclear facilities and the use of best available technologies;
- Improving approaches to managing and funding initiatives to decommission legacy NPP power units that have been shut down;
- Maintaining existing legal regulation with regard to security areas with a special legal regime established under Federal Law No. 170-FZ of 21 November 1995 on the Use of Nuclear Energy in order to enhance the anti-terrorism security of nuclear facilities;
- Taking into account special aspects related to ensuring the uniformity of measurements in the use of nuclear energy.

In order to address the prioritised task of ensuring the safety of facilities posing especially serious nuclear and radiation hazards at all stages of their life cycle and development, the Corporation drafted amendments to Federal Law No. 317-FZ of 1 December 2007 on State Atomic Energy Corporation Rosatom (hereinafter referred to as Federal Law No. 317-FZ) to revise the powers of the Supervisory Board in terms of using the Corporation's special reserve funds.

In 2024, the Corporation made an important contribution to law drafting initiatives by participating in the transformation of legislation aimed at giving a permanent status to a number of temporary economic support measures introduced between 2022 and 2024 that proved to be effective and justified while they were in force, and incorporating the outcomes of an experiment in streamlining and automating permitting processes (including licensing processes) into practice on a permanent basis.

In the reporting period, the Corporation reviewed about 300 bills, amendments, drafts of official comments and opinions of the Government of the Russian Federation, as well as other legislative initiatives. Key focus areas included the following:

- Improving legislation on hazard class 1 and 2 waste management, including addressing concerns arising with regard to organising the management of certain types of hazard class 1 and 2 waste in individual constituent entities of the Russian Federation due to their special geographical, natural and climatic characteristics;
- Providing a legal basis for the application and operation of energy storage systems in the electric power industry;
- Improving legislation and developing comprehensive approaches to the development of the NSR, including those aimed at enabling safe navigation along the NSR, developing the NSR infrastructure and building icebreakers, managing near-coastal transportation, and providing remote sensing data;
- Developing legislation governing matters related to digitisation and information security;
- Transforming legislation on tariff regulation and legislation on natural monopolies, and developing investment programmes;
- Defining the basic principles of government regulation in the sphere of chemical safety, including defining the key principles and the scope of initiatives focused on ensuring chemical safety;
- Improving legislation on protecting the population against radiation exposure;



300 bills

were reviewed in the reporting period

- Ensuring industrial and fire safety at hazardous industrial facilities;
- Improving provisions on the protection of regions and the local population against natural disasters and man-made emergencies;
- Improving legislation on the contract system in the sphere of government and municipal procurement of goods, work and services, and on the procurement of goods, work and services by certain types of legal entities, including formulating proposals concerning measures to establish a national regime for the procurement of goods for these purposes;
- Developing legislation on industrial policy, including formulating approaches to systematising and recording information on unique test facilities and test sites, formalising the legal status of technology testing centres, technology test sites and digital test sites;
- Defining the key principles and objectives and the governance structure, including the powers of government bodies, in the sphere of shipbuilding, and other focus areas.

Pursuant to Federal Law No. 210-FZ of 27 July 2010 on Organising the Provision of Public and Municipal Services, the Corporation, along with federal executive bodies, provides public services in the specified areas of activity and participates in projects to streamline and automate the provision of public services.

More specifically, in the reporting year, the Corporation received 1,561 applications for the provision of public services. The most in-demand public services provided by the Corporation include:

- Accreditation of certification bodies and testing laboratories (centres) verifying compliance with mandatory requirements for products subject to requirements for the safe use of nuclear energy;
- Issuing certificates authorising the transportation of nuclear materials, radioactive substances and products made from them and the use of specific designs of transportation casks for special types of radioactive substances;
- Registering hazardous industrial facilities under ROSATOM's jurisdiction and maintaining the departmental (industry) section of the State Register of Hazardous Industrial Facilities;
- Issuing permits for the construction and commissioning of capital facilities to the Corporation's institutions, joint-stock companies and their subsidiaries, and to enterprises under its jurisdiction with CATFs established around their operations in the event when the said facilities are built or renovated in these CATFs.

The established procedure for the provision of public services by the Corporation enables it to efficiently provide the required services to applicants and helps make the process more transparent and open and improve the level of satisfaction of individuals and organisations.

Plans for 2025 and for the medium term

In 2025, the Corporation will continue to provide legal support for the draft Federal Law on Amending Articles 20 and 24 of the Federal Law on State Atomic Energy Corporation Rosatom in terms of revising the powers of the Supervisory Board with regard to using the Corporation's special reserve funds as it is passed by the Federal Assembly of the Russian Federation.

The Corporation plans to draft the Federal Law on Amending Article 2 of the Federal Law on Official Statistical Accounting and the National Statistics System in the Russian Federation and Article 6 of the Federal Law on State Atomic Energy Corporation Rosatom. Under the draft Federal Law, the Corporation is to be included in the list of statistical authorities, which will make it possible to adopt a systematic approach and monitor all stages of preparation of statistical information, including in order to enable efficient management as part of the New Nuclear and Energy Technologies National Project and related federal projects.

Other focus areas prioritised for 2025 include the following:

- Regulating the mechanism for government accounting and monitoring of nuclear materials and special non-nuclear materials used in the development, production, testing, operation and disposal of nuclear weapons and military nuclear power systems;
- Participating in improving the legal and organisational framework for cargo deliveries to the Far North;
- Regulating certain matters related to the construction and operation of vessels with nuclear propulsion units;
- Improving legislation on radioactive waste management;
- Other legislative initiatives that may directly or indirectly affect the operations of ROSATOM and its organisations.

1.6.3. Government Programme 'Development of the Nuclear Power and Industry Complex'

In 2024, the Corporation implemented the Government Programme of the Russian Federation 'Development of the Nuclear Power and Industry Complex'. The implementation of the Government Programme is aimed at supporting the achievement of national development goals set by the President of the Russian Federation.

All metrics of the Government Programme, as well as metrics, results and milestones of its structural elements the achievement of which has been entrusted to ROSATOM, including those of federal projects included in the Comprehensive Programme 'Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024' which form part of the Government Programme, were achieved in full.

1.6.4. Implementation of federal target programmes

In 2024, ROSATOM's organisations participated in the implementation of initiatives forming part of two federal target programmes (FTPs).

Funding for the implementation of the FTPs (for the part of their scope on which information is publicly available)	Amount, RUB '000
Total funding, including:	47,420,190.2
– From the federal budget	19,200,363.9
– From extra-budgetary sources	28,219,826.3

1.6.5. State property management and restructuring of non-core assets

As at 31 December 2024, ROSATOM kept records of property transferred to the Corporation as asset contributions of the Russian Federation pursuant to resolutions of the President of the Russian Federation and the Government of the Russian Federation, as well as the assets of:

- Joint-stock companies whose shares are partly owned by the Russian Federation, with ROSATOM exercising the relevant shareholder powers on behalf of the Russian Federation;
- Limited liability companies in whose authorised share capital ROSATOM has interests;
- ROSATOM's private institutions;
- Federal state unitary enterprises (FSUEs) with regard to which ROSATOM exercises ownership powers;
- Joint-stock companies whose shares are owned by ROSATOM.

Real property owned by ROSATOM's organisations and enterprises under its jurisdiction is recorded in the Automated Property Management System (APMS).

As at 31 December 2024, the records of real property of nuclear organisations in the APMS covered 456 organisations, including:

- 13 FSUEs with an authorised capital totalling RUB 491,055 million;
- The Federal State Budgetary Institution Northern Sea Route General Administration.

The APMS contains information on items of real property and the relevant documents; all real property over which ROSATOM and its organisations have proprietary rights or which they own under the law of obligations are required to be recorded.

The Corporation exercises ownership rights on behalf of the Russian Federation with regard to:

- Property under the economic management of FSUEs included in the list approved by the President of the Russian Federation pursuant to Article 5 of the Law on State Atomic Energy Corporation Rosatom;
- Assets allocated to FSUEs (government stockpiles of raw materials and fissionable materials managed in accordance with paragraph 1 of Article 12 of the Law on State Atomic Energy Corporation Rosatom and the Regulations on Government Stockpiles of Special Feedstock and Fissionable Materials);[1]
- Assets under the operational control of the NSR General Administration.

ROSATOM's property

ROSATOM's assets have certain special characteristics. More specifically, in accordance with paragraph 9 of Article 3 of the Law on State Atomic Energy Corporation Rosatom, foreclosure of certain property of the Corporation[2] is prohibited.

The Corporation is authorised to exercise ownership rights with regard to federal property on behalf of the Russian Federation.

Federal property under the economic management of FSUEs is recorded on their balance sheet. Federal property acquired as part of the exercise of the powers of a public contracting authority is recorded in the Corporation's budgetary accounting records.

Property of enterprises under ROSATOM's jurisdiction

As at 31 December 2024, there were 13 FSUEs under ROSATOM's jurisdiction. In 2024, none of the Corporation's FSUEs were reorganised.

To enable effective use of real property and protect the rights and legitimate interests of owners and holders of these rights, in 2024, ROSATOM monitored the registration of title to real property used by FSUEs.

Performance of government functions related to state property management by the Corporation in 2024 involved monitoring the registration of title to real property held by the Russian Federation by FSUEs under ROSATOM's jurisdiction, as well as land regularisation.

In 2024, the Russian Federation registered its title to 143 items of real property (buildings and structures). As at 31 December 2024, enterprises under ROSATOM's jurisdiction concluded a total of 289 agreements granting a lease of real property with a total floor space of 456,230 m².

1. Approved by Decree No. 693-24 of the Government of the Russian Federation dated 19 August 2011.
2. According to the list approved by Decree No. 346 of the Government of the Russian Federation dated 6 May 2008 on Measures for Implementing Decree No. 369 of the President of the Russian Federation dated 20 May 2008.

According to reports of enterprises under ROSATOM's jurisdiction, as at 31 December 2024:

Total number of items of real property under the economic management of the enterprises	13,057
Total floor space of the items of real property under the economic management of the enterprises	47,659,260 m²
Initial book value of the items of real property under the economic management of the enterprises	RUB 430,126,681,960
Residual book value of the items of real property under the economic management of the enterprises	RUB 379,978,581,550
Total number of land plots used by the enterprises	2,254
Total area of land plots used by the enterprises	104,967.24 hectares
Cadastral value of the land plots	RUB 329,900,485,360
Authorised capital of the FSUEs	RUB 491,055 million

Property of ROSATOM's organisations

107 non-core assets owned by joint-stock companies in which ROSATOM has a shareholding exceeding 25% were restructured in 2024. More specifically, 105 assets were sold; two assets were transferred free of charge to the government and municipalities. Proceeds from the sale of these non-core assets totalled RUB 1,747.51 million.

119 non-core assets owned by joint-stock companies in which ROSATOM has a shareholding totalling less than 25% and by companies whose shares are held by ROSATOM on behalf of the Russian Federation were restructured in 2024. More specifically, 46 assets were sold; 58 assets were transferred free of charge to the government and municipalities; 15 assets were liquidated (written off). Proceeds from the sale totalled RUB 315.22 million.

As at 31 December 2024, ROSATOM's organisations concluded a total of 2,140 agreements granting a lease of real property with a total floor space of 2,159,220 m².

According to reports of ROSATOM's organisations, as at 31 December 2024:

Total number of items of real property owned by the organisations	28,678
Total floor space of the items of real property on the balance sheet of the organisations	56,056,670 m²
Initial book value of the items of real property	RUB 1,051,447,197,480
Residual book value of the items of real property	RUB 784,740,740,420
Total number of land plots used by the organisations	5,056
Total area of land plots used by the organisations	70,850.56 hectares
Cadastral value of the land plots	RUB 173,459,529,790

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1.7. TECHNOLOGICAL SOVEREIGNTY

ROSATOM plays a key role in the implementation of Russia's technological policy, paving the way for the country's technological leadership. The Corporation develops state-of-the-art production facilities, introduces new materials, helps enhance energy self-sufficiency and supports science.

As a leader in the nuclear power industry and in related areas, the Corporation seeks to become a national technological leader across a wide range of areas. More specifically, in addition to core nuclear initiatives forming part of the New Nuclear and Energy Technologies National Project, the Corporation also participates in various initiatives forming part of nine other national projects aimed at achieving technological leadership.

As part of the New Materials and Chemicals National Project, ROSATOM, jointly with the Russian Ministry of Industry and Trade, is taking steps to expand state-of-the-art manufacturing capabilities for the production of composite materials. Carbon fibre produced by ROSATOM is already used in the aircraft industry, shipbuilding and the transportation sector. The Corporation is developing plans to increase carbon fibre production to 4,900 tonnes per year and to launch new production lines with a capacity of 7,000 tonnes of PAN precursor per year. By 2030, these initiatives will make it possible to fully meet the demand of Russian industry for carbon fibre and composite materials based on it and to supply these products to the international market. Projects are underway to process carbon-fibre-reinforced plastics and develop thermoplastic composite materials, which will help make the industry more environmentally friendly.

As part of efforts to develop the production of rare and rare-earth metals, ROSATOM, jointly with the Russian Ministry of Industry and Trade, is developing the Kolmozerskoye lithium deposit, expanding titanium, zirconium and niobium production, and is taking steps to launch the production of rare-earth magnets in order to develop a new high-technology industry.

As part of efforts to develop the energy industry of the future, ROSATOM is building gigafactories that will produce lithium-ion batteries and is exploring opportunities for local production of key components and materials for these batteries. New electrochemical systems are being developed, including technologies for post-lithium energy storage systems, electric mobility technologies and modern alternative energy technologies. These projects will make it possible to provide power supply in remote regions, and support industry and transport infrastructure.

ROSATOM's participation in national projects is aimed at developing new industrial capabilities in the country, supporting high-technology manufacturing enterprises and promoting robust cooperation between businesses, the scientific community and the government.



1.7.1. Critical information infrastructure

Pursuant to Decree No. 166 of the President of the Russian Federation dated 30 March 2022 on Measures to Ensure Technological Independence and Security of Critical Information Infrastructure (Decree No. 166), in September 2022, ROSATOM established a dedicated research and production association specialising in the development, production, technical support and maintenance of trusted hardware and software systems for critical information infrastructure (CII) in the Russian Federation.

In 2024, the Corporation implemented a pilot project to test solutions adopted pursuant to Decree No. 166; as part of the project:

- Methodological Recommendations for the Transition of Critical Information Infrastructure Entities in the Russian Federation Operating in the Nuclear and Space Industries to Preferential Use of Trusted Hardware and Software Systems at Significant CII Facilities Owned by Them[1] were developed and piloted;
- A system for voluntary certification of trusted products and processes, CII-CERT, was established;
- Proposals were developed concerning the conclusion of forward contracts;
- Proposals were developed concerning the procedure for and the format of technological independence audits of CII entities;
- A project to establish an information system covering the entire life cycle of CII solutions was launched and financed by ROSATOM using its own funds.

The outcomes of the project will provide a basis for rolling out successful solutions at the federal level and for amending existing and developing new laws and regulations aimed at ensuring the technological independence of CII.

The special role played by the Corporation in terms of ensuring the technological independence of CII necessitated amending Federal Law No. 317-FZ. The relevant Federal Law[2] was adopted, which authorises the Corporation to formulate proposals concerning developing government policy and statutory regulation in the sphere of CII, to manage initiatives concerning the Corporation's institutions in the sphere of CII, and to develop and implement the technical policy in the sphere of CII in the nuclear industry.

In order to develop and implement the technical policy in the sphere of CII, a technical committee on the standardisation of hardware and software systems for CII and the relevant software (TC 167) was established jointly with the Federal Agency for Technical Regulation and Metrology (Rosstandart). In 2024, TC 167, with assistance from Rosstandart and 15 related technical committees, developed and approved the Advanced Programme of Standardisation of Hardware and Software for CII for the period from 2024 through 2028, which involves developing more than 130 national standards.



1. Pursuant to Decree No. 1912 of the Government of the Russian Federation dated 14 November 2023 on the Procedure for the Transition of Critical Information Infrastructure Entities in the Russian Federation to Preferential Use of Trusted Hardware and Software Systems at Significant Critical Information Infrastructure Facilities Owned by Them in the Russian Federation.
2. Federal Law No. 170-FZ of 8 July 2024 on Amending the Federal Law on State Atomic Energy Corporation Rosatom..

1.7.2. Electricity storage systems

Electricity storage systems are one of the key non-nuclear businesses being developed by ROSATOM. Pursuant to Order No. 356-r of the Government of the Russian Federation dated 28 February 2022, a Letter of Intent between the Government of the Russian Federation and ROSATOM to Develop a High-Technology Area, 'Technologies for Electricity Storage Systems, Including Portable Ones', in the Russian Federation was concluded on 9 March 2022.

A road map for the development of the 'Technologies for Electricity Storage Systems, Including Portable Ones, in the Russian Federation' high-technology area approved under resolution No. 4857p-P51 of the Deputy Prime Minister of the Russian Federation Alexander Novak dated 16 May 2022 is the main mechanism for implementing the Letter of Intent.

Pursuant to instructions from the President of the Russian Federation,[1] the Agreement between the Government of the Russian Federation and ROSATOM on the Development of the Electricity Storage Systems (ESS) High-Technology Area in the Russian Federation was signed in a new format.

Pursuant to the updated Agreement, a Road Map for the Development of the ESS High-Technology Area[2] (hereinafter referred to as the Road Map) was approved; it is designed to enable the Russian Federation to achieve technological sovereignty and leadership in the electricity storage segment, including supporting the accomplishment of the objectives established in the Concept for the Development of the Production and Use of Electric Vehicles in the Russian Federation until 2030[3] and the Strategy for Developing the Automotive Industry in the Russian Federation until 2035.[4] Pursuant to minutes No. 1pr of the virtual meeting of the Interdepartmental Working Group on the Development of Electricity Storage Systems in the Russian Federation dated 25 December 2023, an updated version of the Road Map was approved.

The implementation of initiatives included in the Road Map will ensure technological sovereignty of the ESS industry along the entire product chain, from materials for the mass production of lithium-ion batteries to the disposal of used cells. It is envisaged that the Road Map will be financed both out of the budget and using extra-budgetary funds, including own funds of ROSATOM and other participants.

Key projects under the Road Map include investment projects aimed at building two ESS production plants in the Russian Federation with a capacity of 4 GWh per year each. These production capacities will be sufficient to supply traction batteries for about 100,000 passenger vehicles. The plants are scheduled to be launched in 2025 in the Kaliningrad Region and in 2026 in Moscow. The projects will help replace ESS imports, ensure ESS supply to Russian high-technology enterprises, including in the automotive industry, and reach a high level of local content, including manufacturing processes involved in the production of lithium-ion battery cells.

The plants are high-technology operations with a high degree of automation and the use of robotics; they are capable of producing 18 million cells per year each (1 cell per second). The performance characteristics of the cells match those achieved by top global producers. The plants are fully integrated operations covering all process stages, including the mixing of active materials, the production of electrode strips and the subsequent production of lithium-ion cells.

Battery cells produced by the plants are assembled into a standardised battery module. These modules serve as a basis of all types of batteries for a wide range of electric transport solutions (pleasure vehicles, electric vehicles, electric buses, water and rail transport, mining and other equipment) and large-capacity storage systems for energy infrastructure.

1. List of Instructions No. Pr 1553 from the President of the Russian Federation following the meeting of the Presidential Council for Strategic Development and National Projects dated 18 July 2022; Order No. 43-r of the Government of the Russian Federation dated 16 January 2023.
2. Approved pursuant to minutes No. 3 of the meeting of the Interdepartmental Working Group on the Development of Hydrogen Energy in the Russian Federation dated 28 December 2022.
3. Approved by Order No. 2290-r of the Government of the Russian Federation dated 23 August 2021.
4. Approved by Order No. 4261-r of the Government of the Russian Federation dated 28 December 2022.

The development of the ESS high-technology area in the Russian Federation is aligned with the national development goal of achieving technological leadership pursuant to Decree No. 309 of the President of the Russian Federation dated 7 May 2024 on the National Development Goals of the Russian Federation until 2030 and for the Future until 2036.

The Russian Ministry of Industry and Trade, jointly with ROSATOM, has developed and approved a federal project titled 'New Lithium-Ion and Post-Lithium Energy Storage System Technologies and Production Capabilities' forming part of the New Nuclear and Energy Technologies National Project, which is aimed at achieving technological leadership. The aim of the project is to achieve technological sovereignty in the lithium-ion and post-lithium ESS segment. The implementation of the federal project will result in the development of state-of-the-art production technologies and the launch of production of 49 key ESS types and their components.

The development of the new ESS high-technology area in the Russian Federation, including the production of battery systems for electric transport, is facing a challenge of competition from analogues imported on an industrial scale from foreign countries (in 2024, imports totalled about 1 GWh, or RUB 20 billion). In order to gradually replace imports until large-scale ESS production and the production of ESS components is launched in Russia, it is necessary to provide consumers of domestically manufactured products with federal support in the form of subsidies. The Federal Project involves supporting the sales of finished ESS products by providing consumers with compensation for the difference between the cost of new Russian products and their imported analogues.

In order to ensure technological sovereignty, the production of key input materials for lithium-ion battery gigafactories (cathode and anode materials and electrolytes) will be launched.

For details, see section 2.1. 'Business Diversification'.

1.7.3. Composite materials

There is only one process line producing carbon fibre and one process line producing polyacrylonitrile (PAN, a key type of feedstock for carbon fibre production) in Russia. In order to ensure steady supplies in the event of a disruption in their operation, it is necessary to expand carbon fibre production capacities.

As the only owner of the technology for the production of modern carbon fibre and PAN in Russia, the Corporation is developing a project to expand carbon fibre and PAN production. The project involves building three new carbon fibre production plants and one PAN precursor production plant with a capacity of up to 4,900 tonnes and 7,000 tonnes respectively. The project is aimed at achieving the Technological Leadership national goal[1] by ensuring technological independence in the sphere of new materials and chemicals.

In August 2024, the project was proposed for inclusion in the scope of the federal programme titled 'Development of Production of Composite Materials and Products Made from Them', which forms part of the New Materials and Chemicals National Project aimed at achieving technological leadership. Loans on preferential terms via the Cluster Investment Platform have been prioritised as a support measure.

Key industries consuming products manufactured as part of the project include the following:

- The aircraft industry (applications: wing components, high-lift devices, tail assemblies, aircraft bodies, helicopter fuselage components; nacelles for aircraft engines);
- Gas-fuelled vehicles (applications: high-pressure cylinders for Volgabus buses, UAZ passenger vehicles, and KAMAZ and MAZ trucks);
- The nuclear power industry (applications: gas centrifuges for uranium enrichment and fuel supply to NPPs);
- Rocket engineering (applications: spacecraft structures and fairing for launch vehicles);
- Other industries (applications: wind turbine blades and nacelles, bridges, sheet piling, pipes, components of vessel hulls, sports gear).

For details, see chapter 2 'Business Development Report'.



1.7.4. Rare and rare-earth metals

ROSATOM's projects are aimed at providing a robust mineral resource base for launching and developing the production of high-technology products making it possible to achieve synergy, and at accelerating the achievement of technological leadership in terms of the development and introduction of advanced materials and products.

Project to develop the Kolmozerskoye lithium ore deposit

The project is aligned with the goals of the New Materials and Chemicals National Project, which is aimed at achieving technological leadership. The project is aimed at ensuring technological independence and developing new markets in a number of areas, such as bioeconomy, preserving people's health, food security, unmanned aircraft systems, production and automation equipment, transportation mobility (including autonomous vehicles), new materials and chemicals, advanced space technologies and services, and new energy technologies (including nuclear technologies) (Decree No. 309 of the President of the Russian Federation dated 7 May 2024).

1. Decree No. 309 of the President of the Russian Federation dated 7 May 2024.

Products manufactured as part of the project include battery-grade lithium carbonate and battery-grade lithium hydroxide monohydrate. Producers of materials for lithium-ion energy storage systems are the target consumer group.

Value to consumers lies primarily in the possibility of using the products to produce materials for key types of lithium-ion batteries available on the market (NMC and LFP batteries).

The project is aligned with global development trends as the growth of global demand for lithium is driven by the development of green energy (large-scale electrification of transport) and the growing output of other innovative products (energy storage systems, consumer electronics, etc.). Global consumption volumes currently total 300,000 tonnes of lithium carbonate equivalent per year and are projected to reach 3.2 million tonnes per year by 2030.

A joint venture has been established that will act as the project operator; a mining licence has been obtained for the Kolmozerskoye deposit; geological exploration has been started, and technical and economic calculations have been performed to select a site for the smelter and chemical plant.

The aim of the project is to establish an integrated production facility at the Kolmozerskoye lithium deposit comprising a mining and processing plant and a smelter and chemical plant in order to mine lithium and produce high-quality battery-grade lithium products to meet the needs of high-technology industries in the Russian Federation and replace lithium imports. The facility is scheduled to be commissioned in 2031.

Project focused on the modernisation and technical upgrade of the Lovozersky Mining and Processing Plant (Murmansk Region)

The project is being implemented as part of the road map for the development of the Technology for New Materials and Substances high-technology area until 2030 with a focus on the Rare and Rare-Earth Metals product area, in accordance with the Strategy for Developing the Mineral Resource Base of the Russian Federation until 2050 approved by Order No. 1838-r of the Government of the Russian Federation dated 11 July 2024 and the list of key strategic minerals approved by Order No. 2473-r of the Government of the Russian Federation dated 30 August 2022.

The project includes a set of measures focused on the modernisation and technical upgrades of existing production facilities in order to ensure uninterrupted supply of the required feedstock (loparite concentrate) to a strategically important enterprise in the Mining Division that produces RM and REM products. The Lovozerskoye deposit, which is currently being developed by the Mining Division, is situated on the Kola Peninsula in the Murmansk Region and is the only developed source of rare-earth metals in Russia. It is unique both in Russia and globally.

Construction of a facility for the separation of rare-earth metals (REM Separation project)

The project is aimed at achieving the Technological Leadership national goal.[1] The relevant technological solution involves state-of-the-art manufacturing capabilities producing individual rare-earth elements (lanthanum, cerium, praseodymium and neodymium) in the form of compounds and a collective concentrate containing medium-weight elements from rare-earth concentrate. The technology will make it possible to almost completely replace imports with individual REM compounds produced in-house.

1. Pursuant to Decree No. 309 of the President of the Russian Federation dated 7 May 2024 on the National Development Goals of the Russian Federation until 2030 and for the Future until 2036.



REMs are strategically important for high-technology industries in Russia. The construction of a separation facility using state-of-the-art technology for industrial REM separation into individual compounds will make it possible to replace imports from China and enhance Russia's technological sovereignty by closing the broken production chain and enabling domestic REM production (following the collapse of the USSR, separation facilities remained in Estonia and Kazakhstan).

The selection of front-end engineering and design contractors is underway. Design work, equipment manufacture, construction and commissioning are scheduled to be completed in 2027.

The launch of production of *magnetic products and superconducting materials* is an important prerequisite for achieving technological leadership. The development of functional electrotechnical composite materials with special properties (superconducting and high-strength materials) and their application on an industrial scale contributes towards accomplishing the national development goal of achieving technological leadership in key industries, such as the energy industry (including nuclear power), aerospace engineering, transportation and healthcare. New materials are also in demand in mega science projects (high-energy physics, controlled nuclear fusion).

Superconducting materials are required in order to enable the production of innovative medical diagnostic equipment (such as NMRI scanners and synchrotron facilities for cancer treatment) in the country. Superconducting electromagnetic systems based on domestically produced superconductors and the first domestically produced MRI scanners will be developed as early as by 2030.

The development of safe nuclear fusion power generation technology of the future involving electromagnetic plasma confinement in tokamak reactors requires the development of new-generation composite superconductors. By 2030, the development of key assemblies for a tokamak with reactor technologies comprising an electromagnetic system based on high-temperature superconductors will be completed, and they will be tested experimentally using world-class cryogenic test benches.

High-strength metal matrix microcomposite conducting materials developed by the Corporation based on a Cu-Nb system have a set of performance characteristics (strength, electrical conductivity, bend strength, high-temperature strength and resilience to radiation). This has made it possible to develop new innovative products that have been successfully tested in small batches in aerospace engineering. For instance, JSC Academician M.F. Reshetnev Information Satellite Systems has successfully tested high-strength ultra thin Cu-Nb wire replacing tungsten wire, which has made it possible to almost halve the weight of antenna panels of a spacecraft and at the same time maintain and improve their electrical performance.

An enterprise of ROSATOM has developed and experimentally tested a prototype of the world's first winding wire resilient to radiation, which is capable of operation in a strong neutron flux without any deterioration of performance.

Starting from 2023, the Corporation has been developing non-destructible pulsed magnetic systems with a record high magnetic field strength (up to 100 T) for the NCPM.

New conducting materials with an ultra high heat resistance are being developed; they may also be in demand in other branches of engineering. The Corporation has launched commercial batch production of a number of new products from microcomposite materials. A project to develop commercial production of a new type of high-strength Cu-Nb wire has been prepared. The implementation of the project will result in the launch of sustainable large-scale commercial production.

1.7.5. Additive manufacturing

In 2024, projects in the sphere of additive manufacturing included preliminary testing of a pilot sample of a batch-produced direct metal deposition (DMD) machine with a 1,500x900 mm printing area. Detailed designs for the pilot sample were marked with letter 'O'. These 3D printers can be used not only for the production of large complex-shaped parts but also for repairing and reconstructing worn or damaged parts (such as turbine blades, components of tank tracks or vessel hulls and propeller components). Following the completion of their development, the batch production of large-sized DMD 3D printers will be launched in 2025.

In 2024, the batch production of medium-sized RusMelt-310 3D printers was launched for the first time in the nuclear industry; this equipment is designed to produce metal parts using selective laser melting (SLM) technology. The equipment has been included in the register of Russian industrial products; it uses Russian software, which ensures technological and information security for customers. In 2024, five RusMelt-310 3D printers were supplied to external customers.

The assembly of a pilot sample of a large-sized 3D printer using SLM technology (RusMelt 610M) was started in order to mark it 'O1' in 2025. Following the launch of this product line, ROSATOM will be able to meet the need for SLM equipment of almost all sizes.

In 2024, detailed designs were developed for a new line of small SLM 3D printers, RusMelt 100 and RusMelt 150. They are suited for use in R&D and healthcare, including dentistry; they are characterised by a high performance and significantly lower cost.

The reporting year saw the launch of production of titanium powders. In the past, Russian manufacturers mostly used imported materials for powder printing. Spherical powders with particle size of 20 to 63 μm are produced from feedstock manufactured in-house. The established production capacities enable the Corporation to produce a sufficient amount of titanium powders to fully meet market needs within the next few years. Powders made from titanium alloys are used to produce parts that are lightweight but strong, which is critical for the aerospace industry and shipbuilding.

In 2025, ROSATOM plans to launch the production of metal powder compositions from heat-resistant and stainless alloys, which are in demand in high-technology industries in Russia.

The development of Russian hardware and software and equipment for the production of parts from various materials using high-temperature selective laser melting and electron beam melting, wire arc and plasma arc additive manufacturing technologies has been completed. Detailed designs have been developed for pilot samples of these machines and have been marked with letter 'O' following preliminary testing. The development of a hardware and software platform for controlling the additive manufacturing process during the production of parts with specified quality parameters and properties has been completed. As part of a comprehensive programme, 14 products used in the nuclear and aerospace industries and mechanical engineering have been produced using additive manufacturing equipment built by ROSATOM and have been tested under near operational conditions (six

products in 2023 and eight in 2024). The deliverables of R&D projects completed by ROSATOM will also be in demand in strategically important sectors of Russian industry.

Shared additive manufacturing centres (SAMCs) are another project prioritised by ROSATOM. This project involves creating a network of educational, research and manufacturing centres with a focus on additive manufacturing and their commercialisation across core operations. By year-end 2024, seven centres had been opened and 12 continuing professional education programmes had been developed jointly with leading universities. As part of the development of a network of additive manufacturing centres, in 2024, SAMCs were opened at Tomsk Polytechnic University and Belgorod State Agrarian University. An additive manufacturing centre with an additive manufacturing equipment production site was established in an enterprise of the Corporation in Novouralsk.

The development of additive manufacturing is one of the tasks prioritised by the Corporation; by accomplishing this task, ROSATOM will be able to lay R&D groundwork for the development of knowledge-intensive sectors of Russian industry (including engine manufacture, rocket engineering, etc.).



1.8. DEVELOPMENT OF THE ARCTIC

1.8.1. ROSATOM's powers related to the development and operation of the Northern Sea Route

Pursuant to Federal Law No. 317-FZ, ROSATOM has been assigned the powers and functions of the infrastructure operator of the Northern Sea Route (NSR). Its responsibilities include managing navigation along the NSR, building infrastructure facilities, providing navigational and hydrographic support and ensuring the safety of navigation in the challenging Arctic environment.

The main functions of the Corporation as the infrastructure operator include the following:

- Formulating proposals and implementing resolutions on government policy-making, including R&D, investment and structural policy, to enable the development and sustainable operation of the NSR;
- Providing navigational and hydrographic support along the NSR, in seaports located along the NSR and in port approaches under the procedure established by the Government of the Russian Federation;
- Managing navigation and issuing permits for navigation along the NSR.

The nuclear-powered fleet consists of eight nuclear icebreakers of various designs managed by ROSATOM (*50 Let Pobedy*, *Vaygach*, *Yamal*, *Taymyr*, as well as new-generation nuclear icebreakers: the flagship Project 22220 multipurpose nuclear icebreaker, *Arktika*; the first follow-on Project 22220 multipurpose nuclear icebreaker, *Sibir*; the second follow-on multipurpose nuclear icebreaker, *Ural*; the *Yakutia* follow-on multipurpose nuclear icebreaker).

In 2024, the NSR General Administration, an organisation of ROSATOM that has been authorised to issue permits for navigation along the Northern Sea Route, reviewed 1,312 applications for navigation along the NSR. Following the review, 1,312 permits were issued:

- 1,188 permits for vessels sailing under the Russian flag;
- 124 permits for vessels sailing under a foreign flag.

In 2024, a project was launched jointly with the Chukotka Autonomous District to establish an integrated maritime operator (IMO) responsible for cargo deliveries to the Far North in 2025. The Chukotka Autonomous District is one of the most challenging regions in terms of both logistics and environmental and climatic conditions. After the task of arranging cargo deliveries to the Chukotka Autonomous District is accomplished, it will then be possible to replicate this experience in all regions interested in this service.



1.8.2. Escorting vessels and handling cargo traffic along the Northern Sea Route

In 2024, nuclear icebreakers escorted 976 vessels with a total gross tonnage of 57,373,831 tonnes along the NSR and to frozen ports in the Russian Federation (+28.6% year on year).

Indicator	2022	2023	2024
Number of escorted vessels	733	759	976
Gross tonnage	43,371,800	44,528,088	57,373,831

In 2024, cargo traffic along the NSR reached a new high of 37.89 million tonnes, up by 4.5% year on year.

Cargo traffic, million tonnes



In addition, a record number of transit voyages were made (92), and a record was set for transit cargo traffic (3.089 million tonnes, which is almost 1.5 times more than in 2023).

In 2024, the growth of cargo traffic was driven, among other things, by transit traffic: during the year, transit cargo traffic totalled 3.089 million tonnes. This is also an all-time record since the start of development of the NSR.

In 2024, three near-coastal voyages were made along the NSR to transport cargo from ports in the north-west of Russia to regions in the Far East and back, with more than 25,000 tonnes of various types of cargo delivered to remote areas of the country with limited delivery periods, including socially important cargo deliveries to the Far North.

As part of a joint venture established by ROSATOM and an international partner, a project is ongoing to establish a regular container line along the NSR, which involves building core transport and logistics hubs in the Murmansk Region and the Primorsky Territory.

One of ROSATOM's strategic goals is to transform the NSR into an effective transport corridor linking Europe, Russia and the Asia–Pacific Region. 2024 saw growing interest in the Northern Sea Route from foreign partners. Chinese shipping companies doubled the number of voyages along the NSR compared to 2023 (from 7 to 14).

Under an agreement concluded at SPIEF 2024 with Hainan Yangpu Newnew Shipping Co. Ltd. on the launch of a year-round container line between ports in the Russian Federation and in China via the NSR, a joint venture, NSR Shipping Line, was established in the People's Republic of China in late 2024.

In May 2024, following a state visit of the President of the Russian Federation Vladimir Putin to China and his meeting with the President of the People's Republic of China Xi Jinping, a decision was announced to establish a Russian-

Chinese Subcommittee on Cooperation on the Northern Sea Route under the Russian-Chinese Commission on Preparing Regular Meetings of the Prime Ministers.

On 25 November 2024, the first meeting of the Subcommittee was held in Saint Petersburg; the Subcommittee is chaired by ROSATOM's Director General Alexey Likhachev on the Russian side and the Minister of Transport of the People's Republic of China Liu Wei on the Chinese side. The parties have a considerable potential for expanding cooperation on the NSR across various focus areas, including developing cargo transportation, ensuring safe navigation, and matters related to infrastructure.

In July 2024, following a meeting of the Russian President Vladimir Putin and the Prime Minister of the Republic of India Narendra Modi at the 22nd India-Russia Annual Summit in Moscow, an announcement was made about the establishment of a joint working body under the India-Russia Intergovernmental Commission on Trade, Economic, Scientific, Technical and Cultural Cooperation in order to cooperate on the NSR. The first meeting of the Russia-India Joint Working Group on Cooperation on the NSR was held on 10 October 2024 in New Delhi. The parties discussed prospects for future cooperation.

1.8.3. Construction and commissioning of new icebreakers

Large-scale fleet upgrades are necessary in order to handle the growing cargo traffic along the NSR. Over the past few years, the Corporation has commissioned three Project 22220 nuclear icebreakers:

- The flagship multipurpose nuclear icebreaker, *Arktika*, in 2020;
- The first follow-on multipurpose nuclear icebreaker, *Sibir*, in 2021;
- The second follow-on multipurpose nuclear icebreaker, *Ural*, in 2022.



The reporting year saw record progress in the development of the nuclear-powered icebreaker fleet: in January 2024, the keel of the fifth follow-on Project 22220 multipurpose nuclear icebreaker, *Leningrad*, was laid, with the President of the Russian Federation Vladimir Putin in attendance; in November, the fourth follow-on multipurpose nuclear icebreaker, *Chukotka*, was launched. In December 2024, the flag was raised on the third follow-on multipurpose nuclear icebreaker, *Yakutia*.

The construction of the flagship *Lider*-class Project 10510 nuclear icebreaker, *Rossiya*, is underway in the Primorsky Territory.

In addition, in December 2024, the keel of a multipurpose nuclear maintenance ship was laid in Saint Petersburg; the ship is designed to perform the full range of operations related to the refuelling of nuclear propulsion units at new-generation nuclear icebreakers currently in operation.

1.8.4. Provision of hydrographic support

ROSATOM is responsible for the construction of seaport infrastructure and the provision of navigational and hydrographic support along the Northern Sea Route (NSR). In 2024, the combined capacity of all ports along the NSR reached a record high of 47.7 million tonnes.

In accordance with the Plan of Navigational and Hydrographic Support of Navigation along the NSR coordinated with the Federal Agency for Maritime and River Transport and approved by ROSATOM (the 2024 NHS Plan), the following work was performed in 2024 in seaports located along the NSR and in port approaches:

- Hydrographic surveys covering 49,782.2 linear kilometres (106% of the target), including additional surveys covering 2,763.2 linear kilometres. This included seafloor topography surveys along the NSR and in areas of minimal under-keel clearance in the Yenisei Bay, the Yenisei and Kolyma Rivers;
- 1,612 messages about changes in the navigational situation along the NSR transmitted to mariners (100% of information received by the Corporation);
- Support for the operation of 316 aids to navigation (100% of the target).

In accordance with paragraph 17 of the Rules for the Provision of Subsidies from the Federal Budget to Organisations for Navigational and Hydrographic Support of Navigation along the Northern Sea Route (Decree No. 797 of the Government of the Russian Federation dated 27 May 2021), the first stage of surveys of the high-latitude route forming part of the NSR was completed. As a result, deep waterways were identified along the entire length of the route that will enable the transit of vessels with a draft of up to 15 metres.

Following the desk analysis of data from hydrographic surveys conducted between 2020 and 2024 and cartographic work informed by reports on the findings of seafloor topography surveys along the NSR between 2011 and 2019, deep waterways for vessel transit along the entire length of the high-latitude route forming part of the NSR were designed and announced in Notices to Mariners and coastal warnings; the waterways have a length of 2,704.9 miles and a minimum depth of 19.4 metres.

In order to promote the operation of large-capacity vessels, large-scale dredging was carried out in the Sever Bay Port oil terminal in the seaport of Dikson (2.4 million m^3), and in the seaport of Sabetta as part of maintenance dredging in the basin of the Utrenny liquid natural gas and stable gas condensate terminal and in the Sea Canal (0.5 million m^3).

The following work was performed in 2024 as part of the NSR Infrastructure Development Plan until 2035:

- Additionally equipping the border checkpoint in the Utrenny Terminal with communications, security and special monitoring systems installed on gravity-based structures No. 1 and 2;
- The construction of facilities under federal ownership as part of the following investment projects: the Sever Bay Port Oil Terminal, Construction of an Offshore Coal Terminal at the Syradasayskoye Coal Deposit, and Construction of a Marine Terminal on Cape Nagloynyn in the Seaport of Pevek.

The Corporation is developing future projects to renovate the basin and the approach canal of the seaport of Tiksi, build a deep-water area in the seaport of Arkhangelsk, and build a cargo port hub near the village of Nayba in the Bulunsky District of the Sakha Republic.

The reporting year saw the completion of the upgrade of the *Alexey Maryshev* hydrographic research vessel, which was the final stage of the project to upgrade the fleet, including the *Grigoriy Mikheyev* and *Petr Kottsov* vessels (the upgrades of these vessels were completed in 2022 and 2023 respectively).

In accordance with the requirements of Chapter V of the International Convention for the Safety of Life at Sea (1974), ROSATOM develops and operates radar-based vessel traffic control systems (VTCSs). In 2024, the Corporation built the Utrenny VTCS at site No. 2 of the seaport of Sabetta. The Utrenny vessel traffic control system has been put into operation in order to enhance the safety and efficiency of navigation, ensure the safety of life at sea, and protect the marine environment, the coast and onshore structures against the negative impacts

of shipping activity in the vicinity of site No. 2 of the seaport of Sabetta. The Corporation uses the VTCS to provide comprehensive navigational services to vessels sailing in the basin of the seaport of Sabetta and in port approaches.

1.8.5. New products

ROSATOM is implementing measures to enhance the monitoring of ice conditions along the NSR. An on-board automated information and measurement system (OBIS) is a new tool enabling prompt collection, processing and delivery of hydrometeorological data and data on the ice conditions in navigation areas.

By the beginning of the 2024/2025 winter and spring navigation season, the OBISs had been installed on five nuclear icebreakers: *50 Let Pobedy, Arktika, Sibir, Ural* and *Yakutia*. Mass-produced OBISs are tested during the navigation season; following the tests, the Corporation plans to review their performance and streamline the process of installing the relevant equipment on icebreakers and high Arctic class vessels. Data from the OBISs are transmitted to the Integrated Platform of Digital Services for the Northern Sea Route (IPDS NSR), which forms part of a digital ecosystem that ROSATOM is developing.

In 2024, the first stage of the IPDS NSR (basic functionality) became fully operational. The implementation of the second stage with expanded functionality is scheduled for 2025. Digital tools forming part of the IPDS NSR will enable boatmasters to engage directly with ROSATOM as the NSR operator by providing services for navigational and hydrographic support, navigation management and navigation safety.

1.8.6. Environmental monitoring along the NSR

The findings of the monitoring indicate that shipping and the development of port infrastructure **do not make** any negative impact on biodiversity in the Arctic.

In 2024, the Marine Research Centre of Lomonosov Moscow State University continued to conduct comprehensive studies and environmental safety and environmental status monitoring along the NSR on the initiative of ROSATOM; these included expeditions focused on studying birds and sea mammals along the NSR, large-scale observations of the status and behaviour of marine wildlife during trips along near-coastal transportation routes, and satellite monitoring of shipping activity and the environment during the active navigation period in 2024.

The findings of the comprehensive studies and environmental safety and environmental status monitoring along the NSR conducted in 2024 have been presented by the Marine Research Centre of Lomonosov Moscow State University as part of 17 Russian and international events varying in scale (including seven international events).

Comprehensive studies and environmental status and biodiversity monitoring along the Northern Sea Route

1.8.7. Improving the subsoil condition monitoring system

As part of measures to improve the subsoil condition monitoring system, ROSATOM is implementing a project to renovate the network of observation wells forming part of the on-site subsoil condition monitoring system at an industrial site of the Corporation in the Murmansk Region; the project has been developed by FSBI HYDROSPETZGEOLOGIYA.

The aim of the project is to renovate the on-site subsoil condition monitoring system in order to enable an accurate and reliable assessment of the enterprise's impact on the subsoil and forecast the potential man-made impact on the natural environment at the Corporation's industrial site in the Murmansk Region, and to provide a rationale for the siting, depth and design of observation wells taking into account the geological and hydrogeological environment at the site.

1.8.8. Plans for 2025 and for the medium term

Starting from 2025, the NSR is being developed as part of a new federal project, Development of the Greater Northern Sea Route, as a single economic, transportation and logistics space extending from Russian ports on the Baltic Sea to the Primorsky Territory and covering internal waters and the territorial sea of the Russian Federation and adjacent land. The development of the Greater Northern Sea Route will provide links between areas in the north-west of the Russian Federation and the Far East, and will help enhance transport security in the Russian Federation.

In 2025, the keel of the sixth follow-on multipurpose nuclear icebreaker, *Stalingrad*, will be laid in Saint Petersburg.

By the end of 2025, ROSATOM plans to complete the installation of equipment for unmanned aircraft systems on three nuclear icebreakers (*Arktika, Sibir* and *Ural*); the systems will be used to monitor the NSR using radars, electro-optical and other equipment for ice observation.

In 2025, the Corporation will provide navigational and hydrographic support along the NSR, including hydrographic surveys to collect navigational information covering a total of 49,144 linear kilometres. The construction of facilities under federal ownership and offshore construction will continue as part of the development of the seaports of Dikson and Pevek.



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1.9. IMPLEMENTATION OF THE ECOLOGY NATIONAL PROJECT

Run between 2018 and 2024, the Ecology National Project was a national project of the Russian Federation aimed at creating a safe and comfortable living environment, including dismantling the most hazardous legacy facilities that cause environmental damage and developing a system for hazard class 1 and 2 waste management.

As part of the Ecology National Project, in 2024, ROSATOM was responsible for the implementation of the Infrastructure for the Management of Hazard Class 1 and 2 Waste Federal Project and participated in the implementation of the General Cleanup, Preservation of Lake Baikal, and Clean Air Federal Projects.

The Corporation implemented these projects under instructions from the President of the Russian Federation and the Government of the Russian Federation taking into account ROSATOM's expertise and capabilities in the sphere of RAW management and the use of unique innovative solutions for the decommissioning of challenging industrial facilities.

1.9.1. Implementation of the Infrastructure for the Management of Hazard Class 1 and 2 Waste Federal Project

As part of the Federal Project, between 2018 and 2024, the Corporation implemented a number of measures aimed at driving a fundamental systemic transformation in the sphere of hazard class 1 and 2 waste management. Key measures implemented as part of the Federal Project included the following:

1. New government regulation has been introduced for the hazard class 1 and 2 waste management industry in order to establish an integrated system for hazardous waste management enabling transparent accounting and monitoring and standardised approaches to hazardous waste management.

2. A digital platform, FGIS OPVK, has been developed and put into operation; it is unique on the Russian waste management market. The platform enables end-to-end tracking and monitoring of hazard class 1 and 2 waste throughout its life cycle.

The FGIS OPVK system enables 24/7 online exchange of information on market management as a 'one-stop-shop' solution, supports the digitisation of business processes required for waste movement (such as tracking waste generation, concluding and carrying out service contracts, ensuring the traceability of transportation processes, reporting), which enables end-to-end tracking and monitoring of hazardous waste management at every stage of the waste management process.

The system is based on domestically developed technologies replacing imported solutions; it ensures robust protection against cyberthreats and is integrated with other government information systems, which eliminates the need for double data entry and enables automatic data verification.

The FGIS OPVK system ensures the transparency of government regulation in the sphere of hazardous waste management, helps business entities to reduce costs, and enables the general public to obtain information on the location of collection points for hazardous waste generated by individuals through a publicly accessible interactive map.

3. A federal operator responsible for hazard class 1 and 2 waste management has started to operate as a 'one-stop shop' for players on the hazard class 1 and 2 waste management market.

An enterprise of the Corporation has been appointed federal operator responsible for hazard class 1 and 2 waste management; it provides safe hazard class 1 and 2 waste management services. Starting from March 2022, hazard class 1 and 2 waste is managed either by waste-generating organisations themselves (provided that they have their own waste management capacities and the relevant licence) or by the federal operator.

By year-end 2024, the federal operator had concluded 66,000 contracts with legal entities and individual entrepreneurs whose operations produce hazard class 1 and 2 waste.

The institution of the federal operator has enabled the introduction of stricter requirements for hazard class 1 and 2 waste processing by hazard class 1 and 2 waste management operators through continuous technical monitoring of contract performance by the operators in order to prevent improper management of hazardous waste. The risk that operators that do not have the relevant capabilities, licences or process equipment will operate on the market has been minimised (the federal operator has conducted 223 technical audits and the follow-up monitoring of measures taken to address the detected violations).

Major benefits for society include minimising the risk of unauthorised burial and illegal processing of hazard class 1 and 2 waste, which helps preserve the environment and improve the standard of living, and raising public awareness of the procedure for hazard class 1 and 2 waste management through government bodies in constituent entities of the Russian Federation (with a total reach of approximately 65 million people).

4. Basic modern industrial infrastructure (with a capacity of up to 100,000 tonnes) has been built using the best available domestically developed environmentally friendly technologies: two industrial facilities, Gorny and Schuchye, have started pilot operation. They will enable centralised and supervised hazard class 1 and 2 waste management (recycling/treatment) aligned with the principles of a circular economy and the market needs.

The facilities use thermal treatment and physical and chemical processing technologies. The plants are equipped with customised domestically developed technological solutions ensuring a high level of environmental safety. These facilities have been designed in compliance with environmental safety requirements: they are equipped with multi-level automated safety systems. This completely eliminates the risk of pollutant discharges into the environment.

The project has provided the following benefits for society:

- The use of four former chemical weapons destruction sites in economic activities (~473.8 hectares of government-owned land has been reused);
- Support for regional economic development (budget revenue in the form of property tax payments);
- Job creation;
- Improving the standard of living for local residents: on average, the salary of employees operating the facilities built at former chemical weapons destruction sites is 36% higher than the regional level (27% higher in the Udmurt Republic, 38% higher in the Kirov Region, 43% higher in the Kurgan Region and 36% higher in the Saratov Region).

Overall, the implementation of the Federal Project has helped minimise the risk of environmental pollution from hazard class 1 and 2 waste management at the industrial facilities, helping to preserve the environment and people's health.

In addition, as part of the completed Federal Project, school and university students participated in a programme of activities titled 'Industrial Ecology as a Prestigious Profession' (a cumulative total of 2,485 people by year-end 2024).

As at 31 December 2024, the Infrastructure for the Management of Hazard Class 1 and 2 Waste Federal Project was completed within the parameters specified in its data sheet.

Pursuant to Decree No. 309 of the President of the Russian Federation dated 7 May 2024 on the National Development Goals of the Russian Federation until 2030 and for the Future until 2036, a decision has been made to continue to develop the system for the management of hazard class 1 and 2 waste as part of the Circular Economy Federal Project included in the Environmental Well-Being National Project.

1.9.2. Implementation of the General Cleanup Federal Project

As part of the General Cleanup Federal Project, in 2024, the Corporation implemented measures to mitigate environmental risks posed by legacy sites in the Leningrad and Irkutsk Regions.

Repairing environmental damage caused by the Krasny Bor industrial toxic waste landfill

The following work was performed in 2024 under the government contract for the clean-up of legacy facilities causing environmental damage at the Krasny Bor landfill:

- The construction of buildings that will accommodate infrastructure for wastewater treatment and for the processing of liquid and paste-like waste stored in open landfill cells was completed; all process equipment was delivered and installed; pre-commissioning is underway;
- Construction of a multi-layer cut-off wall surrounding the landfill site continued; it is designed for groundwater diversion and prevents the seepage of contaminants to adjacent areas. The structure will be equipped with an automated control system;
- The landfill site was prepared for the technical stage of remediation;
- A landfill cap was built as part of the technical stage of remediation.

The reparation of historical environmental damage at the landfill site involves building a 3.5-kilometre-long buried multi-layer cut-off wall around the landfill body and the treatment of 340,000 m^3 of liquid and paste-like waste stored in open landfill cells. The waste will be treated using a unique technology and dedicated infrastructure for the handling of complex waste. The contents of the open landfill cells will be treated to ensure that they meet statutory limits for their discharge into a fishery.

The Krasny Bor landfill was in operation between 1968 and 2014; it was used as an environmental facility enabling smooth operation of industrial enterprises in Saint Petersburg and the Leningrad Region. The landfill has an area of 67.4 hectares, including a 46.7-hectare waste storage area. It was used for the disposal of both liquid and solid hazard class 1 to 4 industrial toxic waste from various enterprises across the USSR. During the operation of the landfill, 70 landfill cells were built; they contain 1.7 million tonnes of highly toxic waste. In addition, there are also other sources of contamination at the site that make a negative impact on the environment and the local community; these include soil from temporary storage sites and unused or contaminated utility systems (pipelines, pontoons, fire hydrants, etc.).



The rehabilitation will involve the construction of a multipurpose landfill cap and topsoil restoration, as well as the construction of storm water runoff and leachate drainage and treatment systems.

Following the completion of the project, the area of restored land will total 67.4 hectares. The site will become completely safe in 2026. The project is expected to improve the quality of life for 6.4 million people.

Repairing environmental damage in the Usolye-Sibirskoye municipality

The project to ensure environmental safety in Usolye-Sibirskoye is unique in terms of its scope and technological solutions used for its implementation. In 2020 and 2021, ROSATOM implemented top-priority measures to clean up the most hazardous facilities at the industrial site of a defunct chemical plant: chemicals stored in 17 dilapidated tanks were moved into new tanks; 12 brine wells were cleaned up; an underground oil lens near the Angara River was contained; a mercury cell electrolysis workshop was dismantled. The set of urgent measures implemented by ROSATOM has helped to eliminate the hazard to people's lives and health. The implementation of these top-priority measures has made it possible to lift the state of emergency in the region.

The following work was performed in 2024 under the government contract for the clean-up of legacy facilities causing environmental damage in Usolye-Sibirskoye:

- The dismantling of 87 capital facilities;
- A set of measures to eliminate the oil lens near the bank of the Angara River (the western pocket forming part of the lens).

Given the large-scale contamination at the site, a unique system of geochemical barriers, namely a cut-off wall made from sorbent material, has been developed jointly with Lomonosov Moscow State University to prevent the leakage of pollutants into the environment. This is the first time that this technology will be used on this scale in the Russian Federation.

Construction waste generated during the dismantling is crushed, and the resulting inert materials are used for insulation during the remediation of the sludge dump, which involves building waterproofing layers to ensure secure waste isolation. The elimination of the oil lens will involve the treatment of oil-contaminated soil through biodegradation of petroleum products.

The Usolye Khimprom Production Association (LLC Usolyekhimprom) was established in 1936. The main manufacturing operations producing organic and inorganic chemicals were commissioned between 1956 and 2000. Total product output exceeded 1 billion tonnes. Core products manufactured, input materials used and waste generated by the enterprise were classified as highly hazardous substances. In 2014, LLC Usolyekhimprom was declared bankrupt. Chemical waste was placed in various tanks, stored at the industrial site and pumped into deep wells. Gradually, these structures ceased to be leakproof, and hazardous substances started to seep into the environment. Mercury from the industrial site of the enterprise contaminated the Angara River.

Following the completion of the project, the area of restored land will total 1,500 hectares. In 2028, the site will become safe and suitable for setting up new manufacturing operations.

Mercury concentration in the air in the Usolye-Sibirskoye municipality has been reduced to a level compliant with the statutory limits, which has helped improve the quality of life for 76,000 people living in the municipality.

1.9.3. Implementation of the Preservation of Lake Baikal Federal Project

Repairing environmental damage caused by OJSC Baykalsk Pulp and Paper Mill

ROSATOM is implementing measures focused on environmental improvement of Lake Baikal, which involves rehabilitating sites with a high and extremely high level of pollution caused by the operations of Open Joint-Stock Company Baykalsk Pulp and Paper Mill (OJSC BPPM).

The following work was performed in 2024 under government contracts for the reparation of historical environmental damage caused by OJSC BPPM.

Work performed at the site of the wastewater treatment facilities included the following:

- The construction of temporary buildings and structures and temporary roads;
- The construction of infrastructure for the treatment of alkali-containing effluents (the main and auxiliary buildings that will accommodate the relevant infrastructure were built; all process equipment was purchased, delivered and installed);
- The dismantling of some of the existing buildings, structures and pipelines.

Work performed at the Babkhinsky landfill site included the following:

- The construction of temporary buildings and structures and temporary roads;
- The construction of infrastructure for the treatment of sludge water (the main and auxiliary buildings that will accommodate the relevant infrastructure were built; 30% of all process equipment was purchased, delivered and installed).

Following the completion of the project at the Babkhinsky landfill site and the site of the wastewater treatment facilities, the area of restored land will total 101.2 hectares. The site will be rendered safe in 2027. The completion of the work will result in significant improvement of the quality of life for 13,000 people living in Baykalsk itself. Given that the project will help prevent the leakage of several thousand tonnes of pollutants (including highly hazardous substances) into the lake, it will make a difference for local residents across the entire catchment area of Lake Baikal (about 2.5 million people).

OJSC Baykalsk Pulp and Paper Mill (OJSC Baykalsk PPM or BPPM) is situated on the southern shore of Lake Baikal in the Slyudyansky District of the Irkutsk Region. The enterprise was put into operation in 1966. It played a central role in the town's economy; it produced pulp, paper and cardboard, including for the needs of the defence industry. Two landfill sites were built for waste disposal (the Solzansky and Babkhinsky landfills), where a series of storage tanks were installed. Over more than 40 years of operation of the mill, more than 6.8 million m³ of industrial waste, mainly lignin sludge, were accumulated at the site of wastewater treatment facilities and at both landfill sites. A major environmental hazard is posed by black liquor stored at the wastewater treatment facilities. In addition, the captive CHPP of the enterprise produced a large amount of ash. In 2013, the Government of the Russian Federation decided to close the mill. It was included in the National Register of Legacy Facilities Causing Environmental Damage pursuant to Order No. 723 of the Russian Ministry of Natural Resources and Environment dated 27 December 2017.



1.9.4. Implementation of the Clean Air Federal Project

Reclamation of the left-bank waste landfill in Magnitogorsk

The set of urgent measures implemented by ROSATOM has helped to eliminate the hazard to the lives and health of about **75,000 people** living in Usolye-Sibirskoye and has made it possible to lift the state of emergency in the region.

The set of measures implemented as part of the Clean Air Federal Project in the Chelyabinsk Region has resulted in a **30%** reduction in harmful emissions into the atmosphere in the city and has helped to eliminate discharges of harmful leachate into the Miass River.

In 2024, ROSATOM completed the entire range of measures to ensure the safety of the 59-hectare left-bank waste landfill in Magnitogorsk (Chelyabinsk Region).

The reclamation of the waste landfill was completed. This involved building a landfill cap with an area of 301,000 m² and complex utility systems: a leachate collection, drainage and treatment system at the wastewater treatment facilities and a biogas collection and utilisation system. As part of the biological reclamation stage, the landfill cap was covered with topsoil and seeded with perennial grasses. Following the completion of the work, harmful emissions into the atmosphere in the city decreased by 17,000 tonnes per year, or by 8%.

The measures implemented by ROSATOM have helped reduce the impact on the atmosphere in Magnitogorsk, completely eliminate leachate discharges from the waste landfill into the environment and, as a result, significantly improve the environment and the quality of life for more than 0.5 million people living in the city and in neighbouring districts of the Chelyabinsk Region.

Earlier, in 2021, the Corporation successfully completed the reclamation of the municipal landfill in Chelyabinsk, which was the largest municipal solid waste (MSW) landfill in Europe at the time. The reclamation of the municipal landfill in Chelyabinsk involved the adoption of state-of-the-art technologies for the treatment of emissions and leachate. The Corporation has gained unique experience which it will be able to leverage at other sites.

The set of measures implemented by ROSATOM has helped to improve the quality of life for more than 1 million people, reduce harmful emissions into the atmosphere in the city by 30% and eliminate discharges of harmful leachate into the Miass River.

The landfill has been rendered safe and restored to 'greenfield' status, and a greenhouse has been built at the site. The Corporation will now be able to replicate this experience at a similar site in the region.

The left-bank municipal solid waste landfill in Magnitogorsk, the second largest industrial hub in the Chelyabinsk Region, was in operation between 1957 and 2022. It is located practically within the city boundaries, with the nearest residential buildings situated just 900 metres away. The volume of accumulated waste totals 5 million m³. The landfill body has an area of 37.5 hectares. Pollutant emissions into the atmosphere from the landfill totalled 16,800 tonnes per year.

1.9.5. Other projects contributing to safety, reliability and self-reliant technological development in Russia

ROSATOM seeks to consistently develop projects ensuring safety, reliability and self-reliant technological development in Russia.

In the reporting period, surveys and preparatory work were completed and design documentation was adjusted for a project to renovate water purification plants/wastewater treatment facilities in Mozhaysk. The main stage of the work will start after a positive opinion is obtained following a state expert review.

In 2024, the Heads of Government of the Russian Federation, the Republic of Belarus, the Republic of Tajikistan, the Republic of Uzbekistan, the Kyrgyz Republic and the Republic of Kazakhstan signed the Framework for Cooperation between the CIS Member States on Hazardous Waste Management and Cleaning Up Legacy Sites Causing Environmental Damage. The document will help replicate the competences and experience acquired by the Corporation during the implementation of the Ecology National Project in former Soviet Union countries.

An organisation of ROSATOM performing the functions of the federal environmental integrator was designated as the basic organisation of the CIS Member States responsible for hazardous waste management and cleaning up legacy sites causing environmental damage. Its functional responsibilities include improving infrastructure for hazardous waste management, aligning the regulatory frameworks of the CIS Member States, personnel development, conducting joint scientific research, and developing and implementing international projects aimed at repairing historical environmental damage.

The set of measures implemented as part of the Clean Air Federal Project in the Chelyabinsk Region has improved the quality of life for more than **1 million people**.

1.9.6. Plans for 2025 and for the medium term

The Corporation will continue to clean up legacy sites causing environmental damage and develop the hazard class 1 and 2 waste management industry as part of a new national project titled 'Environmental Well-Being' (2025–2030).

In 2025, ROSATOM will continue to build infrastructure facilities to enable the safe management of hazard class 1 and 2 waste; more specifically, the Western Siberia industrial facility in the Tomsk Region is scheduled to start pilot operation.

In 2025, the Corporation will continue to take steps to repair environmental damage caused by legacy sites:

- The construction of the cut-off wall and infrastructure for the treatment (processing) of waste stored in open landfill cells will be completed at the Krasny Bor landfill site; the pumping and treatment of waste will be started, and the landfill reclamation process will continue;
- The dismantling of capital facilities, the crushing of the resulting waste and the filling of the sludge dump, and the elimination of the oil lens, including the treatment of oil-contaminated soil through biodegradation of petroleum products, will continue at the site of LLC Usolyekhimprom, and work will be carried out at the municipal solid waste landfill site;
- At the site of OJSC BPPM, ROSATOM will carry out the pre-commissioning of all utility systems and process equipment and will start to pump and neutralise black liquor and treat sludge water.

GRI 3-3 1.10. DIGITAL TRANSFORMATION

Key results in 2024

- The share of Russian software used in ROSATOM reached 80%; competence centres (ICCs and DCCs) were established in order to replace foreign solutions.
- Digital twins were designed for NPPs, uranium mining (ISL) and polymer composite production processes, which has helped improve the efficiency of production processes.
- Two new data centres (Moscow-2 and Innopolis) were launched; the Moscow-2 data centre has become the first in Russia to obtain the Tier IV Constructed Facility certification.
- Memoranda were signed with universities and organisations in Uzbekistan; exchange programmes for specialists were launched with BRICS countries; quantum technologies were presented at forums (SPIEF, the WEF).

1.10.1. Uniform Digital Strategy

Since 2018, ROSATOM has been implementing a Uniform Digital Strategy (UDS), which defines key focus areas of digital transformation: fulfilling government tasks in the sphere of digitisation, developing flagship digital products for the Russian and international markets, and internal digitisation in the nuclear industry. The UDS defines the goals of digital transformation in the nuclear industry until 2030 taking into account changes in the internal and external environment; it supports the achievement of ROSATOM's strategic goals, serving as a driver of its business efficiency.

In 2024, ROSATOM became one of the first state corporations to obtain approval for its UDS from the Russian Ministry of Digital Development, Communications and Mass Media; the UDS complies with all regulatory requirements.

Key stakeholders in the implementation of the UDS include ROSATOM's organisations, as well as partner companies that are potential consumers of ROSATOM's digital products, and the Government of the Russian Federation, which monitors the implementation of the Digital Economy National Programme.

All organisations managed by the Corporation contribute to the digitisation of the nuclear industry.

Goals set in the UDS until 2030 include unconditional fulfilment of government tasks, technological leadership, and widespread adoption of digital technologies, including in order to minimise routine operations.

In 2024, extensive methodological activities and expert work were carried out in order to provide a regulatory, methodological and scientific framework for digitisation in the industry and support the achievement of the goals set in the UDS:

- Methodologies for assessing the digital maturity of enterprises and core products are being developed;
- A register of best practices for the implementation of digital technologies in various types of production operations and various functions is being updated;
- A methodology for calculating metrics for monitoring the achievement of the UDS goals is being developed.

Economic benefits

Digitisation is one of the most important drivers of ROSATOM's business efficiency. The Corporation is actively developing an approach based on a comprehensive assessment of effectiveness of IT projects in the nuclear industry.

In 2024, the Corporation expanded the uniform methodological framework for calculating benefits from the implementation of IT projects and continued to provide training in project impact assessment for managers.

To unlock the significant potential of digitisation as a driver of the Corporation's business efficiency, ROSATOM has adopted an approach to increasing the level of digital maturity of existing processes in its organisations which involves applying digital tools in the manufacture of all core products in the industry.

Digital hierarchy

The digital hierarchy is in place in 20 Divisions of ROSATOM. To maintain a high professional level of chief digital officers (CDOs) managing digitisation initiatives in the Divisions and key organisations, in 2024, the Corporation held strategic sessions and events aimed at sharing experience in digital transformation both in the Divisions and across the industry.

Digitisation programmes in the Divisions

Digitisation programmes in the Divisions are a key tool for the decomposition of the goals of the Uniform Digital Strategy. In 2024, the Corporation launched a project to automate the monitoring of the implementation of digitisation programmes in the Divisions.

1.10.2. Participation in digitisation in Russia

ROSATOM actively participates in the implementation of the Digital Economy National Programme:

- The Corporation is a founder of the Autonomous Non-Profit Organisation Digital Economy, which is involved in managing the implementation of the Digital Economy National Programme (the regulations on the system for managing the implementation of the programme were approved by Decree No. 234 of the Government of the Russian Federation dated 2 March 2019);
- The Corporation performs the functions of a competence centre for the Digital Technology Federal Project forming part of the Digital Economy National Programme[1] and is a contractor responsible for individual deliverables of the Digital Technology Federal Project;
- ROSATOM is an organisation that has been assigned responsibility under letters of intent signed with the Government of the Russian Federation for the development of individual high-technology areas, including Quantum Computing and New Industrial Software (previously New Production Technologies).

In addition, ROSATOM's representatives are members of working groups on federal projects forming part of the Digital Economy National Programme under the Autonomous Non-Profit Organisation Digital Economy.

1. Pursuant to Decree No. 234 of the Government of the Russian Federation dated 2 March 2019.

ROSATOM and its organisations also actively participate in other initiatives launched by the Government of the Russian Federation to develop the digital economy and achieve technological sovereignty. More specifically, in 2023 and 2024, ROSATOM and its organisations actively participated in developing a new national project, Data Economy and Digital Transformation of the State, until 2030; it will build on R&D groundwork laid earlier as part of the Digital Economy National Project.

In 2024, ROSATOM recorded a number of major achievements related to these functions and initiatives.

Technological sovereignty

Participation in the implementation of systemic measures of the Government of the Russian Federation to ensure the technological independence of the Russian economy.

In 2024, ROSATOM and its organisations continued to participate in the implementation of instructions from the Prime Minister of the Russian Federation Mikhail Mishustin.[1] This involved initiating a set of large-scale systemic measures at the federal level in order to replace foreign solutions and software used in the industry with Russian analogues in prioritised areas with financial assistance from the government. The measures are implemented in cooperation with major customers in the industry and independent Russian developers.

In order to align software supply and demand in the industries, the Government of the Russian Federation has established industrial competence centres (ICCs) responsible for replacing imported digital products and solutions, including hardware and software systems, used in key sectors of the economy, as well as competence centres (DCCs) responsible for developing Russian system-wide and applied software in order to replace foreign analogues that are currently in use involving leading Russian companies.



1. Instructions No. MM-P10-10127 of the Prime Minister of the Russian Federation Mikhail Mishustin dated 16 June 2022.

Participation in ICCs and DCCs

ROSATOM's organisations actively participated in the work of a number of ICCs and DCCs. ROSATOM's Director General Alexey Likhachev also heads the ICC for General Mechanical Engineering of the Industry Committee on Industry and Trade. The ICC includes Russia's leading industrial enterprises.

The Corporation is implementing a number of projects aimed at developing and introducing industrial IT solutions that are scalable across entire industries and are critical for ensuring the technological sovereignty of Russian organisations.

Projects of the ICC for General Mechanical Engineering are on schedule, with two critical projects completed by the ICC in 2023 and 2024. In addition, a pipeline of projects for the second stage was formed in 2024.

New industrial software

In 2022, the Corporation signed an updated letter of intent to develop the New Industrial Software high-technology area (hereinafter referred to as the LOI and NIS respectively) with the Government of the Russian Federation. The NIS Road Map[1] is the key tool for the implementation of the LOI. The key goal of its implementation is to ensure the technological sovereignty of the Russian Federation by encouraging the development and rollout of new Russian industrial software. The main deliverable is to develop a fundamentally new digital landscape in Russian industry and to proactively replace imported solutions.

In the future, the Corporation plans to continue to implement projects and activities under the NIS Road Map to replace imported industrial software and simultaneously develop fundamentally new high-quality Russian IT solutions with extensive functionality, including using a platform-based approach.

Industrial software development

ROSATOM is accelerating the development of industrial software in order to support the achievement of technological sovereignty in the Russian Federation.

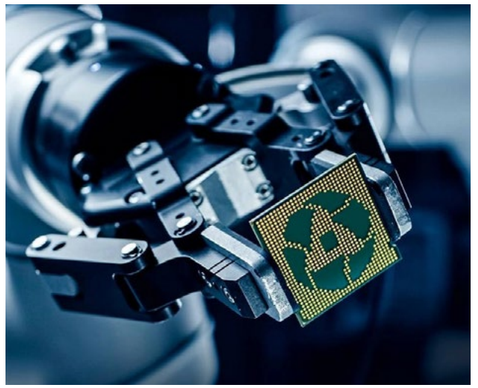
In the product lifecycle management (PLM) systems segment, in December 2024, ROSATOM established a strategic partnership with a leading Russian industrial software developer.

The partnership will involve achieving a synergy of competences and expertise and developing product lifecycle management solutions and industrial software. It will also involve joint participation in new projects targeted at high-technology industries, such as general mechanical engineering, the aerospace and automotive industries. The partnership will make it possible to expand the functionality of existing products and take future development projects to a fundamentally new level.

In the computer-aided engineering (CAE) systems segment, the Corporation continued to develop and roll out the LOGOS system. The industry version of the LOGOS.Atom solution was released in 2024. A project was launched jointly with the Russian Ministry of Industry and Trade to prepare a road map for the development of Russian CAE systems.

Steps were taken to ensure the compatibility of industrial software. In 2024, standards for the compatibility of data formats were developed jointly with Rosstandart with assistance from market players.

In late 2024, the Joint Project Institute was launched, enabling ROSATOM to implement critical large-scale projects jointly with other ICCs. In 2025, ROSATOM plans to launch projects of this kind with the ICC for the Automotive Industry, the ICC for the Aerospace Industry, the ICC for Construction and the ICC for General Mechanical Engineering.



1.10.3. End-to-end digital technologies and data management

In 2024, the Corporation continued to focus on advanced digital technologies, such as digital twins, artificial intelligence and data management.

As part of methodological work and the development of the Digital Twins focus area, a number of steps were taken in 2024:

- Development of the regulatory framework for digital twins. A corporate standard titled 'Digital Twins. Terms and Definitions' was drafted jointly with representatives of ROSATOM's organisations;
- In accordance with paragraph 3 of an order of ROSATOM, work on an IT solution called 'Digital Twin of an NPP' was initiated; the key issues were formulated, and proposals were collected from key organisations of ROSATOM with regard to the concept of the digital twin of an NPP at all stages of its life cycle;
- Criteria for assessing the level of digital maturity in the sphere of application of digital twins were updated; additional criteria were formulated to supplement the methodology for assessing the digital maturity of ROSATOM's enterprises based on the Digital RPS Enterprise status.

In 2024, the Corporation continued to implement practical projects aimed at developing digital twins in the nuclear industry. Companies in the Mining Division took steps to digitise the in-situ leaching (ISL) process, which involved developing digital twins of the site and of mining processes. The digital twin of the ISL process was developed taking into account challenging climatic conditions, geographical remoteness and a large number of items to be monitored. This has made it possible to increase the solution grade by 3–5%, extend the service life of borehole equipment and reduce the failure rate, and minimise man-made environmental impacts.

A project titled 'Digital Twin of a Product' was implemented in 2024; it is aimed at facilitating cross-divisional communication and cooperation as part of after-sales service by developing a digital twin of a product and supplementing it with data from various sources, including those located in various enterprises and in various Divisions. Data on products manufactured by enterprises in the Mechanical Engineering Division were entered into the system. A meeting of a shop floor club was held, which involved formulating the relevant issues and setting key objectives that need to be accomplished in order to organise the after-sales service process based on the digital twin of a product.

1. The Road Map until 2030 was approved under the resolution of the Presidium of the Government Commission of the Russian Federation on Digital Development and the Use of Information Technology to Improve the Quality of Life and the Business Environment dated 14 December 2022. The updated NIS Road Map was approved under the resolution of the Presidium of the Government Commission dated 11 April 2024.

ROSATOM has also implemented and continues to build on a project titled ‘Personnel Positioning’, which is aimed at ensuring employee safety in the workplace by using wearable tags and a smart analysis system. The system promptly issues alerts in the event of unauthorised entry into hazardous areas, equipment operation without a permit, or if employees cross the path of lifting equipment when moving in a workshop building. The system is also used to track the movements of employees and detect waste of time in the workplace (unproductive movements); a special analytics module has been developed for this purpose.

In 2024, work on an IT solution called ‘Digital Twin of an NPP’ (NPP DT) was initiated; the solution is designed to reduce the cost of ownership of an NPP as a product. The approach is centred around developing a universal (benchmark) building information model of an NPP based on the analysis of data on completed and ongoing projects. The project involves creating a shared information space to enable seamless integration of all data, developing the building information modelling (BIM) technology and using mathematical modelling for virtual testing and predictive analytics. This will enable a shift from fragmented project management to a serialised product-based approach, which will help make Russian nuclear technologies safer, more efficient and more competitive. A working group was established to develop the design concept for the solution. It includes leading industry experts from nuclear organisations and other organisations interested in the project. Conceptual design is currently underway.

ROSATOM’s Fuel Division continues to implement projects focused on predictive analytics. Following the completion of a project, an enterprise in the Division conducted a full-scale experiment and confirmed direct benefits; a development project was launched, and the installation of additional sensors on manufacturing equipment was initiated. The Vibration Monitoring project is ongoing; it involves the use of predictive analytics for assessing the condition of equipment. The project is aimed at using domestically developed electronic components and software to reduce equipment downtime caused by unexpected failures. The system is being developed by the Mechanical Engineering Division; it is expected to provide a basis for developing a single vibration monitoring system for the entire Mechanical Engineering Division.

Two enterprises in the Fuel Division are rolling out the AtomMind platform designed to predict product quality and equipment status. The implementation of the system in the enterprises has been completed; work is underway to start its pilot operation. The holding company of the Fuel Division has obtained grants from the Russian Information Technology Development Foundation for a project to develop a centralised segment of the AtomMind platform. An agreement has been concluded with the Russian Information Technology Development Foundation. Arrangements are being made to conclude contractor agreements and launch the first stage of work.



1.10.4. Internal digitisation

In 2024, ROSATOM continued to work towards achieving technological sovereignty and incorporating state-of-the-art domestically developed IT solutions into its own IT landscape. The share of Russian software in procurement reached 95%; on average, it accounts for 80% of software used in the industry. In addition, the Corporation established a competence centre responsible for supporting the transition of nuclear organisations to the use of Russian radio and electronic products.

The Corporation also continues to implement critical IT projects managed by the ICCs for General Mechanical Engineering and Construction. For instance, more than 17,000 employee workspaces have been migrated to automated workstations that do not rely on imported solutions; a total of 151,000 workspaces have been upgraded. As part of projects to replace imported ‘heavy’ CAD and PDM systems, the design of a domestically developed solution has been completed. The development of solutions for the digitisation of Arctic operations forming part of an Integrated Platform of Digital Services for the NSR is another important focus area. The platform is being developed by the Corporation’s IT teams as part of the federal project to develop the Northern Sea Route.

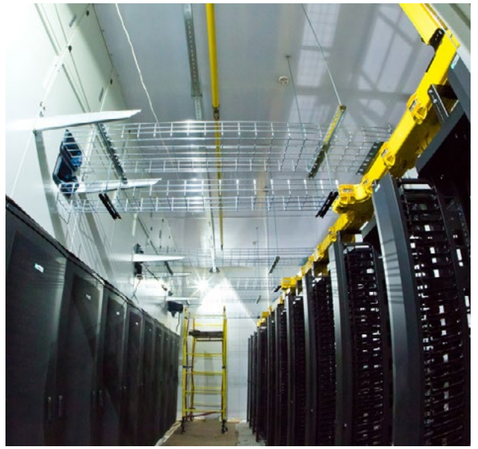
Special focus is given to projects at the preparatory stage, such as the SNPP in Uzbekistan, the SNPP in Yakutia and Beloyarsk NPP (power unit No. 5). In 2024, the roll-out of corporate and basic services and the development of IT infrastructure in ROSATOM’s branches and at construction sites were initiated; this is one of the key challenges that ROSATOM will continue to address in 2025.

27 services for navigational and cartographic communication and the provision of information on the weather and ice conditions became fully operational in 2024. The functionality of the services was tested on three nuclear icebreakers: *Ural*, *Arktika* and *Vaygach*. The Corporation also actively contributes to the development of the Russian IT market: 74 solutions were included in the Unified Register of Russian Computer Software and Databases by nuclear organisations in 2024. Overall, ROSATOM has rights over more than 400 solutions included in the Register.

As part of initiatives to ensure the technological independence of critical information infrastructure (CII) facilities, a voluntary certification system, CII-CERT, was established in 2024. It is a set of requirements, bodies and testing laboratories for the certification of CII solutions. The system is designed primarily to confirm the compliance of solutions with technological independence criteria. The first certification body and the first laboratory specialising in APCS and IT solutions have been registered in ROSATOM’s organisations.

The Corporation attaches special importance to building the talent pipeline for CII. More specifically, in 2024, Master’s degree programmes were launched at Sirius University and RTU MIREA, and the implementation of partner programmes continued as part of advanced engineering schools and continuing education programmes.

In 2024, ROSATOM ranked among the top three companies in the data centre market in the Russian Federation in terms of commissioned capacities (6,570 rack spaces). Two new data centres, Moscow-2 and Innopolis, were launched during the year. The site in Moscow has become the first in Russia to obtain the Tier IV Constructed Facility certification, which corresponds to the highest level of reliability and fault tolerance in accordance with international industry standards.



1.11. QUANTUM COMPUTING

Under the agreement between the Government of the Russian Federation and ROSATOM on the development of the Quantum Computing high-technology area, the Corporation continues to implement the road map for the development of the Quantum Computing high-technology area until 2030 (hereinafter referred to as the QC Road Map).[1] The aim of the project for the period until 2030 is to strengthen global technological leadership in the sphere of quantum computing and accomplish tasks in the sphere of research and technology.

As part of the implementation of the QC Road Map, in 2024, the Corporation developed prototypes of quantum processors based on four main technological platforms for quantum computing (atoms, ions, superconductors and photons), including two 50-qubit quantum processors based on trapped ions and on neutral ultra-cold atoms.

Russia is currently one of the six countries that have operational quantum processors with a similar (or greater) computing power and one of the three countries (along with the US and China) that have operational quantum processors based on four main platforms.

In the sphere of quantum software development, the Corporation has developed a Russian cloud platform as a future product and a service providing access to quantum computing devices developed by ROSATOM that are designed to perform tasks using quantum algorithms. 34 quantum algorithms were developed between 2020 and 2024 (including 12 in 2024); they are used on quantum computing devices built by the Corporation for test activities and for solving model problems in the field of quantum optimisation, quantum chemistry, quantum modelling, big data processing, etc.

As part of the QC Road Map, 121 items of intellectual property were produced in the sphere of quantum computing devices and quantum software, including quantum algorithms and emulators, and 12 patents for inventions and utility models were registered between 2020 and 2024.

In order to develop the talent pipeline and provide early career guidance, starting from 2022, ROSATOM, jointly with the Autonomous Non-Profit Organisation Digital Economy, the Russian Ministry of Digital Development, Communications and Mass Media, the Russian Ministry of Education and the Russian Quantum Centre, holds a Digital Lesson on quantum computing as part of the Digital Lesson Nationwide Educational Project (hereinafter referred to as the Project). Between 8 April and 30 April 2024, a lesson titled ‘A Journey to the Micro Universe: Quantum Computing and Healthcare of the Future’ was hosted on the Project’s online platform (Урокцифры.рф); it included an educational video, educational simulators and teaching aids developed by a company managed by ROSATOM jointly with the Autonomous Non-Profit Organisation Digital Economy.

In 2024, the reach of the Digital Lesson on quantum computing totalled 3.4 million school students and teachers (a total of more than 8.5 million people between 2022 and 2024). The participants of the project included school students from 89 regions of Russia and students of Russian-language schools in more than 130 countries. Lessons on quantum technology were also held as part of international Digital Lessons in the Republic of Belarus and the Republic of Uzbekistan.

ROSATOM’s representatives participated in major federal educational projects with quantum technology on the agenda, including the World Festival of Youth and Students; Your Move, Russia’s main project targeted at students; a nationwide academic competition for students ‘I’m a Professional’; the National Technology Contest, etc.

In 2024, the Corporation initiated a new educational project titled ‘Quantum Weeks’. It is aimed at helping school and university students and teachers, as well as research workers at universities, to learn more about state-of-the-art quantum technologies through active immersion. The project is run in Yekaterinburg, Tomsk, Nizhny Novgorod and Saint Petersburg, as well as four cities in the Republic of Uzbekistan (Tashkent, Samarkand, Jizzakh and Olmaliq).

1. Approved under the resolution of the Presidium of the Government Commission of the Russian Federation on Digital Development and the Use of Information Technology to Improve the Quality of Life and the Business Environment.

Russia’s first English-language Master’s degree programme on Quantum Electronics and Photonics was launched jointly with Saint Petersburg Electrotechnical University; seven first-year students enrolled in 2024. The first cohort of students will graduate in 2026.

A Bachelor’s degree programme on Quantum Engineering continues to be run jointly with NRNU MEPhI; 59 students are doing the course. The first cohort of students will graduate in 2026.

A continuing professional education programme focused on quantum technology titled ‘Quantum Computing’ is run by the Rosatom Corporate Academy for CDOs; 145 specialists, including Chief Technology Officers and technical specialists in the nuclear industry, completed professional development courses in 2024.

In order to establish and develop professional communities in the field of quantum computing, raise awareness among Russian and international specialists and encourage them to contribute to the development of quantum computing, and in order to promote this subject among communities in related areas, 26 international and domestic events were held in 2024 with quantum computing on the agenda. These included specialised meetings, sessions, workshops and presentations at the St. Petersburg International Economic Forum (SPIEF), the Eastern Economic Forum, and the Russia International Exhibition and Forum.

At the Future Technologies Forum held on 14 February 2024, working prototypes of Russian quantum processors were presented to the President of the Russian Federation, including state-of-the-art Russian 20-qubit trapped-ion and 25-qubit atomic computing devices; the application of quantum computing in healthcare of the future was demonstrated: a quantum algorithm was run which helps detect the signs of pneumonia in X-ray images.

As part of the QC Road Map, the Corporation continues to take steps to establish cooperation with the international scientific community in friendly countries. In 2024, three memoranda of cooperation were signed with leading universities and organisations in the Republic of Uzbekistan. As part of visits to BRICS countries, Uzbekistan and Kazakhstan, the Corporation’s representatives visited 25 universities and research centres. Exchange programmes for specialists were launched with universities in BRICS countries and the Republic of Uzbekistan. The Corporation is preparing to expand the scope of experience-sharing and internship programmes for research workers.

In 2024, a programme was launched to introduce quantum computing in the nuclear industry; it is focused primarily on quantum algorithms. As part of the programme, 17 organisations of ROSATOM were working on 14 projects and three initiatives in 2024.

Between 2025 and 2030, the Corporation plans to test quantum algorithms on model problems (‘simplified’ real-life problems that help to gain insight into the most promising applications of quantum computing technology, its impacts and potential) and progress from model to real-life problems. These include, for instance, problems related to the optimisation of nuclear fuel production, solving systems of linear equations as part of heat transfer problems, simulation and mathematical modelling of physical processes taking place in individual components, etc.



Plans for 2025 and for the medium term

Between 2025 and 2030, funding for the implementation of measures included in the QC Road Map will be provided as part of the Applied Research and Advanced Developments Federal Project forming part of the new national project, Data Economy and Digital Transformation of the State.

Objectives set for the next stage of development of the technology, which will be launched in 2025, include not only the scaling of quantum registers and improving the accuracy of operations, but also the miniaturisation of quantum devices, which will require innovative technologies and new engineering ideas, streamlined circuit designs and integrated circuit layouts, various packaging methods, the development and production of special electronic devices, etc.

In 2025, the Corporation will continue to implement a set of R&D projects focused on developing quantum computing devices based on various technological platforms and developing specialised software, including quantum algorithms, codes, and error correction and suppression techniques. By the end of 2025, the Corporation plans to unveil a prototype of a 70-qubit quantum processor.

The aim of the project to be achieved by 2030 is to ensure Russia's technological sovereignty in the field of quantum computing through domestically developed state-of-the-art solutions, their implementation in various sectors of the economy and in the social sphere, and the start of their practical application in various industries. As a result of the implementation of the Russian quantum computing programme, by 2030, Russian quantum computers will be used to accomplish practical tasks in science, the economy and the public sector.



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1.12. RESEARCH AND INNOVATIONS

Key results in 2024

- The number of international applications filed and foreign patents received by ROSATOM totalled 279.
- The share of innovative products and services in the total sales of products and services across the industry stood at 24.92%.

1.12.1. Implementation of ROSATOM's Innovative Development and Technological Modernisation Programme

Pursuant to the minutes of the Government Commission for Economic Modernisation and Innovative Development of Russia dated 27 August 2024, ROSATOM has updated its Innovative Development and Technological Modernisation Programme until 2036 with an outlook until 2045.[1]

ROSATOM's innovative development involves ongoing work aimed at addressing strategic, technological, economic and other tasks that necessitate searching for and applying new knowledge, continuously accelerating innovative development and improving its efficiency. As part of the new Innovative Development Programme (IDP), ROSATOM continues to give priority to the development of nuclear technologies, innovative non-nuclear technologies and related technologies.

One of the priorities of ROSATOM's innovation activities is to achieve national development goals in terms of ensuring technological leadership. The relevant objectives include increasing the share of Russian high-technology goods and services developed in-house and launching them on the Russian and international markets. By 2030, ROSATOM aims to increase revenue from this segment to RUB 5 trillion.

On 5 and 6 September 2024, the Annual Industry-Wide Conference titled 'Innovation Management in ROSATOM' was held in Kazan (Republic of Tatarstan); this is a major business event for the innovation community in the nuclear industry. Over the past 10 years, the conference has become the leading industry platform for discussing key innovative achievements in the nuclear industry, establishing cooperation, and sharing best practices and competences in order to enable ROSATOM to become a global technological leader.

The programme of the conference traditionally included an award ceremony for the most innovative companies in the nuclear industry for 2023.

40 integrated technological projects supporting R&D and technological development in strategic areas of national importance and prioritised industry-specific areas, digitisation of the economy and modernisation of existing technologies were being implemented in 2024 as part of the IDP.

1. Minutes No. 42 of ROSATOM's Management Board dated 13 December 2024.

Performance indicators of ROSATOM's Innovative Development and Technological Modernisation Programme until 2030 (in the civilian segment) between 2021 and 2024

Indicator	2021	2022	2023	2024 (target)	2024 (actual)
Share of innovative products and services in the total sales of products and services across the industry, %	25.69	23.9	24.63	23.0	24.92
Number of intellectual property items,[1] pcs.	2,906	3,150	3,391	3,440	3,670
Research and development costs as a percentage of the output of innovative products and services,[2] %	13.68	13.86	11.6	13.5	8.6

1.12.2. Comprehensive Programme 'Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024'

Between January 2021 and December 2024, ROSATOM implemented a comprehensive programme titled 'Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024' (CP DTTS).[3] The CP DTTS incorporated key initiatives aimed at developing new nuclear, thermonuclear fusion and plasma technologies and related high technology, upgrading and expanding R&D capabilities and pilot production facilities, designing and building innovative nuclear power units.

Implementation of the Federal Project 'New Nuclear Power Industry, Including Small Nuclear Reactors for Remote Areas' included in the CP DTTS

As part of the development of small NPPs to provide power supply to consumers in remote areas with a high export potential that are isolated from the unified power system, in 2024, engineering designs were developed for a line of SHELF-M and Elena-AM small reactor units.

As part of R&D, a preliminary design was developed for a reactor unit using spectral shift control (VVER-S); it meets the requirements of the Uniform System of Design Documentation and technical specifications for the VVER-S design.

The Proryv (Breakthrough) Project was underway; it is aimed at developing fast neutron reactors and closing the nuclear fuel cycle. The implementation of the project will result in the development of technologies that will help prevent serious accidents at NPPs necessitating the evacuation of the local population, will make it possible to fully unlock the energy potential of feedstock, provide technological solutions for enhancing the nuclear non-proliferation regime, and will help address the problem of radioactive waste accumulation and make nuclear power plants more cost-effective. Key outcomes of the Proryv Project in 2024 included the following:

- The module producing mixed uranium/plutonium nitride fuel for the BREST-OD-300 reactor started pilot operation in Seversk (Tomsk Region). This is the first of the three unique facilities forming part of the Generation IV Pilot and Demonstration Energy Facility (PDEF) that is being built as part of the Proryv Project;
- The second stage of the PDEF training and information centre was commissioned. 30 employees of the fabrication/refabrication module (FRM) underwent training using the ATOM software and hardware system;
- An innovative pilot sample of a reactor coolant pump for the BREST-OD-300 reactor was produced and is being tested. Key equipment is being produced for the reactor section; the preparation of production facilities for the manufacture of steam generators has been completed;
- Technologies were developed for the fabrication and refabrication of mixed uranium/plutonium (MNUP) fuel and for closing the NFC.

For details, see section 1.12.3. 'Closing the Nuclear Fuel Cycle'.



1. Foreign patents obtained by ROSATOM, applications for foreign patents submitted and registered under the established procedure, registered trade secrets (know-how) reflecting the commercialisation and expansion of the scope of application of research findings in the nuclear industry (cumulative total).
2. Annual reduction due to an increase in the output of innovative products.
3. Pursuant to Decree No. 270 of the President of the Russian Federation dated 16 April 2020 on Developing Scientific Research, Technical Capabilities and Technology in the Use of Nuclear Energy in the Russian Federation.

Implementation of the Federal Project ‘Construction of Modern Experimental Test Facilities for the Development of Technologies for a Two-Component Nuclear Power Industry Based on a Closed Nuclear Fuel Cycle’

The technical upgrade of a pilot fast neutron reactor with a heat generation capacity of 60 MW (stage 2) was completed. The project has made it possible to upgrade the system of the BOR-60 research reactor in order to improve its safety and reliability and ensure compliance with regulatory requirements.

As part of the construction of the MBIR research reactor in Dimitrovgrad, in 2024, intermediate heat exchangers designed to remove residual heat from the reactor core were delivered to the site. Components of the fuel handling system for the first circuit of the MBIR reactor were moved into final position, which will make it possible to concrete a section of the ceiling of the central hall and to start equipment installation.

Implementation of the Federal Project ‘Development of Controlled Thermonuclear Fusion Technologies and Innovative Plasma Technologies’

Technical upgrades were completed, and a pilot site for the production of superconductors with improved performance was put into operation.

A preliminary design was developed for a unique tokamak with reactor technologies (TRT) to be built in Troitsk. It is designed primarily to test and demonstrate the operability of technologies that will form the basis of a full-scale nuclear fusion reactor, which will provide a virtually inexhaustible source of energy.

A prototype of a plasma jet engine with improved thrust and specific impulse designed for long-distance spaceflight was produced. In the future, the use of such engines will enable Russia to take deep space exploration to a new level and conduct interplanetary spaceflight missions.

Implementation of the Federal Project ‘Development of New Materials and Technologies for Advanced Energy Systems’

Two new types of fibre were developed. One of them is based on silicon carbide and is designed for fuel elements and components of fuel assemblies with a length of 5 metres or more. This is one of the most promising materials that can improve the strength of fuel cladding. The other is intermediate modulus carbon fibre made from PAN precursor (feedstock produced from refined petroleum products); it outperforms analogues in terms of tensile elasticity and improved strength. This material will be in demand in the nuclear industry, aircraft engineering, shipbuilding, the wind power industry, construction and other industries.

New types of steel were developed. Materials were produced from oxide dispersion-strengthened (ODS) steel for cladding tubes of various types of reactors. Tests have shown that the alloy has unmatched high-temperature strength: it retains its physical state in a salt composition heated to 750°C for more than 4,000 hours.

A rationale was provided for the use of a new high-strength steel grade for SNPP equipment; it helps reduce the specific amount of metal used in equipment by almost 1/4.

In the sphere of additive manufacturing, the Corporation completed the development and production of nine 3D printers using 10 different technologies, including the printing of complex-shaped parts from refractory metals. 16 different products were produced and tested. Cluster laser optical systems were produced; they are designed to print parts with a diameter of 95 cm or more from silicon carbide.

A universal hardware and software platform was developed which incorporates digital tools for computer-based materials science that are designed to predict the properties and search for new polymer composite and metallic materials. A database on the properties of polymers, ceramic, steel and other materials was compiled; it incorporates the functionality for the monitoring of the additive manufacturing process and the preparation of the relevant data sheets, as well as smart feedback mechanisms.

Techniques were developed for the rapid assessment of physical and mechanical properties of materials using ion accelerators; they will help optimise the duration of the assessment of resilience of structural materials to radiation and reactor testing.

As part of efforts to synthesise new superheavy elements, a high-current multi-charged ion injector was produced; it has significantly improved the sensitivity of experiments. In addition, a high-performance electromagnetic mass separator was produced, which will be used to produce isotopes required to obtain elements 119 and 120.



Implementation of the Federal Project ‘Design and Construction of Reference Power Units of Nuclear Power Plants’

Measures were implemented to ensure the achievement of first criticality and enable the commissioning of power units No. 1 and 2 of Kursk NPP-2.

The installation of the reactor vessel was started at power unit No. 2, and the confinement area was handed over for ‘clean installation’ in order to weld 20 UJA main coolant lines; the 10UMA turbine was placed on the barring gear at power unit No. 1.

As at 31 December 2024, preparation for the commissioning of Kursk NPP-2, which comprises two power units, was 68.57% complete.

In 2024, the New Nuclear and Energy Technologies National Project, which is aimed at achieving technological leadership (Energy NTLP),[1] was approved under the resolution of the Presidium of the Presidential Council for Strategic Development and National Projects (minutes of the meeting No. 12pr dated 20 December 2024). Federal projects focused on nuclear topics that will be launched as part of the Energy NTLP starting from 1 January 2025 build on the groundwork laid as part of the CP DTTS.

1. Pursuant to Decree No. 309 of the President of the Russian Federation dated 7 May 2024 on the National Development Goals of the Russian Federation until 2030 and for the Future until 2036.

1.12.3. Closing the nuclear fuel cycle

The strategy for the development of Russia's nuclear power industry until 2050 with an outlook until 2100 involves developing a two-component nuclear power industry and transitioning to a closed nuclear fuel cycle. ROSATOM is a global leader in the practical implementation of the concept of Generation IV power systems with a closed nuclear fuel cycle (CNFC).

The world's first Generation IV pilot and demonstration energy facility with the inherently safe BREST-OD-300 lead-cooled fast neutron reactor and onsite facilities forming part of the closed NFC that the Corporation is building in Seversk (Tomsk Region) as part of the Proryv Project will make it possible to master technologies for closing the NFC at a single site accommodating a power unit and all infrastructure required for fuel supply and RAW and SNF management.

To promote further development of fast neutron reactors, the Corporation plans to develop larger industrial energy facilities designed to make electricity that they produce competitive compared to other power generation options in terms of cost.

As part of the Balanced NFC product area, the Corporation promotes products and services for the back end of the nuclear fuel cycle (NFC) on the global market as part of approaches developed by Russian specialists.

A conceptual design for a standardised dry cask storage facility and an engineering design for a large-capacity storage cask were developed; the latter is the main technological solution for dry cask storage facilities that helps ensure the safety of long-term SNF storage. These design solutions enable a seamless transition to SNF reprocessing (in a way that does not require significant additional expenditure) for customers that have opted for a 'deferred' SNF management solution.

ROSATOM is implementing a set of measures to develop SNF processing technologies that are unique in the world; they involve the separation of highly radioactive 'short-lived' fraction and minor actinides (which are the most toxic materials) for transmutation (incineration) in fast reactors. As part of the Balanced NFC product area, feasibility studies have been prepared confirming that it is possible to avoid building deep geological repositories in the countries where NPPs are located.

Proposals for the integration of these solutions into national RAW management systems have been prepared by the Sales and Trading Division for potential overseas customers.



Key results in 2024

As part of R&D initiatives included in the Proryv Project, the Corporation developed technologies for mixed uranium/plutonium fuel fabrication and refabrication and a technology for closing the NFC (hydrometallurgical SNF processing).

In December 2024, the fabrication/refabrication module (FRM) producing mixed uranium/plutonium nitride (MNUP) fuel for the BREST-OD-300 reactor started pilot operation. This is the first facility forming part of the Pilot and Demonstration Energy Facility (PDEF); it is unique in the world.

As part of the construction of the power unit with the BREST-OD-300 reactor, the first stage of testing of the reactor coolant pump (RCP) for the reactor unit was completed, which has made it possible to confirm the head and flow characteristics of the RCP, including the molten lead flow rate of more than 11 tonnes per second. The pump is unique in the world. As part of capital construction projects, the enclosure for the BREST-OD-300 reactor was installed, and the turbine condenser was moved into final position.

In order to train personnel for the Proryv Project, the second stage of the PDEF training and information centre was commissioned.

As part of radiological safety validation, in 2024, it was demonstrated that the risk of cancer caused by radiation exposure of female employees in Seversk as a result of annual emissions from the BREST-OD-300 reactor unit does not exceed the threshold for negligible radiation risk (10^{-6} per year) established by the Radiation Safety Standards applicable in Russia, while the risk of cancer caused by the exposure of the population to existing non-radioactive sources of environmental pollution is eight times higher (up to 8×10^{-6} per year).

In 2024, ROSATOM started the pilot operation of three MOX fuel assemblies containing 1.5% of minor actinides (americium-241 and neptunium-237) in individual fuel elements in the BN-800 reactor, as well as the pilot operation of standard fuel for the BN-800 reactor with increased americium-241 content in feedstock used in fuel production. This is a major step towards building a two-component nuclear power system of the future in Russia, which will considerably increase the availability of feedstock for the nuclear power industry and make it more environmentally friendly by reducing the amount of time required for waste to achieve radiation equivalence to natural uranium several-thousand-fold.

All existing power units equipped with RBMK reactors continue to operate reliably using fuel from reprocessed uranium (with a higher concentration of even-numbered uranium isotopes), making it possible to recycle uranium recovered while reprocessing SNF from Russian NPPs and conserve natural uranium resources.

The adoption of fuel from reprocessed nuclear materials at Russian NPPs has made it possible to save a cumulative total of more than 4,000 tonnes of natural uranium since 2021.

The Corporation continued to develop and introduce new-generation transportation casks for multimodal transportation of SNF from NPPs:

- The pilot TUK-137T.R cask underwent 'cold' in-process testing at Novovoronezh NPP, enabling ROSATOM to proceed to produce three transportation casks of this type to enable regular SNF removal from Russian NPPs with VVER-1200 reactor units;
- A TUK-137T.A1 transportation cask was delivered to the construction site of Akkuyu NPP (Turkey); it will be used during comprehensive testing of NPP equipment at the commissioning stage.

Pilot operation of six experimental TVS-2M fuel assemblies with REMIX fuel continued as part of the second fuel cycle at Balakovo NPP (power unit No. 1) equipped with VVER-1000 reactors. In the fourth quarter of 2024, three REMIX fuel assemblies were unloaded from the core as scheduled in accordance with the testing programme. The other three fuel assemblies remain in operation as part of the third fuel cycle.

Pilot operation of three experimental TVS-2M fuel assemblies with accident tolerant fuel continues at Rostov NPP (power unit No. 2) equipped with VVER-1000 reactors. Following successful operation during two fuel cycles, in the fourth quarter of 2024, ROSATOM started the operation of these fuel assemblies as part of the third fuel cycle.

Objectives for 2025 and 2026:

- To launch the production of MNUP fuel for the start-up of the BREST-OD-300 reactor at the FRM forming part of the PDEF;
- To complete the testing of the vibration model of the steam generator of the BREST-OD-300 reactor unit;
- To issue engineering designs for the BR-1200 reactor unit;
- To complete the testing of combined fuel assemblies with MOX fuel containing americium and neptunium in the BN-800 reactor at Beloyarsk NPP;
- To develop a strategy for the incineration of minor actinides in fast neutron reactors and a programme of pilot demonstration of the incineration of minor actinides in the BN-800 reactor;
- To develop design documentation for power unit No. 5 of Beloyarsk NPP equipped with a BN-1200M reactor;
- To complete the pilot operation of REMIX fuel assemblies at power unit No. 1 of Balakovo NPP;
- To complete the pilot operation of three experimental TVS-2M fuel assemblies with accident tolerant fuel at Rostov NPP (power unit No. 2).

Long-term objectives

In the medium term, ROSATOM plans to commission the power unit equipped with the BREST-OD-300 reactor and the SNF Reprocessing Module at the PDEF site.

The roll-out of industrial energy facilities in Russia will be informed by the update to the General Scheme for the Locations of Power Facilities in Russia, which outlines plans to build eight large fast neutron reactors by 2042.

1.12.4. International projects

ROSATOM participated in major international projects focused on the development of unique 'mega science' research facilities: the International Thermonuclear Experimental Reactor (ITER) and the Facility for Antiproton and Ion Research in Europe (FAIR).

ITER (International Thermonuclear Experimental Reactor) project

The Russian Federation continued to participate in the research and engineering megaproject to build the International Thermonuclear Experimental Reactor (ITER), which is the key technological platform for the fusion power industry of the future.

Factory acceptance tests of the final gyrotron system (No. 8) to be supplied as part of Russia's commitments were completed with assistance from representatives of the Russian ITER agency and the ITER Organisation.

Equipment produced in Russia, including switches and busbars (13 trailers), equipment for diagnostic systems and gyrotron systems (two trailers), and equipment for a port plug test facility (two trailers), was supplied to the ITER Organisation and delivered to the ITER construction site.

As at year-end 2024, a total offset was received amounting to 52.32% of Russia's total in-kind commitments.

More than 25 Russian organisations and over 750 specialists are involved in the ITER project. More than 100 Russian specialists currently work for the ITER Organisation.

Project to establish the Facility for Antiproton and Ion Research in Europe (FAIR)

Russia continued to participate in the project to establish the Facility for Antiproton and Ion Research in Europe (FAIR). Due to the current geopolitical situation, the FAIR Management Board announced a suspension of cooperation with Russian research institutes and organisations, including in the context of contracts for the supply of equipment and the provision of services.

Nevertheless, the Russian Federation remains a member of FAIR and participates in meetings of the Council of FAIR GmbH with the right to vote.

In 2024, Russia made its contribution for the construction of FAIR corresponding to the relevant budget allocations.

Participation in the Generation IV International Forum

The Generation IV International Forum (GIF) Project was initiated in 2000. The main aim of the GIF Project is to promote international cooperation in the development of Generation IV energy systems with improved nuclear safety and energy security, resource utilisation and proliferation resistance, suitable for licensing, construction and operation after 2030. The project participants included Australia, the UK, the EU, Canada, China, the Republic of Korea, the US, France, Switzerland, South Africa, Japan and the Russian Federation.

In 2024, Russian nominated experts participated in all scheduled GIF events (36 events). Russian nominated experts participated in GIF events and meetings, including the work of its governing bodies, Working Groups and thematic activities focused on SFR (sodium-cooled fast reactors), SCWR (supercritical-water-cooled reactors), LFR (lead-cooled fast reactors), MSR (molten salt reactor systems) and VHTR (very-high-temperature gas-cooled reactors).

Pursuant to Order No. 1050-r of the Government of the Russian Federation dated 30 July 2009, Russia acceded to the Framework Agreement for International Collaboration on Research and Development of Generation IV Nuclear Energy Systems dated 28 February 2005, with ROSATOM designated as the Implementing Agent on behalf of the Government of the Russian Federation.[1]

1. The Framework Agreement has been extended until 2025. In 2024, the GIF Policy Group adopted a resolution on the signing of a new Framework Agreement, which the Russian Federation has not been invited to sign. By year-end 2024, the Agreement was signed by Canada, the US, the UK, France, Japan and Switzerland. The new Framework Agreement comes into force on 1 March 2025. Accordingly, the participation of Russian experts and representatives in the GIF will cease starting from March 2025.

International Research Centre Based on the MBIR Multipurpose Fast Neutron Research Reactor (IRC MBIR)

The construction of the multipurpose fast neutron research reactor (MBIR) is ongoing in Dimitrovgrad.

Starting from 2025, the project to build the MBIR reactor will form part of the Federal Project 'Experimental Test Facilities for the Development of Technologies for a Two-Component Nuclear Power Industry' included in the Energy NTLP. The Consortium for the International Research Centre Based on MBIR (the IRC MBIR Consortium) is being developed. This makes it possible to conduct research using state-of-the-art research infrastructure being built in Russia. One international organisation joined the IRC MBIR Consortium in 2024. Negotiations are underway for another three organisations from friendly countries to join the IRC MBIR Consortium.

R&D cooperation is being developed through the key body of the IRC MBIR Consortium responsible for scientific research, namely the Advisory Board, which comprises representatives of nine countries. Fundamental and other research in beyond-the-vessel horizontal and vertical channels has gained new impetus.

1.12.5. Plan of R&D Topics

The implementation of the Consolidated Industry-Wide Plan of R&D Topics (CIPT) is aimed at achieving technological leadership in key areas of scientific and technological development prioritised by ROSATOM, including VVER technology, SNF reprocessing, small-scale reactors, new materials, hydrogen energy, thermonuclear fusion, superconductivity, nuclear medicine, etc.

The R&D Plan builds on ROSATOM's Business Strategy until 2030 and is aligned with the list of promising business areas of the holding companies of ROSATOM's Divisions/incubated businesses as part of prioritised R&D areas and industry-wide and national research and technology programmes, taking into account the outperformance of the product/technology being developed by ROSATOM over existing analogues in terms of their technical characteristics, as well as the findings of benchmarking, patent search and technology readiness assessment conducted by ROSATOM and the commitment to accelerating research and development. Innovative technologies developed as part of the CIPT open up new horizons for the business and the Corporation as a whole.

The Corporation maintains the amount of its own funds allocated for R&D focused on prioritised areas of scientific and technological development as part of the CIPT at a high level; this provides opportunities for the development of promising solutions and their subsequent practical application and adoption in production operations.

Funding provided by ROSATOM for R&D activities included in the CIPT

Indicator	2021	2022	2023	2024
Number of R&D activities funded and completed	160	143	129	93
Funding, RUB billion	11.4	10.3	10.1	7.5

1.12.6. Cooperation on scientific research with research institutions and universities

ROSATOM promotes cooperation in science and education with partner organisations, including specialised universities, the National Research Centre Kurchatov Institute, organisations of the Russian Academy of Sciences, other third-party research institutions, as well as small and medium-sized businesses.

Cooperation in the sphere of scientific research takes various forms: research conducted under contracts, joint science and innovation projects, establishment of joint laboratories, participation in scientific and technical expert reviews, joint conferences, workshops, research and educational programmes, etc.

In 2024, universities and research institutions were involved in projects included in the CP DTTS, the CIPT and programmes run by ROSATOM's Divisions.

ROSATOM actively contributes to the introduction of instruments of government support for scientific and technological development designed to promote integration between businesses and universities.

The Corporation supports the participation of universities forming part of the Consortium of ROSATOM's Core Universities (20 universities) in the Priority 2030 programme, which is aimed at developing progressive modern universities that will serve as the country's scientific, technological, social and economic development hubs.

Organisations in the industry run cooperation programmes in the sphere of research and education with advanced engineering schools affiliated with leading universities (partnership with more than 12 advanced engineering schools) and world-class research and education centres (more than four centres). ROSATOM cooperates with science and technology innovation centres such as the Vorobyevy Gory Science and Technology Innovation Centre and Sirius, and is considering partnership with other Russian science and technology innovation centres.

The implementation of the programme to develop NRNU MEPhI in cooperation with ROSATOM until 2030 continued. The programme is aimed at training highly skilled specialists at NRNU MEPhI as the leading university in the nuclear industry, and facilitating progress from global leadership in the nuclear industry to global technological leadership.

Work is ongoing to establish and develop the National Centre for Physics and Mathematics (NCPM) in Sarov (Nizhny Novgorod Region). The NCPM runs a research programme covering 10 areas of research ranging from artificial intelligence to high-energy-density physics. More than 55 leading Russian research institutions, universities and high-technology companies cooperate with the NCPM in the sphere of scientific research. More than 2,000 leading and young researchers participate in projects forming part of the Centre's research programme. The MSU Sarov branch of Lomonosov Moscow State University is the educational component of the NCPM; it runs Master's degree and postgraduate programmes.

In 2024, a total of more than 40 specialised universities were involved in ROSATOM's research and innovation projects. In 2024, the volume of orders for R&D performed by universities exceeded RUB 2.2 billion.

Key participants of research and innovation projects included NRNU MEPhI, Tomsk Polytechnic University, Lobachevsky National Research State University of Nizhny Novgorod, National University of Science and Technology MISIS, Bauman Moscow Technical University, Lomonosov Moscow State University, the Ural Federal University, St. Petersburg Polytechnic University, Saint Petersburg Electrotechnical University, Moscow Aviation Institute, Alekseev Nizhny Novgorod State Technical University, Mendeleev University of Chemical Technology, Sechenov University, Tomsk State University, RTU MIREA and Moscow State University of Civil Engineering.

Funding of R&D projects carried out by universities at the request of ROSATOM and its organisations, RUB million



MED 4 In 2024, the volume of orders for R&D performed by research institutions outside the industry totalled RUB 7.3 billion.

More than 50 third-party research institutions were involved in ROSATOM's R&D projects, including the National Research Centre Kurchatov Institute, the Nuclear Safety Institute of the Russian Academy of Sciences (IBRAE RAN), the Institute of High Temperature Electrochemistry of the Ural Branch of the Russian Academy of Sciences (IHTE UB RAS), the Budker Institute of Nuclear Physics of the Siberian Branch of the Russian Academy of Sciences, the Joint Institute for High Temperatures of the Russian Academy of Sciences, the Joint Institute for Nuclear Research, the State Research Centre Burnasyan Federal Medical Biophysical Centre, the Russian State Scientific Centre for Robotics and Technical Cybernetics, the Ioffe Institute of the Russian Academy of Sciences, etc.

Funding of R&D projects carried out by research institutions outside the industry at the request of ROSATOM, RUB million



1.12.7. Knowledge management system

The aim of ROSATOM and its organisations in the sphere of knowledge management is to create an environment for transforming corporate knowledge into a strategic resource that will enable them to make their products and services more competitive and achieve technological leadership; this involves:

- Enhancing the commercial appeal of ROSATOM and its organisations on the Russian and foreign markets;
- Improving the operational and cost efficiency of ROSATOM and its organisations;
- Improving performance, making ROSATOM and its organisations more agile and accelerating the development of their business processes.

In 2024, the Corporation continued to maintain and populate its electronic library of R&D information (the R&D e-library).

Lists of R&D projects and metadata on R&D carried out at the request of the Corporation (2022–2023) were added to the local collection of R&D information forming part of the collection of scientific and technical documentation; summaries of information on patent research (2021–2023) were added to the local collection of R&D information; an interactive schedule of R&D activities was prepared (2024); the industry-wide R&D information classification system was updated.

60 new sections and classification numbers were added to the industry-wide R&D information classification system; 34 new terms used in the content included in the R&D e-library in 2023 were prepared and included in the industry thesaurus; 201 documents were added to the collection of national and other standards; the R&D e-library was administered and monitoring was carried out with regard to 1,475 industry documents provided by nuclear organisations; the current procedure for populating the Corporation's R&D e-library was reviewed.

The Digital Science 1.0 System of Digital Services (an integrated information system) started pilot operation; data migration was completed; the relevant architecture was developed, and the organisational structure of the project was updated.

In order to develop an effective communication system in the sphere of science, technology and innovation, ROSATOM continued to implement the Programme to Promote R&D and Innovation.

1.12.8. Intellectual property management

In 2021 and 2022, more than 300 technical patent examinations were carried out with regard to IP notifications in order to assess whether the IP in question is protectable. Starting from 2023, patent examination is conducted in accordance with a new framework; it involves conducting a patent clearance search, assessing patentability, the state of the art and development trends. The main type of legal status assigned to IP is 'know-how'. More than 230 patent examinations were carried out in 2023 and more than 250 in 2024.

Protection of the industry's key products and technologies abroad remained the main priority of the intellectual property management system. The number of international applications filed and foreign patents received in 2024 totalled 279.

Number of items of intellectual property



Results in 2024:

- The Corporation updated internal regulations as part of its efforts to improve the methodological and regulatory framework for intellectual property management at all stages of its life cycle;
- The Intellectual Property School piloted in 2023 was included in the catalogue of key training courses of the Rosatom Corporate Academy;
- The testing of methodological guidelines for assessing the initial value of intellectual property rights of the Russian Federation for budget accounting purposes was successfully completed;
- A methodological approach to calculating licence fees for the granting of the right to use intellectual property the title to which is held by the Russian Federation was developed.

1.12.9. Long-term priorities in the sphere of scientific development

The Corporation makes an important contribution to addressing the national and global sustainability agenda and seeks to increase this contribution by expanding its operations and developing new businesses.

The Corporation's long-term priorities in the sphere of scientific development as part of the sustainability agenda include the following:

- Developing technologies, products and services for diagnosing and treating cancer and other diseases that pose a threat to human life, and services for maintaining human functionality, given the increased global life expectancy and ageing population;
- Developing solutions for the processing of food products and seeds, and developing food technology as part of the global fight against hunger and efforts to ensure food security and support the sustainable development of agriculture;
- Developing solutions for providing potable water supply and improving the efficiency of water use amid a rise in the risk of global water shortage and depletion of water resources;
- Supporting efficient comprehensive management of the urban environment, given the global trend towards urbanisation and the expansion of urban agglomerations;
- Ensuring the low-carbon quality of the Corporation's products and projects and continuously improving its climate performance as part of global climate action and efforts to support an efficient energy transition in the Russian Federation and partner countries.

As part of its IDP, ROSATOM is developing technologies that will help address all existing challenges.

The development of a two-component nuclear power industry will help use natural resources more efficiently and make the nuclear power industry safer and more efficient. The environmental problem of RAW accumulation will be addressed through the development of Generation IV nuclear technologies, including fast neutron reactors with a closed NFC and molten salt reactors suitable for the incineration of high-level waste (HLW).

Growing demand for distributed and flexible power generation will be met by a competitive offer in the small NPP segment. The development of SNPP designs based on RITM-200N and Shelf-M reactor units and the implementation of industry projects to build pilot NPPs until 2031 will help provide steady low-carbon power supply in remote and hard-to-reach areas in the Arctic and other northern regions to support the development of large mineral deposits and accomplish social objectives.

The Corporation is developing research and technology initiatives that have a potential for a breakthrough (superconductivity, nuclear fusion power, nuclear propulsion, etc.), new products and technologies (wind power, energy storage systems, electric vehicles and charging infrastructure, hydrogen technology, waste management, water treatment and purification technologies, technological solutions forming part of the Smart City) and is developing state-of-the-art technologies for a wide range of applications: CII, digital innovations, new materials, additive manufacturing technologies, laser technologies, healthcare (including nuclear medicine), mechanical engineering, robotics, etc.

The IDP involves continuous technological development of nuclear enterprises amid external trade, economic, technological and political restrictions.

1.12.10. Performance of the Research Division in 2024

Key results in 2024

- In 2024, the share of young researchers totalled 39%.
- In 2024, almost 1,900 people joined the team of the Research Division, of which 58% were young employees aged under 35.

The holding company of the Research Division (an incubated Division of ROSATOM) is responsible for scientific research in the nuclear industry. Its aim is to develop and commercialise the Division's technological competences, search for and structure technologies and subsequently sell them in the domestic and foreign markets.

The activities of the Research Division have been grouped into three units focused on specific disciplines: the Physics and Energy Unit, the Electrophysics Unit, and the Chemical Technology Unit. 12 companies within the Division are involved in R&D and innovation activities.

Given the Division's extensive research and technological capabilities in the field of nuclear medicine, in 2024, the Corporation's management made the decision to integrate competences in these areas into a single management hierarchy. Two research institutes and an industry integrator responsible for selling and promoting isotope products manufactured by the Corporation's enterprises were included in the Division.

1.12.11. Development of technologies supporting the technological sovereignty of the Russian Federation

ROSATOM's researchers built a bioreactor for growing blood vessel equivalents up to 10 cm long. A blood vessel grown in a bioreactor cell is 6 to 10 cm long and 3 to 5 mm in diameter and consists of three layers: the endothelium, smooth muscle and connective tissue; its mechanical and biological properties are identical to those of native blood vessels. Plans include further development of bioprinting technologies, which will make it possible to produce more complex organs, such as the thyroid gland, the kidney, the liver, etc.

Pilot samples of microsources for brachytherapy based on iridium-192 were produced. The new product will replace foreign analogues and will enable sparing cancer treatment using the Brachium gamma radiation therapy device.

The Corporation launched fully integrated production of customised implants with a special coating. The materials consist of a hard metallic frame with a ceramic coating; this is a promising technique for the reconstruction of damaged bone tissue. These implants will be in demand in traumatology, orthopaedics, and oral and maxillofacial surgery.

The sales footprint of isotope products for medical applications in Russia and abroad was expanded. New healthcare institutions in Kaliningrad, Tula and Moscow received the first batches of technetium-99m generators; starting from 2023, a drug produced using technetium-99m generators is supplied to clinics in the Republic of Belarus on a weekly basis. Technetium-99m generators produce isotopes used in diagnostic procedures for detecting cancer, heart conditions, neuroendocrine and other diseases. The Corporation assisted in resuming regular deliveries of 123I-mIBG, a vital radiopharmaceutical for children, to healthcare institutions in Moscow. This radiopharmaceutical is

used for the functional assessment of the sympathetic nervous system when diagnosing neuroblastoma (one of the most widespread and aggressive types of malignant tumours) in small children.

In 2024, the Corporation started to supply iodine-131 and molybdenum-99 to healthcare institutions on Cuba on a regular basis. As part of its projects, the Research Division conducted pre-clinical studies of a targeted radiopharmaceutical based on the thorium-227 isotope (with clinical studies scheduled to start in 2025). This radiopharmaceutical will be used to treat prostate cancer. A technology was developed for the production of the carbon-13 isotope through low-temperature distillation of carbon monoxide. Basic technical specifications were drafted for the launch of commercial production. The diagnostic product based on the carbon-13 isotope will be used to detect *Helicobacter pylori* bacteria.

As part of the project to build a radiopharmaceuticals plant compliant with GMP standards, work aimed at closing the thermal envelope was completed in 2024. It is expected that the plant's production lines will produce more than 10 advanced radiopharmaceuticals for cancer diagnostics and treatment and for the diagnostics of cardiovascular and other diseases.

A unique mobile laser system (MLS) developed by the Corporation was used for the first time to dismantle decommissioned high-rise steel structures (transfer cranes). Specialists used the laser system to cut up the supporting columns of two cranes that were up to 40 metres high and had a lifting capacity of up to 32 tonnes. The operations were complicated due to the fact that the structures to be dismantled were situated in close proximity to warehouse infrastructure. This equipment, which is unique in Russia, enables the remote cutting of steel structures up to 300 mm thick using laser beams from a distance of up to 200 metres. This innovative solution developed by the Corporation has made dismantling operations safer, more efficient and cost-effective.

Since 2024, a project is underway to launch the production of components for the MC-21 aircraft, which is the key project in Russia's aircraft industry. Pre-commissioning of equipment purchased for the project, namely five-axis CNC machining centres and a water jet cutter, was completed in the pilot production and mechanical assembly division, and tests were conducted to assess manufacturing precision. Maintenance personnel and operators completed a training course and successfully started to apply state-of-the-art technologies.

The Corporation's researchers developed a prototype of a selective laser sintering (SLS) machine equipped with a new cluster laser optical scanning system. This solution will make it possible to print large-sized parts from silicon carbide, which can replace heavier and less wear-resistant metallic alloys in multiple sectors of modern industry, from nuclear power to the automotive industry. Parts made from this material are harder than conventional steel or aluminium (slightly less hard than diamond), have a high structural strength and thermal conductivity, a low coefficient of thermal expansion and an excellent tribological performance. The use of the SLS technology makes it possible to produce parts with a complex design with a high degree of precision and reduce the lead time.

The Corporation developed a hydrometallurgical processing technology for the recycling of black mass from lithium-ion batteries; this makes it possible to close the life cycle of critical metals. The technology enables the production of battery-grade lithium carbonate, nickel and cobalt sulphate. In addition, graphite with a purity of up to 97% is produced during processing as a by-product; it is also a valuable material for the Russian market. This technology can be adapted in order to directly produce cathode precursors for lithium-ion batteries.

The Corporation's researchers built a modular test bench for the testing of a technology for the production of low-carbon hydrogen and hydrogen-containing mixtures using heat generated by a high-temperature gas-cooled reactor (HTGR). While building the test bench, Russian specialists developed unique equipment that will make it possible to study non-stationary processes, test catalysts and sorbents, and study heat exchange, gas dynamics and combustion processes.

The Corporation launched fully integrated production covering all stages, from the growing of crystals of A3V5 semiconductor compounds to the manufacture

of epi-ready wafers. The chemical and mechanical treatment of wafers is of special importance. Single-crystal calibration, the division of a crystal into wafers, mechanical and chemical/mechanical treatment of wafers make a significant impact on the quality of finished products (substrates) and, consequently, the yield of good devices. An institute managed by the Corporation controls all stages of the production cycle and guarantees wafer surface quality in terms of structure and geometry. Newly developed technologies include the growing of scintillation and semiconductor crystals for detecting gamma radiation, including for the use in nuclear medicine.

A technology for the production of high-purity phosphorus was developed to replace imported solutions; it is a domestically developed process chain involving phosphorus purification and the synthesis of phosphorus compounds. The solution will help address the current shortage of high-purity elements used in the production of special materials for the aerospace and computer industries.



Participation of the Research Division in international projects

New agreements on the provision of services and high-technology experiments at Russian research facilities were concluded with partners from South Korea, Germany, China, the Republic of Belarus and Brazil. Contracts for the supply of isotope products were signed with partners from India, the US, China, Hungary, the Netherlands, Cuba, the UK, Kazakhstan, the Czech Republic and Germany.

The main subjects of foreign contracts included reactor research and post-irradiation examination, the supply of high-purity substances and materials and radioisotope products, and the development of technologies.

The Corporation continues to develop solutions and services for overseas Nuclear Research and Technology Centres (NRTCs): in 2024, technical specifications were approved for an NRTC in Bangladesh, and the compilation of basic data was started for the research reactor and science laboratories that will form part of an NRTC in Vietnam.

Active cooperation was ongoing with the Republic of Belarus on the implementation of the Comprehensive Russian-Belarusian Programme for Cooperation on Nuclear Non-Energy and Non-Nuclear Projects. Specialised working groups were established with institutes of the National Academy of Sciences of Belarus; they started to examine opportunities for the implementation of programmes of the Union State focused on the development of new lines of medical equipment, radiopharmaceuticals, new types of power electronics and other areas of R&D cooperation. In the reporting year, a registration certificate was obtained in the Republic of Belarus for the Russian-made Brachium device; steps are being taken with regard to potential supplies of the device to the Republic of Belarus.

For details, see chapter 2 'Business Development Report'.

Talent development in the Research Division

In 2024, almost 1,900 people joined the team of the Research Division, of which 58% were young employees aged under 35. The most in-demand professions included researchers and research workers, materials scientists, chemical engineers, process engineers, designers, IT specialists, analysts, as well as cross-disciplinary specialists (such as medical physicists and data scientists) and highly skilled workers.

As a result of the Corporation's active efforts to train and recruit young science talents, young employees aged under 35 make up 27% of 11,500 employees of the Division; moreover, among research workers, the share of this age segment totals 39%. Budding specialists are often promoted to project leaders or heads of laboratories and standalone divisions within two to three years.

In the reporting year, 120 students from 22 Russian universities were selected for the Research Internship Programme in eight research organisations of ROSATOM in Moscow and the Moscow Region, Saint Petersburg, Obninsk and Zarechny (Sverdlovsk Region). In addition to immersing themselves in research projects with a practical focus, students are trained in the use of digital tools and develop specialised competences in prioritised areas relevant to the industry, including new materials, radiochemistry, nuclear fusion and plasma technologies.

Since its launch in 2020, 570 students have been enrolled on the Research Internship Programme; they were selected from among more than 4,000 applicants from various regions of Russia. Following graduation, more than 220 people became permanent employees in ROSATOM's organisations.

More than 150 employees act as research supervisors and mentors to interns and other young employees and help them to successfully defend their PhD theses. As a result of this practice, highly qualified personnel are getting younger: the average age of employees who defended their PhD theses in 2024 was 28 years, and the youngest Candidate of Sciences was 25 years old.

The effectiveness of the HR policy is reflected in the recognition of achievements of employees of the research unit at the highest level: in 2024, 28 employees were presented with government awards; 17 employees received awards from the President of the Russian Federation, and 303 employees were nominated for industry awards. In the reporting year, eight employees in the industry won government awards in the field of science, engineering and technology, including the most prestigious prize: the Russian Federation National Award for Science and Technology.

In order to reward the Corporation's employees for results achieved in the field of science, engineering, technology and innovation, ROSATOM has established an award for achievements in science and innovation for young researchers. Submissions for the award may be made by young researchers and teams from nuclear organisations. In 2024, five research teams and one young specialist were awarded RUB 1 million each for projects that help make the nuclear power industry more competitive, improve the properties of carbon fibre products and promote the development of quantum computers.

In the reporting year, the research unit held a record number of events for young people, including university and school students and even preschoolers. More than 100 of the Corporation's researchers participated as experts in 200 career guidance events across the country. Most of these specialists were young researchers aged under 35, including members of ROSATOM's Council of Young Scientists and the Division's Youth Council.



1.13. PERFORMANCE OF DIVISIONS

1.13.1. Mining Division

ROSATOM's Mining Division is one of the largest natural uranium producers in the world.

Key assets managed by the Division include the following:

- Uranium mining assets currently in operation in the Zabaykalsky Territory, the Republic of Buryatia and the Kurgan Region;
- Service companies;
- Existing and prospective enterprises.

In the Zabaykalsky Territory, uranium is produced from underground mines. In the Republic of Buryatia and the Kurgan Region, uranium is mined using in-situ leaching (ISL), which is the most cost-effective and environmentally safe technique. In addition to uranium mining, the Division implements projects focused on the mining of rare and rare-earth metals (RMs and REMs), the development of gold deposits, brown coal mining, the design of an integrated production facility at the Pavlovskoye lead and zinc deposit, etc.

Enterprises of the Division perform a full range of operations, from geological exploration, design and pilot operation to the decommissioning of production facilities and land rehabilitation.

The Division operates in ten Russian regions: the Murmansk, Arkhangelsk, Tomsk, Kurgan and Moscow Regions, the Zabaykalsky and Perm Territories, the Republic of Buryatia, the Sakha Republic (Yakutia) and the Chukotka Autonomous District.



Key results and events in the reporting year

- Uranium output from underground mine No. 8 in the Zabaykalsky Territory reached the 6-million-kilogram milestone;
- The construction of key industrial buildings and machinery at mine No. 6 in the Zabaykalsky Territory was completed;
- Coal production at the Urtuyskoye Open-Pit Mine Office in the Zabaykalsky Territory reached the 100-million-tonne milestone;
- A technology for the separation of rare-earth metals was developed for the future production facility in Solikamsk;
- Field geological exploration and desk analysis of data from the Kolmozerskoye lithium deposit were completed as part of the lithium project;
- The construction of key facilities at the Severnoye deposit was completed.

Contribution to ensuring safety, reliability and self-reliant technological development in Russia

Uranium operations

In 2024, uranium production in the Division totalled 2,738 tonnes, up by 1% year on year.

Zabaykalsky Territory:

- Uranium output from underground mine No. 8 reached the 6-million-kilogram milestone;
- The mining equipment fleet was upgraded, which will improve the efficiency and safety of natural uranium mining processes;
- New mining vehicles, namely three 60-tonne mine dump trucks and a front-end loader with a 4 m^3 bucket, were delivered to the Urtuyskoye Open-Pit Mine Office;
- The Government of the Russian Federation issued an order[1] to hold an auction for mining rights to the Shirondukuyskoye subsoil area of federal importance;
- The Smart Hard Hats digital solution was introduced at production sites to ensure industrial safety.

Republic of Buryatia:

- During the year, the enterprise became a leader in terms of uranium mining in Russia;
- A licence was obtained for geological surveys in the Namaru-1 open-pit mine;
- Statements of compliance were obtained for completed facilities at the Dybrynskoye (stage 1) and Kolichikanskoye (stage 2) deposits;
- The Government of the Russian Federation issued an order[2] to hold an auction for mining rights to a subsoil area of federal importance forming part of the Tetrakhskoye deposit.

Kurgan Region:

- The construction of facilities at the site of the Vostochnaya local sorption unit (LSU No. 2) was completed; railroad support facilities at the Khokhlovskoye deposit were put into operation;
- A permit was obtained for the commissioning of a pilot site (stage 1) at the Dobrovolnoye deposit;
- The first joint state geological and environmental expert review was carried out for a slurry pond at the Dalmatovskoye deposit (stage 1);
- A project focused on robotic automation of a finished product warehouse was developed and launched as part of the ISL Digital Twin.

1. Order No. 3634-r of the Government of the Russian Federation dated 9 December 2024.
2. Order No. 3474-r of the Government of the Russian Federation dated 28 November 2024.

Non-uranium operations

The development of production of rare and rare-earth metals (RMs and REMs) is of critical importance for high-technology industries in the Russian Federation.

The key priority for the development of the nuclear industry is to replace imports, develop technologies and establish integrated production operations based on its own mineral resource base. To achieve this, a road map titled 'Technology for New Materials and Substances' is being implemented, which includes RM and REM operations; it is aimed at completely ceasing imports by 2030.

RM and REM production is included in a federal project titled 'Development of the Rare and Rare-Earth Metals Industry', which forms part of the New Materials and Chemicals National Project. The project involves establishing integrated production chains covering all stages, from raw materials to finished products, meeting the needs of industry and achieving full independence from import supplies of strategic RMs and REMs by 2030.

Lithium. The production of battery-grade lithium carbonate and hydroxide at the Kolmozerskoye lithium deposit (Murmansk Region) will make it possible to provide raw materials for producers of lithium-based products, including enterprises of the Corporation. Geological exploration at the lithium deposit and desk analysis of data, as well as comprehensive engineering surveys for a route connecting the mining and processing plant and the village of Oktyabrsky were completed. Operating procedures were developed for the enrichment of ore from the Kolmozerskoye lithium deposit and the production of spodumene concentrate.

Rare-earth metals. The Division manages two enterprises producing RMs and REMs that form part of a single process chain. One of them mines ore and produces loparite concentrate, while the other extracts collective REM concentrate from it and produces titanium, as well as tantalum and niobium compounds. The Division plans to build its own separation facility in Solikamsk, which will enable it to produce separated lanthanum, cerium, neodymium and praseodymium compounds. The resulting products will help replace imported separated REM compounds and enhance Russia's technological sovereignty.

In the reporting year, a technology for the separation of rare-earth metals was developed for the future production facility in Solikamsk. The first pilot sample of equipment was produced for the new REM production facility.

Comprehensive upgrades of main process equipment were launched at a beneficiation plant and an underground mine in the Murmansk Region. Plans for 2025 include reserve evaluation at the south-western flank of the Karnasurt mine.

Titanium and zirconium. In the reporting period, the output of titanium and zirconium concentrate increased by 35% compared to 2023.

Scandium. As part of the Scandium project, main engineering studies were completed and an official transition was made to commercial production of scandium recovered from uranium solutions as a by-product in the Kurgan Region. 453 kg of scandium oxide with a purity of at least 99.9% was produced in 2024.

Gold. As part of the Gold Mining strategic programme, the construction of key facilities was completed at the Severnoye deposit. A feasibility study was approved for the Sovinoye deposit, which contains 86 tonnes of gold and 29 tonnes of silver. Prospecting is underway as part of the Dor and Ryveem projects; it has confirmed the prospects for the development of these deposits.

Plans for 2025

In 2025, the Division will continue to develop new uranium deposits. Plans include obtaining a licence to use a subsoil area of the Tetrakhskoye deposit in the Republic of Buryatia. The enterprise intends to start mining operations at the Namaruskoye deposit. LSU-2 is to be commissioned at the Khokhlovskoye deposit in the Kurgan Region.

Tunnelling operations will be started in shaft 20V at mine No. 6 (Zabaykalsky Territory). The enterprise plans to obtain a mining licence for a subsoil area forming part of the Shirondukuyskoye deposit and to start developing it.

The Division plans to implement measures to improve operations management in order to meet the targets for the production of loparite concentrate.

The Division plans to complete the design of the separation facility and submit the documents to Glavgosexpertiza of Russia.

As part of the lithium project, the Division plans to present the scoping study and register new reserves of the Kolmozerskoye deposit, and to start preparing design documentation.

As part of the Gold Mining strategic programme, the Division plans to obtain a positive opinion from Glavgosexpertiza for design documentation for stage 2 facilities at the Severnoye deposit and transition from pilot development to production (commissioning).

The Division will continue to improve the technology for scandium recovery from pregnant solutions and to expand the geographic footprint of scandium oxide sales.

For details, see 'Performance of the Mining Division in 2024'.

1.13.2. Fuel Division

The Fuel Division is one of the world's largest nuclear fuel producers and the only supplier of nuclear fuel for all Russian NPPs, marine and research reactors in Russia. The Division provides nuclear fuel for more than 70 power reactors in 15 countries worldwide, as well as research reactors in nine countries.

The Division is a fully integrated producer of nuclear fuel with operations covering all stages, from triuranium octoxide to finished fuel assemblies; it also sells nuclear fuel on the market. Fuel and its components produced by the Division are exported and supplied to all types of Russian-design reactors and Western-design light-water reactors (PWRs and BWRs). The company also supplies fuel components for foreign heavy-water reactors (PHWRs).

In addition, the Division has developed a proprietary fuel design for PWRs, TVS-Kvadrat.

The Fuel Division manages enterprises specialising in uranium conversion and enrichment, the production of gas centrifuges for the separation of uranium isotopes, the production of nuclear fuel components, and nuclear fuel fabrication. The company is a turnkey supplier of fuel and provides support for its use.

The Division works to improve the technical and economic characteristics of nuclear fuel, such as fuel burnup, uranium intensity, the service life and reliability, and develops new types of fuel.

Today, the Fuel Division not only produces nuclear fuel but also designs gas centrifuges, enriches uranium, carries out scientific research, produces 3D printers, energy storage systems and superconducting materials, isotope products, automotive catalysts and digital products, and decommissions facilities posing nuclear and radiation hazards.

The Division's production operations and R&D activities make an important contribution to ensuring safety, reliability and self-reliant technological development in Russia.



Key results and events in the reporting year

In 2024, ROSATOM's Fuel Division fulfilled all its contractual obligations to customers.

Nuclear fuel cycle

- Nuclear fuel was produced for the first time for a research reactor in Bolivia; this is the first-ever batch of Russian fuel supplied to a nuclear facility in South America;
- A batch of nuclear fuel for reactor start-up at power unit No. 2 of Akkuyu NPP in Turkey was produced and shipped as part of one of the Corporation's largest overseas projects;
- The final cycle of pilot operation of new-generation ATF nuclear fuel with enhanced safety performance was started at Rostov NPP. The final cycle of pilot operation of REMIX uranium/plutonium fuel will be started at Balakovo NPP before the end of 2025;
- The production of chrome-coated cladding for new-generation ATF fuel elements with enhanced safety performance was launched.

Contribution to ensuring safety, reliability and self-reliant technological development in Russia

Proryv Project

The Proryv (Breakthrough) Project, which is being implemented by ROSATOM in Russia, is one of the key innovative projects in the global nuclear power industry and federal project No. 1 included in the Comprehensive Programme 'Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024'.[1] The Pilot and Demonstration Energy Facility (PDEF), which is under construction in Seversk, includes a power unit equipped with the BREST-OD-300 reactor, a mixed uranium/plutonium nitride (MNUP) fuel production module and an SNF reprocessing module.

For the first time in the world, the closed nuclear fuel cycle with a fast neutron reactor will be implemented at a single site, which will provide the foundation for the Generation IV nuclear power industry. Researchers working in the Fuel Division and on the Proryv Project of ROSATOM have developed an innovative technology for the treatment and recovery of nuclear material from irradiated nuclear fuel. A new refining crystallisation technology will be applied at the irradiated MNUP fuel processing module.

In April 2024, the Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) issued a licence to ROSATOM for the operation of a nuclear installation forming part of the fabrication/refabrication module producing nuclear fuel for the BREST-OD-300 reactor. Under the licence, the Division may produce mock-ups of fuel assemblies containing depleted uranium.

25 December 2024 saw the start of pilot operation of a unique fuel production plant forming part of the Generation IV Pilot and Demonstration Energy Facility. Four process lines have been built at the FRM: carbothermal synthesis of mixed uranium/plutonium nitrides, the production of fuel pellets, the production of fuel elements and the assembly of complete fuel bundles.

The third and final tier of the reactor enclosure was installed at the construction site of the BREST-OD-300 reactor. The installation of turbine island equipment, namely a steam turbine condenser, was started.

Additive manufacturing

The Additive Manufacturing business of the Fuel Division covers all segments of the additive manufacturing market: the production of 3D printers and their components, powder materials, software development, and the establishment of additive manufacturing centres.

Key events in 2024 included the following:

- Batch production of 'medium-sized' RusMelt 310M 3D printers using the selective laser melting (SLM) technology was launched. The production volume met more than 30% of demand of the Russian industry for additive manufacturing equipment in 2024;
- Two new Shared Additive Manufacturing Centres (SAMCs) were opened at Belgorod State Agrarian University named after Vasily Gorin and at Tomsk Polytechnic University;
- For the first time, a component for a nuclear facility, namely a pump impeller for a uranium conversion site, was produced on a 3D printer;
- The production of titanium powders for 3D printing using the SLM technology was launched; this will meet the demand of the Russian market for materials of this kind.

1. Approved on 24 December 2020 by the Prime Minister of the Russian Federation Mikhail Mishustin.

Electric mobility and energy storage systems

ROSATOM is developing a wide range of domestically designed solutions for electric mobility, from the development of critical parts and components for electric vehicles and charging stations (integrated electric drives, the fast battery swapping technique, etc.) to the establishment of joint ventures producing individual types of electric vehicles and supplying low-carbon green electricity generated by nuclear and wind power plants. The industry integrator specialising in energy storage systems, which is managed by the Fuel Division, has successfully implemented dozens of projects focused on refitting equipment and vehicles powered by lithium-ion batteries:

- In November 2024, two EV charging hubs comprising 15 charging stations with a total capacity of more than 2 MW were put into operation in Kaliningrad. ROSATOM's Fuel Division acted as an investor in the project under a cooperation agreement with the government of the Kaliningrad Region on the development of electric transport in the region;
- An agreement was signed on the launch of a battery assembly plant at a site of the Avtotor automotive enterprise in Kaliningrad;
- An agreement was signed with the government of the Lipetsk Region on launching the production of a key component for EVs, namely electric traction drives consisting of an electric motor, a reduction drive and an inverter. Production facilities will be situated at the Gryazi site of the Lipetsk Special Economic Zone. They are scheduled to be commissioned in 2025. At the first stage, the project involves developing local production operations, to be followed by the manufacture of electric drives developed by ROSATOM's companies;
- An agreement was signed with the government of the Novosibirsk Region on the development of electric mobility in the region. The parties intend to cooperate in implementing the Concept for the Development of the Production and Use of Electric Vehicles in the Russian Federation until 2030 in the region. Plans include building fast charging hubs for electric vehicles in the region in 2024 and 2025 and developing a retail charging station network jointly with regional operators;
- A DC control power system started full-scale operation at the Krasnopolyanskaya HPP in Sochi. A lithium-ion battery produced by the Fuel Division will ensure reliable and uninterrupted operation of critical systems at the power plant;
- A set of traction batteries for mining equipment was supplied to the Republic of Belarus.

Hydrogen energy

In 2024, a pilot sample of equipment for hydrogen production (an electrolysis unit) with a capacity of 30 Nm^3/h developed and produced by the Corporation was delivered to the pilot hydrogen production site of the Eastern Hydrogen Cluster in Yuzhno-Sakhalinsk. The relevant technology and design solutions for the equipment have been developed as part of the industry-wide programme to develop hydrogen-based nuclear technologies.

Metals production

In 2024, the Division set a record in terms of production and sales of calcium injection wire, which is widely used in the iron and steel industry to improve steel quality. 6,000 tonnes of calcium injection wire were supplied to Russian iron and steel enterprises (up by 11% year on year). This is an all-time high since the launch of production of this product.

Special chemicals. Chemical production facilities of the Fuel Division produce high-purity metals and materials and complex chemical compounds used in various industries, healthcare, agriculture and science.

- An enterprise in the Division acquired a 50% stake in the capital of a major Russian manufacturer of exhaust catalytic converters and integrated exhaust systems (Tolyatti);

- An R&D centre specialising in electrolytes was established; the first batches of electrolytes were produced in-house to be sold to consumers;
- A second polycarbon monofluoride production unit was put into operation in the Tomsk Region;
- The first batch of mass-produced truck catalysts was shipped.

Plans for 2025

The Fuel Division's development prospects hinge on the development of core nuclear businesses and promising non-nuclear business areas:

- Upgrading the production capacities of nuclear fuel cycle enterprises;
- Starting to supply nuclear fuel to new power units in Russia and abroad;
- Launching a new mass-produced model of 3D printers, RusMelt 610M, on the market;
- Opening new SAMCs in new regions of the Russian Federation;
- Launching the first Russian gigafactory producing energy storage systems in the Kaliningrad Region;
- Launching the production of medical implants and instruments.

For details, see 'Performance of the Fuel Division in 2024'.

1.13.3. Mechanical Engineering Division

ROSATOM's Mechanical Engineering Division offers equipment for the nuclear and thermal power industries, shipbuilding, the oil and gas industry, and special steel production.

Full control over the production chain helps ensure high product quality. The Division is involved in NPP construction, equipment upgrades and maintenance; it also produces equipment for power generation facilities, with operations covering all stages, from special steel to finished products. It performs design and engineering work for both its own and third-party projects.

The Division is the chief designer and single-source supplier of all marine reactor units for multipurpose nuclear icebreakers with RITM-200 reactor units, which are rightly considered state-of-the-art icebreakers.

The Mechanical Engineering Division manufactures high-performance equipment for the Russian oil and gas industry. Its enterprises have a proven track record in the design and manufacture of equipment for the thermal power industry: the company has supplied products to 40% of CHPPs in Russia and the CIS.



Key results and events in the reporting year

In 2024, the Mechanical Engineering Division continued to participate in projects to build nine large NPPs comprising a total of 24 power units. The Division completed the delivery of main reactor unit equipment for five power units, supplied equipment to enable the achievement of first criticality at two power units, and supplied all equipment for the reactor units and turbine halls of four power units. The Division also produced blanks for nuclear steam generator equipment for five power units.

The Division's enterprises produced and supplied key reactor equipment and turbine hall equipment for ROSATOM's NPP construction projects, including the following:

Kursk NPP-2, Russian Federation	Power unit No. 1. Equipment was supplied for cold and hot trials and the first criticality stage. Trials of a new unique pump, RCP-1753, were started.
Akkuyu NPP, Republic of Türkiye	Power unit No. 1. The first locally produced low-speed turbine was placed on the barring gear. This is one of the key pre-commissioning operations, demonstrating the high level of technical availability of the turbine unit and its auxiliary systems. Power unit No. 2. The delivery of the main equipment for the reactor unit was completed. Trials of a new unique pump, RCP-1753, were started.
El Dabaa NPP, Egypt	Power units No. 1–4. Flow-line production of nuclear steam generator equipment was launched for all four power units with an interval of six months. The production of blanks for an experimental main steam valve unit was launched in advance. Deliveries of turbine hall equipment were started; orders were placed, and the production of heat exchangers was launched.

Kudankulam NPP, India	Power unit No. 3. Turbine hall equipment was delivered. Power unit No. 5. The main equipment for the reactor unit was delivered. Power unit No. 6. The reactor vessel was shipped to the port of Novorossiysk.
Rooppur NPP, Bangladesh	Power unit No. 1. Preparations were made for the first criticality stage. Power units No. 1 and 2. Turbine hall equipment was delivered.
Tianwan NPP, China	Power unit No. 7. Equipment was delivered. Power unit No. 8. The main equipment for the reactor unit was delivered.
Xudapu NPP, China	Power unit No. 3. The delivery of equipment was completed. Power unit No. 4. The delivery of the main equipment for the reactor unit was completed.
Paks II NPP, Hungary	Power unit No. 5. The production of blanks for the reactor vessel was started eight months ahead of schedule.

In 2024, the Division produced and shipped metal-intensive equipment for gas processing projects, with some items of equipment weighing up to 341 tonnes. The Division successfully implemented key initiatives to develop new domestically designed solutions and produce equipment for gas processing. As part of the development of new products, the Division concluded a contract for oil unloading equipment. The Division has supplied equipment to 40% of CHPPs in Russia and the CIS.

The Division continues to implement a project focused on local production of main equipment for waste-to-energy plants based on a reference technology and compliant with strict requirements for environmental performance. A test run of the first of the four waste-to-energy plants under construction in the Moscow Region was carried out successfully. The plant will help avoid waste burial and will produce energy to provide electricity supply to local residents.

The Division is the chief designer and single-source supplier of all marine reactor units, including for multipurpose nuclear icebreakers with RITM-200 reactor units. Key equipment was supplied for two nuclear icebreakers. First criticality was achieved and the power start-up of the reactor unit of the third icebreaker was performed.

In 2024, the Mechanical Engineering Division achieved impressive results in the production of special steel for the nuclear industry. Key projects of the year included the production of the first batch of steel for the reactor vessel of power unit No. 4 of El Dabaa NPP in Egypt and the start of production of the reactor vessel for Paks NPP in Hungary.

Contribution to ensuring safety, reliability and self-reliant technological development in Russia

The Mechanical Engineering Division contributes to national power machine engineering capabilities by producing and supplying equipment for power generation facilities, and has a complete process chain comprising all stages, from the production of special steel and metal blanks to the manufacture of end-user equipment; this includes:

- Developing new nuclear reactor technologies to enhance the safety and efficiency of the use of nuclear energy;
- Providing solutions enabling stable supply of clean electricity in remote and hard-to-reach areas;
- Developing and introducing new materials for steel production which help reduce metal intensity and, consequently, reduce energy costs and resource consumption in the course of production of mechanical engineering equipment;
- Being a leader in R&D aimed at developing new mechanical engineering solutions;
- Producing blanks and finished steel products from plain carbon steel and special stainless steel for the nuclear power industry, the oil, gas and petrochemical sector, general mechanical engineering, the thermal power industry and the metals industry;
- Participating in government programmes aimed at developing Russian technologies for the oil and gas industry;
- Developing innovative solutions and integrated systems for wastewater treatment, including as part of efforts to provide local residents with clean water.

Plans for 2025

- Increasing revenue, including revenue from the sales of new products;
- Carrying out existing contracts and developing cooperation with foreign companies and industrial partners;
- Securing the foothold in target markets;
- Expanding the range of equipment supplied by the Division;
- Supplying key equipment;
- Upgrading and expanding production capacities.

For details, see ‘Performance of the Mechanical Engineering Division in 2024’.

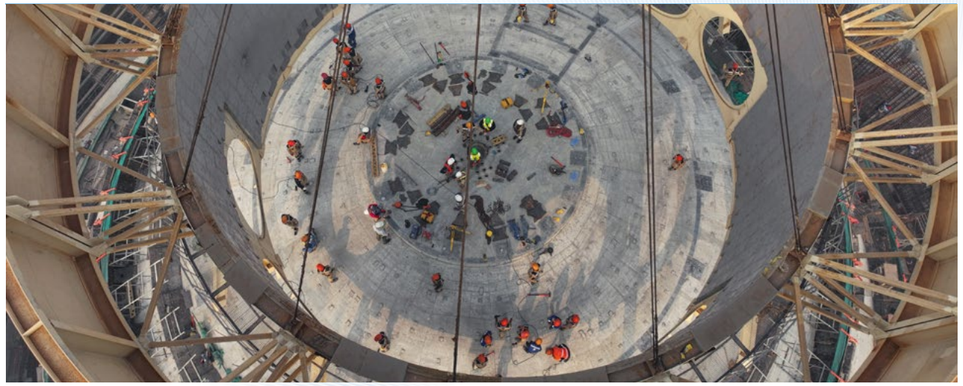
1.13.4. Engineering Division

ROSATOM’s Engineering Division provides project management and NPP design and construction services, and supplies equipment. The Division’s mission is to shape the future of the global nuclear power industry building on extensive experience in implementing complex engineering projects, taking into account economic and environmental feasibility, and promoting social interests of society and governments.

The Division’s vision is to provide the world with a reliable and affordable source of electricity while reducing man-made impacts on the environment.

The strategic goals of the Engineering Division are aligned with the Corporation’s strategic development priorities defined in ROSATOM’s Business Strategy until 2030. By seeking to achieve the following goals, the Division makes an important contribution to the development of the nuclear industry:

- High-quality and timely execution of contracts for NPP construction projects;
- Optimisation of the duration and cost of NPP construction;
- Development of advanced technologies.



Key results and events in the reporting year

January

Concreting of the nuclear island was started at power unit No. 4 of El Dabaa NPP in Egypt.

May

The world's first export contract for the construction of a small NPP (SNPP) in Uzbekistan was signed; the NPP will comprise six 55 MW reactors based on the RITM-200N reactor unit.

July

The first two power units of Kudankulam NPP supplied 100 billion kWh of electricity to the power system of the Republic of India.

A contract was signed for the development of design documentation for the construction of power unit No. 5 of Beloyarsk NPP equipped with the BN-1200M fast neutron reactor.

August

The first item of large-sized equipment (the core catcher) was delivered to the construction site of Paks II NPP in Hungary.

September

The Industry Centre for SNPP Design was established. The Division's Joint Design Institute was designated as the main organisation and the general design contractor for SNPPs.

A protocol was signed on the start of work on the SNPP project in the Republic of Uzbekistan.

November

A positive opinion was obtained for design documentation and the results of engineering surveys for construction and installation facilities at Smolensk NPP-2.

December

A general contract was concluded for the construction of power units No. 1 and 2 of the SNPP in the Sakha Republic (Yakutia) based on the RITM-200N reactor unit with a total capacity of at least 110 MW; a contract was signed for the development of design documentation for the construction of the SNPP.

A contract was signed for the construction of power unit No. 5 of Beloyarsk NPP based on the BN-1200M reactor unit.

Contribution to ensuring safety, reliability and self-reliant technological development in Russia

In 2024, the Division continued to take steps to ensure technological independence and the safe and reliable operation of the nuclear industry. Progress was made both in traditional business areas and on new projects.

NPP construction makes it possible to provide uninterrupted supply of clean energy for 20 to 50 million people, create tens of thousands of new jobs for local residents and reduce emissions by 9 to 16 million tonnes of CO_2e. NPP construction helps promote regional development, as new cultural and educational projects are launched and healthcare institutions are established in the host regions, and people, industrial enterprises and commercial organisations relocate to new towns and cities.

NPPs with VVER reactors

NPPs in the Engineering Division's portfolio are equipped with safe state-of-the-art Generation III+ VVER reactors. The design meets all current safety requirements: it incorporates both active and passive safety systems, which helps maximise the resilience of NPPs to external and internal impacts.

The Generation III+ VVER-1200 water-cooled water-moderated power reactor was first featured in the NPP-2006 design; it builds on the serialised V-320 design. VVER-1200 reactors have demonstrated their efficiency and reliability during the operation of reference power units in Russia and abroad. The design meets all post-Fukushima safety requirements. This is a cutting-edge technology for which references have already been obtained and which is applied successfully.

The VVER-TOI (standardised, optimised and digitised) design has been developed by Russian specialists based on technical solutions for the NPP design with a V-510 reactor. The advantages of this design include increased capacity and improved technical and economic performance, as well as passive and active safety systems designed to prevent the destruction of the reactor core for at least 72 hours under any accident scenario.

Closed nuclear fuel cycle. Proryv Project

The Division is the general design contractor for all stages of development of the Generation IV Pilot and Demonstration Energy Facility for the testing of the closed NFC technology; it is also working on three NPP designs with fast neutron reactors: BN-1200M, BREST-OD-300 and BR-1200.

Small NPPs (SNPPs)

The SNPP design is based on the RITM-200N water-cooled water-moderated nuclear reactor, which is a state-of-the-art solution developed in Russia by adapting an innovative technology for small marine reactors (RITM-200) for onshore use. The development of a safe modern SNPP will help provide power supply in remote regions and accelerate their social and economic development. Advantages of SNPPs include their small size, modular design, manoeuvrability, resilience to external impacts, safety and long operating time without overload.

Development of the spectral shift control technology and the medium-power NPP design

The Division is designing a two-unit medium-power NPP with a VVER-S-600 spectral shift control reactor. The NPP being designed by the Division will have the following distinguishing characteristics: VVER reactors being part of a closed fuel cycle, highly efficient use of uranium fuel and the possibility of using MOX fuel, daily load-following operation without the use of boric acid, the possibility of in-vessel retention of corium, and the potential for replication of design solutions for large NPPs.

GRI 203-2 This unique product will enable the Division to expand the list of countries that are prospective NPP customers and enter new NPP markets; it will also significantly boost consumer interest from energy companies whose power generation sources require replacement (such as coal-fired power plants).

In addition, medium-power Russian-design NPPs will fill a vacant niche in the sphere of nuclear power generation (~600 MW) and will make it possible to build NPPs in power systems with limited capacity, where the construction of large NPPs could cause a disruption in the power system.

Digitisation

In 2024, the Division's priorities the sphere of digitisation included developing and introducing digital solutions, improving the efficiency of NPP construction project management, and import substitution in the sphere of information technology.

The main goals and focus areas of digitisation and digital transformation in the Division include carrying out EPC contracts in terms of digital technologies and internal digitisation of the Division's production and supporting processes. Another important task is to develop digital culture and up-to-date competences and technologies.

In order to manage processes as part of NPP construction projects, the Division has developed a proprietary technology, MULTI-D, which has formed a basis for a line of digital products. During the reporting year, the Division was actively developing new functionality of MULTI-D digital products to meet the needs of NPP construction project offices and customer requirements. In 2024, another four digital products of the Engineering Division were included in the register of Russian software maintained by the Russian Ministry of Digital Development, Communications and Mass Media. A total of 28 products of the Division are on the register, including six products forming part of the MULTI-D line.

In order to meet its contractual obligations in terms of digital technologies, the Division actively engaged with the owners of the El Dabaa, Paks II and Kudankulam NPP construction projects.

Work is ongoing to digitise internal processes and reduce the lead time. In 2024, a project was launched to introduce a single industry-wide traceability system for warehouse management as part of NPP construction projects.

The Division continued to implement projects aimed at enhancing technological independence and improving the safety and reliability of its operations at NPP construction sites; this included replacing an imported network scheduling system, and developing and introducing the Construction Supervision module in order to improve quality and enhance control during the acceptance of construction and installation work.

Digital import substitution

To ensure the technological independence of the Engineering Division, in 2024, a secure video conferencing system was introduced in the industry. Active steps are being taken to replace server and network software, which will help reduce reliance on imported technologies.

In 2024, import substitution projects were ongoing with a focus on engineering information management systems and 2D and 3D computer-aided design systems. Domestically developed solutions with the required maturity level are scheduled to be put into operation in late 2027.

The Engineering Division has made considerable progress in digitisation and import substitution and has ensured a high level of technological independence and safety of NPP construction projects.

Technology Transfer and Technical Policy Centre

The Centre is implementing an industry-wide programme to streamline business processes related to NPP construction, initiatives forming part of the Assembly-Line Construction and Improving Labour Productivity focus area of the industry-wide programme to streamline business processes related to NPP construction, and the Division's programme to make large NPPs more competitive.

In 2024, the Centre completed important stages of the following innovative projects:

1. Expanding the application of and obtaining certification for flux-cored welding wire for nuclear facilities, and adjusting the current regulatory framework for the use of new welding materials;
2. Use of pipe-bending CNC machines for the implementation of a seamless technique for the design and production of mounting units for pipelines using pipe-bending equipment;
3. Comprehensive development of a high-speed concreting and reinforcement technique;
4. Experimental validation and regulatory and methodological support for the application of steel-concrete composite structures with external sheet reinforcement in NPP construction;
5. A feasibility study and a cost-benefit analysis of the use of OPEN TOP technology were carried out, and recommendations were produced for its successful application to reduce the lead time for the construction of NPP reactor units. The outcomes of this work will be used by general contractors, design and installation organisations in the industry;
6. Employees were provided with training in the use of high-performance technologies and tools at NPP construction sites, including the construction site of Paks II NPP (Hungary).

For details, see 'Performance of the Engineering Division in 2024'.

1.13.5. Power Engineering Division

The Power Engineering Division of ROSATOM is the only NPP operator in Russia and a major player on the Russian electricity market. The Division ranks first among power generation companies in terms of the share in the total electricity output in Russia.

The Division includes a holding company (the central office, branches and a standalone division), 11 NPPs, the Yakutia Small Nuclear Power Plant branch and 22 subsidiaries. The Division is a member of more than 20 industry and third-party non-profit organisations (associations).

The Division's main business areas include power and heat generation and capacity supply by NPPs and the operation of nuclear facilities (nuclear power plants), radiation sources, and storage facilities for nuclear materials and radioactive substances, in accordance with Russian legislation.

New and international businesses are also a significant area of the Division's operations, including a wide range of services for both nuclear and non-nuclear markets in the Russian Federation and abroad.

Key results and events in the reporting year

- Nuclear power generation totalled 215.523 billion kWh (100.7% of the target set by the Federal Antimonopoly Service of Russia);
- The capacity factor stood at 85.61%;
- The share of power generation by NPPs operating in the Unified Power System (UPS) of Russia totalled 18.5%;
- Repairs were carried out in full and to the required standard;
- Performance against the targets of the investment programme stood at 102%;
- The Division achieved the strategic goal of preventing work-related fatalities at NPPs; there were also no serious injuries among NPP personnel and contractors;
- A licence was obtained for the operation of power unit No. 2 of Kursk NPP, which was shut down for decommissioning, until 2034; power unit No. 2 was shut down in preparation for decommissioning on 31 January 2024;
- A radioactive waste processing facility was put into operation at Kursk NPP;
- A technological solution for the management of substandard spent fuel assemblies from the RBMK reactor unit was adopted at power unit No. 1 of Leningrad NPP;
- Changes were made to the terms of licences for the pilot operation of power unit No. 2 of Novovoronezh NPP-2 and power unit No. 1 of Leningrad NPP-2 with an 18-month fuel cycle; the first batches of fuel were loaded as part of the transition;
- All key milestones for Kursk NPP-2 and Leningrad NPP-2 construction programmes were reached;
- The share of new and international businesses in the Division's consolidated revenue exceeded 40%.

Contribution to ensuring safety, reliability and self-reliant technological development in Russia

The Division's innovation activities are aimed at accomplishing the objectives of the New Nuclear and Energy Technologies National Project, which is aimed at achieving technological leadership, in order to achieve the goal set by the government: to strengthen the innovative potential of Russian nuclear technologies and expand the scope of their application.

The main innovation management tool is the Innovative Development and Technological Modernisation Programme of ROSATOM until 2030 (in the civilian sector).

The Power Engineering Division is an acknowledged leader in terms of the output of innovative products in the industry; in 2024, it generated revenue from the sales of innovative products and services exceeding RUB 376 billion, which is RUB 32 billion more than in 2023. The Division focuses on innovative development driven by the introduction and use of technologies and competences developed at the request of the Division at NPP power units, and the implementation of research, development and technology (R&D) projects. All key R&D projects scheduled for 2024 were implemented in full.

Changes in R&D financing, RUB million





Practical development of new nuclear power generation technologies formed part of a federal project titled 'New Nuclear Power Industry, Including Small Nuclear Reactors for Remote Areas' included in the DTTS Comprehensive Programme.

New products and businesses

All new businesses of the Division, including engineering and energy services, support the achievement of technological sovereignty and structural adaptation of the Russian economy. The following results were achieved in new business areas in 2024:

- The Centre of High Medical Technology of the Vishnevsky National Medical Research Centre of Surgery and the first stage of the Innopolis data centre were commissioned;
- The Division's share in the global market for cobalt-60 for sterilisation reached 30%;
- The range of medical isotopes was expanded; pilot batches of samarium-153 and lutetium-177 were produced;
- Leningrad, Kalinin and Balakovo NPPs underwent the qualification procedure for issuing 'nuclear' certificates; the first 'nuclear' certificates were issued and redeemed;
- Work was started on a project to re-extend the service life of power unit No. 2 of the Armenian NPP;
- Nine scheduled preventive maintenance projects were implemented at Russian-design overseas NPPs;
- The first long-term contract was signed for scientific and technical support for the operation of the Belarusian NPP;
- 156 charging stations were put into operation, including 90 stations in Moscow (accounting for 60% of the local market for fast charging infrastructure).

Plans for 2025

- Carrying out 34 repairs at NPP power units with a total scheduled duration of 1,597 days (target). Optimising scheduled repairs at NPP power units and work related to managing the service-life performance of reactor units and in-core monitoring of graphite stacks at power units with RBMK-1000 reactors in order to ensure that the government target is met;
- Achieving first criticality, performing the power start-up and starting the pilot operation of power unit No. 1 of Kursk NPP-2 with a VVER-TOI reactor unit;
- Obtaining licences for the extended service life of power unit No. 3 of Beloyarsk NPP;
- Construction and installation operations aimed at replacing steel cable structures in the turbine hall of power unit No. 2 of Kalinin NPP;
- Supplying hardware forming part of the hardware and software system for the monitoring and control system of the second safety train at power unit No. 2 of Kalinin NPP;
- Carrying out the government contract for the processing of radioactive waste (in federal ownership) accumulated at NPPs in full.

For details, see 'Performance of the Power Engineering Division in 2024'.

1.14. RESOURCE MANAGEMENT

1.14.1. Corporate governance

Corporate governance system

The corporate governance system in the nuclear industry is currently underpinned by the following key principles:

- Standardisation of governance in the organisations in the Russian nuclear power and nuclear weapons sectors, organisations of various legal forms specialising in nuclear and radiation safety, nuclear science and technology and personnel training, with due regard to the special characteristics of each enterprise and organisation;
- Removing non-operating and inactive companies from the nuclear industry and eliminating redundant corporate ownership levels;
- Avoiding excessive expansion of the area of competence of corporate governance bodies of nuclear organisations and transferring a number of 'optional' issues to the level of cooperation between them based on regulatory documents adopted in the industry with regard to various groups of business processes;
- A division-based management model within the civilian part of the nuclear industry, which involves creating core business divisions of ROSATOM (e.g. the Mining, Fuel, Mechanical Engineering, Power Engineering and Engineering Divisions), as well as a number of incubated divisions and functional industry organisations whose holding companies own/manage various organisations in the nuclear industry, depending on their areas of business.

GRI 2-9

Governing bodies

Supervisory Board

In accordance with Article 23 of Federal Law No. 317-FZ, the Supervisory Board is ROSATOM's highest governing body. The Supervisory Board comprises nine members, including eight representatives of the President of the Russian Federation and the Government of the Russian Federation, as well as ROSATOM's Director General, who is a member of the Supervisory Board by virtue of his position. There are no independent members of the Supervisory Board.

GRI 2-10 The Supervisory Board members and the Chairman of the Supervisory Board selected from among them are appointed by the President of the Russian Federation.

GRI 2-11 The Supervisory Board members, except for ROSATOM's Director General, are not executives of ROSATOM. ROSATOM's Director General may not simultaneously chair the Supervisory Board.

There are no collective advisory bodies (committees) under the Supervisory Board.

In 2024, there were no changes in the composition of the Supervisory Board.

Out of the nine members of the Supervisory Board, one is female (accounting for 11% of the total number of Supervisory Board members). MED 44

No remuneration is paid to Supervisory Board members. GRI 2-19

In 2024, the Supervisory Board held 14 meetings, including one in-person meeting, and considered 51 issues. The attendance rate at the meetings stood at 94%. MED 36

GRI 2-12 The Supervisory Board approves ROSATOM's business strategy and the long-term operational programme.

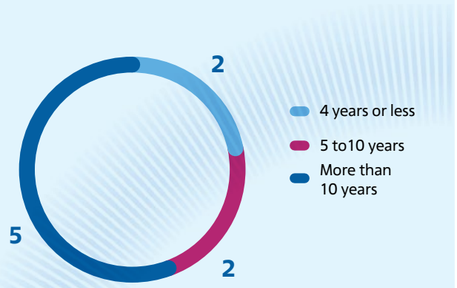
GRI 2-16 In 2024, the Supervisory Board approved the following:

- The report on progress against key performance targets of ROSATOM in 2023 (minutes No. 193 dated 22 April 2024);
- Key performance targets of federal nuclear organisations for 2024 (minutes No. 193 dated 22 April 2024);
- ROSATOM's annual report for 2023 (minutes No. 195 dated 25 June 2024).

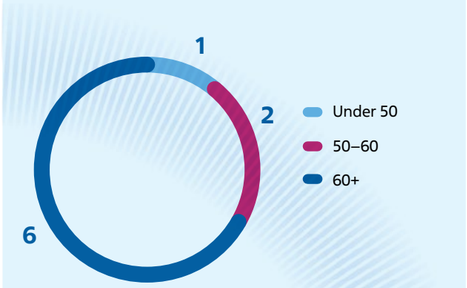
In accordance with Article 25 of Federal Law No. 317-FZ, compliance with instructions from the Supervisory Board and its Chairman is monitored by the Director General of ROSATOM.

Tenure of the members of the Supervisory Board (as at 31 December 2024), persons

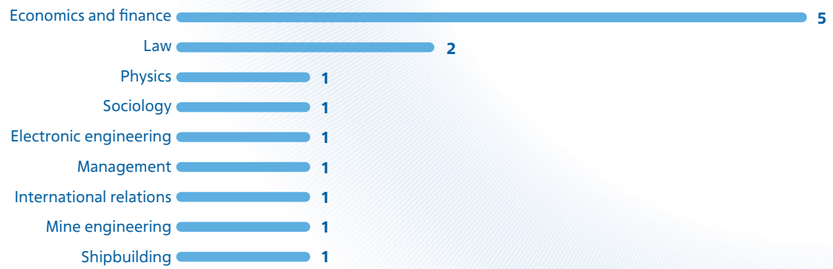
MED 37



Age of the members of the Supervisory Board (as at 31 December 2024), persons



Educational profile of the members of the Supervisory Board[1]



1. The data reflect the fact that some members of the Supervisory Board hold more than one degree.

Director General of ROSATOM

The powers of ROSATOM's Director General are stipulated in Federal Law No. 317-FZ. ROSATOM's Director General is the Corporation's sole executive body and manages its day-to-day operations.

Alexey Likhachev is ROSATOM's Director General (appointed by Decree No. 527 of the President of Russia dated 5 October 2016).

GRI 2-19 The remuneration of the Corporation's Director General is determined based on an evaluation of performance against KPI targets that apply to all employees of the Corporation.

For details, see section 3.1.3. 'Remuneration System'.

ROSATOM's Management Board

The Corporation's Management Board is ROSATOM's collective executive body. The Corporation's Management Board includes ROSATOM's Director General, who is a member of the Board by virtue of his position, and other members of the Board. The work of ROSATOM's Management Board is managed by ROSATOM's Director General (paragraph 1 of Article 28 of Federal Law No. 317-FZ).

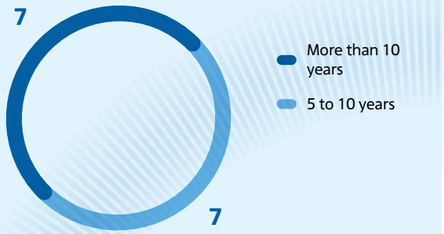
GRI 2-12 ROSATOM's Management Board exercises the following powers:

- Submitting proposals concerning the Corporation's key performance indicators for the next year to the Supervisory Board for approval;
- Defining the position of the shareholder (the Corporation) on matters related to the operations of joint-stock companies whose shares are owned by the Corporation, except for matters that fall within the competence of the Supervisory Board;
- Defining, under the procedure established by the Government of the Russian Federation, the position of the shareholder, namely the Russian Federation, on behalf of which the Corporation exercises shareholder powers, on matters on the agenda of the general meetings of shareholders of joint-stock companies in the nuclear power industry whose shares are under federal ownership, except as stipulated by laws and regulations of the Russian Federation;
- Drafting ROSATOM's business strategy, ROSATOM's long-term operational programme and ROSATOM's financial plan, including defining the amount of expenditure and focus areas for allocations from ROSATOM's special reserve funds;
- Formulating proposals for the allocation of ROSATOM's earnings;
- Formulating proposals for the establishment of branches, the opening of representative offices and for the establishment of ROSATOM's entities;
- Approving the list of projects to be financed using ROSATOM's special reserve funds;
- Approving the procedure for contributing to ROSATOM's revenue a portion of earnings of enterprises under ROSATOM's jurisdiction that remains available after the payment of taxes, fees and other mandatory payments;
- Approving ROSATOM's annual report before it is submitted to the Supervisory Board;
- Approving the annual financial statements of ROSATOM's entities;
- Submitting proposals concerning the issuance (additional issuance) of bonds to the Supervisory Board;
- Exercising other powers conferred on ROSATOM's Management Boards by the Supervisory Board.

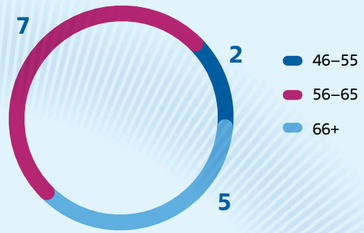
GRI 2-19 Members of the Management Board receive no remuneration for serving on ROSATOM's Management Board.

In 2024, there were no changes in the composition of ROSATOM's Management Board. The Management Board comprises 14 members; all of them are men.

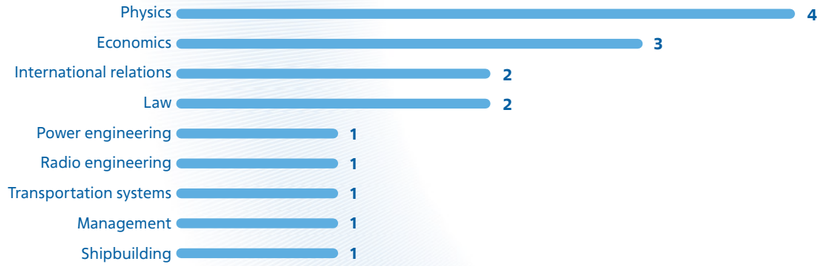
Tenure of the members of ROSATOM's Management Board (as at 31 December 2024), persons



Age of the members of ROSATOM's Management Board (as at 31 December 2024), persons



Educational profile of the members of ROSATOM's Management Board[1]



Criteria for appointment to ROSATOM's Management Board

In accordance with Article 28 of Federal Law No. 317-FZ, members of ROSATOM's Management Board are appointed and dismissed under the resolution of ROSATOM's Supervisory Board on the recommendation of ROSATOM's Director General. Members of ROSATOM's Management Board are permanent employees of the Corporation or employees of ROSATOM's organisations, joint-stock companies and their subsidiaries, as well as enterprises under ROSATOM's jurisdiction.

1. The data reflect the fact that some members of the Management Board hold more than one degree.

Meetings of ROSATOM's Management Board in 2024

In 2024, ROSATOM's Management Board held 45 meetings (all by absentee voting). A total of 369 issues were considered. Key issues reviewed by ROSATOM's Management Board in 2024 included the following:

- The Corporation's progress against key performance targets in 2023;
- Approval of the Corporation's key performance targets for the period from 2024 through 2026;
- Changes in the Corporation's long-term operational programme;
- Approval of the Corporation's updated business strategy until 2030;
- Approval of the Corporation's Innovative Development and Technological Modernisation Programme until 2036 with an outlook until 2045 (for the civilian segment).

Mechanisms for implementing the resolutions of ROSATOM's Management Board

Following a meeting of ROSATOM's Management Board, resolutions adopted at the meeting are recorded in the minutes. If the minutes contain instructions, after the minutes are entered in the Integrated Industry-Wide Electronic Document Management System (IIEDMS), the instructions are sent to responsible persons and are subject to follow-up monitoring.

The manager responsible for carrying out the relevant instructions gives assignments to the relevant divisions or specialists, which are also recorded in the IIEDMS. An assignment completion report is entered into the system, and an internal memo to the Director General is written (or a personal report is presented), if required. Compliance with instructions from the Management Board is monitored by the Office of the Director General.

Improvement of the corporate governance system

The Corporation continued to adopt regulations governing cooperation between ROSATOM and the holding companies of its Divisions, business incubators and industry complexes. The industry-wide mechanism for the conclusion of corporate integration and cooperation deals by ROSATOM and its organisations was improved.

GRI 2-6

Key changes in the corporate structure

1. The holding company of the Critical Information Infrastructure Division (an incubated division) was established.
2. Shares/interests in certain Russian and foreign companies were acquired, and a number of joint ventures were established in order to:
   - Develop new businesses and critical information infrastructure (including launching the production of printed circuit boards; replacing imported industrial software for a 'heavy' PLM system; establishing an industry mobile virtual network operator; trading in chemicals; establishing a Shared Additive Manufacturing Centre (SAMC); launching integrated production of exhaust gas processing systems; developing the robotics business; developing the manufacture of glass fibre-based finished products, etc.);
   - Ensuring guaranteed delivery of seaborne cargo when supplying products to foreign counterparties, and launching a year-round container line connecting Russian ports and the ports of certain foreign countries;

- Developing capabilities for building physical protection systems for Russian-design nuclear facilities built abroad;
- Ensuring that drilling operations are performed within the scope required to achieve the targets set in production programmes; etc.

3. Shares/interests in a number of companies were sold, and the companies were excluded from the scope of ROSATOM.

Non-arm's length transactions

In accordance with paragraph 4 of Article 29.1 of Federal Law No. 317-FZ, the Supervisory Board approves non-arm's length transactions. In 2024, the Supervisory Board approved 13 non-arm's length transactions.

1.14.2. Risk management

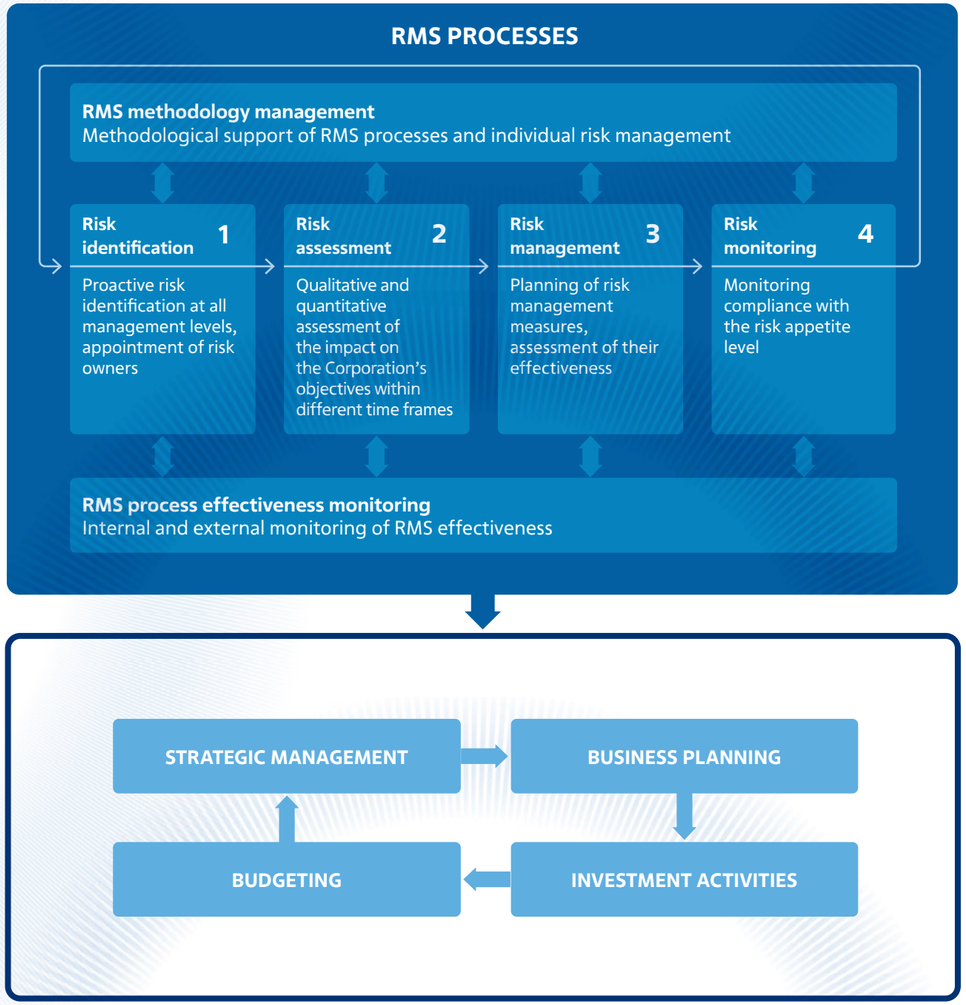
Risk management system

The industry-wide risk management system (RMS) is integrated into the Corporation's planning and management processes. The RMS is based on a continuous cyclical process of identifying, assessing and managing the risks that can affect ROSATOM's short- and long-term performance and the implementation of its strategy.

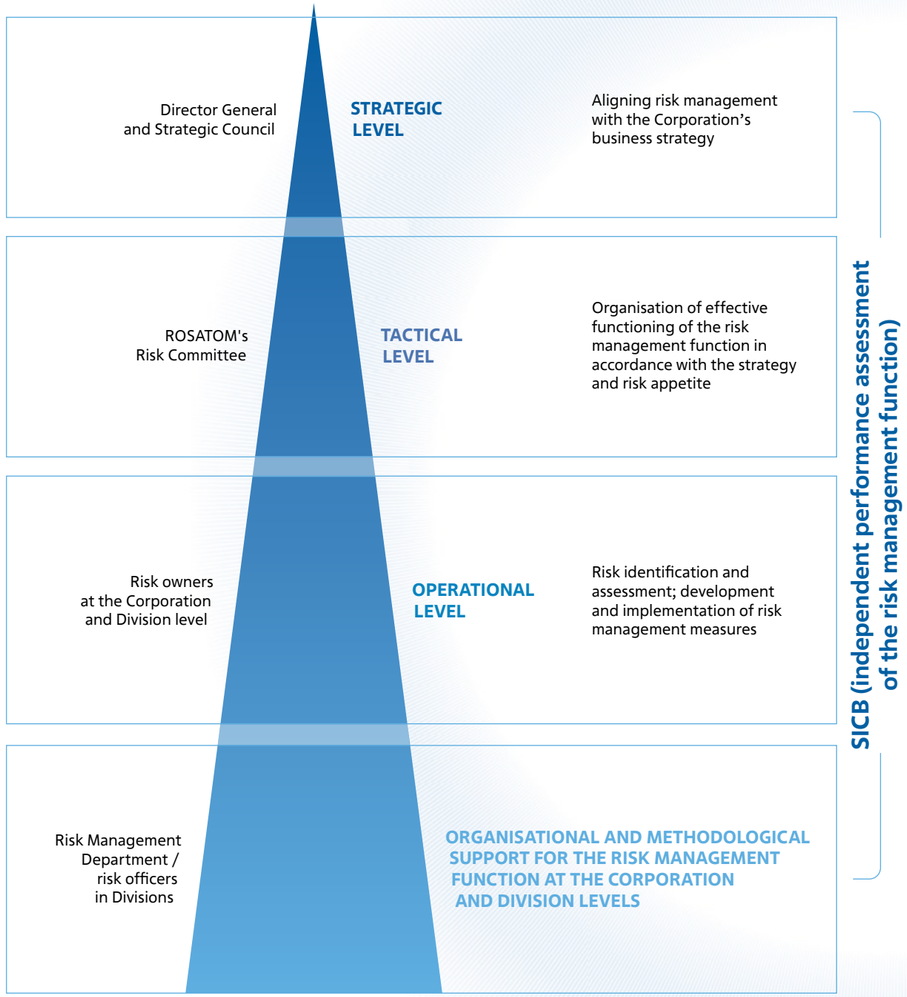
In 2024:

- The Industry-Wide Risk Management System (IRMS), an information system developed as part of project B-RM1-1 to build an Industry-Wide Risk Management System in ROSATOM, was in operation;
- The list of key risk indicators was updated, including a description, the calculation algorithm and frequency, sources of information and thresholds (baseline, warning and response thresholds);
- A system for early response to risks related to the Government Programme 'Development of the Nuclear Power and Industry Complex', national and federal projects was in place; key risks were monitored;
- Key risks affecting ROSATOM's key financial and economic indicators (KPIs) were identified and assessed;
- Workshops, risk sessions and conferences were held to enable risk officers and employees within the hierarchy of the Risk Management function and the relevant divisions to share their experience.

Risk management process in ROSATOM



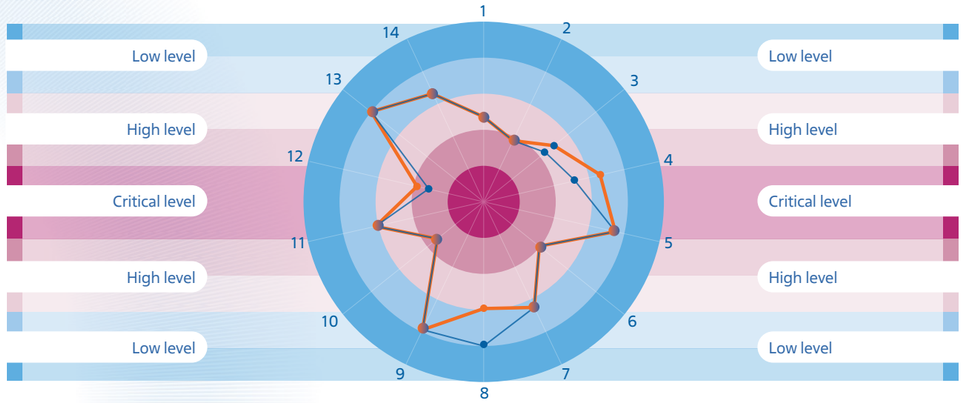
Organisational model of the risk management system



Key business risks[1]

As part of the functioning of the RMS, a list of key risks was compiled; risk owners were appointed; risks were assessed, and risk management measures were developed and implemented.

Risk radar



1. Currency risk
2. Interest rate risk
3. Credit risk
4. Liquidity risk
5. NFC product and service market risk
6. Electricity and capacity market risk
7. Reputational risk
8. Risk of a decrease in power generation
9. Health, safety and environmental risks
10. Political risk
11. Risk of loss of and damage to assets
12. Project risks
13. Climate risk (including environmental risk)
14. Social and political risks

Comprehensive risk management measures largely offset the negative impact of external factors on the implementation of ROSATOM's strategy. Information on key risks, the relevant risk management approaches applied by the Corporation and results achieved in 2024, as well as the link between the risks and ROSATOM's strategic goals, is provided in the table.

1. The annual report does not contain an exhaustive description of all risks that may affect ROSATOM's operations; it only provides information on key risks.

Risk management outcomes in 2024

ROSATOM's strategic goals:

1. To increase the international market share
2. To reduce production costs and the lead time
3. To develop new products for the Russian and international markets
4. To achieve global leadership in state-of-the-art technology

Risk name (risk owners)	Risk description	Connection with strategic goals
Economic risks		
1. Currency risk (Executives of ROSATOM's Divisions)	Adverse changes in exchange rates	1 2 3

MANAGEMENT PRACTICES

Management approaches:

- Applying currency clauses in commercial contracts and locking in exchange rates (where possible);
- Switching to settlements with counterparties in the currencies of friendly jurisdictions and in Russian roubles;
- Examining the possibility of switching to settlements with counterparties through banks in friendly jurisdictions;
- Using long-term pricing mechanisms with counterparties;
- Exploring opportunities for engaging Russian suppliers and contractors in order to reduce the foreign exchange position;
- Continuously monitoring exchange rates to enable prompt decision-making to mitigate currency risk;
- Setting the highest possible conversion rates when negotiating the terms of expense contracts;
- Monitoring the terms of foreign currency payments under revenue contracts and expense contracts concluded as part of performance of revenue contracts;
- Maintaining a balance of claims and liabilities denominated in foreign currencies (natural hedging);
- Examining opportunities for the use of financial hedging instruments.

Results:

- An optimal ratio of assets and liabilities denominated in the same currency was maintained;
- Foreign currency liabilities were met without raising additional funds to compensate for exchange rate fluctuations;
- Divergent trends in the exchange rates of currencies in which project financing, key items of capital expenditure and operating cash flows are denominated were taken into account.

2. Interest rate risk (ROSATOM's Treasury Department)	Adverse changes in interest rates, different timing of interest income and interest expenses	1 2 3

MANAGEMENT PRACTICES

Management approaches:

- Maintaining a balance of interest income and interest expenses in terms of timing and amounts;
- Reasonable selection of interest rates (fixed or floating) for the expected maturity period. Taking into account projected changes in the key rate and the required term of the loan, the Corporation may prefer either fixed-rate or floating-rate loans. At the same time, all things being equal, the Corporation prefers loans with the option of penalty-free early repayment;
- If there is a risk of an increase in the interest rate on floating-rate loans, the Corporation examines opportunities for refinancing them.

Risk name (risk owners)	Risk description	Connection with strategic goals

Results:

- The Corporation maintains a stable long-term loan portfolio;
- There was no significant increase in the risk level in 2024 due to the effective use of the risk management approaches described above.

For details, see section 1.14.5. 'Financial Management'.

3. Credit risk (ROSATOM's Treasury Department; executives of ROSATOM's organisations for other counterparties)	Failure by counterparties to fulfil their obligations in full and on time	1 2

MANAGEMENT PRACTICES

Management approaches:

- Setting and monitoring limits for counterparty banks;
- Using suretyship, guarantees, restrictions on advance payments in favour of external counterparties;
- Monitoring the status of accounts receivable and the financial position of counterparties;
- An internal counterparty solvency rating system;
- Using an extended list of potential collateral to secure counterparties' obligations; closer communication with counterparties in order to monitor the performance of work and the financial position.

Results:

- Losses through the fault of counterparties were minimised.

4. Liquidity risk (ROSATOM's Treasury Department / executives of Divisions)	Lack of funds for the fulfilment of obligations by ROSATOM and its organisations	1 3

MANAGEMENT PRACTICES

Management approaches:

- Centralised cash management (cash pooling);
- Rolling liquidity forecasts and cash flow budget;
- Maintaining required amounts of open lines of credit with banks (funds committed by banks);
- Reducing the period of keeping spare cash on bank deposits when this is advisable from an economic perspective;
- Discussing matters related to state support measures with federal and regional executive authorities of the Russian Federation;
- Active use of project financing instruments as part of implementation of projects and programmes by ROSATOM and its organisations;
- Maintaining the credit ratings assigned to JSC Atomenergoprom and to the Corporation by national rating agencies, JSC Expert RA and ACRA, at the highest possible level.

Results:

- ROSATOM maintained sufficient liquidity to repay liabilities on time, preventing unacceptable losses and reputational risks.

For details, see section 1.14.5. 'Financial Management'.

Risk name (risk owners)	Risk description	Connection with strategic goals
Commercial risks		
5. Nuclear fuel cycle (NFC) product and service market risk (Executives of the relevant Divisions of the Corporation)	Adverse changes in the pricing environment and demand on markets for natural uranium and uranium conversion and enrichment services	1 2 4

MANAGEMENT PRACTICES

Management approaches:

- Maintaining an optimal balance between market-focused and escalation pricing (benchmark price inflation) in contracts;
- Embedding quantitative flexibility and options in contracts with suppliers to align purchase and sales volumes;
- Discussing the volume of future orders with customers in advance;
- Promoting products in new market segments;
- Improving the technical and economic characteristics of nuclear fuel; introducing new types of fuel;
- Establishing partnerships in the form of joint ventures (JVs) with foreign suppliers of NFC products and services to partially localise production abroad in order to maintain and secure access to the markets of these countries for Russian organisations;
- Using long-term pricing mechanisms. Aligning pricing mechanisms used for procurement and those used in contracts with a high level of commodity risk;
- Taking into account the current market performance and established operational limits in the course of transactions;
- Product supply diversification;
- Promptly changing the structure of product sales; exploring alternative sales channels.

Results:

- There were no significant changes in the risk level, as quotations for natural uranium and the separative work unit are currently low, which limits their downside, while creating an upside if the market environment improves.

6. Electricity and capacity market risk (Head of the Power Engineering Division)	Adverse changes in electricity and capacity prices	1

MANAGEMENT PRACTICES

Management approaches:

- Participating in the methodological work focused on the market model and in the working group on forecasting hosted by the Russian Ministry of Energy and the Association NP Market Council;
- Monitoring short- and long-term price drivers on electricity and capacity markets;
- Updating price forecasts for electricity markets on a monthly basis.

Results:

- Actual prices did not deviate significantly from forecast levels, which has helped minimise the risk of failure to achieve targets for the Corporation's revenue and market share.

Risk name (risk owners)	Risk description	Connection with strategic goals
7. Reputational risk (Communications Department of ROSATOM and executives of Divisions)	Changes in stakeholder perception of the trustworthiness and appeal of ROSATOM and its organisations	1 3

MANAGEMENT PRACTICES

Management approaches:

- Measures to shape a positive public opinion on the development of the Corporation's technologies and projects (both nuclear and non-nuclear) through information transparency and open stakeholder engagement (including the functioning of an industry-wide public reporting system);
- Continuous efforts to improve the recognition and appeal of ROSATOM's HR brand (both in the industry and among prospective employees and within the expert community);
- Continuously monitoring and analysing news reports in the national and international media and information obtained during business meetings, industry conferences and workshops;
- Implementing communication, humanitarian and educational projects in cooperation with foreign partners. The Corporation successfully uses the practice of holding online events in overseas organisations and virtual tours;
- Technical tours and media tours of Russian facilities for foreign media representatives;
- Maintaining a presence on social media: the number of followers of the Corporation's official community pages on social media is growing steadily, with the largest increase in the number of followers recorded for social media platforms focused on visual content;
- Participation of ROSATOM's representatives in international trade fairs as speakers/delegates;
- Producing printed materials and videos targeted at various stakeholder groups in order to raise public awareness about the nuclear power industry;
- Setting up various types of communication platforms with assistance from the expert community to discuss matters related to the development, safety and environmental friendliness of nuclear technology.

Results:

- Projects implemented in Russia and abroad are supported by governments;
- The opinion poll conducted in 2024 shows that 78% of the Russian population have a positive opinion of nuclear power (2023: 77%);
- This upward trend shows that a growing number of people perceive the Corporation as a developing high-technology company that contributes to enhancing the defence capability and ensuring the sovereignty of our country. A high level of openness and transparency in ROSATOM is confirmed by the appreciation of quality of the Corporation's public reports. In the competition of annual reports held by the RAEX rating agency, ROSATOM's public report won in the Best Annual Report (Non-Financial Sector) category and was awarded five stars (the highest score) in the ranking of reports for the fifth year in a row;
- In 2024, the level of reputational risk remained unchanged due to successful communication activities; the risk level remains low.

For details, see section 1.14.8 'Strategic Communications'.

Risk name (risk owners)	Risk description	Connection with strategic goals
Operational risks		
8. Risk of a decrease in power generation (Head of the Power Engineering Division)	Decrease in power generation due to equipment shutdowns and unavailability	1

MANAGEMENT PRACTICES

Management approaches:

- Optimising repairs and improving their quality; building centralised reserves;
- Updating traffic and analysing orders for equipment that has gone out of service;
- Implementing measures to improve the quality of operational management at NPPs;
- Implementing measures to improve the resilience of power units under capacity supply agreements;
- Implementing measures to improve reliability and ensure safety;
- Addressing flaws in the designs of NPP and FTNPP power units;
- Implementing RPS projects to optimise the duration of scheduled preventive maintenance at NPP and FTNPP power units;
- Implementing measures to prevent the recurrence of deviations in NPP operation;
- Implementing plans to replace imported equipment.

Results:

- All incidents and equipment failures were properly investigated. Corrective and preventive measures were developed in order to address the root causes of the incidents and prevent their recurrence;
- The implementation of risk management measures and the use of RPS tools make it possible to offset the impact of negative factors.

For details, see 'Performance of the Power Engineering Division in 2024'.

Nuclear and radiation risks		
9. Health, safety and environmental (HSE) risks (Executives of ROSATOM's Divisions)	Major accidents/incidents in nuclear enterprises	4

MANAGEMENT PRACTICES

Management approaches:

- Occupational safety and health monitoring in nuclear organisations, including inspections and preventive visits, development of action plans and implementation of risk mitigation measures;
- Implementing measures in order to improve industrial and environmental safety in enterprises, including maintaining and expanding the scope of rerouting (repairs, renovation) of heating networks amid a rise in prices and tariff constraints by raising financing from regional development funds and reducing accounts receivable from consumers;
- Monitoring the environmental situation in ROSATOM's regions of operation;
- Constant readiness of emergency and incident response teams and equipment;

Risk name (risk owners)	Risk description	Connection with strategic goals

- Special reserve funds formed by the Corporation to ensure safety at all stages of the life cycle of its production facilities;
- Arranging civil liability insurance against damage resulting from accidents for enterprises that own hazardous industrial facilities;
- Calculating and monitoring indicators used for assessing the probability of potential negative impacts of industrial safety violations at hazard class 1 and 2 industrial facilities;
- As part of the Environmental Well-Being National Project, the Corporation is building the Gorny, Schuchye, Maradykovsky, Kambarka, Vostok, Western Siberia and RG Centre industrial facilities for the processing, recycling and treatment of hazard class 1 and 2 waste;
- Timely updates to internal regulations of the organisations, as required by legislation and federal rules and standards;
- Technical inspection of equipment used at hazardous industrial facilities;
- Maintaining a high level of professionalism, accountability and safety culture among employees, including certification of operating personnel at hazardous industrial facilities;
- Continuously monitoring the use of personal protective equipment by employees in the workplace;
- Improving project management practices in the sphere of occupational safety and health;
- In 2024, the Corporation launched a project to develop a methodology for managing environmental risks in ROSATOM and its organisations, which involves developing the Uniform Industry-Wide Guidelines on Environmental Risk Management and implementing them in the industry in 2025.

Results:

- Safe operation of ROSATOM's organisations, including hazardous industrial facilities.

For details, see chapter 5 'Safety Report' and chapter 3 'Social Report'.

Political risks		
10. Political risk (ROSATOM's International Relations Unit and International Business Development Unit)	Changes in the regulatory and political climate in foreign countries imposing restrictions on the operations of ROSATOM and its organisations	1 3 4

MANAGEMENT PRACTICES

Management approaches:

- Strict compliance with international requirements governing relations in the sphere of peaceful use of nuclear energy: nuclear non-proliferation, export control, security and physical protection;
- Active media outreach; ensuring openness and transparency during the construction of nuclear facilities abroad, including through community engagement;
- Systematic engagement with the IAEA and partner countries with a focus on nuclear infrastructure;
- Coordination with the Russian Ministry of Foreign Affairs to provide political support for global operations of Russian nuclear organisations;
- Expanding the overseas network of partner organisations in countries that do not support sanctions regimes of foreign states;
- Developing and introducing alternative logistics routes to ensure uninterrupted supplies;
- Expanding the product range (wind power, healthcare, composite materials);
- Exploring alternative financing options for overseas projects; using national currencies for settlements;

Risk name (risk owners)	Risk description	Connection with strategic goals
– Monitoring the political, social and economic situation, regulatory requirements and restrictions in the sphere of foreign trade in the countries where ROSATOM is implementing its projects; – Negotiations and consultations under intergovernmental and interdepartmental agreements; – Implementing import substitution programmes and ensuring Russia's technological independence; – Expanding the footprint in target markets. **Results:** – Despite a continuously deteriorating global political situation, the Corporation continues to fulfil all its international commitments to build Russian-design nuclear facilities abroad; – The conclusion of 22 intergovernmental and interdepartmental agreements on the peaceful use of nuclear energy is a positive sign. **For details,** see section 1.5 'International Cooperation' and chapter 2 'Business Development Report'.		
Corruption risks		
11. Risk of loss of and damage to assets (Asset Protection Department of ROSATOM)	Corruption and other offences leading to a damage to/loss of assets	1 2
MANAGEMENT PRACTICES **Management approaches:** ROSATOM and its organisations have adopted an industry-wide system for the prevention of corruption and other offences, which includes the following: – Continuous assessment of corruption risks across all business processes implemented in the Corporation and all accounting events; – Professional development of employees focused on combating corruption, including employees newly hired by ROSATOM and its organisations and appointed to positions involving responsibility for compliance with anti-corruption standards; executives that have been assigned responsibility for preventing corruption in the organisations; employees involved in the procurement of goods, work and services; – Introducing online anti-corruption training based on mobile platforms accessible to every employee in the industry; – Reporting evidence of corruption and other offences, including through feedback mechanisms (the hotline); – Reviewing and updating industry-wide regulations on asset protection and combating corruption in line with updates to anti-corruption legislation; – Detection, timely prevention and resolution of conflicts of interest; – Prioritised implementation of industry-wide anti-corruption regulations in new businesses. **Results:** – All measures stipulated in the National Anti-Corruption Plan for the period from 2021 through 2024[1] that are relevant to ROSATOM were implemented; the Anti-Corruption Plan of ROSATOM and Its Organisations for the period was implemented in full; the requirements of anti-corruption laws of the Russian Federation and the Corporation's internal regulations were fulfilled, which supported corruption risk management.		

1. Decree No. 478 of the President of the Russian Federation dated 16 August 2021.

Risk name (risk owners)	Risk description	Connection with strategic goals
Technical risks		
12. Project risk (Executives of ROSATOM's Divisions)	Changes in the macroeconomic indicators of the countries participating in the projects; contractors' failure to fulfil their commitments with regard to the schedule and quality of work to be performed	1 3 4
MANAGEMENT PRACTICES **Management approaches:** – Full-cycle risk management applied in NPP construction projects, including risk identification and assessment, development and implementation of risk management measures, risk monitoring, updates to the risk register, and reporting; – Improving project management and risk management systems; – Negotiating the main terms and conditions of contracts with customers in advance; – Developing risk maps for new business areas; – Regular monitoring and control of achievement of key milestones, financial and physical targets for overseas projects; – Regular monitoring and communication with customers concerning the schedule for NPP maintenance and training of foreign NPP personnel abroad, as well as other matters related to the implementation of overseas projects; – Adoption of best project management practices (including the Corporation's industry-wide risk management system and the TCM NC cost and schedule management methodology) and the Corporation's industry-wide guidelines for projects and investment activities by project companies; – Steps taken both by shareholders and at the operational level to enhance risk-based project management; – Developing action plans for engagement with foreign customers; – Concluding long-term contracts and locking in electricity prices; – Developing standardised design solutions; – Implementing a programme to reduce the cost and duration of NPP construction; – Using opportunities for the redistribution of available credit resources between projects; – Concluding agreements that impose penalties for the full or partial repudiation of commitments; – Developing alternative projects meeting the established criteria; – Concluding long-term offtake contracts; – Searching for new, more efficient technological solutions and implementing measures to keep costs within budget. **Results:** – Given the continuing influence of factors such as more complex logistics arrangements for equipment supply, special features of payment processes, as well as the effects of accelerated import substitution efforts amid persisting sanctions pressure, there were no significant changes in the risk level.		

Risk name (risk owners)	Risk description	Connection with strategic goals
Nature and climate risks		
13. Nature and climate risks (Executives of ROSATOM's Divisions)	Adverse climate change/impacts of natural disasters on the operations of ROSATOM and its organisations; risk of environmental damage from the operation of nuclear facilities and other facilities in the industry	1 4

MANAGEMENT PRACTICES

Management approaches:

- Implementation of industry-wide policies on sustainable development and environmental protection;
- Monitoring environmental protection in nuclear organisations, including inspections and preventive visits;
- Managing nature and climate risks taking into account the approaches defined in Decree No. 812 of the President of the Russian Federation dated 26 October 2023 on Approving the Climate Doctrine of the Russian Federation; implementing the Uniform Industry-Wide Guidelines on Nature and Climate Risk Management in ROSATOM and Its Organisations;
- Taking into account adverse natural phenomena (including earthquake tendencies) at the stage of design of nuclear facilities; for instance, at the stage of NPP design, the Corporation carries out a comprehensive assessment of nature and climate risks and environmental characteristics of the region where the proposed NPP construction site is situated;
- Radiation monitoring at the locations of nuclear facilities, which provides timely information on the status of the environment and helps assess and forecast changes in the environment to minimise the potential negative impacts of radiation on people and the environment;
- Taking active steps to maintain a high level of environmental safety of the natural uranium mining and processing cycle and ensuring strict compliance with the relevant technological standards at all stages of the production process.

Results:

- Approaches applied by the Corporation in the course of operation of nuclear facilities and other facilities in the industry have helped prevent the risk of environmental damage.

Social risks		
14. Social and political risks in the regions of operation (ROSATOM and executives of the Corporation's Divisions)	Loss of public approval for the location of infrastructure facilities	1 3 4

MANAGEMENT PRACTICES

Management approaches:

- Implementing projects to build and renovate (upgrade) social infrastructure facilities in cooperation with regional and municipal governments as part of federal projects and target programmes;
- Engaging with regional and municipal governments on matters related to promoting regional development, increasing regional tax revenue and maintaining social and economic stability in the regions;

Risk name (risk owners)	Risk description	Connection with strategic goals

- In order to reduce social risks in its regions of operation, the Corporation implements a set of measures (public consultations, engagement with non-governmental organisations and the media) to inform the general public about the operations of its regional manufacturing enterprises, plans for their future development and their stability, and the fact that its operations do not pose any environmental risks.

Results:

- The situation in the Corporation's host towns and cities remains stable. Constructive engagement with regional and municipal governments has helped prevent the negative impacts of social and political factors.

Other risks

Risk of shortcomings in technological solutions

Decreased competitiveness of technologies that the Corporation is developing and introducing may affect the achievement of innovative development and technological modernisation goals. In order to ensure the competitiveness of technologies that it is developing and introducing, the Corporation implements measures to reduce material intensity, adopt industrial construction techniques, maintain quality and apply state-of-the-art management tools.

The Corporation works to accomplish its goals and support the future development of the nuclear industry as part of efforts to ensure national sovereignty in the sphere of science and technology; this involves implementing the following measures:

- Developing the required technologies to replace imported solutions;
- Digitisation of corporate procedures;
- In-house development of IT systems for the Corporation;
- Expanding the range of research and development initiatives;
- Establishing world-class in-house research and education centres;
- Launching in-house production of software, new materials and robotics solutions that do not rely on imported technology;
- Developing research and production capabilities for the closed nuclear fuel cycle and a two-component nuclear power industry, including in order to provide exclusive NFC services to foreign partners in countries not included in the list of foreign countries and territories that take hostile steps against the Russian Federation, Russian legal entities and individuals.

Risk of shortage of qualified personnel

The demographic crisis, a declining economically active population and a rise in the cost of qualified human resources pose a risk of shortage of workforce in general and specific professions.

Efforts to accomplish the Corporation's objectives of ensuring technological leadership and sovereignty of the Russian Federation also drive demand for highly qualified personnel.

To reduce this risk, ROSATOM and its Divisions take steps to recruit employees from other regions, provide social security for employees, pay market-rate salaries, and support professional development of employees in the organisations by developing a talent pool. Based on the findings of analysis of statistical information on the causes of employee turnover, the relevant managerial decisions are taken, if necessary. The Corporation cooperates with universities and specialised educational institutions

on an ongoing basis (this includes concluding direct contracts for the training of specialists, participating in open days and job fairs, arranging internships and work placements, graduation projects done by students in the Corporation's enterprises, running educational programmes, workshops and special training courses for school and university students, and contributing to the funding and establishment of school and university laboratories and classrooms).

Risk insurance

Risk insurance is one of the main risk management approaches used by ROSATOM.

To improve the reliability of insurance coverage, in 2024, the Corporation and its organisations continued to cooperate with the insurance community in order to insure Russian operators against property risks. A significant share of liability of Russian NPPs for potential nuclear damage was transferred for reinsurance to the Russian Nuclear Insurance Pool (RNIP) and the Russian National Reinsurance Company (RNRC). This proves that the insurance community acknowledges the safety and reliability of Russian NPPs to be adequate.

In 2025, the Corporation plans to continue to engage RNIP and RNRC experts to audit key enterprises in the industry for insurance purposes.

In order to mitigate commercial, operational and other risks, in addition to the risk management approaches outlined in the Report, the Corporation takes a number of additional steps, including arranging insurance against the risk of early contract termination, maintaining a reserve stock of equipment and components to ensure the uninterrupted operation of facilities and comply with the investment project schedule, etc.

Objectives for 2025 and beyond

The following objectives for the development of risk management in the Russian nuclear industry have been set for 2025:

- To develop a set of industry-wide tools to be integrated into the Corporation's planning and management processes;
- To develop a practice of adopting uniform approaches to risk management, including in terms of support for the implementation of new national projects in which ROSATOM and its organisations participate as joint contractors;
- To expand the range of tools for monitoring the implementation of investment projects, including applying the risk-based approach;
- To revise the list of key risks taking into account the current challenges and to update the approach to early risk response (key risk indicators);
- To update internal regulations in the industry governing the risk management function in ROSATOM and its organisations;
- To complete the integration with investment management systems applied in the industry as part of the project to develop the Industry-Wide Risk Management System (the IRMS information system).

1.14.3. Internal control system

Key results in 2024

- Award-winner in the Internal Audit Service category (Association Institute of Internal Auditors);
- Award-winner in the Best Company in Terms of Development of Best Independent Internal Control Practices in Russia category (National Association of Internal Auditors and Controllers);
- Based on the findings of monitoring, internal control performance was highly rated by internal customers, with a score of 6.6 out of 7 against a target of 5.7;
- Internal control performance was highly rated by government monitoring and supervisory agencies, with internal financial audit given a 100% score by the Russian Ministry of Finance and a High Level score by the Accounts Chamber of the Russian Federation.

The internal control system in ROSATOM and its organisations is based on:

- Russian laws and regulations;
- The IAEA requirements;
- The COSO model (The Committee of Sponsoring Organisations of the Treadway Commission);
- Guidelines for Internal Control Standards for the Public Sector by the Internal Control Standards Committee of the International Organisation of Supreme Audit Institutions (INTOSAI).

Key characteristics of the internal control system include the following:

- Preventive control and development of timely, comprehensive and practicable corrective measures;
- Efficient communication and cooperation with operating divisions at all stages of operations;
- Proactive change management;
- Growing demand from executives in ROSATOM's organisations for advisory services provided by specialised internal control bodies (SICBs) of the organisations.



Results in 2024

The following measures were implemented in order to improve the internal control system (ICS):

- Coordinators from among experienced employees were included in the hierarchy of independent control functions in ROSATOM in order to improve communications and adapt the relevant processes at new assets;
- The institution of internal control advisors to deputy CEOs and senior executives was piloted;
- Predictive analytics is being developed in order to minimise risks when managing significant projects, including construction projects;
- A continuous audit methodology was introduced for construction projects; it provides reasonable assurance when forecasting the achievement of key milestones;
- Steps are taken jointly with the management to improve the efficiency of the ICS by demonstrating its value to employees in the industry (this includes regular meetings with business process owners, developing and screening videos on the subject);
- A mechanism was introduced to enable the SICB youth council to engage with youth councils in nuclear organisations.

Large-scale efforts were undertaken to incorporate IT practices into the ICS and embed internal control mechanisms into business development and digitisation processes:

- A preventive control mechanism was introduced to monitor the achievement of supporting and key milestones in construction projects;
- The efficiency of the system for monitoring corrective measures was improved; the system enables real-time monitoring of the status of tasks and the relevant deadlines;
- Steps were taken to introduce software robots in order to automate routine tasks and improve data processing speed and accuracy;
- The Digital Auditor project was launched in order to improve the digital analytics system in internal control functions through data sorting, smart search across data from corporate information systems and data analysis across multiple dimensions.

Further steps were taken to promote ROSATOM's practices in the Russian Federation and globally and ensure professional sovereignty:

- Participation in the drafting of new versions of the Global Internal Audit Standards, the National Internal Control Standard and the National Internal Audit Standard;
- Publication of articles and multiple presentations on internal audit, internal control, risk management and corporate governance on various platforms, including international conferences in Kazakhstan and Turkey and a working meeting with partners in Brazil;
- Participation as part of the delegation of the Institute of Internal Auditors (IIA) of Russia in the signing of a cooperation agreement with the IIA Saudi Arabia;
- A session on internal audit held in partnership with the Institute of Internal Auditors at the 13th Atomexpo 2024 International Forum; the session featured foreign partners as speakers (Belenergo (Republic of Belarus), IIA Kazakhstan, IIA Bangladesh).

Special focus was given to developing the internal professional community of independent control functions in the nuclear industry:

- The library of best practices and techniques in the sphere of internal control and audit was updated; it includes 36 webinars on various topics and information on techniques and practices applied in Russia and abroad;
- Online meetings of internal auditors and controllers in the nuclear industry are held on a monthly basis in order to share best practices and practical experience (every event is attended by more than 200 employees);
- Six centralised training sessions were held on end-to-end internal audit based on a uniform methodology for assessing the efficiency of a specific business process in nuclear organisations; the training sessions were attended by more than 300 people;
- 104 SICB employees in nuclear organisations underwent an independent assessment of compliance of their qualifications with the professional standard for internal auditors.

Outcomes of control activities in 2024

In the reporting year, SICBs of ROSATOM and its organisations conducted 764 inspections and provided more than 1,200 consultations in Russian nuclear organisations. External supervisory bodies conducted 14 inspections in the Corporation, including 10 inspections by the Accounts Chamber of the Russian Federation.

Following the inspections conducted by SICBs of ROSATOM and its organisations, 4,408 corrective measures were developed and approved for implementation (including 595 measures following the inspections conducted by ROSATOM's SICBs).

Based on the findings of inspections conducted in the reporting year, disciplinary sanctions were imposed on 360 employees of nuclear organisations, including 11 senior managers.

Stakeholder control

The Corporation continues to maintain a public information system for calculating the business reputation score of suppliers, which is one of the key risk assessment tools used in the course of procurement in the nuclear industry. The implementation of a project to develop the practice of applying the business reputation score, the Nationwide Business Reputation Rating, was approved.

As part of methodological initiatives to improve procurement practices in the nuclear industry, methodologies for monitoring the development of statements of work for conducting procurement procedures and determining whether the initial maximum price is justified amid declining competition were developed and sent to specialised internal control bodies (SICBs) of the organisations for the purpose of preventive control in the sphere of procurement.

As part of advisory activities, explanatory letters on individual issues are sent in order to prevent similar violations; advice is provided to employees in procurement departments regarding the application of provisions of the Uniform Industrial Procurement Standard (UIPS) and the business reputation score of suppliers. A Q&A forum for employees in the industry is in operation as part of the Partner Special Monitoring and Analytics Unit.

GRI 2-25 Bodies responsible for out-of-court settlement of disputes in the sphere of procurement in the nuclear industry (the Central Arbitration Committee and the arbitration committees of the Power Engineering, Fuel and Engineering Divisions) received 517 reports (complaints) from stakeholders regarding violations of procurement rules established by Russian legislation, the UIPS and other regulations of ROSATOM and its organisations supporting the UIPS. 337 complaints were investigated; 85 complaints (25.2% of the total number of investigated complaints) were deemed to be valid. Other complaints were withdrawn by complainants or were dismissed on the following grounds:

- Because the deadline for filing the complaint had expired;
- Because a similar complaint had been accepted for investigation or investigated by the Federal Antimonopoly Service;
- Because the complainant was not entitled to file a complaint (after the deadline for submitting bids has expired, complaints may only be filed by bidders that have submitted a bid);
- Because the defendant had taken corrective measures to address the violation before the complaint was investigated by the Arbitration Committee.

Steps were taken to enhance the stakeholder control mechanism in a new environment. An increase in the number of complaints was due to the fact that they can be submitted to industry arbitration committees on the procurement page on electronic trading platforms as part of a non-public procurement process and an appeal may be filed with the Central Arbitration Committee using the Brief solution, a new procurement method introduced in 2024. The number of valid complaints as a percentage of the total number of purchases increased by 29%, from 0.07% in 2023 to 0.09% in 2024.

Systematic efforts of the arbitration committees, including detailed explanations provided to customers/procurement authorities during the investigation of complaints concerning the nature of detected violations, the publication of reviews and a library of arbitration practices maintained on the official website, presentations at forums and meetings, the provision of advice and the holding of webinars have helped ensure that procurement processes in the industry are legitimate and minimise the number of violations.

In addition, the Central Arbitration Committee reviewed 45 complaints related to the calculation of the business reputation score of suppliers (all complaints were found to be invalid) and 47 requests for the inclusion of information in the supplier blacklist of the nuclear industry (information on 14 entities was included).

Changes in indicators pertaining to control activities

Indicator	2021	2022	2023	2024
Third-party inspections				
Number of inspections by external supervisory bodies	17	13	16	14
including the number of inspections by the Accounts Chamber of the Russian Federation	11	9	10	10
Outcomes of inspections				
Number of actual incidents or significant shortcomings detected by government agencies as a result of inspection of processes in ROSATOM and its organisations that had not been detected by the ICAF	0	0	0	1
Quality of organisation and performance of internal financial control and internal financial audit as assessed by the Russian Ministry of Finance, %	95.6	96.9	100	100
Internal inspections				
Number of inspections by specialised internal control bodies (SICBs)	722	728	760	764
Outcomes of inspections				
Number of corrective measures implemented following the inspections	575	692	775	595
Number of employees on whom disciplinary sanctions were imposed	358	292	277	360
including the number of senior managers	22	7	12	11
Stakeholder control				
Number of complaints filed with the arbitration committees of ROSATOM and its Divisions regarding violations of procurement rules	869	636	449	517
Number of reports (complaints) accepted for investigation	496	365	271	337
Outcomes of investigation of complaints in the sphere of procurement				
Number of valid complaints	113	81	55	85
Valid complaints as a percentage of the total number of investigated complaints	22.8	22.2	20.3	25.2
Valid complaints as a percentage of the total number of purchases	0.14	0.11	0.07	0.09

Plans for 2025 and beyond

In 2025, control activities will be focused primarily on improving the cost efficiency of ROSATOM's investment activities and projects and ensuring its competitiveness in the future.

Further improvement of the ICS will be supported by the implementation of a set of measures including the following:

- Updating the risk-based approach at all stages of control activities;
- Ensuring that risk factors that may affect project implementation are identified more promptly;
- Developing digital tools to support control activities of independent control functions and the monitoring of construction projects: launching an integration of the IT system supporting the Internal Control and Audit Function and the Navigator Digital Management System, automating the process of independent monitoring of construction projects, replacing imported solutions for the Partner Special Monitoring and Analytics Unit, etc.;
- Addressing matters related to incorporating control procedures/reports for the purpose of independent control into the existing information systems within the scope of ROSATOM, including project management information systems;
- Developing a targeted learning system using a tailored approach;
- Building a talent pipeline for the hierarchy of independent control functions in the Corporation;
- Ensuring that SIBCs of ROSATOM and its organisations remain leaders in the Russian professional community and in the international arena.



1.14.4. Prevention of corruption and other offences

Pursuant to Russian anti-corruption legislation and ROSATOM's internal anti-corruption regulations applied in the industry, the Corporation is taking active steps to improve the existing system of corruption prevention measures.

To do so, the Uniform Industry-Wide Anti-Corruption Policy of ROSATOM and Its Organisations is applied in the industry; it defines the main principles, methodological approaches and instruments for combating corruption.

In 2024, the Corporation completed action items stipulated in the National Anti-Corruption Plan for the period from 2021 through 2024 approved by Decree No. 478 of the President of the Russian Federation dated 16 August 2021 (hereinafter referred to as the National Plan) that are relevant to ROSATOM.

The Corporation implemented the Anti-Corruption Plan of ROSATOM and Its Organisations for the period from 2021 through 2024, which includes tasks related to the implementation of the National Plan, as well as measures aimed at:

- Minimising corruption risks;
- Monitoring compliance with restrictions, prohibitions, and requirements for preventing or resolving conflicts of interest, and the fulfilment of anti-corruption responsibilities;
- Improving the methods and mechanisms for engaging with supervisory and law enforcement agencies;
- Professional development focused on combating corruption, and anti-corruption education.

In 2024, the updated Uniform Industry-Wide Code of Ethics and Professional Conduct of ROSATOM and Its Organisations came into force; it sets out professional conduct and ethical requirements that govern interactions within ROSATOM and its organisations and engagement with external stakeholders, including government bodies, suppliers, partners and society.

ROSATOM took steps to ensure that its employees fulfil their responsibilities and comply with prohibitions, restrictions and requirements for preventing or resolving conflicts of interest, as stipulated in Federal Law No. 273-FZ of 25 December 2008 on Combating Corruption.

A report on arranging the submission of declarations of income, expenses, property and liabilities by ROSATOM's employees was reviewed at an operational meeting chaired by ROSATOM's Director General.

The Corporation's employees, including those newly hired, were informed in a timely manner about anti-corruption responsibilities, prohibitions, restrictions and requirements.

Pursuant to ROSATOM's orders, the list of positions in ROSATOM subject to the requirement that candidates nominated to and ROSATOM's employees holding such positions must provide information on their income, property and liabilities, as well as information on the income, property and liabilities of their spouse and underage children, was expanded.

As part of the declaration campaign, in 2024, 296 employees of ROSATOM submitted declarations of income, expenses, property and liabilities and provided the relevant information with regard to 416 members of their families.

Information on the income of candidates applying for positions in ROSATOM in 2024 was analysed (44 candidates and 73 of their close relatives).

As part of its efforts to ensure that Russian anti-corruption laws are applied consistently in order to enhance the efficiency of mechanisms for preventing and resolving conflicts of interest, ROSATOM implemented the following key measures:

- Every executive within the administrative management framework was assigned responsibility for ensuring compliance of their subordinates with the provisions of anti-corruption legislation of the Russian Federation and local regulations and for timely implementation of effective measures aimed at preventing and resolving conflicts of interest;
- Steps were taken to ensure compliance with legislative requirements concerning the submission of information on persons dismissed due to a loss of trust and confidence to the competent department of the Office of the Government of the Russian Federation for inclusion in the relevant register, and concerning the removal of the relevant information from the register;
- Steps are taken to standardise anti-corruption measures in nuclear organisations;
- Provisions stipulating that an organisation and its chief executive are responsible for ensuring compliance of its operations with the anti-corruption laws of the Russian Federation or its country of operation and for implementing measures to prevent corruption and other offences are incorporated into the charters of nuclear organisations as part of their establishment, reorganisation and/or acquisition;
- Provisions requiring ROSATOM's employees to inform the employer about personal interest in the course of job performance that may create a conflict of interest and to take measures to prevent it are incorporated into the templates of employment contracts;
- Methodological guidelines on preventing and resolving conflicts of interest are posted on ROSATOM's official website;
- Persons appointed to positions involving anti-corruption responsibilities, restrictions and prohibitions are informed in writing about requirements for preventing and resolving conflicts of interest and about anti-corruption laws and regulations of the Russian Federation.

In accordance with paragraph 39 of the National Plan, ROSATOM implemented a set of initiatives scheduled for 2024 to support professional development with a focus on combating corruption and to promote anti-corruption standards.

More than 12,800 employees of ROSATOM and its organisations completed anti-corruption training programmes (including online training courses) in 2024; this included:

- More than 8,100 employees involved in anti-corruption efforts;
- More than 1,300 employees newly hired by ROSATOM and its organisations and appointed to positions involving compliance with anti-corruption restrictions and prohibitions and the fulfilment of anti-corruption responsibilities;
- More than 3,400 employees involved in the procurement of goods, work and services.

>12,800

employees of ROSATOM and its organisations completed anti-corruption training programmes in 2024

In addition, in order to ensure the proper implementation of paragraph 39 of the National Plan and improve the system of professional development focused on combating corruption in ROSATOM and its organisations, steps were taken in the following key areas:

- Coordinating the work of educational institutions in the industry, namely the Rosatom Corporate Academy and the Rosatom Technical Academy, in terms of methodological, organisational and information support for professional development events focused on combating corruption that are held for employees in the industry;
- Organising anti-corruption training events featuring representatives of the Russian Ministry of Labour, the Institute of Legislation and Comparative Law under the Government of the Russian Federation and other government institutions involved in expert activities focused on combating corruption;
- Raising awareness by providing advice to employees appointed (transferred) to positions in ROSATOM involving responsibility for compliance with anti-corruption standards (those who are required to provide information on their income, expenses, property and liabilities);
- Developing a modular online training course on combating corruption in the nuclear industry for employees of ROSATOM and its organisations (eight online training courses have been posted on the RECORD industry-wide training platform);

- Facilitating the integration of new employees into the workplace, cultural and social environment in ROSATOM and its organisations, including preventive measures encouraging employees to adopt a zero-tolerance approach to any unlawful conduct. A set of online induction training courses is available to newly hired employees in the RECORD information system; this includes a training course titled 'ROSATOM's Anti-Corruption Culture' (induction training courses that newly hired employees are required to complete are assigned to them automatically in the RECORD information system or by an employee of the HR function).

In order to make anti-corruption training more effective, a publicly available website for professional development focused on combating corruption has been updated.

An anti-corruption hotline is operated effectively in the industry; it is a tool forming part of the industry-wide anti-corruption system that is used for receiving, processing, carrying out a primary review of, recording and investigating reports of corruption and other offences received via the hotline, in accordance with the Uniform Industry-Wide Procedure for the Handling of Reports Received via the Hotline in ROSATOM and Its Organisations. In 2024, all reports of corruption and other offences received through the hotline and other channels were investigated. GRI 2-25

Steps were taken to ensure that punishment for corruption and other offences is inevitable. Materials on violations detected in 2024 by anti-corruption units were submitted to law enforcement agencies, with criminal proceedings instituted in cases stipulated by law.

1.14.5. Financial management

Implementation of ROSATOM's financial strategy in 2024

Given the scale of ROSATOM's business in Russia and abroad, the Corporation's management attaches special importance to the financial resilience of nuclear organisations in a changing environment. The financial strategy is an integral part of ROSATOM's overall business strategy. The main aim of the financial strategy is to ensure the financial resilience of ROSATOM and its organisations in a changing external environment and to maximise the efficiency of financing and financial risk management.

ROSATOM's key financial transactions have been centralised. Cash flow management is centralised through:

- A single industry-wide legal framework regulating financial management (including the Uniform Industry-Wide Financial Policy);
- Vertical integration of treasury departments in subsidiaries and affiliates, which are functionally accountable to ROSATOM's Treasury Department. The established treasury structure enables 100% control of funds in the industry;
- Concentration of principal treasury functions of nuclear organisations in ROSATOM's Treasury Department, which communicates with nuclear organisations in a shared information space and is essentially a liquidity management centre;
- An industry-wide automated system for recording treasury transactions (the Corporate Settlement Centre Information System), which enables the recording of all treasury transactions across the group on a daily basis.

Targets set for 2024 in the financial strategy in terms of engagement with banks, debt portfolio management as part of the day-to-day operations and projects of ROSATOM and its organisations, and further centralisation of financial transactions were met. In order to improve the performance of the treasury functions, in 2024, the Corporation continued to work towards:

- Accumulating spare cash in the accounts of pool leaders;
- Improving the accuracy of payment scheduling (a rolling liquidity forecast);
- Maintaining a competitive cost of servicing of the consolidated debt portfolio;
- Centralising treasury transactions (complying with the financial policy);
- Introducing project financing instruments as part of project implementation by the Corporation and its organisations.

In 2024, ROSATOM continued to implement and expand the scope of the project focused on further centralisation of the treasury function, including the rollout of the Payment Factory at JSC Atomenergoprom (the Payment Factory). This project is aimed at further improving the performance of the treasury function in the industry.

Green bonds

At year-end 2024, JSC Atomenergoprom had three outstanding exchange-traded bond issues, including two green bond issues, as part of a programme to issue series 001R exchange-traded bonds worth a total of RUB 100 billion inclusive.

In 2021, JSC Atomenergoprom placed the first issue of green exchange-traded bonds (series 001R-01) with a par value of RUB 10 billion and a maturity of five years.

In 2022, the Company placed the second bond issue (series 001R-02) with a par value of RUB 9 billion and a maturity of three years. In addition, in October 2024, the Company placed an issue of exchange-traded bonds (series 001R-03) with a par value of RUB 20 billion and a maturity of three years.



Maintaining credit ratings

In the reporting year, the Corporation and JSC Atomenergoprom continued to take steps to maintain credit ratings assigned by national rating agencies.

In 2024, the ratings assigned to ROSATOM by national rating agencies were confirmed at the highest possible level: ruAAA with a stable outlook from JSC Expert RA and AAA(RU) with a stable outlook from ACRA.

As at 31 December 2024, the ratings assigned to JSC Atomenergoprom by national rating agencies JSC Expert RA and ACRA were confirmed at ruAAA with a stable outlook and AAA(RU) with a stable outlook respectively.

Raising financing for day-to-day operations and for projects

Despite turbulence on the Russian financial market amid unprecedented sanctions pressure on financial and industrial sectors of the Russian economy, throughout 2024, ROSATOM maintained sufficient liquidity to ensure that it and its organisations operate normally and fulfil their contractual obligations on time.

ROSATOM's organisations continued to obtain funding on preferential terms as part of government support measures and programmes.

ROSATOM continued to use suretyship to secure obligations of organisations in the industry to their counterparties. This measure helps to reduce both the cost of bank guarantees and the cost of financing raised by the Corporation (including interest expenses).

A wholly owned subsidiary of the Corporation acting as a pool leader in intra-group financing of FSUEs enabled an optimal debt burden distribution between JSC Atomenergoprom and organisations and enterprises outside its scope.

The Corporation continued to search for sources of financing for projects in traditional and new business areas, including (but not limited to) the following:

- Binding documents were signed and loans were raised to finance the project to build WPPs between 2025 and 2027, which is being implemented by an organisation in the Wind Power Division. Loans to be raised will total RUB 61.5 billion;
- Following the singing of loan documents with a consortium of banks in 2023 (under a syndicated loan agreement based on the principles of the Project Finance Factory), in the reporting year, the Corporation continued to raise financing for the project to build a plant that will produce lithium-ion batteries and energy storage systems in the Kaliningrad Region and signed a syndicated loan agreement worth RUB 27.2 billion to finance a project to build a 4 GWh plant that will produce battery cells, modules and packs and stationary systems based on lithium-ion cells in Moscow;
- The Corporation continued to take active steps to raise loans for the Akkuyu NPP construction project in Turkey;
- The Corporation continued to actively engage with the Industry Development Fund on matters related to the financing and support of ROSATOM's projects, including through a cluster investment platform.[1]

1. Decree No. 295 of the Government of the Russian Federation dated 22 February 2023 on Government Support for Organisations Implementing Investment Projects Focused on the Manufacture of Prioritised Products.

Plans for 2025 and beyond

- To roll out the Payment Factory project;
- To ensure a consistent payment discipline for intra-group financing;
- To improve the accuracy of medium-term cash flow planning;
- To prevent internal competition for credit resources between organisations;
- To continue to centralise cash management;
- To fulfil all obligations (including covenants) to existing lenders and rating agencies;
- To discuss ROSATOM's project financing arrangements in order to reduce recourse on the group and minimise the use of the Corporation's consolidated investment resources (including through the use of project financing instruments);
- To expand the range of financing instruments used by the Corporation (where it is economically feasible to do so) in order to reduce the cost of debt service and ensure timely and full financing of the investment programme of organisations in the industry on acceptable terms and conditions;
- To continue to discuss potential areas of cooperation in the sphere of digitisation, including the use of digital financial assets, with credit institutions.

1.14.6. Procurement management

Key results in 2024

- Savings from competitive tendering procedures (using ROSATOM's own funds and federal budget funds) totalled RUB 30.00 billion.
- The share of electronic procurement (excluding procurement for foreign projects) totalled 98.3%.
- Pursuant to the order of the Prime Minister of Russia to disclose information on counterparties, ROSATOM disclosed information on 22,891 counterparties (100%).

The Uniform Industrial Procurement Standard (UIPS) (the Regulations on Procurement) of ROSATOM is the main document that regulates the procurement activities of ROSATOM and organisations in the industry.[1]

Governing and supervisory bodies in the sphere of procurement include:

- The Central Procurement Commission;
- Permanent procurement commissions of the Divisions;
- The contract management function (for procurement using federal budget funds in accordance with the Federal Law on the Contract System of the Federal and Municipal Procurement of Goods, Work and Services (Federal Law No. 44-FZ));
- The Central Arbitration Committee of ROSATOM and arbitration committees of the Divisions;
- The Chief Controller.

Official procurement website: www.zakupki.rosatom.ru.

One of ROSATOM's priorities is to ensure the robustness, effectiveness and technological independence of its supply chains. In order to accomplish these objectives, in 2022, the Corporation launched the Atomplan project, which includes a set of measures aimed at building robust supply chains, including supplies of products that do not rely on imported solutions. During 2024, the Corporation took steps to assess long-term demand for a 10-year period and update the relevant assessments. Information on demand is made available to manufacturers both in and outside the industry (via electronic trading platforms).

ROSATOM ranks high in professional procurement rankings every year.

In 2024, the Corporation was included in major procurement rankings and achieved the following results:

- The National Transparency Ranking in the Guaranteed Transparency category;
- Top 20 in the ranking of loyalty of major customers to small and medium-sized businesses.

Joint efforts are being made to launch the production of items 'of concern' by manufacturers from the Russian Federation or friendly countries.

In order to implement measures aimed at building robust supply chains, including supplies of products that do not rely on imported solutions, standardising and centralising demand by reducing the number of purchases and contracts, and supporting long-term contracting, work is ongoing to switch to products offered by manufacturers from the Russian Federation and friendly countries (Atomplan). More specifically, pursuant to Order No. 1/2496-P of ROSATOM dated 19 December 2024, amendments were made to the Uniform Industry-Wide Procedure for Procurement Planning and Preparation, Tendering, Reporting on Procurement Activities and Carrying Out Contracts Using ROSATOM's Own Funds for the Needs of ROSATOM and Its Organisations[1] stipulating that records of the outcome of procurement procedures must be approved by the head of the Division/organisation if a contract is concluded for the supply of products from unfriendly countries.

Special emphasis is placed on critical items where supply disruption may affect safety and business continuity in nuclear organisations and the implementation of operational, repairs and maintenance, and investment programmes. Category strategies are developed and implemented for these items in order to engage manufacturers from the Russian Federation or friendly countries; the possibility of using the product range of Russian manufacturers and adjusting technical specifications is reviewed on a regular basis, and the development of new products and production operations is initiated. Accordingly, the list of products for which category strategies for import substitution need to be developed was expanded (Order No. 1/1541-P of ROSATOM dated 19 August 2024).

To ensure supply robustness, in 2024, the Corporation issued an order approving the rules for developing and applying contract strategies for NPP and NRTC construction projects which ensure that contracts are concluded and equipment and construction and installation services are purchased in a timely manner at the preparatory stage of NPP construction.

Pursuant to the Order of ROSATOM on Amending the Uniform Industry-Wide Methodological Guidelines on Data Reliability Audit, the procedure and rules for assessing the technological capabilities of equipment manufacturers were approved; this enables customers in the nuclear industry to adopt a uniform approach to monitoring the performance of expense contracts in terms of production technology used by manufacturers of critical products. In 2024, as part of the audit, ROSATOM assessed the technological capabilities of 33 manufacturers of key equipment, most of which achieved good results confirming their potential for fulfilling the Corporation's current and future orders.

When purchasing critical products, ROSATOM establishes a qualification criterion with regard to the country of origin of the products (Russia or friendly countries). Exceptions may only be made at the discretion of the senior executive of the customer organisation (when procurement volume totals less then RUB 100 million) or the head of the Division (when procurement volume exceeds RUB 100 million).

The performance of contracts for critical products is monitored under a special procedure: organisations conduct continuous monitoring; key dates for the most important contracts are tracked by the management; reports on deliveries are provided on a regular basis; if there are any deviations, corrective measures are implemented immediately.

Implementation of the annual procurement programme

In 2024, the demand of nuclear organisations for products with the required price and quality was met in full.

170 orders worth a total of RUB 39.2 billion were placed by ROSATOM under a competitive tendering procedure using federal budget funds. Savings on procurement activities totalled RUB 0.1 billion (0.3% of the value of completed purchases).[2]

ROSATOM and its organisations placed 31,189 orders worth a total of RUB 3,168.4 billion under a competitive tendering procedure using their own funds. The Corporation achieved savings totalling RUB 29.9 billion (5.0% of the value of completed purchases); overall, over the past 15 years, savings totalled RUB 421.9 billion.

As part of the annual procurement programme, contracts were concluded with 25,175 counterparties. The share

1. Approved by ROSATOM's Supervisory Board (minutes No. 37 dated 7 February 2012).

1. Approved by Order No. 1/283-P of ROSATOM dated 21 March 2019.
2. Taking into account orders placed under an open competitive tendering procedure using the funds allocated through the Russian Ministry of Industry and Trade under Federal Law No. 44-FZ of 5 April 2013 on the Contract System of the Federal and Municipal Procurement of Goods, Work and Services (hereinafter referred to as Federal Law No. 44-FZ).

of electronic procurement (excluding procurement for foreign projects) totalled 98.3%.

The share of purchases of Russian goods, work and services in the total volume of purchases of goods, work and services totalled 97%. MED 8

Volume of procurement through competitive tendering and achieved savings,[1] RUB billion

Indicator	2022	2023	2024
Total value of orders placed under an open competitive tendering procedure	1,540.2	1,839.3	3,207.6
Using ROSATOM's own funds	1,443.9	1,746.2	3,168.4
Using federal budget funds	96.3	93.1	39.2
Total savings, including:	28.16 (4.7%)	27.62 (4.0%)	30.00 (8.6%)
– Savings from competitive tendering procedures using ROSATOM's own funds	26.4 (5.1%)	26.9 (4.4%)	29.9 (5.0%)
– Savings from competitive tendering procedures using federal budget funds	1.76 (2.0%)	0.72 (0.9%)	0.10 (0.3%)

Procurement rules are posted in the Unified Procurement Information System (UIS) at http://zakupki.gov.ru and are publicly available on ROSATOM's official website.

The annual procurement programmes of ROSATOM and its organisations, as well as information on procurement procedures are posted in the UIS and on the official procurement website of the nuclear industry at http://zakupki.rosatom.ru.

At the same time, ROSATOM and a number of its organisations comply with Decree No. 301 of the Government of the Russian Federation dated 6 March 2022 on the Grounds for Refraining from Posting Information about Suppliers (Contractors, Service Providers) Awarded Contracts on the Official Website of the Unified Information System for the Procurement of Goods, Work and Services for Government and Municipal Needs. Pursuant to the Decree, the Atomplan document, which includes annual procurement programmes for the period from 2025 to 2035 inclusive, and information on procurement procedures are posted in restricted sections of the websites of electronic trading platforms, namely JSC Unified Electronic Trading Platform at http://roseltorg.ru; JSC Electronic Trading Systems at http://etp-ets.ru; LLC RTS-Tender at http://rts-tender.ru, etc.; they are available on the personal account page of accredited suppliers on these electronic trading platforms.

To be able to view this information, a supplier needs to register on an electronic trading platform in the nuclear industry section in accordance with the rules, terms and conditions, and the registration procedure established by the relevant electronic trading platform.

1. Savings from competitive tendering are the difference between the set initial maximum purchase price and the purchase price obtained as a result of competitive tendering. Only completed procurement procedures are taken into account.

Expanding access to procurement procedures for SMEs

In 2024, nuclear enterprises concluded 74,383 contracts with small and medium-sized enterprises (SMEs) worth a total of RUB 564.5 billion; this included 57,431 contracts worth a total of RUB 398.3 billion concluded with SMEs by enterprises subject to Decree No. 1352 of the Government of the Russian Federation dated 11 December 2014 on the Special Features of Participation of Small and Medium-Sized Enterprises in the Procurement of Goods, Work and Services by Certain Types of Legal Entities. The value of contracts concluded following tendering exclusively among SMEs totalled RUB 43.3 billion. The target share of procurement from SMEs was achieved.

The share of goods, work and services purchased from SMEs in the total volume of purchases from Russian organisations exceeded 16%. MED 9

Data reliability audits, including supplier assessment

In 2024, ROSATOM continued to improve the procedure for conducting data reliability audits, which is a tool for confirming that a supplier is able to carry out a contract in good faith. To do so, manufacturers are audited by a commission set up by the customer and having the required competences and expertise regarding the contract being tendered.

In 2024, 314 audits were conducted among manufacturers, contractors and service companies participating in procurement procedures:

- 276 audits were successfully passed by manufacturers/contractors;
- 38 potential suppliers of products failed the audit;
- 25 enterprises refused to undergo an audit.

It is worth noting that 27 audits were conducted remotely using state-of-the-art information and communications technologies. Analytics on contract performance show that the audit procedure helps to increase the share of contracts performed on schedule.

ROSATOM continues to develop the UIS Quality information system. The system is designed for automating a number of processes, such as nonconformity management, inspection management, data reliability audit, recording non-conformance costs, preparing documents for claims management, and quality reporting. The use of the system has made it possible to reduce the lead time, improve product and process quality, and transition from hard copy documents to electronic document management involving the use of electronic signatures.

In 2024, representatives of ROSATOM and its organisations took part in 17 workshops held jointly with JSC Russian Small and Medium Business Corporation, which were attended by representatives of 1,642 SMEs. Overall, between 2016 and 2024, a total of 120 workshops were held, which were attended by more than 12,600 representatives of SMEs.

Amid restrictions related to sanctions imposed by foreign countries, organisations in the industry continue to take steps to reduce procurement lead time. To advance the automation of logistics and procurement processes, work was ongoing in 2024 to develop and improve the shared information space:

1. The Procurement 2.0 Unified Industry-Wide System designed to automate procurement management business processes related to procurement planning and preparation, tendering and initiating the conclusion of a contract/supplementary agreement following the tendering. Robotic process automation tools were introduced in order to reduce the expenditure of time and effort; integration with 30 industry and external systems was completed, including the Automated Bidding System for the State Defence Order, pursuant to Decree No. 301 of the Government of the Russian Federation dated 6 March 2022 on the Grounds for Refraining from Posting Information about Suppliers (Contractors, Service

Providers) Awarded Contracts on the Official Website of the Unified Information System for the Procurement of Goods, Work and Services for Government and Municipal Needs. To date, more than 17,000 users from 377 organisations in the industry have been connected to the system.

2. The Uniform Industry-Wide System for Communication with Suppliers during Contract Performance (UIS Contract) started permanent operation; it is a platform containing digitised information on contractual obligations and enabling the supplier and the customer to exchange information in a shared information space. The functionality developed by the Corporation helps significantly speed up communication during contract performance (the signing of letters and documents, a group chat, etc.), enables the parties to view all their contracts and the status of their performance in a single window and escalate arising issues; it also includes reminders and a task calendar.

3. The BRIEF digital solution, which is designed to improve operational efficiency of procurement arrangements, minimise the risk that products supplied to ROSATOM may be of poor quality, and enhance digital culture. The system enables bilateral communication, whereby customers are informed about products offered by businesses, while suppliers and manufacturers are informed about existing needs in a timely manner; it also enables the prompt conclusion of contracts based on the principles incorporated in the system and aimed at improving contract performance. 275 customers in the industry, 164 suppliers in the industry and more than 3,500 external suppliers have been connected to the system; the product catalogue comprises more than 72,000 product cards. In 2024, 1,541 procurement procedures were conducted using the BRIEF solution; 6,000 invitations to register in the BRIEF system were sent to potential suppliers, and more than 5,000 users were registered. The lead time for procurement procedures in the BRIEF system averaged 15 business days in 2024.

4. As part of the import substitution programme, in 2024, the UIS Quality system was migrated to software that does not rely on imported solutions. Work is underway to migrate the functionality of the UIS Quality system to the Corporation's Integrated Information Platform. Work is ongoing to integrate the UIS Quality system with information systems used in the industry. Based on the findings of a user satisfaction survey, steps were taken to improve the system interface, ergonomics and speed.

More than 20,000 users from 278 organisations in the industry and 1,738 external counterparties have been connected to the system, and more than 480,000 documents signed using electronic signatures have been registered. For all nonconformities recorded in the UIS Quality system, measures are developed and implemented to address the nonconformities and their root causes in accordance with the Uniform Industry-Wide Nonconformity Management Procedure. According to the survey, the level of user satisfaction with the functionality of the UIS Quality system was assessed at more than 93%.

Capabilities added to the UIS Quality system in 2024 include, among other things, the signing of documents with the Gosklyuch enhanced unqualified electronic signature (to ensure compliance with the requirements of Order No. 344/pr of the Russian Ministry of Construction, Housing and Utilities dated 16 May 2023 with regard to the signing of receiving inspection reports used in capital construction projects and classified as as-built documentation during the construction, renovation and major repairs of capital facilities). The Power Engineering Division completed and expanded integration with the NPP EXPERIENCE information system for documenting operating experience based on domestically developed software solutions and integrated it with the Division's system for process performance monitoring. At four quarterly meetings, improvements to the system's functionality were proposed and were subsequently implemented.

The development of the Qualified Buyer Service (QBS) continued in 2024. The QBS performs the full range of competitive and non-competitive procurement activities and the relevant preparations. In 2024, services provided by the QBS to ROSATOM with regard to procurement under Law No. 223-FZ covered 92% of divisions, while services related to procurement under Law No. 44-FZ covered 100% of divisions of the internal customer, with 493 procurement procedures with a total value of RUB 285.1 billion completed under Law No. 223-FZ (up by 30.1% compared to 2023).

In 2024, satisfaction with the quality of service was assessed at 98.82% out of 100% (the highest possible score on the rating scale established by the methodology).

The lead time averaged 37 days between a procurement order and the contract award as part of the procurement process under Law No. 223-FZ (four days less than in 2023).

Training and development in the sphere of procurement

In order to develop employees' competences to enable more effective use of procurement, logistics and quality management mechanisms, in 2024, the Procurement, Logistics and Quality School conducted a wide range of activities.

As part of the Procurement School, in 2024, 700 people took the entrance test. A pilot group did the test in the Record 2.0 and RECORD Mobile industry-wide systems. More than 2,000 people participated in face-to-face training courses and webinars; free online courses on procurement, logistics and quality management available on the RECORD Mobile industry platform garnered more than 12,000 views. The Rosatom Corporate Academy jointly with experts from ROSATOM and other organisations in the industry produced video content focused on topics related to procurement (for instance, matters related to the assessment of technological capabilities) in order to provide training in the use of new tools and approaches and promote them. In addition, six new face-to-face and online training programmes on procurement, logistics and quality management were developed; they are focused on topical issues of long-term pricing, price audits and the streamlining of the procurement process. A training programme on the use of the Procurement 2.0, UIS Contract and BRIEF systems was developed jointly with the Corporation's digital specialists.

In order to develop employees' competences in the sphere of nonconformity management, in 2024, the Rosatom Technical Academy provided specialists with training in nonconformity management techniques and the use of modules of the UIS Quality system. A total of 669 specialists completed continuing professional education courses on these topics and received the relevant certificates.

In addition, specialists in the industry were provided with online training using the RECORD Mobile system. A total of 7,906 people successfully passed tests between 2017 and 2024. In 2024, 299 employees completed the Data Reliability Audit training programme at the Rosatom Corporate Academy in order to undergo certification qualifying them to audit manufacturers and contractors.

To provide assistance to nuclear organisations and streamline internal communication at various stages of the procurement process, the Procurement Assistance Portal information system continues to operate. It enables users to ask a question or perform a search across questions asked and answers provided earlier.

Several support channels for specialists on procurement, logistics and quality management are actively used as part of the Procurement Officers' Club project.

Two dedicated groups (Procurement, Logistics, Quality, and the Quality Management professional community) are being developed on the ROSATOM Life industry-wide social media platform. These platforms enable direct communication between industry specialists from different enterprises and areas of operations. By year-end 2024, more than 2,000 industry specialists had joined the Procurement, Logistics, Quality group and more than 250 participants had joined the Quality Management group. In addition, the Corporate Academy maintains an advanced specialised group, the Community of Data Reliability Auditors, created in 2024.

The development of the Procurement Environment webinar platform continued in 2024. During the past year, more than 20 events were held for specialists in the industry; they were attended by more than 8,000 industry specialists.

In addition, starting from 2024, the webinar platform is actively used for communication with suppliers to nuclear enterprises. Nine webinars were held for manufacturers and suppliers seeking to develop cooperation with ROSATOM;

as part of the webinars, more than 2,700 representatives of suppliers received advice on matters related to supplies to nuclear enterprises.

In 2024, representatives of ROSATOM and nuclear organisations organised and participated in conferences and other external events focused on the development of the procurement system, including the 19th GOSZAKAZ Forum and Exhibition (15–17 May), the 27th St. Petersburg International Economic Forum (5–8 June) and the 3rd Nationwide Conference on Procurement 'State Order Explained by the Federal Antimonopoly Service' (10–11 October).

Plans for 2025 and beyond

The key objectives for 2025 and for the medium term in the sphere of procurement, logistics and quality management are as follows:

- To continue work focused on long-term planning and the conclusion of long-term contracts, including using mechanisms for assessing and developing production capabilities of suppliers, and flexible (formula) pricing mechanisms;
- To continue to develop contract strategies for ROSATOM's nuclear construction projects both in Russia and abroad;
- To develop the shared information space for customers and suppliers covering the entire procurement cycle, from the identification of needs to the performance of contracts (to increase the number of suppliers using the UIS Contract system); to integrate local modules, industry-wide and national systems; to globalise data; to expand the application of electronic document management in procurement; to use robots in order to reduce the amount of time and effort spent on routine transactions;
- To promote and develop the BRIEF digital solution (including expanding the range of products purchased from external suppliers using the BRIEF solution, encouraging external customers to use the BRIEF solution, compiling general product catalogues, adjusting the system and the methodology to the requirements and special characteristics of external customers, and discussing the matter of obtaining the status of an electronic trading platform);
- Establishing partnerships with Russian manufacturers and concluding long-term contracts, including using instruments such as a framework agreement, order splitting, price audit and price formulas, and offset agreements;
- To support the development of procurement legislation.

1.14.7. Investment management

Key results in 2024

- The investment programme was 81% completed (-4 p.p. compared to 2023).
- Return on the investment portfolio stood at 22.9% (+4.4 p.p. compared to 2023).

Approaches to investment management

- A distributed system has been built for investment decision-making by the governing bodies of ROSATOM and its organisations; it is aligned with the distribution of competence centres in the industry;
- A phase-gate approach is applied to project implementation, with decisions on key milestones made in a staged process;
- Key projects are monitored at the level of the Corporation;
- Investment decisions related to day-to-day operations of assets are delegated to ROSATOM's organisations in order to speed up the decision-making process;
- To improve the quality of investment decision-making, opinions of experts independent from the project initiator are taken into account;
- ROSATOM's project portfolio is built as a set of projects of organisations in the industry for a year and for the medium term based on available investment resources and the required rate of return;
- Experts are engaged to perform an in-depth probabilistic risk analysis for significant projects; the findings of analysis are incorporated in the decision-making system;
- A comprehensive audit is conducted, which helps to formulate recommendations on how to improve project planning and implementation;
- Measures to raise external financing for projects are being developed.

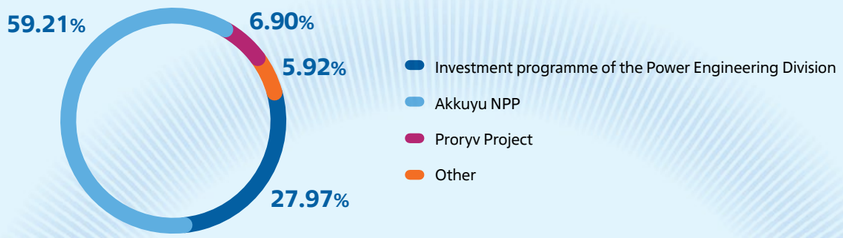
Results in 2024

In 2024, ROSATOM's investment programme was 81% completed.[1] Performance against the targets of the investment programme (including in the Divisions) decreased by 4 percentage points compared to 2023 due to restrictions on payments as part of overseas projects.

At the same time, return on ROSATOM's investment portfolio reached 22.9%,[2] up by 4.4 percentage points compared to 2023. The increase in return on the investment portfolio was driven primarily by a revision of the methodology for cash flow calculation for a number of projects.

1. Including the investment programme of the Power Engineering Division.
2. Calculated for the period from 2024 through 2099.

Breakdown of ROSATOM's investments in significant projects



Measures to improve investment efficiency

In the reporting year, steps were taken to improve process quality and introduce tools to automate routine operations. Robots were developed for calculating the balance of investment resources and for automated monitoring of project data sheets; AI-powered solutions are being piloted. A chatbot for organisational and management projects became fully operational.

In order to develop the relevant competences, in 2024, the Project Management School continued to provide training for project managers and members of project teams. A total of 443 people completed training, which is 14% more than in 2023. Three new programmes in the form of face-to-face practical courses were developed. Face-to-face employee development events were attended by 647 people, which is 48% more than in 2023.

Special focus was given to network scheduling. Regulations on network scheduling were developed jointly with the Project Management Competence Centre and implemented in 10 Divisions; an industry expert review process was launched for network schedules; face-to-face and online training courses were developed.

The efficiency of services provided by the secretary of collective governing bodies increased significantly: as the scope of work was expanded while the headcount remained unchanged, labour productivity increased by 28%.

In response to changes in the external environment, a financial and economic modelling competence centre was established in the industry; its tasks include accelerating efforts to secure government support.

The regulatory framework governing investment activities and projects continued to evolve. The investment decision-making system was streamlined; regulatory requirements were formulated for providing project teams with highly qualified specialists; the Uniform Industry-Wide Guidelines for the Application and Modelling of Real Options for Components of ROSATOM's Investment Portfolio were approved.

Significant progress was made in 2024 as part of efforts to replace imported software. The Risk Analytics software replacing imported solutions was developed and successfully piloted; it is designed for quantitative assessment of risks associated with investment projects.

Plans for 2025 and beyond

- To speed up investment and project processes through process automation, the introduction of state-of-the-art information technologies (robotic process automation, machine learning, artificial intelligence) and alignment of related processes (investment planning, business planning, developing and updating investment strategies);
- To develop project management competences by working systematically with project teams, improving the quality of project planning, and establishing a network scheduling competence centre;
- To review projects more thoroughly and increase return on projects through the active use of quantitative risk assessment and real options valuation techniques;
- To improve the investment decision-making system by developing portfolio management and adopting an approach to investment decision-making taking into account the impact of investment decisions on the portfolio's performance;
- To develop an effective mechanism for early termination of projects whose goals cannot be achieved, and simultaneously simplify the decision-making process with regard to projects that are on track;
- To further develop the Sirius information system by integrating it with industry-wide systems, including the risk management system.



1.14.8. Strategic communications

Stakeholder engagement

Key results in 2024

- **78.3%** of the population support the nuclear industry.
- The Corporation took part in more than 150 Russian and international exhibitions.

Approaches to stakeholder engagement

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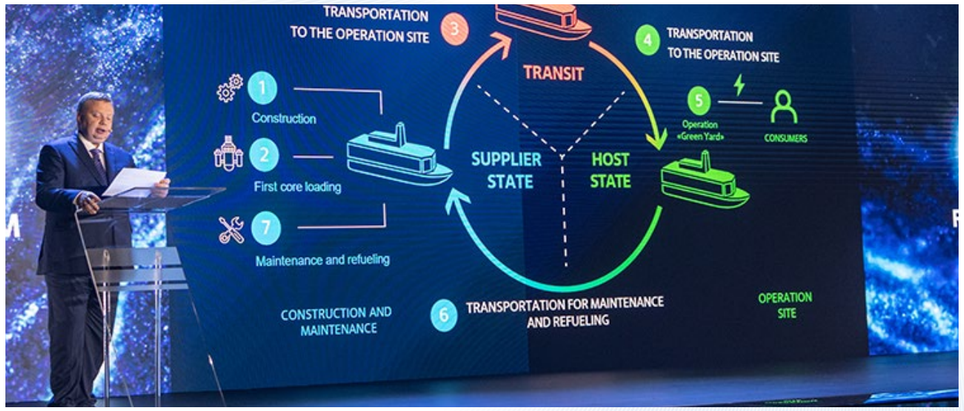
Due to its scale and special characteristics of its business (simultaneous performance of state and business tasks, operation across a large number of markets), ROSATOM has a wide range of stakeholders both in Russia and worldwide.

Targeted stakeholder engagement is aimed at achieving strategic goals and gaining public acceptance for nuclear power development.

The Corporation promotes systematic and constructive stakeholder engagement across all areas of its business and conducts communication and information campaigns for the general public.

Fundamental principles underlying stakeholder engagement in the Corporation are as follows:

- Respect for and accommodation of the interests of all participants;
- Open and productive cooperation;
- Timely provision of complete information on ROSATOM's activities;
- Striving to provide specific benefits to all participants;
- Fulfilment of obligations.



Stakeholder map[1]

Types of stakeholders | **Means of influence**

Government level
- Federal legislative and executive bodies of Russia
- Governments of constituent entities of Russia
- Local governments in Russia
- Governments of foreign countries
- International organisations

Government level
- Participation in the drafting of legislation
- Implementation of federal target programmes
- Tax payments in the regions of operation

Corporate level
- Regulators (including those responsible for maintaining standards)
- Trade union (RTUNPIW)
- Employees of ROSATOM and its organisations
- Business partners
- Specialised research institutes and educational institutions

Corporate level
- Sales of products and services to customers
- Remuneration and social benefits provided to employees
- Expenditure on targeted educational programmes for university students
- Procurement of goods and services for operational needs
- Payments to suppliers of capital and external borrowings
- Expenditure on scientific research

Social level
- Consumers of products and services / customers
- Non-governmental organisations (NGOs) and environmental NGOs
- Local communities
- Media

Social level
- Competitions and grants for environmental and social initiatives
- Expenditure on safety and environmental protection
- Expenditure on social, economic and charitable programmes in the regions where nuclear facilities are located

VALUE CREATION AND DISTRIBUTION

1. For details on stakeholders' areas of interest and types of engagement, see section 1.12.8 'Strategic Communications' of ROSATOM's public report for 2022.

Industry media

To inform employees and other stakeholders about news and key events in the Russian nuclear industry, a range of corporate media outlets operates under the common brand name *Strana ROSATOM* ('The Country of ROSATOM'):

- The *Strana ROSATOM* newspaper (published weekly and distributed in all organisations in the Russian nuclear industry, in core universities in the industry and nuclear towns and cities, with a circulation of 72,000 copies and a readership (including the online version, social media and video advertising) exceeding 500,000 people);
- A TV news programme (aired weekly in nuclear towns and cities).

Online communications

In 2024, ROSATOM continued to actively communicate with its stakeholders on the Internet. Information is disclosed both on ROSATOM's official website (www.rosatom.ru) and on official community pages on social media. In addition, the ROSATOM Digital Press Office, Atom Media (atommedia.online), maintains an online presence since 2023; it aggregates news and other media content of ROSATOM and its organisations. ROSATOM published press releases informing the general public about the activities of the Corporation and its organisations on a daily basis.

Key events involving ROSATOM received extensive coverage; interviews with and comments from experts were published. In 2024, the Digital Press Office attracted more than 435,000 views (2023: 122,000 views), with the number of users totalling 150,600 (2023: about 38,000).

ROSATOM Digital Press Office

Communication projects

Icebreaker of Knowledge

The Icebreaker of Knowledge is a science communication project launched by the network of Nuclear Energy Information Centres (NEICs) with support from ROSATOM. It is aimed at promoting STEM disciplines and nuclear technologies, searching for and supporting talented and gifted children, developing their talents and providing career guidance. School students from across Russia participate in the project, with about 15,000 people applying to participate during the year. Since the launch of the project, more than 300 gifted school students from various regions of Russia, who are winners of multiple competitions and projects, have participated in Arctic expeditions on board the *50 Let Pobedy* nuclear icebreaker. ROSATOM's anniversary Icebreaker of Knowledge Arctic expedition was timed to coincide with the 65th anniversary of establishment of the nuclear-powered icebreaker fleet.

400 children

have visited the North Pole since 2019 as part of the Icebreaker of Knowledge project

On 13 August 2024, the 5th Icebreaker of Knowledge Arctic expedition set out from Murmansk for the North Pole; it was organised with support from ROSATOM and the Russian Znanie Society. An international team of talented schoolchildren and experts from 15 countries worldwide went on board the *50 Let Pobedy* nuclear icebreaker. During the expedition, its participants were offered an educational programme including lectures, workshops, science games, film screenings and a wide range of other activities. The participants of the expedition brought the flags of their respective regions and countries to the North Pole. A series of lectures titled 'The Northernmost Lecture Hall' and a documentary reality show were filmed during the expedition.

Educational projects. Nuclear Energy Information Centres

The objective of Nuclear Energy Information Centres (NEICs) is to raise awareness among local communities about the operation of the nuclear industry and prospects for the development of nuclear power and radiation technologies, make professions in the industry more prestigious, promote science, innovative technologies and technical education, and cooperate with the professional scientific community in promoting science. The NEIC network comprises 22 centres in Russia, including the centre in Obninsk opened in 2024 (to mark the 70th anniversary of the launch of the world's first NPP) and the Atomarium in Sochi, as well as a centre in the Republic of Belarus (Minsk). In addition, the Corporation has opened information centres in Mersin (Turkey), Hanoi (Vietnam), Almaty (Republic of Kazakhstan), Tashkent (Uzbekistan) and Dhaka (Bangladesh), as well as the Nuclear Technology Information Centre (NTIC) in Myanmar.

In 2024, more than 250,000 people of different ages who are passionate about science and technology and seek to pursue intellectual leisure activities took part in events hosted by the NEICs, including the KSTATI ('By the Way') Science Festivals, the NEIC OPEN weekly programmes and the Atomic Workshop classes, series of lectures, workshops, intellectual games, teleconferences, adventure games, and debates, which is a new format of events. As part of the Energy of Science project, which is aimed at introducing local residents to the latest scientific discoveries and ideas, more than 50 leading science communicators, researchers and science journalists gave presentations in the host towns and cities of the network. In 2024, regional media outlets published about 7,000 stories about projects and events run by the NEIC network.

8 Festivals of Science held in 2024:

>100

events held in host towns and cities

>60,000

participants

Nuclear Kids (NucKids)

This is an annual international art project for children (http://www.nuckids.ru/). Its participants include children of employees of Russian nuclear enterprises and ROSATOM's foreign partners. The Nuclear Kids project has been run by ROSATOM since 2009. A distinctive feature of the project is the fact that a new unique musical performance is produced within just three weeks under the guidance of professionals and the ensemble then tours with it in Russian towns and cities and abroad.

The project is run in ROSATOM's host towns and cities in Russia (Moscow, Saint Petersburg, Yekaterinburg, Nizhny Novgorod, Chelyabinsk, Krasnoyarsk, Zelenogorsk, Zheleznogorsk, Volgodonsk, Novovoronezh, Kurchatov, Tomsk, Seversk, Sosnovy Bor, Petrozavodsk, etc.) and in the Corporation's partner countries: the Republic of Belarus, Bulgaria, Hungary, South Africa, South Korea, Turkey, Vietnam, India, Bangladesh, etc. Over the 16 years since the launch of the project, more than 1,000 children of employees of ROSATOM's enterprises and its foreign partners in 25 countries have taken part in it.

Rehearsals for the 2024 summer project were held at facilities situated in the Republic in Belarus. The musical was premiered in Minsk (Republic of Belarus). This was followed by a tour that ran in Nizhny Novgorod, Obninsk (Kaluga Region) and Udomlya (Tver Region) and traditionally concluded in Moscow. Students of music schools from nuclear towns and cities joined the project for a second year in a row.

Media Station communication project

The project was launched in October 2023 on the initiative of ROSATOM's Communications Department in order to provide a signal boost in 22 of the Corporation's host towns and cities. The project gained recognition from PR professionals and won the Silver Archer National Award; it was continued in 2024. The project has resulted in the emergence of a community comprising 220 public relations specialists from nuclear enterprises, municipal administrations, institutions affiliated with the FMBA, as well as local media outlets and opinion leaders. The community helps disseminate content and develop communications products, including using new technologies. In 2024, key focus areas of the Media Station project included assisting in developing a brand platform for nuclear towns and cities, and encouraging young talents to work for nuclear enterprises and organisations.

Science communication projects

In order to promote science and technology and shape an image of the future, during 2024, the Corporation organised media tours in Obninsk and Troitsk. In order to develop a pool of friendly media outlets and establish a community of science communicators, Science Communication Days were held in 2024. In 2024, community pages titled 'ROSATOM's Scientists' were created and developed on social media (VKontakte and Dzen); a media campaign was run to support the Laboratories of Growth research internship programme.

Opinion polls

The Corporation analyses the public perception of the development of nuclear power in Russia on an annual basis and adjusts its communication with stakeholders accordingly.

According to a nationwide opinion poll carried out by ZIRCON Research Group, in 2024, 78.3% of the Russian population supported the use of nuclear power (2023: 77.2%). Over the past few years, the figure has remained consistently high.

Trends in the positive public perception of the nuclear power industry, %



Question: 'On the whole, do you approve or disapprove of the use of nuclear (atomic) energy as a way to provide power supply for the country?' (Combined number of answers: 'I definitely approve' and 'I somewhat approve')

Exhibitions

In 2024, ROSATOM took part in more than 120 international congresses and exhibitions in the Russian Federation and abroad (including 15 events in Russia). These included major events, such as the Future Technologies Forum, the World Youth Festival, the Open Innovations Forum, the Conference on Digitalisation of Industrial Russia, the St. Petersburg International Economic Forum (SPIEF), the Eastern Economic Forum, the Russian Energy Week, the 68th Regular Session of the IAEA General Conference, the 29th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP29), African Energy Week 2024 (South Africa), the INNOPROM Central Asia International Industrial Trade Fair, etc.

For details, see section 1.5. 'International Cooperation'.

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Dialogues with stakeholders

In order to improve transparency and accountability in the Corporation, representatives of key stakeholders are engaged in the preparation of ROSATOM's public report (the Report) through participation in the discussion of socially important aspects of the Corporation's business and their reflection in the upcoming Report. In addition, stakeholder representatives participate in public consultations on the draft Report and public assurance of the Report.

Stakeholder engagement is an integral part of the provisions of international standards: the Global Reporting Initiative Sustainability Reporting Standards (GRI Standarts), the International Integrated Reporting Framework (International <IR> Framework), and the AA1000 guidelines (2015). During the previous reporting campaign, ROSATOM took on a number of commitments that were later fulfilled during the preparation of the 2024 report (see the subsection 'Incorporation of Stakeholders' Proposals').

In 2024, the Corporation held dialogues with stakeholders (directly and in the form of a questionnaire survey) in order to discuss material topics and drafts of ROSATOM's public report and the reports of its Divisions for 2023. During these events, stakeholder representatives voiced their requests, provided recommendations as to what information should be disclosed, and put forward proposals for developing the public reporting system in the Corporation and its Divisions. In addition, in the post-reporting period (on 14 February 2025), the Corporation held a dialogue to identify material topics to be disclosed in the 2024 public report, as well as public consultations to discuss the draft Report (on 23 May 2025), where stakeholders voiced their recommendations and comments on the draft Report (see the subsection 'Incorporation of Stakeholders' Proposals').

Public reports of ROSATOM, JSC Atomenergoprom and the Divisions are available on the public reporting portal (https://report.rosatom.ru).

For details, see Appendix 1 'Report Profile'.

Outcomes of the 2024 reporting campaign

RAEX Competition of Annual Reports (RAEX-Analytics)	ESG Ranking of Sustainable Corporate Governance
Ranked 1st in the Best Annual Report category (non-financial sector)	**Rated A** ('Best Corporate ESG Practice in the Russian Federation')

In 2024, ROSATOM's Report won in the Best Annual Report in the Non-Financial Sector category in the federal competition of annual reports held by the RAEX rating agency (RAEX-Analytics) for the fifth year in a row. ROSATOM's Report was also awarded five stars (the highest score) for quality in the ranking compiled by RAEX. The results can be viewed on the RAEX website (https://raex-a.ru).

The Corporation was once again rated A ('Best Corporate ESG Practice in the Russian Federation') in the 2024 ESG Ranking of Sustainable Corporate Governance compiled by the Da-Strategiya Agency for Corporate Development based on corporate public reports. The score characterises the Corporation as a company that has adopted a strategic approach to ESG management, fully manages ESG risks and has governing bodies with a wide range of competences. In addition, according to the compilers of the ranking, a company rated A actively engages stakeholders in governance, has a high level of transparency and a well-developed corporate culture.

Incorporation of stakeholders' proposals

Stakeholders' proposals and comments concerning ROSATOM's public report for 2024[1]

No.	Stakeholders' proposals/recommendations	ROSATOM's comments on the incorporation of recommendations
1	To disclose information on the average salary and the ratio between the salary of the management and that of mid-level personnel across ROSATOM's assets and regions of operation, and provide a breakdown by gender	ROSATOM plans to disclose the information in the medium term
2	To expand the range of methods for collecting feedback on the report in digital format	The proposal will be considered in the course of preparation of the Report for 2025
3	To segregate information on ROSATOM's operations in the Arctic into a separate reporting module	The proposal will be considered in the course of preparation of the Report for 2025
4	To segregate information on adaptation to climate change into a separate section	The proposal will be considered in the course of preparation of the Report for 2025. In the 2024 Report, information on climate risks will be disclosed in the sections 'Risk Management' and 'Sustainable Development Management'
5	To consider expanding the Report by adding information on climate change scenarios or preparing a separate climate report	The proposal will be considered in the medium term
6	To add information on methods for assessing the Corporation's impact on biodiversity	The proposal will be considered in the course of preparation of the Report for 2025
7	To add a systematic description of work with people with disabilities to the section on inclusion	The information has been added to the Report, section 3.1.10 'Human Rights'

1. Based on the outcomes of dialogues and public consultations with stakeholders concerning ROSATOM's draft reports for 2023 and 2024 (held in 2024 and 2025 respectively).

No.	Stakeholders' proposals/recommendations	ROSATOM's comments on the incorporation of recommendations
8	To provide information on the salary level as compared to the average level in Russia and in ROSATOM's regions of operation	The proposal has not been incorporated. This information is confidential and requires additional explanation
9	To provide information on the personnel turnover rate as compared to other industries	The proposal has not been incorporated. Comparison with other industries is flawed as the Corporation's business is diversified (its scope of operations includes multiple industries)
10	To raise the limit on the volume of reports for the Divisions	The proposal has not been incorporated. The volume is governed by ROSATOM's internal regulations based on the principle of materiality of information
11	To develop a policy or procedure for assessing the effectiveness of social investments	The proposal will be considered in the medium term
12	To specify whether ROSATOM has its own stakeholder communication model and describe its special characteristics	The stakeholder engagement model is formalised in the Public Reporting Policy[1] and the Uniform Industry-Wide Methodological Guidelines on Public Reporting,[2] and the relevant information is disclosed on an annual basis in section 1.14.8. 'Strategic Communications' and section 4.5 'Work of ROSATOM's Public Council and Community Relations'; the model is also described in the article on ROSATOM's public reporting system[3]
13	To add information on what species were monitored and what environmental monitoring involved (whether the impact of noise pollution was assessed), information on the outcomes of the work and the resulting conclusions to section 1.8.6	The proposal will be considered in the course of preparation of the Report for 2025. Detailed information on monitoring along the NSR in 2023 and 2024 is provided in the report of the Marine Research Centre of Lomonosov Moscow State University[4]
14	To specify in section 5.4.7. whether nature conservation areas were established during NPP operation or before the NNPs were built, and how it was determined that there was no impact on local flora and fauna	The proposal will be considered in the course of preparation of the Report for 2025
15	To add information on joint projects with the Lapland Nature Reserve	The proposal will be considered in the course of preparation of the Report for 2025
16	To include information on the outcomes of rehabilitation of sites as parts of ecosystems	Partially incorporated in the Report in section 1.9. 'Implementation of the Ecology National Project' and section 5.4.8. 'Rehabilitation of Disturbed Areas'
17	To provide information on the status of ecosystems at mining sites	Partially incorporated in the report 'Performance of the Mining Division' in section 6.3.6. 'Measures to Reduce the Negative Impact'
18	To reflect the fact that units on business and biodiversity have been included in training programmes in the section on employee training	Incorporated in section 3.1.5. 'Employee Training' (subsection 'Rosatom Corporate Academy')
19	To separate measures implemented in accordance with requirements of Russian legislation (including fish stocking) and measures that can be classified as responsible business conduct	Partially incorporated in the Report in section 5.4.7. 'Impact on Local Flora and Fauna'
20	To explain at the beginning of the Report that individual environmental topics are presented in several sections	The proposal has been taken into account. The modular format of the Report does not involve a separate section on environmental protection. Instead, issues forming part of the environmental agenda are seamlessly integrated into various sections of the Report, as specified in the table of contents and the GRI Content Index (Appendix 2)
21	To supplement information on expenditure on biodiversity with the findings of the analysis of its efficiency	The proposal will be considered in the course of preparation of the Report for 2025

1. ROSATOM's Public Reporting Policy: https://www.report.rosatom.ru/doc/politica2.pdf
2. Public Reporting Standard (Uniform Industry-Wide Methodological Guidelines) of ROSATOM and Its Organisations: https://report.rosatom.ru/go/rosatom/go_rosatom_2020/report_standart_2020.pdf
3. https://raex-rr.com/b2b/public_relations/public_organizations_reports/2021/opinions/mamii_KGO_2021/
4. https://marine-rc.ru/novosti/broshyura-s-itogami-raboty-cmi-mgu-i-gosk/

Statement of Public Assurance of ROSATOM's Public Report for 2024



80 YEARS OF RUSSIAN NUCLEAR INDUSTRY

2

BUSINESS DEVELOPMENT REPORT

Anatoly Alexandrov (1903–1994)

Anatoly Alexandrov headed the Institute of Atomic Energy in 1960; he was also one of the scientists providing supervision for the construction of Rheinsberg Nuclear Power Plant in the German Democratic Republic. His responsibilities included dealing with the most challenging issues related to the construction of the NPP. Rheinsberg NPP was the first nuclear power plant built outside the USSR; this marked the start of exports of Soviet reactor technologies to the global market.

STATEMENT BY THE FIRST DEPUTY DIRECTOR GENERAL FOR DEVELOPMENT AND INTERNATIONAL BUSINESS

Dear colleagues and partners,

You are reading the business development report of ROSATOM for 2024. During the year, new records were set for the Corporation's new and international businesses: ROSATOM's foreign revenue totalled USD 18 billion, which is almost USD 2 billion more than in 2023; the portfolio of overseas orders currently totals about USD 200.4 billion, while revenue from new products has increased by a factor of 4.5 over the past three years and has reached USD 1,473.8 billion.

We operate in more than 60 countries worldwide. In addition, ROSATOM's subsidiaries have 204 overseas representative offices on various continents, including 24 regional centres and country offices.

At year-end 2024, ROSATOM remained a leading supplier on the global nuclear fuel cycle product and service market. We rank first in the world in terms of uranium enrichment (with a market share of 39%), second in terms of uranium reserves and third in terms of uranium and nuclear fuel production. Despite external circumstances, ROSATOM fulfilled all its contractual obligations related to exports.

ROSATOM remains a leader in the global nuclear industry in terms of NPP exports with a market share of about 90%. We have 22 large power units under construction in seven countries. In addition, in 2024, we signed the world's first export contract for the construction of a small NPP (SNPP). It provides for the construction of a 330 MW SNPP comprising six 55 MW reactors in the Jizzakh Region of Uzbekistan.

Reference projects implemented domestically enable us to maintain an active dialogue with our foreign customers. During the past year, we signed bilateral agreements and documented intentions with partners from the Middle East, Africa, Asia and the CIS.

In 2024, following the start of concreting at power unit No. 4, El Dabaa NPP in Egypt became our second largest nuclear construction project after Akkuyu NPP in Turkey. In October, the core catcher was moved into final position at power unit No. 3 of El Dabaa NPP, and in November, the installation of the core catcher was started at power unit No. 4.

At power unit No. 2 of Rooppur NPP in Bangladesh, the concreting of the outer containment structure was completed in January of last year. In September, the loading of dummy fuel assemblies was started at power unit No. 1. In October, the assembly of the reactor was completed at power unit No. 1 of the NPP.

In Turkey, full-scale pre-commissioning operations were launched in April of last year at power unit No. 1 of the country's first nuclear power plant, Akkuyu NPP.

In July, ROSATOM started to carry out a contract for the supply of nuclear fuel for stage 2 power units of Kudankulam NPP currently under construction in India (power units No. 3 and 4 equipped with VVER-1000 reactors). For the first time in history, power units with VVER-1000 reactors will have an extended 18-month fuel cycle right from the start of their operation.

In Hungary, the core catcher for power unit No. 1 was delivered in August 2024 to the site of Paks 2 NPP. It was shipped from Volgodonsk using water transport. In December, the Hungarian regulator issued a permit for the start of concreting of the foundation of Paks 2 NPP.

In 2024, the construction of power units No. 7 and 8 of Tianwan NPP and power units No. 3 and 4 of Xudapu NPP continued successfully in China; construction work is at an active stage and is carried out in accordance with the contractual schedule. In November, the welding of the main coolant line was completed at power unit No. 7 of Tianwan NPP. At power unit No. 4 of Xudapu NPP, the dome of the reactor building was installed in June 2024. Deliveries of main equipment for the Chinese demonstration fast neutron reactor (CFR-600) were completed.

In Bolivia, the construction of the Nuclear Research and Technology Centre situated at an altitude of 4,000 metres above sea level is ongoing. In the reporting year, nuclear fuel for the start-up of the BRR-1 Bolivian research reactor was produced at the Novosibirsk Chemical Concentrates Plant and underwent the acceptance procedure. A number of countries express their interest in similar projects; we cooperate with African and Southeast Asian countries to prepare the relevant feasibility studies.

In 2024, Russia held the BRICS presidency. Countries that form part of this alliance make a vital contribution to the development of the global nuclear power industry: as early as by 2030, they will account for at least two thirds of new additions to global NPP capacities, with 45 out of 66 nuclear power units currently under construction worldwide situated in BRICS countries. At a meeting held in October in Moscow, senior executives of major specialised companies and organisations from BRICS member countries supported ROSATOM's initiative to establish the BRICS Nuclear Energy Platform. Its aim is to develop and adopt best practices and incentives for the implementation of projects focused on energy and non-energy applications of nuclear technology. The statement expressing support for the initiative was signed by representatives of Russia, Brazil, China, South Africa, Ethiopia, Bolivia and other countries.

At the same time, we also think that BRICS plays a key role in the discussion of a number of other matters. For instance, a forum on nuclear medicine was held for the second time in order to discuss the development prospects of this sector in BRICS countries and BRICS partner countries. We consistently promote the NSR agenda as part of the relevant working group.

In 2024, we launched new business areas in friendly countries with which we have established partnerships. More specifically, ROSATOM and the Republic of Belarus agreed to expand strategic cooperation by signing the Comprehensive Russian-Belarusian Programme for Cooperation on Nuclear Non-Energy and Non-Nuclear Projects.

In the Kyrgyz Republic, we launched a project to build our first exported wind farm; its capacity will total 100 MW. Wind power capacities in the Kyrgyz Republic can potentially be expanded to 1 GW.

In September, we signed a contract with the Bolivian state-owned company YLB for the construction of an industrial lithium carbonate production complex. The new plant will be located on the world's largest lithium-rich salt flat, Salar de Uyuni, which is situated at an altitude of 3,650 metres above sea level and has an area of more than 10,500 square kilometres.

Overall, in the reporting year, we also achieved record results in terms of new business development. In Russia, in addition to ROSATOM's existing wind power generation capacities, which total 1,035 MW, the foundation of the Novolakskaya WPP in Dagestan was laid in late November; this will be the country's largest wind power plant. Local content in the project will total 90%. This has been made possible by the launch of the first Russian enterprise producing wind turbine blades in Ulyanovsk.

ROSATOM remains a leader in the radioisotope segment, ranking among the top five isotope producers globally. It supplies more than 90% of isotope products that are widely used worldwide. In 2024, we increased isotope exports by more than 7% year on year, with isotopes supplied to more than 50 countries. In 2024, about 2.5 million diagnostic and therapeutic procedures were performed using Russian isotopes.

We continue to actively develop innovative Russian radiopharmaceuticals in cooperation with medical professionals. Over the past three years, we have made significant progress in this area and, most importantly, have helped hundreds of Russian people fight serious diseases. Work aimed at closing the thermal envelope has been completed as part of the project to build Europe's largest radiopharmaceuticals plant. In order to ensure Russia's technological sovereignty, we are actively developing medical equipment.

The reporting year was the first year since the inclusion of FESCO Transportation Group in the scope of ROSATOM; during the year, the Group set all-time records as it expanded its own container fleet to 200,000 TEU (20-foot equivalent units) and increased the number of well cars to almost 15,000. The Commercial Port of Vladivostok, which forms part of FESCO Transportation Group, remains a leader in terms of container turnover in Russia for a fifth year in a row. All this, combined with an extensive network of assets and logistics services, enables FESCO to be a leader in terms of seaborne cargo imports into Russia.

Looking back on 2024, I would like to emphasise that it was an eventful and successful year for ROSATOM. We intend to keep up the pace in the future and offer both Russian people and our foreign partners high-technology solutions that help improve people's lives. Our economic and scientific achievements in the reporting period provide a sound foundation for new accomplishments and victories with which we hope to celebrate a great occasion in 2025: the 80th anniversary of the establishment of Russia's nuclear industry.

Kirill Komarov,

First Deputy Director General
for Development and International Business

Key Results in 2024

- Projects were underway in more than 60 countries.
- The Corporation accounts for about 90% of the global market in terms of NPP exports.
- Foreign revenue totalled USD 18 billion (USD 16.2 billion in 2023).
- 22 power units in seven countries are under construction.
- The world's first export contract for the construction of a small NPP was concluded.

GRI 3-3

2.1. BUSINESS DIVERSIFICATION

Key results in 2024

- Revenue from the sales of new products outside the scope of the nuclear industry totalled RUB 1,473.8 billion, which is 29.1% above the target.
- The 10-year portfolio of orders for new products outside the scope of the nuclear industry reached RUB 3,894.4 billion, which is 25.6% above the target.

Despite the current geopolitical instability and restrictions, ROSATOM remains a leader in the nuclear market and continues to fulfil all its contractual obligations.

The development of competitive high-technology non-nuclear products is a strategically important business area prioritised by the Corporation. Projects are implemented taking into account both the needs of the domestic market and the export potential of the Corporation's products.

More than 10 years of operation in this area have resulted in a diversified portfolio of products which match and, in some cases, even outperform the best foreign analogues.

2.1.1. Management system

The system for managing new businesses at the level of ROSATOM is focused on the implementation of strategic programmes. There are currently 16 such programmes (Wind Power, Products and Services for the Oil and Gas Industry, Industrial and Consumer Waste Management, the Programme to Launch the Production of Composite Materials, Development of the Nuclear Medicine and Technology Product Line, Energy Storage Systems Based on Electrochemical Cells, Additive Manufacturing, Digital Products, the Smart City, an International Logistics Operator, APCS and Electrical Engineering, Development of the Lithium Business, Renewable Energy (Foreign Markets), Hydrogen Energy, Gold Mining, and Critical Information Infrastructure).

At the same time, the Corporation is actively searching for areas that could become strategically important in the near future.

2.1.2. Results in 2024

Revenue from the sales of new products outside the scope of the nuclear industry totalled RUB 1,473.8 billion, which was RUB 331.1 billion, or 29.1%, above the target (RUB 1,141.9 billion).

The integrated target for revenue from the sales of new products was exceeded by 27.3%, which was due to an increase in volumes in such segments as trading, logistics services and services provided by the nuclear-powered icebreaker fleet, shipbuilding, special steel, engineering and energy services, the decommissioning of facilities posing nuclear and radiation hazards, special chemicals, etc.

ROSATOM's 10-year portfolio of orders for new products outside the scope of the nuclear industry reached RUB 3,894.4 billion, which is RUB 794.4 billion, or 25.6%, higher than the target (RUB 3,100 billion).

Wind power

Wind power is an important part of clean and low-carbon energy solutions offered by ROSATOM. Greenhouse gas emissions over the life cycle of ROSATOM's WPPs are minimal and total 8.7 g of CO_2e/kWh, which is lower than average estimates based on the findings of international research (IPCC: 11 g of CO_2e/kWh). The operation of ROSATOM's wind farms helps reduce greenhouse gas emissions and serves as a mechanism supporting the climate agenda.

As part of the Wind Power business, which is one of ROSATOM's key business areas, the Corporation builds and operates wind power plants (WPPs) in the Russian Federation. According to the General Scheme for the Locations of Power Facilities until 2042,[1] renewable energy capacities are expected to increase by 17.4 GW by 2042.

As part of the Wind Power Strategic Programme, ROSATOM successfully builds wind farms in the Russian Federation. Following competitive selection as part of the DPM RES and DPM RES 2.0 government programmes aimed at promoting the development of renewable energy generation in the Unified Power System of Russia, by year-end 2024, ROSATOM formed a portfolio of projects with a total capacity of approximately 1.7 GW, with the portfolio of overseas orders totalling 100 MW. ROSATOM's share on the Russian wind power market currently totals about 40%. The Corporation plans to expand its order portfolio in key segments of the renewable energy market, including solar and wind power, both in Russia and abroad.

MED 10 In 2024, the Wind Power Division generated revenue totalling RUB 34.0 billion. ROSATOM's investments in the wind power industry totalled RUB 9.5 billion in 2024.

In 2024, the Corporation completed the construction of the second stage of the Trunovskaya WPP (35 MW) in the Stavropol Territory and started the construction of the Novolakskaya WPP with a total installed capacity of 300 MW in the Republic of Dagestan. The Novolakskaya WPP will become the biggest wind farm in Russia. This status is currently held by another of ROSATOM's WPPs, the Kochubeyevskaya WPP.

Overall, by year-end 2024, nine wind farms with a total capacity of 1,035 MW were in operation; the remaining WPPs are scheduled to be commissioned between 2025 and 2027. Plans for 2025 include commissioning the Novolakskaya WPP in the Republic of Dagestan with installed capacity of 300 MW.

In 2024, wind power generation totalled 2,752 billion kWh, up by 482 billion kWh year on year. In 2023, wind power generation totalled 2,270 billion kWh.

ROSATOM produces components for 2.5 MW wind turbines in-house; it is currently the only Russian producer of wind turbines in the megawatt range. At year-end 2024, local content in equipment produced by the Corporation stood at 68%.

Given the tightening of local content requirements as part of the Russian programme to develop renewable energy, ROSATOM currently continues to take steps to further increase the share of domestically produced equipment and components in its 2.5 MW wind turbines and to upgrade the existing wind turbine technology. In December 2024, the Composite Materials Division of ROSATOM launched the production of wind turbine blades in Ulyanovsk, which will enable an increase in the share of local content to 85% in 2025.

ROSATOM positions itself on the global market as a renewable energy project developer and offers its capabilities in the sphere of comprehensive implementation of projects to build renewable energy facilities.

Projects to build wind and solar power plants abroad are being developed. More specifically, in order to implement a pilot overseas project to build a 100 MW WPP in the Kyrgyz Republic, in 2023, ROSATOM's Wind Power Division opened a representative office, and in December 2024, an investment agreement was signed with the Cabinet of Ministers of the Kyrgyz Republic, which establishes the key parameters of the investment project to build a 100 MW WPP in the Issyk-Kul Region, including guarantees to be provided by the Kyrgyz Republic.

In parallel, pre-project planning is underway as part of business initiatives in neighbouring countries, in Asia and in individual countries in the MENA region.

ROSATOM's plans for 2025 and for the medium term until 2030 include expanding the portfolio of renewable energy projects outside Russia.

1. Approved by Order No. 4153-r of the Government of the Russian Federation dated 30 December 2024.



Healthcare

ROSATOM is a global leader in the production of medical isotopes for the manufacture of radiopharmaceuticals. The sales geography includes 600 organisations across Russia, 100 companies in neighbouring countries, and more than 50 countries globally. Demand for ROSATOM's isotope products is growing steadily: in 2024, exports increased by 7%.

The construction of Europe's largest radiopharmaceuticals plant compliant with GMP standards is underway in Obninsk. The plant will produce a wide range of radiopharmaceuticals and active pharmaceutical ingredients. It is expected that the plant will produce about 20 types of isotope products for cancer diagnostics and treatment and for the diagnostics of cardiovascular and neurodegenerative diseases.

GRI 3-3 ROSATOM is building healthcare infrastructure facilities in several regions of Russia simultaneously in order to improve the accessibility of high-technology medical care using nuclear medicine technology. The Nuclear Medicine Building of the Dmitry Rogachev Centre has been commissioned. Projects to expand and renovate the Dmitry Rogachev National Research Centre of Paediatric Haematology, Oncology and Immunology and to build a cyclotron unit that will supply radionuclides for the Bakulev National Medical Research Centre for Cardiovascular Surgery are being implemented pursuant to orders of the Government of the Russian Federation. Radionuclide therapy centres are being built in Ufa and Lipetsk, and the radiology department building of the East Siberian Cancer Centre is under construction in Irkutsk. CIS, Asian, African and Latin American countries currently express considerable interest in ROSATOM's technologies for the design and construction of healthcare infrastructure facilities.

The Corporation is successfully implementing projects focused on batch production of 16 types of medical equipment and products for medical applications. In 2024, revenue from the sales of special medical equipment totalled RUB 538.1 million. The portfolio of contracts concluded by the Corporation is worth more than RUB 20 billion.

An enterprise of the Corporation is successfully implementing a project to develop and produce a Russian-made haemodialysis machine, with subsidies for R&D provided by the Russian Ministry of Industry and Trade.

In 2024, more than 140 Tianox devices were produced and supplied to healthcare institutions.

In 2025, the Corporation plans to launch the following medical devices on the market: the Lasertool thulium surgical laser system, the Krona-El radio frequency electrosurgical system, a haemodialysis machine and consumables for haemodialysis (a blood filtering process

that is critical, in particular, for the treatment of kidney diseases). By 2030, the Corporation plans to launch the production of new types of high-technology medical equipment, including SPECT/CT scanners, linear particle accelerators, etc., as well as the relevant consumables.

In 2025, the Corporation plans to launch a production facility that will produce more than 140,000 titanium implants per year and will meet at least 30% of demand of the Russian healthcare market for high-quality medical implants for traumatology and orthopaedics.

Additive manufacturing

Batch production of several models of medium-sized 3D printers was launched; the pilot sample of the large-sized RusMelt 600M printer was marked with letter 'O'.

As part of the project to develop a pilot sample for a product line of additive manufacturing equipment using the direct metal deposition (DMD) technique, Technology Readiness Level (TRL) 6 was achieved for a DMD machine.

The Corporation jointly with RUDN University ran a partner continuing professional education programme focused on additive manufacturing technologies in the nuclear industry (52 academic hours of face-to-face training in the 'summer school' format).

Several RM310 printers were supplied.

Preliminary tests were conducted in order to mark detailed designs for the DMD machine with letter 'O'.

Two Shared Additive Manufacturing Centres (SAMCs) were opened in 2024 at Tomsk Polytechnic University and Belgorod Agrarian University.

A titanium powder production site is about to be commissioned, and a project to produce superalloys was launched in Glazov.

An agreement was concluded with the Russian Ministry of Industry and Trade to provide subsidies for R&D in 2024 and 2025.

A pump impeller produced on a RusMelt 300M 3D printer was delivered to the Siberian Chemical Plant in Seversk.

In addition to supplying printers to Russian customers, the Corporation actively promotes 3D printers on foreign markets, including in India and the Republic of Belarus.

RUB 140 billion

Projected revenue from the new materials business in 2034

New materials

Composite materials produced by ROSATOM's enterprises are widely used as part of efforts to ensure technological independence in various industries in the Russian Federation. In 2024, the Composite Materials Division of the Corporation comprised five business units, 31 companies and 17 plants in 15 regions of the Russian Federation. The forecast for revenue from this business for 2034 has been revised upwards from RUB 77 billion to RUB 140 billion on the back of an increase in carbon fibre production from 1,200 to 3,200 tonnes.

Starting from early 2024, composite materials are used for the production of metal-composite high-pressure cylinders (69 MPa, with a capacity of 50 litres or more) for the hydrogen energy sector; the cylinders have been successfully tested at the request of the Power Engineering Division.

In May 2024, composite materials produced by the Corporation for the vertical stabiliser of the MC-21 aircraft were successfully tested; this involved a simulation of

10,000 flights. In September 2024, the Tango aircraft also made from composite materials produced by ROSATOM was tested.

The use of composite materials produced by the Corporation has made it possible to extend the flight range of a two-seat powered parachute piloted by the traveller Fyodor Konyukhov from 900 to 1,300 km.

The Corporation develops new production operations: in October, it launched the production of consolidated plates made from composite materials, and in December, the first sets of blades for wind turbines produced in-house in Ulyanovsk were delivered.

In 2025, the Corporation plans to continue to expand carbon fibre and pre-preg production capacities.

GRI 3-3

Environmental protection

In 2024, ROSATOM completed the implementation of initiatives aimed at building an integrated system for hazardous waste management as part of the Infrastructure for the Management of Hazard Class 1 and 2 Waste Federal Project included in the Ecology National Project. The Corporation also participated in the implementation of the Clean Country, General Cleanup, Preservation of Lake Baikal, and Clean Air Federal Projects.

Two out of seven industrial facilities that the Corporation is building in accordance with the principles of circular economy (Gorny and Schuchye) started pilot operation.

Some items of equipment were delivered for the Kambarka, Maradykovsky, Western Siberia and Vostok facilities, and construction and installation work was underway in main industrial buildings and auxiliary buildings. Public consultations were held concerning the potential environmental impact of the RG Centre facility.

As part of projects to repair historical environmental damage, the Corporation completed the reclamation of the municipal waste landfill in Magnitogorsk (Chelyabinsk Region) and carried out work at the following sites:

- At the industrial site of the defunct Usolyekhimprom enterprise in Usolye-Sibirskoye (Irkutsk Region);
- At the Krasny Bor toxic industrial waste landfill;
- At the site of OJSC Baykalsk Pulp and Paper Mill.

In 2025, as part of the Circular Economy Federal Project forming part of the Environmental Well-Being National Project, the Corporation will continue to build five industrial facilities: Vostok, Western Siberia, Maradykovsky, Kambarka and RG Centre. As part of the General Cleanup Federal Project, it will continue to take steps to repair historical environmental damage in the Usolye-Sibirskoye municipality, at the site of OJSC BPPM and at the Krasny Bor landfill site.

For details, see section 1.9. 'Implementation of the Ecology National Project'.

Smart City

More than 110,000 consumers used digital services on the Smart City platform and more than 40,000 enquiries were handled in 2024. A digital utility system was introduced in one of Russia's border regions; this helped ensure efficient and reliable provision of utility services for thousands of local residents and visitors to the region.

In 2024, solutions developed by the Corporation and successful cases in this area won awards in industry competitions: the Best Municipal Practice Nationwide Competition organised by the Ministry of Construction, Housing and Utilities of the Russian Federation, PROF-IT. Innovation 2024, and the 2nd National Award for Contribution to the Digitisation of Municipal Services.

A demonstration laboratory based on the Infrastructure IoT Platform software was included in Russia's first ranking 'Demonstration Laboratories for the Testing of Russian IT Solutions in 2024'. This is a ranking covering a new segment of the IT market focused on the provision of services related to the testing of Russian software and computing equipment.

As part of programmes to promote the long-term development of Russian regions, in 2024, agreements were concluded with the Belgorod, Voronezh, Lipetsk, Smolensk, Kursk and Sakhalin Regions. In addition, as part of a project titled 'Long-Term Regional Development Programmes', a general framework cooperation agreement was concluded with a Russian bank.

In order to enhance technological independence, a service centre specialising in the maintenance of gas turbine units produced by GE and Siemens was established. The Corporation acquired capabilities for ongoing maintenance of gas turbine units produced by GE (LM6000/LM2500) and Siemens (SGT-600, SGT-800). Services provided by the centre include annual inspection, borescope inspection, adjustment of the combustion mode, and repairs of gas turbine units.

Hydrogen energy

ROSATOM is currently developing several key technological initiatives:

- R&D for the project to build a nuclear power plant for hydrogen production comprising high-temperature gas-cooled reactors (HTGRs) and chemical processing facilities: the main technical solutions for the chemical processing facilities have been approved; R&D within the scope sufficient to make a decision on the transition to the investment stage of the project to build the NPP with HTGRs and chemical processing facilities is expected to be completed in 2028;
- The development of Russian electrolysis units of various capacities: the first Russian electrolysis units with a capacity of 5 and 50 Nm^3/h have been built; they are currently undergoing service life tests;
- Steps are being taken to set up a pilot site for hydrogen production based on the water electrolysis technique using electricity generated by an NPP (design documentation and the findings of engineering surveys were approved in early 2025);
- High-pressure cylinders made from composite materials have been produced; they have a capacity of 80 to 210 litres and are designed for an operating pressure of 392 atm.



2.2. INTERNATIONAL BUSINESS DEVELOPMENT

Key results in 2024

- The 10-year portfolio of overseas orders totalled USD 128.8 billion.
- The portfolio of overseas orders covering the entire life cycle totalled USD 200.4 billion.
- Foreign revenue reached USD 18 billion (USD 16.2 billion in 2023).
- The overseas NPP construction project portfolio comprised 33 large power units and six small power units in 10 countries around the world.
- Projects were underway in more than 60 countries worldwide.

GRI 2-6

2.2.1. Promoting ROSATOM's technologies on foreign markets

GRI 3-3

Despite persisting sanctions pressure, in 2024, ROSATOM remained a leader in key segments of the global nuclear energy market.

The main focus of ROSATOM's international business is the construction of Russian-design nuclear power plants abroad. The Corporation promotes an integrated offer covering a wide range of areas, from NPP construction and fuel supply to the development of nuclear infrastructure and personnel training. This approach is unique on the global market, which enables the Corporation to remain the only player in the world capable of establishing a comprehensive technological partnership in the nuclear power industry.

ROSATOM is actively promoting Russian nuclear technologies and solutions for energy and non-energy applications both in countries that are beginning to develop nuclear power and in countries with a well-developed national nuclear power industry (including based on Russian technology).

In addition, ROSATOM provides support throughout the life cycle of nuclear facilities (including both energy and non-energy facilities) by supplying the global market with the full range of products and services in the front-end and back-end stages of the nuclear fuel cycle (NFC), as well as providing services related to the maintenance and modernisation of such facilities. In 2024, ROSATOM maintained its foothold on the nuclear fuel cycle product market.

GRI 2-1 As at 31 December 2024, ROSATOM was implementing projects in more than 60 countries worldwide.

ROSATOM's country offices and regional centres

24
regional centres, country offices and business representation offices

14
overseas representatives in embassies and trade missions worldwide

204
overseas units



As at 31 December 2024, 204 overseas divisions of ROSATOM and its organisations operated in 51 foreign countries. Among them, a special role is played by 24 regional centres, country offices and business representation offices of ROSATOM. They are managed by Rusatom International Network, a private institution that performs international business development, marketing and PR functions in the industry.

ROSATOM not only builds nuclear power plants under existing contracts but also continues to make steady progress in terms of arrangements for the construction of new NPPs. For instance, following the nationwide referendum held in Kazakhstan in October 2024 which resulted in the decision to build an NPP, the Corporation continues to engage with its partners in order to form an international consortium headed by ROSATOM. On 24 December 2024, State Atomic Energy Corporation Rosatom and the China Atomic Energy Authority signed a Road Map for the Implementation of the Comprehensive Long-Term Cooperation Programme for Fast Neutron Reactors and Closing the Nuclear Fuel Cycle.

ROSATOM takes systematic steps to promote small nuclear power plants; given heightened interest from customers in the energy market, this is a crucial focus area for the Corporation. For instance, May 2024 saw the signing of the first-ever export contract for the construction of a 330 MW SNPP comprising six 55 MW reactors in the Jizzakh Region of Uzbekistan. In 2024, similar projects were actively promoted in the CIS and South Asian countries.

In addition, steps were taken to promote floating NPPs; this product is unique in the world. ROSATOM's capabilities and the successful implementation of the project to build the FTNPP, which simultaneously supplies both heat and power to the town of Pevek in Chukotka, enable the Corporation to engage in a meaningful dialogue with overseas partners. The Corporation consistently explores opportunities for the implementation of projects to build floating nuclear power units in a number of African and Southeast Asian countries. Approaches to establishing an appropriate regulatory framework for such projects are developed in cooperation with partners.

The Corporation attaches special importance to partnerships in the CIS countries. In addition to maintaining and expanding its footprint in countries that already have certain nuclear industry capabilities, such as Kazakhstan, Armenia, the Republic of Belarus and Uzbekistan, the Corporation also cooperates with other countries (Kyrgyzstan, Tajikistan) building on historical ties.

GRI 2-28 ROSATOM views cooperation with foreign non-profit organisations as a key tool supporting the achievement of business targets in its host countries and regions. In 2024, ROSATOM cooperated with more than 30 foreign organisations in 19 countries worldwide, including comprehensive cooperation with the World Nuclear Association. These efforts were focused on further expanding the Corporation's geographic footprint with an emphasis on promoting ROSATOM's new businesses in prioritised friendly countries, such as Turkey, Kazakhstan and Namibia.

Special mention should be made of ROSATOM's initiative to establish the BRICS Nuclear Energy Platform (the Platform). Its aim is to strengthen partnerships with friendly countries and key companies in the nuclear industry. The Platform will make it possible to pool corporate capabilities and accelerate nuclear development. Plans also include engagement with specialised organisations (the World Nuclear Association, the IAEA, etc.). The Platform's agenda will cover the entire life cycle of nuclear power generation, including fuel supply, spent nuclear fuel and radioactive waste management; non-energy and related areas: nuclear medicine, personnel training, developing educational standards, shaping a positive public perception, etc.

In 2024, ROSATOM took part in more than 120 international congresses and exhibitions both in the Russian Federation and abroad.

For details, see section 1.14.8. 'Strategic Communications'.

2.2.2. Changes in foreign revenue and the portfolio of overseas orders

In the reporting year, ROSATOM's 10-year portfolio of overseas orders exceeded USD 128 billion.

Changes in the portfolio of overseas orders, USD billion

Indicator	2021	2022	2023	2024
10-year portfolio of overseas orders, including:	139.9	135.9	127.1	128.8
– NPP construction abroad	84.1	78.0	60.4	56.1
– NFC (including the back end)	34.0	33.5	36.4	39.4
– Other activities	21.2	24.4	30.3	33.3

Changes in foreign revenue, USD million

Indicator	2021	2022	2023	2024
Foreign revenue, including:	8,979	11,764	16,209	17,983
– NPP construction abroad	4,896	5,612	7,319	8,754
– NFC (including the back end)	3,336	4,098	5,193	5,485
– Other activities	748	2,051	3,697	3,744

2.2.3. NPP construction abroad

At year-end 2024, ROSATOM's portfolio of overseas NPP construction projects comprised 33 large power units and six small power units in 10 countries worldwide, with 22 power units in seven countries at the construction stage. All overseas NPP construction projects are on track. Russian-design nuclear reactors that are currently under construction fully meet international safety requirements.



NPP, country	Results
Asia	
Rooppur NPP, Bangladesh	The assembly of the reactor was completed at power unit No. 1. The concreting of the outer containment structure was completed at power unit No. 2.
Kudankulam NPP, India	The following systems and equipment were delivered: – A smart automated monitoring system (power unit No. 4); – Reactor control and protection system drives (power unit No. 5); – Spent fuel pool racks (power unit No. 6).
Tianwan NPP, China	The welding of the main coolant line was completed at power unit No. 7.
Xudapu NPP, China	The dome of the reactor building of power unit No. 4 was installed.
Europe	
Paks II NPP, Hungary	The core catcher for power unit No. 1 was delivered to the site.
Middle East and North Africa	
El Dabaa NPP, Egypt	Concreting was started at power unit No. 4. The core catcher was moved into final position at power unit No. 3.
Akkuyu NPP, Turkey	Full-scale pre-commissioning operations were started at power unit No. 1. The construction of the roof of the turbine hall was completed at power unit No. 2.

2.2.4. NPP servicing abroad

ROSATOM provides maintenance services for 48 Russian-design power units abroad that are currently in operation or at the design/construction stage. Its product portfolio targeted at international markets includes a wide range of work and services covering the entire NPP life cycle.

In 2024, the Corporation provided support for nine scheduled preventive maintenance projects at foreign NPPs, namely the Belarusian NPP (Republic of Belarus), Tianwan NPP (China), Kudankulam NPP (India) and the Armenian NPP (Armenia). The first major repairs were carried out at power unit No. 2 of the Belarusian NPP. Long-term contracts were signed for the supply of equipment, spare parts, tools and accessories and service provision for foreign NPPs in the Republic of Belarus, India and Armenia.

The project to re-extend the service life of the Armenian NPP was launched.

An agreement was signed concerning a long-term contract for the provision of comprehensive technical support for the operation of power units of Tianwan NPP (China).

Full-scale simulators were developed and delivered to Tianwan NPP (China), Xudapu NPP (China) and El Dabaa NPP (Egypt).

1,320 members of operating and maintenance personnel at foreign NPPs underwent training as part of long-term and short-term programmes in 2024, including at Rooppur NPP (Bangladesh), Akkuyu NPP (Turkey), El Dabaa NPP (Egypt), Paks II NPP (Hungary), etc.

2.2.5. Export of uranium products and natural uranium enrichment services

In 2024, ROSATOM remained the world's leading supplier of uranium enrichment services.

All obligations under existing contracts in the reporting year were fulfilled in full, with uranium products supplied to 26 customers in 13 countries. Feedback received from customers indicates that product quality, communications and supply chain resilience meet their expectations. The customer-centric approach adopted by the Corporation and the importance that it attaches to its partners' offers provide a foundation for constructive long-term cooperation. The 10-year portfolio of orders for uranium products remained roughly at the same level as in previous years.

In the reporting year, the Corporation concluded seven new contracts for the supply of uranium products with six customers from five countries, including addenda to existing contracts.

Uranium mining abroad

In 2024, ROSATOM's overseas uranium mining enterprises managed by the Sales and Trading Division produced about 5,800 tonnes on uranium (the share of production based on ownership interest). Together with the operating results of uranium mining enterprises in the Russian Federation, this enabled ROSATOM to rank third in the world in terms of production.

The Corporation plans to develop its mineral resource base and continuously improve the economics of its natural uranium mining projects.

Uranium mining by Uranium One enterprises in the Republic of Kazakhstan, '000 tonnes



2.2.6. Nuclear fuel export

In 2024, ROSATOM strictly complied with contractual obligations to foreign customers with regard to nuclear fuel supply, despite external factors, such as transportation and logistics challenges, difficulties with money transfers, etc.

In 2024, ROSATOM's share on the global nuclear fuel fabrication market totalled 19%.[1]

In 2024, Russian nuclear fuel fully met the demand of Russia, as well as a number of partner countries, including India and Turkey, for reactor fuel. Nuclear fuel produced by ROSATOM is also used in reactors at NPPs in the Republic of Belarus, China and a number of other countries. In the reporting year, the Corporation started to carry out a contract for nuclear fuel supply to power units No. 3 and 4 of Kudankulam NPP throughout its life cycle.

The first batches of nuclear fuel for ROSATOM's major overseas projects were manufactured and shipped in a timely manner; this included fuel for reactor start-up at power unit No. 2 of Akkuyu NPP in Turkey.

In the furtherance of cooperation with foreign customers the Corporation continues to expand its logistics capabilities and plans to launch an alternative route to Egypt.

1. The calculation does not include 23 NPP power units (Japan, India) which were classified as in 'suspended operation' as at 31 December 2024, according to data in the IAEA Power Reactor Information System (PRIS).

2.2.7. New products for international markets

Non-energy applications of nuclear technologies

ROSATOM also continues active work on non-energy applications of nuclear technology.

For instance, ROSATOM's high-technology healthcare projects help to save lives and protect the health of thousands of people worldwide. ROSATOM provides people with access to vital benefits, such as the possibility to preserve food products and sterilise medical supplies to proactively maintain their own health; medical equipment and radiopharmaceuticals for effective cancer diagnostics and treatment; healthcare infrastructure facilities to improve the accessibility of medical care using best practices in the sphere of nuclear medicine.

The Corporation continues to implement the project to build a Nuclear Research and Technology Centre (NRTC) in Bolivia, which is the world's highest-altitude nuclear facility. Since the commissioning of the Cyclotron Radiopharmacy Preclinical Complex (CRPC), several thousands of patients have undergone medical examinations using radiopharmaceuticals produced by the CRPC. Construction and installation operations were completed and key equipment was installed at stage 4 NRTC facilities, including the reactor vessel and the primary cooling circuit. Despite existing restrictions, 90% of equipment has been delivered to the construction site.

The Corporation is assessing options for the implementation of similar projects in a number of countries in Africa and Southeast Asia. For instance, during the visit of the President of the Russian Federation Vladimir Putin to Hanoi (Vietnam) in June 2024, an interdepartmental memorandum was signed concerning the schedule of implementation of the project to prepare a feasibility study for an NRTC in Vietnam.

Lithium projects

The Corporation continues to actively cooperate with Bolivian partners on lithium projects.

Major achievements in 2024 included the signing of a contract with the Bolivian state-owned company Yacimientos de Litio Bolivianos (YLB) for the construction of an industrial lithium carbonate production complex in Bolivia. The new plant will be located on the world's largest lithium-rich salt flat, Salar de Uyuni. Resources of the salt flat will be developed using Russian direct sorption technology for lithium recovery, which has demonstrated a high level of safety and efficiency during testing. Environmental benefits from the Russian technology include avoiding the use of aggressive chemicals in the production process and maximising water recycling, which will help preserve ecosystems in the Potosi Department of Bolivia.

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Healthcare and isotope products

In 2024, ROSATOM continued to develop its capabilities in the sphere of healthcare. The Corporation remains a leader in the radioisotope segment, ranking among the top five isotope producers globally. It supplies more than 90% of radioisotope products that are widely used worldwide. In 2024, exports of Russian isotopes increased by more than 7% year on year, with isotopes supplied to more than 50 countries.

Work is ongoing to develop innovative Russian radiopharmaceuticals. Significant progress has been made in this area over the past three years. Work aimed

at closing the thermal envelope has been completed as part of the project to build Europe's largest radiopharmaceuticals plant.

In 2024, the first Tianox medical device was exported to the Republic of Belarus. In the reporting year, a registration certificate was obtained in the Republic of Belarus for the Russian-made Brachium device; steps are being taken with regard to potential supplies of the device to the Republic of Belarus.

~2.5 million

diagnostic and therapeutic procedures were performed using Russian isotopes in 2024

Promoting life cycle back-end services

ROSATOM continues to promote products and services for the back end of the nuclear fuel cycle (NFC) on the global market, including as part of the Balanced NFC framework developed by Russian specialists.

The Corporation is developing new-generation transportation casks for multimodal transportation of spent nuclear fuel (SNF) from NPPs. A transportation cask was delivered to the site of Akkuyu NPP; it will be used during comprehensive testing of NPP equipment at the commissioning stage.

The Corporation continues to develop the key component of the Balanced NFC, namely solutions for managing the 'short-lived' fraction of radioactive waste that will be produced during the processing of SNF from NPPs. Feasibility studies have been prepared confirming that it is possible to avoid building deep geological repositories in the countries where NPPs are located. Proposals for the integration of these solutions into national RAW management systems have been prepared for potential customers.

Wind power

In 2024, ROSATOM started to build its first exported wind farm in the Kyrgyz Republic; its capacity will total 100 MW. In addition, the Corporation is discussing projects in other countries in order to expand its portfolio of overseas projects.

Energy storage systems

The Corporation is taking steps to expand into new markets in neighbouring and other foreign countries. ROSATOM is discussing strategic partnerships and projects to supply energy storage systems to Latin America, Southeast Asia, the Middle East and North Africa, Nigeria, India and South Africa.

A proposal for the potential phased localisation of production of energy storage systems, up to and including comprehensive marketing and technology support for the construction of a gigafactory in the customer country, has been prepared and unveiled on the market. The introduction of this product has resulted in the signing of a contract for technology transfer to South Africa. The project involves phased provision of services, from market research to conceptual design of a gigafactory based on Russian technology.

The production and delivery of a set of traction batteries for mining equipment have been completed under a contract with MoAZ (Republic of Belarus).

2.2.8. Plans for 2025 and beyond

In 2025, the Corporation plans to continue preparations for the commissioning of several power units in Bangladesh and Turkey and the launch of the research reactor in Bolivia.

Given that the customers' interest in the energy market is shifting towards flexible solutions (in terms of both the power generation volume and the amount of funding), the most important area of focus for the Corporation in 2025 will be the promotion of small NPPs. The Corporation plans to make new arrangements concerning such projects with countries in Africa, Latin America and Southeast Asia.

ROSATOM plans to consistently diversify its product offer by launching new products on new markets. It also plans to be more active on foreign markets with a focus on wind power, energy storage systems and electric mobility, given the considerable potential of these market segments.



2.3. ENERGY EFFICIENCY

2.3.1. Energy efficiency management system. Implementation of energy efficiency management and energy management systems

Energy conservation is an important prerequisite for the efficient use of ROSATOM's energy resources, making it more competitive and reducing the negative impact on the environment. An energy conservation and energy efficiency improvement programme for the period from 2023 to 2027 is being implemented in the Russian nuclear industry.

2.3.2. Results in 2024[1]

Energy consumption and energy cost allocation with a breakdown by Division and complex

In 2024, energy costs incurred by ROSATOM's organisations (under comparable conditions, in 2020 prices) totalled RUB 36.36 billion, including:

- Mining Division: RUB 3.10 billion;
- Mechanical Engineering Division: RUB 1.03 billion;
- Power Engineering Division: RUB 2.30 billion;
- Research Division:[2] RUB 1.38 billion;
- Environmental Solutions: RUB 2.12 billion;
- NWD: RUB 7.46 billion;
- Other: RUB 18.98 billion.



1. According to the reports of nuclear organisations in the Automated Energy Efficiency Management System (the AEEMS information system).
2. In 2024, the scope of the Research Division was expanded through the inclusion of organisations that had been part of the Health Technologies Division.

MED 22 **Energy consumption in the nuclear industry in physical terms (reduction against 2020 as the base year)**

Division/complex	Heat		Water		Electricity		Other (gas, fuel oil, etc.)	
	Actual consumption during the period under comparable conditions, '000 Gcal	%	Actual consumption during the period under comparable conditions, '000 m³	%	Actual consumption during the period under comparable conditions, '000 kWh	%	Actual consumption during the period under comparable conditions, tonnes of fuel equivalent	%
Mining Division	606.68	-1.34	9,352.10	2.74	461,700.59	4.46	680,805.34	3.76
Mechanical Engineering Division	48.90	3.18	1,366.87	38.61	159,117.56	2.40	59,376.34	12.60
Power Engineering Division	387.81	7.61	1,184,184.10	0.59	963,585.47	3.11	-	-
Research Division	223.32	3.04	5,533.27	1.21	185,884.85	-0.59	9,544.63	3.84
Environmental Solutions and Environmental Protection	492.36	7.79	23,828.55	7.65	316,615.65	6.25	22,776.08	2.00
NWD	2,055.33	2.89	25,435.14	3.45	855,963.11	2.81	156,118.97	2.85
Other	2,055.69	4.00	565,389.73	0.03	3,052,008.83	2.42	1,852,017.90	2.71
Total across ROSATOM	**5,870.10**	**3.63**	**1,815,089.76**	**0.62**	**5,994,876.05**	**2.86**	**2,780,639.26**	**3.21**

Energy efficiency measures

According to reports by nuclear organisations, in 2024, actual energy savings against 2020 as the base year totalled 2.8%, or RUB 1.05 million (excluding VAT) in monetary terms and 4,265,303.95 GJ in physical terms, with the following breakdown by Division/complex:

Energy cost savings between 2021 and 2024 (against 2020 as the base year, excluding VAT)

Division/complex	2021		2022		2023		2024	
	RUB million	%	RUB million	%	RUB million	%	RUB million	%
Mining Division	23.24	1.22	33.66	1.77	57.38	1.81	72.16	2.28
Mechanical Engineering Division	31.11	2.86	35.28	3.25	62.50	5.75	58.76	5.41
Power Engineering Division	12.74	0.55	11.06	0.48	13.26	0.57	12.46	0.54
Research Division	8.56	0.67	3.87	0.30	17.16	1.35	11.52	0.83
Environmental Solutions and Environmental Protection	26.24	1.24	118.64	5.23	135.95	5.99	147.91	6.52
NWD	86.68	1.13	107.16	1.40	166.15	2.17	210.49	2.74
Other	164.83	0.86	251.01	1.20	410.24	2.09	532.92	2.73
Total across ROSATOM	**353.40**	**0.99**	**560.68**	**1.50**	**862.65**	**2.30**	**1,046.21**	**2.80**

Specific fuel and energy consumption in relation to revenue in 2023 and 2024,[1]
tonnes of fuel equivalent per RUB 1 million excluding VAT

Division/complex	2023	2024
Mining Division	27.91	26.64
Mechanical Engineering Division	1.00	0.65
Power Engineering Division	0.34	0.31
Research Division	1.55	1.27
Environmental Solutions and Environmental Protection	5.61	4.52
NWD	0.87	1.72
Other	4.43	3.95
Total across ROSATOM	**2.69**	**2.55**

In 2024,[2] specific fuel and energy consumption per unit of output in ROSATOM's organisations in individual areas of business totalled:

- Electricity generation (in the non-nuclear segment of the industry): 0.28 tonnes of fuel equivalent per 1,000 kWh (Mining Division: 0.32 tonnes of fuel equivalent per 1,000 kWh; Infrastructure Solutions: 0.27 tonnes of fuel equivalent per 1,000 kWh);
- Heat generation: 164.1 tonnes of fuel equivalent per 1,000 Gcal (Mining Division: 183.28 tonnes of fuel equivalent per 1,000 Gcal; Infrastructure Solutions: 162.79 tonnes of fuel equivalent per 1,000 Gcal);
- Uranium mining:[3] 13.9 tonnes of fuel equivalent per tonne;
- Coal mining: 2.66 tonnes of fuel equivalent per 1,000 tonnes;
- Cargo transportation by sea and river transport: 6 tonnes of fuel equivalent per 1 million DWT-miles;
- Port operations: 19.6 tonnes of fuel equivalent per 1,000 containers.

ROSATOM's organisations have implemented most elements of an energy management system compliant with the ISO 50001 international standard (organisations in the Power Engineering and Fuel Divisions have obtained international certificates; organisations in other Divisions have implemented individual elements of the system).

2.3.3. Contribution of the nuclear industry to ensuring safety, reliability and self-reliant technological development

ROSATOM makes an important contribution to ensuring the country's technological security and independence by introducing state-of-the-art digital and energy-efficient solutions.

The Infrastructure Solutions Division is implementing an IoT platform for managing urban infrastructure in Moscow, Obninsk, Belgorod, Smolensk and Balakovo. The use of the platform helps conserve energy resources by controlling temperature based on automated modelling taking into account weather forecasts. The accident response time has been shortened. In Belgorod, the Alerts function has been incorporated in the IoT platform and is used to predict failures, which helps respond to pre-accident situations, reduce the loss of energy resources and achieve savings of up to 20% on repairs of faulty equipment.

ROSATOM's Mining Division continues to implement the project to produce functional LED lamps[1] and introduce them in the industry. The lamps combine lighting control, fault diagnostic and energy consumption metering features with capabilities for receiving and transmitting data from external sources, equipment and personnel (monitoring of production processes through connected sensors (including standalone sensors) monitoring temperature, sensors monitoring the presence of personnel and other industrial equipment). These lighting control systems are already used in the industry and are suggested for use in mining organisations between 2025 and 2030.

Number of ROSATOM's organisations covered by the AEEMS



2.3.4. Objectives and plans for 2025 and for the medium term

Energy conservation targets for 2025 (%)

Division/complex	Target
Mining Division	2.30
Mechanical Engineering Division	3.0
Power Engineering Division	0.55
Research Division	1.2
Infrastructure Solutions	2.5
Environmental Solutions	2.1
NWD	4.0
Other	from 1.1 to 6.30

Between 2025 and 2030, ROSATOM plans to:

- Monitor progress on scheduled energy audits in organisations in the industry;
- Monitor updates to energy conservation programmes approved by organisations with energy costs exceeding RUB 50 million per year for the next five years following the completion of the current programmes;
- Assess the outcomes of energy conservation measures implemented by the organisations (assign industry ratings) on an annual basis;
- Maintain the energy efficiency management and energy management systems implemented in the industry and continuously improve their performance;
- Achieve additional synergy between energy conservation initiatives and the Corporation's efforts to improve sustainability maturity in the industry;
- Update the Corporation's scope of reporting;
- Continuously improve the functionality of the AEEMS.

1. The indicator 'Specific fuel and energy consumption in relation to revenue, tonnes of fuel equivalent per RUB 1 million excluding VAT' is calculated starting from the data for 2023 in accordance with Order No. 1/1165-P of ROSATOM dated 12 October 2018.
2. The indicator 'Specific fuel and energy consumption per unit of output, tonnes of fuel equivalent per unit of output' is calculated starting from the data for 2024.
3. Using the in-situ leaching technique.

1. Based on the basic LED lamp designed by an enterprise in the Mining Division and introduced in the industry.

2.4. BUSINESS EFFICIENCY

Key results in 2024

- The scope of systematic RPS development included 84 nuclear organisations.
- 178 digital benchmarks were created in 29 nuclear organisations.
- More than 6,800 RPS projects with a social and economic focus were implemented in the regions.

2.4.1. ROSATOM Production System

The ROSATOM Production System (RPS) is a lean manufacturing culture and a system for continuous process improvement to provide ROSATOM with competitive advantages globally. The RPS principles enable the Corporation to achieve one of its strategic goals: to reduce the production cost and the lead time by identifying and eliminating all types of losses in manufacturing and office processes and by improving the performance of each employee.

2.4.2. Results in 2024

Digital RPS Enterprise

Since 2015, a systematic RPS development programme is implemented in nuclear enterprises: business goals are decomposed to the level of production sites; the manufacture of an enterprise's core products (production flows) is optimised; training in RPS techniques is provided for employees, and incentive systems are introduced to encourage continuous improvement.

Nuclear enterprises supporting the comprehensive development of the ROSATOM Production System are eligible for one of the following statuses: the RPS Reserve, an RPS Candidate, an RPS Leader or a Digital RPS Enterprise.

In 2024, the scope of systematic RPS development included 84 enterprises.

The Digital RPS Enterprise is a prioritised initiative. This approach is focused on improving the management of manufacturing operations through the application of RPS tools, digital solutions and information technologies.

In 2024, 178 digital RPS benchmarks were created in 29 nuclear enterprises; they involve the use of a variety of digital solutions based on state-of-the-art technology, such as artificial intelligence and machine vision, digital twins and digital 3D modelling, robotics and additive manufacturing, the Industrial Internet of Things (IIoT) and predictive analytics, as well as MES, ERP, PLM, CAE, CAD, PDM and other information systems.

An RPS benchmark is a processing stage or a process in the process flow for a key product of ROSATOM's organisation matching global best practices in production engineering.

RPS engineering

In 2024, ROSATOM continued to implement RPS engineering standards at construction sites of RPS enterprises in the nuclear industry.

At the Kursk NPP-2 construction site, all the necessary criteria were met for maintaining the third level of the development status of the RPS construction benchmark 'Operational Management of the Kursk NPP-2 Construction Schedule'.

At the construction site of the Pilot and Demonstration Energy Facility (PDEF) with the BREST-OD-300 reactor in Seversk, the achievement of the second level of the status of an RPS construction benchmark was confirmed.

RPS construction projects were successfully implemented at ROSATOM's major construction sites:

- Optimising the duration of construction and installation operations at the facilities of Akkuyu NPP;
- Creating an RPS construction benchmark at the construction site of the GMP-compliant plant in Obninsk that will produce isotope products for medical applications;
- Streamlining project management processes as part of the construction of the frame of the radiology department building of the East Siberian Cancer Centre in Irkutsk;
- Ensuring that the construction of PDEF facilities is on schedule in 2024;
- Improving productivity during the construction of cast-in-place reinforced concrete structures at a construction site.

In order to mobilise reserves and promote horizontal cooperation in the sphere of design, the Shop Floor Club of Design Engineers was active in the reporting year.

2024 saw the launch of an industry-wide programme to streamline business processes related to NPP construction in order to make large NPPs equipped with VVER reactors more competitive, ensure that NPP construction projects in Russia and abroad are always on schedule and on budget, improve the implementation of NPP construction projects and enhance their efficiency.



Supplier development

In 2024, industry RPS experts continued to support the development of over 40 suppliers from other industries using lean manufacturing approaches and tools. Supplier development initiatives are underpinned by the Uniform Industry-Wide Guidelines on the Development of the Production System of Suppliers of ROSATOM and Its Organisations Using RPS Techniques and Tools. In 2024, two suppliers participating in systematic development efforts reached a high level, namely the third stage, Efficiency.

Objectives in 2024 included scaling approaches to data reliability audit involving a production system assessment (including the assessment of technological capabilities) across the industry. To accomplish this objective, more than 90 experts were trained, more than 70 production system assessment procedures were carried out in 59 supplier enterprises, and 30 technological capability assessment procedures were carried out in 26 supplier enterprises.

According to the Uniform Industry-Wide Guidelines on the Development of the Production System of the Corporation's Suppliers, **production systems in supplier enterprises** are developed in three stages:

1. The first stage includes efforts aimed at starting the transformation and establishing a pilot production site using lean manufacturing techniques and tools.

2. The second stage is aimed at laying the foundation for the production system underpinned by the lean manufacturing principles, further improving process flows selected earlier for optimisation, ensuring that the pilot production site reaches a benchmark level, starting to roll out best practices, planning and launching systematic initiatives (Decomposition, Process Flows, Project Implementation, Training, Motivation).

3. The highest stage (Efficiency) includes efforts aimed at creating an operational system of continuous improvement and formulating a strategy for the development of key product flows. After reaching the third stage, suppliers are able to develop their own production system without regular involvement of the Customer's RPS experts.



Introduction of lean techniques in Russia's social sector and industry

ROSATOM voluntarily shares its best management techniques and workflow organisation methods nationwide as part of the Efficient Region project and the Labour Productivity and Employment Support National Project, helping to improve efficiency in healthcare, education, housing and utilities and other sectors.

268 benchmark best practices in the application of lean techniques were validated in 2024 in the following areas of social and economic activity in the regions: public and municipal administration, education, healthcare, housing and utilities, employment centres, multi-service centres, social security, sports, and industry.

Projects covered 50 regions, with another two regions joining the project in the reporting year. More than 6,800 projects were implemented. In 2024, regions participating in the Efficient Region project won all the prizes in the Lean Management Projects category of the Project Olympus competition in the sphere of professional project management in the public sector, as well as prizes in other categories.

2024 saw rapid development of lean communities in the form of clubs as part of the project; these include the Club of Directors of Lean Schools, the League of Lean Colleges and the Association of Lean Universities, the Community of Lean Local Governments, as well as regional associations, which currently comprise more than 1,750 educational institutions in 14 regions. In addition to existing communities, the Club of Lean Archivists and the Club of Change Leaders in Multi-Service Centres (comprising representatives from 17 regions) were established in 2024.

In 2024, the Corporation continued to implement the End-to-End Investment Flow project jointly with the Ministry of Economic Development of the Russian Federation, the Agency for Strategic Initiatives and major business associations. The project is aimed at reducing paperwork and speeding up the launch of investment projects. The optimisation of the end-to-end investment flow, or the investor journey, is supported by RPS tools and approaches. The Corporation's experts provided training for representatives of the Higher School of Public Administration of the Russian Presidential Academy of National Economy and Public Administration and its regional branches acting as coaches under the programme of training in RPS techniques.

The Corporation was implementing a joint project with the Ministry of Economic Development to introduce process management in multi-service centres providing public and municipal services based on a basic process model in 25 pilot regions.

The Corporation, jointly with three pilot regions, is participating in the development of an Efficiency Workshop affiliated with the Senezh Management Workshop (supervised by the Autonomous Non-Profit Organisation Russia – the Country of Opportunities) to facilitate widespread adoption of lean management techniques at the regional and municipal levels. 20 standards for best regional practices of process optimisation were prepared and tested at the interregional level in 2024.

The reporting year saw the launch of a joint project with the Ministry of Education to reduce the bureaucratic burden on teachers. The Lean School industry-wide competence centre was established with assistance from the Corporation at the Institute of Content and Methods of Education; lean projects are underway in 10 regions of Russia. Solutions for reducing red tape in education on a regional scale are being piloted in seven regions forming part of the third 'cohort' of regions participating in the project. By year-end 2024, the bureaucratic burden was reduced by more than 30%.

In 2024, the Corporation, jointly with the relevant government agencies, took steps to develop a methodology for estimating the standard lead time for government inspections of commercial vehicles (as part of implementation of the list of instructions on implementing the Presidential Address to the Federal Assembly of the Russian Federation dated 29 February 2024).

In 2024, RPS experts implemented measures to manage visitor flows at the Russia International Exhibition and Forum at VDNKh. As a result, at weekends and on holidays, the waiting time for visitors to enter the exhibition space in the Regions of Russia Pavilion was reduced by a factor of 6.5 (from 40 to 6 minutes), and in the Atom Museum the

waiting time was reduced tenfold (from 80 to 8 minutes), while the number of visitors to the pavilions quadrupled.

These measures enabled more than 18.5 million people to visit the exhibition between November 2023 and July 2024.

The project resulted in the development of a methodology titled 'Management System for Large-Scale Public Events', while the Atom Pavilion at VDNKh was given the status of a museum.

Project implementation in new businesses

In 2024, the Advanced Materials and Technologies Division continued to work on systematic RPS development in prioritised areas, such as sales forecasting and production planning, improving product quality, organising and optimising customer engagement and supplier management. Training was provided for coaches, who subsequently worked actively at 17 production sites, including in the Division itself.

In 2024, the Corporation continued to work towards accomplishing ambitious goals of developing its transportation and logistics business, which involve improving efficiency and scaling best RPS practices in logistics operations. Road maps for RPS development until 2030 were developed and approved; they provide a basis for streamlining logistics processes in the long term and improving operational efficiency.

The throughput of the container terminal in Novorossiysk was increased by improving work planning, optimising customs clearance processes and enhancing the port's digital systems. In late 2024, similar initiatives were launched in the port of Vladivostok. During the year, meetings were held with representatives of leading container terminals in the industry in order to identify and replicate the most effective solutions for planning and managing the loading and unloading of container cargo.

These initiatives laid the groundwork for further development of ROSATOM's transportation and logistics business.

2.4.3. Plans for 2025

Digital RPS Enterprise

Plans for 2025 include creating at least 245 new digital RPS benchmarks for product flows and production support processes in 44 nuclear enterprises.

Pursuant to instructions from the Government of the Russian Federation, the Corporation plans to launch an initiative focused on robotic automation in the industry. By 2030, the Corporation is expected to install 4,320 industrial robots, with the target for the average density of robotic automation by 2030 set at 33 robots per 10,000 employees (for enterprises in the manufacturing industry). In order to achieve the target, in 2025, the Corporation plans to publish a methodology for carrying out RPS audits of product flows in order to develop medium-term programmes for the automation of production operations and the use of robotics, carry out RPS audits in 16 pilot enterprises, and develop medium-term programmes informed by the findings of the RPS audits.

RPS engineering

In 2025, ROSATOM will continue to implement RPS engineering standards at construction sites of RPS enterprises in the industry and to develop the industry-wide programme to streamline business processes related to NPP construction.

Supplier development

In 2025, the Corporation will continue to scale approaches to data reliability audit involving a production system assessment (including the assessment of technological capabilities) in the industry. In order to accomplish this objective, ROSATOM will continue to train RPS experts eligible to participate in the assessment of the production system in supplier enterprises, and will at least double the number of assessments of the production system in supplier enterprises by RPS experts compared to 2024. The Corporation plans to continue to support systematic RPS development in at least 50 supplier enterprises in other industries.

Introduction of lean techniques in the social sector and industry

As part of the Efficient Region programme, the Corporation will continue to develop benchmark best practices in all areas of social and economic activity in the regions. ROSATOM will continue to develop the Efficiency Workshop affiliated with the Senezh Management Workshop to facilitate widespread adoption of lean management techniques at the regional and municipal levels, including by standardising regional best practices and developing national-level regulations based on them. In 2025, the Corporation plans to cooperate with representatives of 30 regions in preparing 25 standards for best regional practices and testing them at the interregional level.

ROSATOM will continue to implement the joint project with the Ministry of Education of the Russian Federation to reduce the bureaucratic burden on teachers. Solutions developed in seven pilot regions will be rolled out in all schools across the country.

The methodology titled 'Management System for Large-Scale Public Events' developed in 2024, which is informed by the measures implemented by RPS experts at the Russia International Exhibition and Forum at VDNKh (the Atom Museum and the Regions of Russia Pavilion) and is unique in Russia, will be applied in 2025 when organising and holding large-scale public events in Russia.

New businesses

The Advanced Materials and Technologies Division has prioritised systematic RPS development in its enterprises, including creating the Division's first digital RPS benchmark. In 2025, the Corporation plans to further scale initiatives aimed at improving the productivity and operational resilience of its logistics operations. The main focus will be on process optimisation, the introduction of digital solutions, and the creation of digital RPS benchmarks in key ports, which will make it possible to master advanced techniques and methods for managing core flows and production support processes. This will help improve transparency, speed up operations and reduce costs.

Work has been initiated to organise an end-to-end flow of container cargo via the NSR using the Corporation's logistics assets. The development of this route will help expand the country's transportation capabilities, improve the efficiency of international logistics links and strengthen Russia's position in the global cargo transportation system.

The Medscan Group of Companies will continue to embed RPS tools into all its processes; it plans to develop and launch a process factory and implement at least 10 cross-functional projects and the Benchmark Department project in the Hadassah inpatient clinic.



80 YEARS OF RUSSIAN NUCLEAR INDUSTRY

3

SOCIAL REPORT

Boris Vannikov (1897–1962)

Boris Vannikov was appointed as senior executive of the nuclear industry on the very day of its establishment, 20 August 1945. He was responsible for engineering activities forming part of the project, for the siting and the commissioning schedule of production facilities, for staffing various sections of the Technical Council with researchers and engineers, and selecting experts to address specific issues. In order to meet the need for specialists for the nuclear project, in 1947, a network of special faculties was established in a number of Soviet universities under Vannikov's supervision. Boris Vannikov recommended that scientists should teach at universities and technical institutes and contribute to the training of researchers and engineers. He supervised the establishment of the first nuclear industry hubs in the country and contributed to laying the groundwork for the use of nuclear technology in the energy industry, healthcare and other sectors.

STATEMENT OF THE DEPUTY DIRECTOR GENERAL FOR HR

Dear colleagues and partners,

2024 was an eventful year marked by major achievements for ROSATOM. The Corporation continued to make steady progress towards global technological leadership while remaining a top player on the global nuclear power market. We launched new innovative businesses, embarked on new projects, and expanded our international strategic partnerships.

ROSATOM's people are central to the achievement of its ambitious goals. The Corporation's performance and achievements reflect the efforts of our talented and committed employees. In 2024, our nuclear family grew even larger as the number of people employed in the industry increased by 13% and reached 418,000 by the end of the year. This is a team of like-minded individuals who are united by shared values and a vision for the future.

ROSATOM gives special focus to initiatives in its regions of operation. The Corporation continued to develop the People, Towns and Cities programme. As part of ROSATOM's comprehensive approach to promoting the development of its host towns and cities, a Coordination Council comprising executives of Divisions across the industry was set up in the Corporation in February 2024. The Council acts as a forum for discussing and effectively addressing issues related to cooperation in the four main areas of urban development.

In 2024, significant progress was made in improving healthcare in nuclear towns and cities. We approved a joint programme in collaboration with the FMBA of Russia. Highly qualified medical professionals are recruited to work in polyclinics and specialised medical centres. Over the past three years, about 1,000 medical professionals of various specialisms have been recruited, including 338 in 2024. 29 adult and children's polyclinics were renovated, and nine Industrial Medicine Centres were opened. We have been running an extensive awareness campaign focusing on disease prevention and a healthy lifestyle. In the reporting year, residents of 18 towns and cities took part in the ROSATOM – Territory of Health forum. The share of residents in towns and cities participating in the project who were satisfied with medical care increased from 36% to 71%.

Today, we are taking steps to create a comfortable urban environment in nuclear towns and cities, expand access to high-quality education and offer opportunities to participate in volunteer projects and sports competitions. In 2024, over 110,000 employees, students and residents of nuclear towns and cities participated in large-scale sports and wellness events. For the first time in five years, five countries in which we operate took part in industry-wide basketball and futsal tournaments: Russia, the Republic of Belarus, Egypt, Turkey and Bangladesh. We set a new record for the number of victories at the Ready for Labour and Defence festival, with ROSATOM scoring its fourth National Cup win.

The popularity of corporate volunteering is growing. In 2024, we launched over 500 social initiatives and provided grant support for more than 300 projects. Maria Karpenko, the leader of the Second Life volunteer movement in Kurchatov, was named Volunteer of the Year and won the #WEARETOGETHER International Award. The award was presented in person by the Russian President Vladimir Putin.

We continue to improve and develop ROSATOM's educational ecosystem. Securing the talent pipeline is key to the successful implementation of our strategic business plans. Today, the Corporation's network of partner schools includes more than 250 institutions, which are opening nuclear, engineering and mining classes and Mendeleev classes (focused on chemistry and other STEM disciplines). To provide students with in-depth learning opportunities, we have launched ROSATOM's Network Engineering School, an online platform that helps students prepare for the Unified State Examination and academic competitions in physics and mathematics. Since last year, we have been collaborating with a network of specialised educational and research centres. The network currently comprises 10 centres. We would like to express our sincere gratitude to the teachers who train future nuclear scientists and engineers and generate enthusiasm for STEM disciplines among the younger generation. Over 500 physics, chemistry, mathematics, computer science and technology teachers have completed professional development programmes run by the Rosatom Corporate Academy in collaboration with the National Centre for Physics and Mathematics, National Research Nuclear University MEPhI, and Moscow Institute of Physics and Technology (MIPT). As part of the Teacher for ROSATOM project, over 300 students from teacher training colleges undertook internships in schools in ROSATOM's host towns and cities.

As part of the Professionality Federal Project, seven more state-of-the-art educational clusters were created in Polyarnye Zori, Seversk, Krasnokamensk, Sarov, Novouralsk, Elektrostal and Yuryuzan. The project currently covers 11 colleges and 2,000 students studying for the most in-demand blue-collar jobs. In the reporting year, the project produced 150 graduates, 85% of whom have been hired by ROSATOM's enterprises.

We also continued our cooperation with the Consortium of Core Universities headed by NRNU MEPhI, which was included in the top five universities worldwide for the first time according to the RUR Nuclear Education and Technology 2024 ranking. It is a comprehensive initiative that includes upgrading educational infrastructure and taking a fundamentally different approach to training in-demand specialists.

We are establishing and developing new educational spaces to train future elite scientists and engineers: MSU Sarov, the New Snezhinsk Educational Centre, and the Obninsk Tech International Scientific and Educational Centre for Nuclear and Related Technologies.

MSU Sarov is training a new generation of scientists, physicists and mathematicians specialising in pure and applied science, with the second cohort of students graduating in 2024. All 42 of these young specialists have been hired by ROSATOM or its partners. A total of 104 students from 19 Russian regions enrolled at MSU Sarov in 2024. New Snezhinsk, a nationwide centre training specialists in applied nuclear science, produced 16 Master's degree graduates in 2024, all of whom have been hired by an enterprise of ROSATOM. The number of students is expected to grow to 300 by 2030.

As part of the Obninsk Tech project, we are already collaborating with partner universities and ROSATOM's businesses to deliver online educational products, host major international events and youth forums, and build and upgrade existing infrastructure. Obninsk Tech focuses on training the future technology elite for our partner countries. The goal is to train at least 10,000 professionals in nuclear and related disciplines, as well as emerging frontier technologies, by 2030.

ROSATOM's educational system is an undisputed leader in the international arena. In 2024, over 2,200 foreign students from 65 countries, including more than 150 people from BRICS countries, studied at the Corporation's core universities.

The Corporation's professionals showcase their skills and expertise in a variety of competitions and contests. ROSATOM's team traditionally ranks among leaders in terms of the medal count in professional skills competitions. Last year was no exception. We won a total of 44 medals at the BRICS Future Skills & Tech Challenge, the 4th World Construction Championship, and the Hi-Tech International Competition of High-Technology Professions. The main industry-wide competition, AtomSkills, saw record attendance in 2024, with 2,000 participants from 12 countries. A student league was held for the first time, and the number of competences represented in the competition increased to 42.

We appreciate and recognise the achievements of our nuclear family. The culture of celebrating our employees is an integral part of the unique environment created in

the Corporation. Our flagship industry-wide programme, ROSATOM's Person of the Year, comprises around 80 categories. It enables us to acknowledge achievements and projects across all areas of ROSATOM's operations. In 2024, around 4,000 entries were submitted for nomination. As a result, 536 people won awards in divisional, cross-divisional, corporate and special categories. They are our asset, our treasure and our pride.

ROSATOM's efforts to develop its people receive recognition from the expert community. In 2024, ROSATOM was included in the Platinum category in the ranking of employers in Russia according to *Forbes*. We further confirmed our status as a top employer by being included in the top group in the employer ranking according to *RBC*. Additionally, we won the Grand Prix at the Employer Branding Awards in the following categories: Employer Brand 2024, Best Employer in the Energy Sector, Best Digital Solution for Employer Brand Promotion, Best Communication Campaign (ROSATOM's Person of the Year), and Best Engagement Campaign for University and College Students and Graduates.

In 2024, ROSATOM acted as the general partner of the World Youth Festival, which brought together young people interested in nuclear topics from all over the world. Over 12,000 people from 180 countries viewed the Corporation's display. The Corporation became the title partner of the 2024 Congress of Young Scientists, a key event of the Decade of Science and Technology. The reporting year saw the 70th anniversary of the launch of the world's first nuclear power plant, which marked the beginning of the era of peaceful nuclear development. Multiple high-profile events were held to celebrate this milestone.

Our industry emerged in the same year which saw the Great Victory in World War II, and we will celebrate our 80th anniversary in 2025. However, this is just the beginning of our journey. Even more ambitious tasks and achievements lie ahead of us. We confidently make our plans a reality. A close-knit team united by shared goals and values is key to the long-term success of ROSATOM and the nuclear industry as a whole.

Tatyana Terentyeva,

Deputy Director General for HR

Key Results and Events in 2024

- The average monthly salary reached RUB 137,190 (up by 11.3% compared to 2023).
- The personnel turnover rate stood at 13.87%.
- In 2024, the employee engagement rate in the industry stood at 82%, on a par with the world's best employers.
- Over the past three years, 96% of members of the executive succession pool have been appointed to new managerial positions.
- Over 450 employees of ROSATOM and its organisations received government awards, certificates of appreciation and acknowledgements from the President of the Russian Federation.
- Over 10,300 employees and veterans received industry awards.

Awards

- Top employer: included in the Platinum category of the 2024 *Forbes* ranking;
- Top group (the highest score) in the employer ranking according to *RBC*;
- Winner of the Grand Prix at the Employer Branding Awards in the following categories: Employer Brand 2024, Best Employer in the Energy Sector, Best Digital Solution, Successful Promotion Campaign Targeted at Students, etc.

Social responsibility

- ACRA upgraded ROSATOM's annual ESG rating one notch to ESG-2, reflecting an improvement in its social score;
- Category A in the Corporate Charity Leaders ranking;
- Winner of the ESG Excellence Award 2024 in the CSR Project of the Year category.

Education and science

- Winner of the Crystal Pyramid Awards in the HR Team of the Year and the Corporate University of the Year categories;
- Winner of the Grand Prix of the Leaders for Women Nationwide Competition (Eurasian Women's Forum).

Culture, environment and innovation

- Winner of the Best Completed Construction Project in Moscow Award for the Atom Pavilion at VDNKh;
- Winner of the Korsh Award for ROSATOM's Territory of Culture;
- Winner in the People's Choice category of the More Than a Journey Award for the Mendeleev Ecological Expedition project.

Volunteering

- Winner of the SoUchastie Nationwide Award for contribution to the promotion of blood donation initiatives in the PRopaganda category for the Редкое-совпадение.рф online portal;
- ROSATOM's volunteer and CSR projects received key federal awards: the #WEARETOGETHER International Award, Champions of Good Deeds, Best for Pets, ECO Best, Best Social Projects in Russia, etc.

Sports and healthy lifestyle

- Winner of the SPIEF 2024 Champion Award for promoting the Ready for Labour and Defence programme among employees;
- Winner of the Best Social Projects in Russia Award in the Sports Promotion category for the Nuclear Games;
- Winner of the Investment in the Development of a Healthy Country Nationwide Competition for a project titled 'ROSATOM's Healthy Lifestyle Ambassador. Running Race of the Divisions'.

Digital and media

- Winner of the Energy of Words Award (Russian Energy Week);
- Winner of the Digital Leaders Awards in the following categories: Socially Significant Project of the Year (Включитесвет.рф), SMART Solution of the Year (Росатомгранты.рф), Project of the Year (Редкоесовпадение.рф).

Key events of the year

- The 2024 AtomSkills Competition of Blue-Collar and Engineering Professions was organised, attracting around 2,000 participants; a new skill, Digital Twins, was represented for the first time.
- The IT Core Conference, which attracted over 300 participants, was held in Nizhny Novgorod to discuss the application of advanced technologies in the nuclear industry.
- A record number of entries were submitted for the Corporation's employee recognition programme, ROSATOM's Person of the Year, in 2024, with 536 employees in the industry presented with awards.
- The Uniform Industry-Wide Code of Ethics and Professional Conduct for Employees of ROSATOM and Its Organisations was approved.
- Training programmes on ethics and human rights were launched, with 320,000 employees of ROSATOM receiving training.
- The Corporation's team traditionally ranks among leaders in terms of the medal count in professional skills competitions. In 2024, the Corporation won a total of 44 medals at the BRICS Future Skills & Tech Challenge, the 4th World Construction Championship, and the Hi-Tech International Competition of High-Technology Professions.
- The 9th AtomSkills 2024 Industry-Wide Competition of Blue-Collar and Engineering Professions was held, attracting around 2,000 participants. The competition featured a student league for the first time in 2024, with students from 48 partner educational institutions competing. The number of competences represented in the competition increased to 42. The number of participating countries grew to 11.
- In 2024, ROSATOM acted as the general partner of the World Youth Festival and was given the status of a clean energy supplier for the Festival. The Festival took place from 1 to 7 March 2024 at the Sirius Federal Territory. The Corporation's display was viewed by more than 12,000 participants of the Festival from 180 countries globally; another 8,000 students attended 120 lectures and workshops held by ROSATOM's executives and experts.

- In June 2024, the Obninsk NEW International Youth Nuclear Forum was held as part of the celebrations marking the 70th anniversary of the launch of the world's first nuclear power plant and the beginning of the era of peaceful nuclear development. The event was attended by 900 delegates from 100 countries.
- In June 2024, the Presidential Executive Office of the Russian Federation recognised ROSATOM's contribution to BRICS energy cooperation in terms of human resources and included a seminar on personnel development in the context of the energy transition in Russia's BRICS presidency plan. The seminar was held on the sidelines of the Obninsk NEW Forum. It was attended by nine official delegations of experts on personnel development in the energy sector. Following the seminar, a set of recommendations and an action plan for 2025 were developed and approved by BRICS energy ministers.
- The IAEA International Conference on Nuclear Knowledge Management and Human Resources Development took place in Vienna (Austria) from 1 to 5 July. The event, which was held after a four-year hiatus, was attended by high-level industry delegates, who delivered 17 reports. ROSATOM sponsored prizes for the IAEA Young Talents ProSTEM Challenge, which was held in a specially constructed high-technology 'green' pavilion.
- The 6th BRICS Youth Energy Summit took place on 27 and 28 September in the Atom Pavilion at VDNKh in Moscow. The event was organised in cooperation with ROSATOM and featured 120 young representatives of the energy industry from 27 countries, as well as young employees of ROSATOM as part of the Russian delegation.
- On 18 November, on the sidelines of the 29th Conference of the Parties to the UN Framework Convention on Climate Change (COP29) in Baku, Azerbaijan, an official closing event was held to conclude the celebration of the 70th anniversary of the launch of the world's first nuclear power plant in Obninsk. The event titled 'Nuclear Dream' offered its participants an immersive experience. It was attended by representatives of the IAEA and the World Nuclear Association, as well as young leaders and activists promoting the green agenda. At the event, ROSATOM announced the launch of its global mentoring programme.
- From 27 to 29 November, the Sirius Federal Territory hosted the Congress of Young Scientists, with ROSATOM acting as its title partner. Over 300 young researchers from ROSATOM participated in the event. An agreement was signed with the Government of the Kaluga Region and NRNU MEPhI to implement the Development Programme for the Obninsk Tech International Scientific and Educational Centre for Nuclear and Related Technologies for the period from 2024 through 2030. A bilateral cooperation agreement was signed with Saint Petersburg Electrotechnical University.
- The AtomProfi forum for young professionals, the largest youth event in the nuclear industry, was held and attracted 600 participants representing ROSATOM's youth communities.
- The Secretariat of the Business 20 (B20), a group comprising the largest companies in the G20 nations, approved ROSATOM's participation in the Employment & Education Task Force and the Women in Business Action Council.
- As part of the Alliance of Human-Centric Organisations, ROSATOM and Eskom (South Africa) implemented an action plan to develop human resources and promote a human-centric labour market. A unique educational course was held to facilitate the sharing of best practices in six key areas of human resources cooperation.
- The first international Summer School for Women in STEM was held in Obninsk and Moscow; it was attended by 50 young women from 27 countries.



3.1. HR POLICY

GRI 3-3

3.1.1. HR policy approaches and principles

ROSATOM implements a motivating HR policy that involves competitive salaries and an extensive benefits package (health insurance, corporate loan programmes, pension plans, health resort treatment and recreation, family programmes, etc.).

The HR policy is aimed at providing ROSATOM and its organisations with the required number of engaged employees having the required skills in a timely and cost-effective manner.

The principles of the HR policy are as follows:

- The areas and priorities of the HR policy must support the achievement of the Corporation's strategic goals;
- Executives of the Corporation, its organisations and business units are responsible for employee performance;
- Social partnership aimed at aligning the interests of employees and employers;
- Prioritisation of a culture focused on results and continuous improvements in the Corporation and its organisations;
- Systematic training, development and promotion of employees of the Corporation and its organisations in the nuclear industry in accordance with strategic goals;
- Performance-based remuneration contributing to the achievement of strategic goals of ROSATOM and its organisations;
- All employees of the Corporation can express their opinions on the situation in the Corporation and its organisations, give and receive feedback on their performance to/from their executives, and obtain any information on the operations of ROSATOM and its enterprises, except for classified information.

ROSATOM has adopted a uniform Code of Ethics and Professional Conduct for Employees. The Code of Ethics communicates the key values of the nuclear industry and defines the relevant ethical principles of employee conduct when interacting with a wide range of external and internal stakeholders. The rules of conduct set out in the Code concern combating corruption, protecting the Corporation's resources, property and information, occupational health and safety, environmental safety, conflict prevention and resolving conflicts of interest, as well as maintaining the corporate image.

ROSATOM's Code of Ethics

GRI 2-7

3.1.2. Key personnel characteristics

As at year-end 2024, ROSATOM and its organisations employed 418,000 people[1] (the average headcount for the year totalled 393,500 people; the number of external part-time employees averaged 2,450 people[2]).

1. The increase in the headcount was due to an additional 18,900 employees being hired by existing enterprises in various Divisions, as well as the inclusion of new assets with a total headcount of 28,100 people in the Corporation's scope.
2. Although the average number of external part-time employees is not included in the main average headcount figure, it is taken into account when calculating the average monthly salary.

Changes in the number of employees, '000 people

Indicator	2021	2022	2023	2024
Headcount at year-end	298.6	337.4	371.2	418.4
Average headcount	288.5	329.2	343.2	393.5

As at year-end 2024, ROSATOM's organisations operated in 79 Russian regions and had a headcount of 357,700 employees.[1]

ROSATOM's organisations with the largest number of employees are based in the following regions:

- Moscow and the Moscow Region: 73,600 people;
- Nizhny Novgorod Region: 34,500 people;
- Chelyabinsk Region: 33,600 people;
- Saint Petersburg and the Leningrad Region: 29,800 people;
- Kursk Region: 26,200 people.

At year-end 2024, ROSATOM's organisations operated in 32 foreign countries,[2] where they employed 60,700 people, with the highest headcount in the following countries:

- Egypt: 25,300 people;
- Bangladesh: 15,600 people;
- Turkey: 15,000 people;
- CIS countries (Belarus, Kazakhstan, etc.): 2,700 people.

Average headcount by employee category

Indicator	Headcount, '000 people	% of the total headcount
Executives	45.0	11.44
Specialists and white-collar workers	171.6	43.61
Blue-collar workers	176.9	44.96

Headcount by education level

Education level	Headcount, '000 people	% of the total headcount
Employees holding a university degree	211.5	50.56
Candidates and Doctors of Sciences	3.29	0.79

GRI 2-8

The average number of employees working under independent contractor agreements totalled 720 people (0.18% of the average headcount).

The share of women in the average headcount in ROSATOM and its organisations has not decreased over the past four years, remaining stable at 32%, which reflects the nature of the industry.

1. For details on the headcount of ROSATOM's divisions in the Russian Federation, see Appendix No. 4.
2. For details on the headcount in ROSATOM's foreign branches and organisations, see Appendix No. 4.

MED 44 **Male/female ratio by employee category, %**

Employee category	Share of men	Share of women
Executives	78.53	21.47
Specialists and white-collar workers	51.27	48.73
Blue-collar workers	80.93	19.07

The age of employees averaged 42.2 years (45.6 years for executives). 30.6% of employees were aged under 35.

Breakdown of the headcount by age group, %

Age of employees	Share, % of the total headcount
Under 35 years	30.84
36 to 50 years	42.36
50+	26.80

GRI 401-1 During 2024, 107,600 people were hired, which accounts for 27.3% of the average headcount. 54,600 employees were dismissed in 2024.

MED 25 **Staff turnover,[1] %**



3.1.3. Remuneration system

In 2024, personnel costs totalled RUB 865.9 billion, up by 28% year on year.

Costs per employee per year increased by 11.6% from RUB 1,960,270 in 2023 to RUB 2,186,950 in 2024.

1. According to ROSATOM's methodology, the staff turnover rate is calculated based on the number of dismissed employees, excluding dismissals due to downsizing, the expiration of fixed-term employment contracts, retirement, conscription for military service, death or transfers within the industry. An increase in the staff turnover rate compared to 2023 was due to the consolidation of new assets with a high staff turnover rate and the completion of the latest stages of construction as part of overseas projects in the Engineering and Power Engineering Divisions.

MED 24 **Structure of personnel costs, %**

Indicator	2021	2022	2023	2024
Payroll	75.4	75.8	75.5	75.4
Insurance contributions	20.6	20.2	20.1	20.4
Social and other expenses (including training)	4.0	4.0	4.4	4.2

GRI 2-20 ROSATOM has in place a flexible remuneration system which includes a variety of tools designed to ensure that business targets are achieved and employees are closely focused on results.

The Corporation's current remuneration system:

- Provides competitive remuneration matching the level of remuneration in the best companies in Russia;
- Is result-based: the size of an employee's salary is linked to their efficiency, professionalism and achievement of key performance indicators (KPIs).

ROSATOM develops KPIs in accordance with the Methodological Guidelines on KPI Development and Application;[1] the KPIs are approved by the Supervisory Board and cascaded from ROSATOM's top management down to line managers in organisations.

In accordance with the requirements of the Integrated Industry-Wide Remuneration System and the Uniform Industry-Wide Performance Management Policy, the size of the annual bonus paid to employees depends on achieving KPI targets and reflects progress in achieving the key performance targets of the Corporation and its organisations.

MED 26 In 2024, the average monthly salary in ROSATOM increased by 11.3% compared to 2023 and totalled RUB 137,190 per month. This was possible largely due to the ongoing improvement of labour productivity and operational performance, and cost control.

3.1.4. Career development opportunities

Executive succession pool

In order to ensure succession and train employees to be appointed to managerial positions, an executive succession pool (ESP) is being formed and developed in ROSATOM.

In order to select development programmes that are best suited to the target positions of ESP members, the ESP is divided into four levels:

- ROSATOM's Assets and ROSATOM's Assets. Basic Level (top and senior executives);
- ROSATOM's Capital (middle-level executives);
- ROSATOM's Talents (promising specialists and junior executives).

Since the establishment of the executive succession pool, the number of its members has exceeded 6,700.

1. Approved by Order No. 3579-r of the Government of the Russian Federation dated 28 December 2020.

Number of ESP members with a breakdown by gender

Gender	2021		2022		2023		2024	
	Number	Share	Number	Share	Number	Share	Number	Share
Men	4,279	77%	4,614	78%	4,928	78%	5,157	77%
Women	1,186	23%	1,306	22%	1,426	22%	1,542	23%

Appointments of ESP members to a new position[1]

Indicator	2021	2022	2023	2024
Share of ESP members appointed to vacant top and senior executive positions (top 30 and top 1,000 executives in the industry)	70.4%	70.8%	74.1%	77.7%
Share of ESP members among senior, middle-level and junior executives appointed to a new (management) position	91.0%	92.0%	94.0%	96.0%

A special feature of succession pool development programmes is their practical focus. Executives not only complete training modules, but also work on their own projects contributing to the achievement of the Corporation's strategic goals.

Training as part of ESP development programmes

ESP level	Development programme	Key training topics	2021	2022	2023	2024
Senior executives	ROSATOM's Assets	Shaping the Future, Virtuosos of Management, Communication in Times of Change, Marketing, Finance	391	416	449	483
	ROSATOM's Assets. Basic Level	Strategy, Leadership and People Management, Change Management and Horizontal Interaction, Marketing, Finance	427	491	562	621
Middle-level executives	ROSATOM's Capital	Leadership and Project Management, Advanced Leadership Skills, Data Management, Situational Leadership	2,271	2,448	2,640	2,833
Junior executives	ROSATOM's Talents		2,376	2,565	2,703	2,855
Total			**5,465**	**5,920**	**6,354**	**6,792**

1. Since 2018, the calculation of the indicator has changed: the promotion of succession pool members was assessed based on the number of ESP members appointed to new positions over the last three reporting years. Between 2020 and 2022, the assessment focused on the share of promoted ESP members who had been included in the ESP in 2018 and 2020 respectively.

Successor assessment

The practice of assessing high-potential employees was introduced in 2018 in order to improve the quality of succession plans and the transparency of employee promotion processes. The methodology is based on the best practices adopted in major international companies. Executives are involved in talent assessment and are responsible for developing succession plans. In order to share experience and ensure that decisions are made objectively, the assessment methodology involves the possibility of cross-functional and cross-divisional cooperation, whereby executives participate in the assessment of other executives who are candidates for managerial positions. Successor candidates are assessed in terms of their commitment to corporate values, the relevant professional and managerial experience and knowledge, motivation and potential.

The number of executives who take part in the assessment of successors to be appointed to managerial positions is growing year by year. In 2024, more than 109 organisations carried out an assessment of successor candidates for higher management positions. The assessment is performed by the superiors of the potential successors and is facilitated by a certified expert. As part of this approach, executives have a greater personal responsibility for and are more actively involved in the development of succession plans; this also reduces the duration and cost of the assessment process. A total of 2,080 successors were evaluated. More than 170 certified successor assessment experts work in the industry; 37 experts obtained certification in 2024.

Career counselling

The career counselling service continued to function. Career counselling is provided by 39 industry experts. During 2024, 884 consultations were held in 117 organisations in the industry, including 183 consultations at the industry-wide career counselling centre for IT specialists opened in 2024. In 2024, the service was highly rated by employees (77% of employees were willing to recommend career counselling to their colleagues, and 93% were satisfied with the career advice they received).

The development of digital career management tools for employees has continued: in 2024, the online training course titled 'My Career in ROSATOM' was completed by more than 4,400 employees, and more than 1,000 participants used the Restart interactive career simulator. The number of subscribers to the 'My Career in ROSATOM' group on the ROSATOM LIFE corporate social media platform exceeded 2,400 people in 2024.

Career opportunities for female employees in the industry

The [In]Visible Power leadership programme for women is now available to all female employees in the industry as part of the catalogue of programmes run by the Rosatom Corporate Academy. The programme is targeted at female leaders and community influencers, assisting them in developing leadership strategies and providing access to mentoring and training opportunities and a support community. In 2024, the programme expanded beyond the industry with the launch of the International Women's Summer School, which provided training to 50 female participants from 27 countries. ROSATOM's support system for female employees won the Grand Prix of the Leaders for Women Competition at the 4th Eurasian Women's Forum.

GRI 404-2
GRI 404-1
MED 31

3.1.5. Employee training

Systematic talent development is one of the priorities of ROSATOM's HR policy, with training forming an integral part of the talent development framework.

In 2024, 85.4% of employees across the industry, including partner businesses, and 98% of employees in enterprises managed by ROSATOM[1] were covered by training programmes. The number of training hours per employee averaged 52.0 hours.[2]

Percentage of employees who underwent training by category and gender, %

Employee category	2024
Executives	11.9
Specialists and white-collar workers	41.9
Blue-collar workers	46.2
Gender	
Men	68.7
Women	31.3

Average annual training hours per employee by gender

Gender	2024
Men	57.0
Women	32.3

Average annual training hours per employee by category

Employee category	2021	2022	2023	2024
Executives	72.0	73.9	87.9	83.9
Specialists and white-collar workers	35.6	36.0	45.6	40.0
Blue-collar workers	44.3	37.1	65.0	56.0

Training hours per employee category

Employee category	2024
Executives	3,738,663
Specialists and white-collar workers	6,806,272
Blue-collar workers	9,885,456

1. Industry enterprises that apply industry-wide operational processes and personnel training and development standards; their number is smaller than that of enterprises included in the overall scope of social performance disclosures.
2. Based on the average headcount. Based on the number of employees on the payroll as at 31 December 2024, the figure stood at 48.9 hours per employee. The decrease in training hours per employee in 2024 was due to the fact that additional large-scale occupational health and safety training under Decree No. 2464 of the Government of the Russian Federation dated 24 December 2021, which is provided once every three years, was completed in 2023.

Flagship development programmes

Personnel training and development programmes are tailored to ROSATOM's business needs and strategic goals:

- **ESP development programmes.** Their participants are employees of nuclear organisations who have the relevant management skills and professional expertise and have been selected for training and subsequent appointment to key positions.
- **Executive E-School.** In 2024, junior and middle-level executives, as well as successors to be appointed to managerial positions continued to receive training as part of the Executive E-School industry-wide programme aimed at promoting a uniform approach to the development of managerial competences in the industry and providing high-quality training for executives and their successors. By year-end 2024, more than 16,000 employees had received certification as part of the Executive E-School programme.
- **Project Manager Development Programme for NPP Construction Projects.** In 2024, 58 construction project managers participated in this industry-wide successor training programme. Feedback received from the participants reflects a high level of satisfaction with the programme (with an NPS score of 92%, the majority of respondents are willing to recommend the programme for training purposes).
- The **Technological Leader** programme not only provides training but also contributes to boosting productivity and reducing lead times across various Divisions. In 2024, two training modules were delivered, with over 70 employees from the Mechanical Engineering, Fuel, and Arctic Divisions taking part in the programme.
- **Global Professionals** is a comprehensive development programme designed for employees involved in global projects. To date, a total of 318 participants have completed the programme.
- As part of the **Voice of ROSATOM** speaker training programme, 161 people have completed the assessment and training process.
- **ROSATOM's Business Leaders** is a training programme for executives of ROSATOM's international business and new businesses. To date, 101 executives have received training as part of the programme.
- **ROSATOM's New Products** is a programme designed to support the achievement of the strategic goal of developing new products for the Russian and international markets. The amount of training under the programme (measured as the number of participants multiplied by the number of completed courses) exceeded 3,600 person-courses. As part of the programme, a total of 54 employees successfully completed in-person training, and 30 projects focused on developing new businesses were presented.
- **First Line** is a training and development programme for line managers in the industry. More than 30 events were held during the year, including management workshops, management platforms for the sharing of experience, a Management Quiz, and an industry-wide conference. Over 22,000 people received training. The level of satisfaction with the programme was assessed at 77% (NPS) and 95% (CSAT).

A total of 15,734 people took part in the Management Quiz, an increase of 32.9% compared to 2023. The managerial knowledge index stood at 77%.

The 4th Industry Conference for Line Managers, which has already become a regular event, was attended by more than 3,000 people.

80 organisations from nine Divisions of the Corporation took part in the programme focused on engaging line managers and small group leaders. The programme included Line Manager Days and meetings of the Production League, which were attended by more than 11,000 people. More than 5,000 small group leaders and line managers received training as part of the Production Reserves track.

Technological schools

In order to maintain traditions and preserve the acquired expertise, provide opportunities for dialogue within the expert community, solve 'real-life' cases and establish a base of lessons learned, ROSATOM develops technological schools hosted by industry centres of expertise.

In 2024, technological schools expanded their reach:

- The School of Innovative Waste Processing Technologies (114 people received training);
- The School of Advanced Materials (249 people received training);
- The School of Thermal Power Engineering (591 people received training);
- The School of Additive Manufacturing Technologies (1,020 people received training);
- The School of Design Engineers (1,874 people received training);
- The IT School (661 people received training).

By launching new programmes at technological schools, ROSATOM builds on the knowledge of key technologies to address practical technological challenges in a comprehensive way in partnership with leading scientific and technical experts.

Functional schools

In 2024, training in corporate functions continued to be provided at industry schools:

- The Procurement, Logistics and Quality School;
- The Law School;
- The Project Management School;
- The HR School.

The HR School provided training to over 2,000 people and held 25 HR Friday webinars with a reach of more than 3,600 people; the webinars were hosted by experts from ROSATOM and other Russian companies. They included a review of business cases of industrial and technology companies and the sharing of HR practices.

The L&D Academy continued to run its six-month training programme for the developers of educational products launched by the Rosatom Corporate Academy together with corporate universities of major Russian companies. Between 2021 and 2024, a total of more than 500 people took part in the programme, including employees in the nuclear industry, as well as external participants.

The scope of training delivered as part of the Property Management and Law School programmes exceeded 5,400 person-courses. The Procurement School attracted over 14,000 participants, with more than 2,000 people joining its dedicated community.

The portfolio of distance learning courses of the online Project Management School is updated annually. A total of 11,500 people successfully completed training in 2024.

Industry Competence Centres

In 2024, the expert community of the network of Industry Competence Centres organised 617 events aimed at proactively developing competences to ensure technological leadership. These included educational events (workshops, seminars, lectures, etc.) designed to improve operational efficiency, preparation for professional skills competitions, career guidance events, etc. Over 20,000 people took part in these events, including nearly 600 teachers and employees of partner educational institutions, more than 4,000 university students, about 1,600 school students and over 13,000 employees of industry organisations.

Promoting a culture of safe behaviour

The Corporation continued to hold events as part of programmes designed to foster a culture of safe behaviour (CSB). The following events were held in 2024: nine Divisional and industry-wide events; an event organised as part of international cooperation with the IAEA; five WANO support missions; more than 50,000 safety dialogues; training provided by in-house CSB instructors to over 14,000 people; more than 90 on-site CSB promotion projects, two of which won prizes as part of the Youth Day of the World Week for Safety and Health at Work 2024; three industry-wide Safety Leaders' Forums (each attended by over 700 people); a conference titled 'Vision Zero: From Vision to Reality', which was attended by top management; and the annual Nuclear Power and Industry Safety Day Dialogue Forum, which was attended by over 300 people, including senior executives of ROSATOM, its Divisions and organisations.

The Centre for Safety Culture and Human Reliability (CSCHR) at the Rosatom Technical Academy participated in a project launched at two pilot NPPs in the Power Engineering Division to identify psychological factors that contribute to unsafe behaviour among employees, and to determine what causes a loss of awareness of danger.

As part of the Atomic Recharge programme, a number of industry events were held, attracting over 13,000 participants, with the satisfaction level reported at 97%. A survey on occupational well-being was also conducted among 36,867 respondents.

> 87,400
person-courses

Total scope of training programmes focused on the culture of safe behaviour

Training in digitisation

To achieve technological leadership, ROSATOM continued to take steps to improve digital literacy among its employees.

More than 30% of managers and industry specialists have completed digital literacy training. This helps to meet the Corporation's demand not only for talented IT specialists, but also for a high level of digital literacy among all employees without exception.

In 2024, the amount of training provided as part of the programme to assist end users in the transition to domestic software (Astra Linux and My Office) totalled 18,500 person-courses.

In the reporting year, the Technical Academy provided training in information security and information technology (programming, network and system administration) for 781 people.

Overall, the digital literacy level in the industry (among executives, specialists and white-collar workers) was rated at 78.2%, which is more than 10 percentage points higher than the national average.

The following programmes were implemented to develop digital competences among digitisation leaders and customers: Development of Digitisation Leaders in the Nuclear Industry, and the Digital Seasons engineering and manufacturing club. The coverage of the programmes totalled over 200 person-courses.

In addition, the following events were held for students: the IT Core Conference, hackathons, career events at universities, technical tours for IT specialists, a conference for IT interns, and the ITober project for IT students and graduates (with a total reach of approximately 600,000 person-courses and views on social media).

To promote the IT employer brand, 10 industry-specific cases were presented at federal hackathons, with 377 teams working to develop solutions. A total of 126 winners were offered training at the IT School.

Information security culture is an important part of ROSATOM's digitisation programme. In 2024, the coverage of face-to-face and online training courses on information security culture totalled about 24,500 person-courses.

The annual ROSATOM/Information Security/2024 conference was held for information security specialists working in the industry; it was attended by about 500 IT infrastructure representatives. The participants discussed the security of domestically developed operating systems, as well as existing threats and new technological solutions. Major events in the field of information security in the industry included the ROSATOM/State-of-the-Art Technologies (RoST) conference, which was held by the Technical Academy for the first time in February 2024, and the regular Conference on Information Security in Automated Physical Protection Systems. The RoST conference offered a universal platform for sharing experience and best practices in information technology, and for fostering collaboration on the market for IT services, both in the nuclear industry and beyond.

Two new demonstration simulators for practising cyber threat prevention skills were developed and deployed at the site of the Technical Academy in Obninsk. One of them is used to simulate password cracking scenarios (Kraken), while the other simulates attacks on video surveillance systems.

Industry platforms for personnel training and development

Industry-specific training is provided primarily by the Rosatom Corporate Academy, including the Andrey Sakharov Mayak Academy (Nizhny Novgorod), and by the Rosatom Technical Academy with branches in Obninsk, Moscow, Saint Petersburg and Novovoronezh. Both Academies are full partners of ROSATOM in achieving its strategic objectives; they implement projects directly relevant to prioritised areas of business development.

Rosatom Corporate Academy

The Corporate Academy implements programmes focused on developing leadership and business competences, management training, developing corporate functions, encouraging the best graduates and professionals to work in the industry, competence evaluation, career counselling, training blue-collar workers and engineers, and developing the corporate culture, the youth community and the safety culture.

The Rosatom Corporate Academy plays a leading role in ROSATOM's key projects: People, Towns and Cities (focused on building a sustainable social environment in ROSATOM's host towns and cities); Acceleration (aimed at reducing red tape); Blue-Collar Workers and Engineers for Production Growth and Technological Development; Safety Culture Development in ROSATOM, and ROSATOM's Values. New projects and programmes are rolled out every year, such as the L&D Academy for methodologists involved in educational programmes, the [In]Visible Power leadership programme for female executives, sustainability initiatives, etc.

One of the main objectives of the Corporate Academy is to build a talent development ecosystem to meet today's challenges. During the year, the Academy held more than 2,900 events, with the amount of training exceeding 1.7 million person-courses. Its portfolio includes more than 250 educational and training programmes. The Academy's programmes include training focused on the ESG agenda, including topics such as Business and Biodiversity (as part of the Sustainability course).

In 2024, the Andrey Sakharov Cultural and Education Centre Mayak Academy secured its status as the top venue in Nizhny Novgorod for major industry, regional and federal events. The Centre hosted more than 135 events attended by more than 49,000 participants. The Mayak Academy actively cooperates with the National Centre for Physics and Mathematics, the Federal Agency for Youth Affairs, the Autonomous Non-Profit Organisation Russia – the Country of Opportunities, the government of the Nizhny Novgorod Region and other partners in developing educational and cultural initiatives. In recognition of its contribution towards developing the urban environment, the Centre received the Nizhny Novgorod of the Future 2024 award for the best renovation project.



Rosatom Technical Academy

In 2024, the Rosatom Technical Academy remained a leading centre for continuing professional education (CPE) in the industry in the following areas:

- Development of competences focused on the safe use of nuclear energy, controls, state security, operational and supporting processes, etc.;
- Cooperation between ROSATOM and the IAEA in five areas: nuclear energy, nuclear security, nuclear sciences and their applications, small modular reactors, nuclear medicine and radiopharmaceuticals;
- Training of personnel for foreign NPPs as part of projects to build Russian-design NPPs abroad;
- Training of personnel for new areas of the Corporation's business;
- Conducting an independent scientific and technical evaluation of R&D for major industry projects (a total of 5,560 evaluations worth a total of RUB 500 million have been conducted over the past 10 years).

In 2024, the portfolio of the Rosatom Technical Academy included more than 750 CPE programmes, including programmes that reflect a comprehensive approach to ensuring the safe operation of nuclear facilities and national security. These cover a range of topics, from nuclear, radiation and industrial safety, occupational safety and health to NPP operation, design and construction, IT solutions that do not rely on imported technology, information security, physical protection, asset protection and anti-corruption, protection of state secrets, etc. GRI 403-5

A major event in 2024 was the launch of a welding and inspection project office at the Novovoronezh branch, marking the launch of a project to establish a Welding and Inspection Certification and Training Centre.

The Rosatom Technical Academy is a member of the Moscow Centre of the World Association of Nuclear Operators (WANO) under the auspices of the Power Engineering Division; in this capacity, it focuses on maintenance and

repairs, operating experience and incident investigation, as well as on safety culture and NPP personnel reliability. In addition, in 2024, the Academy carried out five WANO safety culture missions and a mission on the training of NPP personnel.

In 2024, 275 participants from 45 countries, including Nigeria, Ghana, Turkey, Egypt, Kenya, Brazil and other countries, attended training events organised in cooperation with the IAEA, as well as courses for professors from foreign universities. A further 291 participants underwent training as part of nuclear security programmes. Over the years of cooperation with the IAEA, the Academy has trained around 5,000 specialists from 95 countries.

The Academy continues to provide extensive personnel training to support international projects to build Russian-design NPPs in the Corporation's partner countries: in 2024, 324 specialists and managers of Rooppur, El Dabaa, Akkuyu and Paks II NPPs, which are currently under construction, received training. The Academy also started to provide personnel training for Xudapu NPP, which is under construction in China.

In 2024, the Technical Academy held nine divisional and industry-wide events focused on providing psychological support to ensure the professional reliability of personnel, and on promoting safety culture and leadership. A research and practice workshop titled 'Radiopharmaceuticals: Production, Quality and Safety' was held for the first time.

Personnel training for overseas customers

The Technical Academy has been the first in the world to start retraining nuclear specialists with a focus on the two-component nuclear power industry and the operation of Generation IV nuclear power systems. The relevant series of training courses has been developed in collaboration with leading experts working on the Proryv (Breakthrough) Project and with support from ROSATOM's Department of Scientific and Technical Programmes.

In 2024, the Rosatom Technical Academy trained 287 instructors that will train personnel for the future NPP equipped with a BREST-OD-300 reactor. The training was provided at the Corporation's training and information centre in Seversk.

Training in cooperation with the IAEA

In 2024, the Centre for International Cooperation of the Rosatom Technical Academy, in collaboration with the IAEA, organised nine training events attended by 196 participants from 35 countries. These included training courses, workshops and jointly organised schools, as well as a research visit for delegates from the Republic of Türkiye.

Key international events organised jointly by the Technical Academy and the IAEA in 2024 included the following:

- The 2nd ROSATOM–IAEA Regional Research Reactor School took place from 30 May to 13 June at the Moscow branch of the Rosatom Technical Academy. Delegates from over 11 countries were offered an opportunity to expand their knowledge of nuclear technology with a focus on experimental power plants;
- The Russia–IAEA International Nuclear Energy Management School for Managers in Saint Petersburg was attended by 27 delegates from 13 East Asian, African and Latin American countries. As part of a week-long programme, participants learned about various components of nuclear infrastructure, shared their experience and participated in panel discussions addressing emerging issues. The programme also included a technical tour of ROSATOM's Emergency Response Centre;
- The 5th Russia–IAEA Nuclear Knowledge Management School took place at the site of the Rosatom Technical Academy in Moscow. The event was attended by 28 delegates from 14 countries across Asia, Africa and Latin America, as well as the CIS.

Training programmes delivered abroad

As part of cooperation with international customers under contracts for NPP construction abroad, by year-end 2024, the Rosatom Technical Academy trained 324 specialists; a further 486 people will continue their training next year. In 2024, the amount of training provided to the personnel of five NPPs (Rooppur, Akkuyu, El Dabaa, Paks and Xudapu NPPs) totalled 77,511 man-days.

In order to effectively provide training for the personnel of El Dabaa NPP at the customer's site, the Rosatom Technical Academy initiated the establishment of a branch in Egypt.

Distance learning

ROSATOM continues to develop distance learning formats in order to create a comprehensive digital learning environment.

Training courses are accessible on any device anywhere 24/7 through the RECORD Mobile training platform. The RECORD Mobile platform is available as both a mobile app and a web app. The catalogue of training courses contains 3,753 units of educational content. In 2024, more than 25,000 new users registered on the platform. As at year-end 2024, a total of 252,000 employees used the platform, including 2,100 employees working abroad.

Youth engagement

ROSATOM attaches special importance to building the talent pipeline for the nuclear industry; it is developing a comprehensive system for engaging with both established professionals and prospective employees in order to secure human resources for the organisation. An innovative educational ecosystem has been created in the industry, with the Rosatom Corporate Academy at its core. This ecosystem enables the training of top-class specialists from school level onwards and supports them throughout their professional journeys.

This is a two-way process: by offering work placements, we give school and university students an opportunity to gain first-hand experience of the working environment in ROSATOM's organisations; at the same time, we establish a presence in schools and universities through our involvement in supervisory and trustees' boards, by setting up dedicated departments and participating in the teaching process, thereby incorporating the business agenda into the educational process and reducing the amount of time needed to onboard new employees and introduce them to our corporate culture. The Rosatom Corporate Academy also engages with professional and social communities and develops youth movements and associations: ROSATOM's Juniors, ROSATOM's Student Community, and the Industry Youth Council.

ROSATOM gives special focus to systematic engagement with students and universities. ROSATOM's Consortium of Core Universities currently comprises 20 universities led by NRNU MEPhI. The Rosatom Corporate Academy actively supports this collaboration.

Career events involving representatives of nuclear enterprises, such as open days and job fairs, are a traditional tool for promoting ROSATOM's employer brand at core universities. More than 38,000 students attended career events in 2024. Over 105 industry enterprises represented at the events offered over 600 vacancies to students and graduates.

In addition, ROSATOM's Student Community expanded its network in 2024 by opening 20 new units at ROSATOM's core universities, launching 14 new units at NRNU MEPhI branches, establishing 10 units at partner universities, and ensuring their integration into the overall framework of the Community, which currently includes over 750 students.

The project to promote the development of Student Construction Teams (SCTs) in the nuclear industry continued, with around 2,400 SCT activists participating in projects in Russia and abroad during the winter and summer work terms in 2024. These included 14 construction projects in

Russia, including in Moscow, Ozersk (Chelyabinsk Region), Sosnovy Bor, Sarov (Nizhny Novgorod Region), Seversk (Tomsk Region) and at other sites, as well as overseas NPP construction projects in Egypt, Turkey, Bangladesh, Hungary and India.

The culmination of 2024 was the 10th Industry-Wide SCT Forum, which attracted a total of 120 participants. The event also included an awards ceremony to recognise the top SCT members in the nuclear industry in 2024, with 12 individuals receiving awards from ROSATOM in appreciation of their significant personal contribution to the project to promote the development of student construction teams in the nuclear industry.

The Nationwide Forum of Student Teams was held from 22 to 25 November 2024 to mark the 65th anniversary of the movement. The event was attended by over 12,500 delegates from across Russia and friendly countries, including veterans and current members of the movement, government officials, partners and employers' representatives. ROSATOM was a strategic partner of the event. At the forum, the Corporation signed a five-year strategic partnership agreement with the Youth All-Russian Public Organisation Russian Student Teams.

Every year, in order to stimulate interest in STEM disciplines and engineering professions among school students, ROSATOM partners with major federal events and projects, including the All-Russian Public-State Movement of Children and Youth 'Movement of the First', the Big Break Nationwide Competition, the Academic Competition 'I Am a Professional', joint events organised by the Russian Znanie Society, etc. In 2024, events held as part of federal projects with support from ROSATOM garnered a total of over 6.2 million views.

In 2024, ROSATOM continued to cooperate with the Movement of the First in holding joint educational, career guidance, and awareness projects for school students. Examples of this collaboration included a series of popular science lectures on new materials delivered on the community page of the Movement of the First on VKontakte, the Movement of the First at VDNKh Festival of Childhood and Youth and a number of other events.

One of the flagship projects of the Movement of the First is the Big Break Nationwide Competition, with ROSATOM acting as a strategic partner. In 2024, over 37,000 school students from ROSATOM's host towns and cities took part in the anniversary season of the Big Break competition. A total of 34 lectures and workshops were delivered with a total reach of over 1.2 million people, the Atom Month was held, and 13 participants from nuclear towns and cities won the competition. In 2024, the prize fund for the winners of the 2023 competition was disbursed. Six overall winners of the Big Break Nationwide Competition in the Shape the Future category took part in the Icebreaker of Knowledge International Arctic Expedition, while six overall winners in the Preserve the Nature category went on the Mendeleev Ecological Expedition to Kamchatka. Similarly, the authors of the best solutions to industry-specific cases presented by ROSATOM in 2024 will take part in the Icebreaker of Knowledge Expedition and the Mendeleev Ecological Expedition in 2025.

In 2024, this collaboration resulted in ROSATOM and the Movement of the First signing a road map for cooperation for 2025 and 2026. The road map outlines ongoing initiatives aimed at providing school students across the country with an opportunity to embark on a career in science, find mentors and unlock their talents in the nuclear industry.

In addition, to encourage talented school and university students to pursue a career in the nuclear industry, ROSATOM has partnered with the Talent and Success Foundation, Sirius University and Sirius Lyceum to develop educational programmes, establish specialised laboratories and launch Master's degree programmes. In 2023 and 2024, over 70 events were held, featuring 75 industry experts. Since 2022, Sirius Lyceum has hosted science camps for 105 school students. In 2024, a programme titled 'Science. Art. Atom' was run, involving 13 experts from ROSATOM's enterprises and 40 high school students who solved cases in key areas such as new materials, laser technologies and nuclear fusion technologies.

ROSATOM supports large-scale nationwide projects organised by the Sirius Educational Centre, including the Big Challenges science and technology programme, and the nationwide educational initiative to search for and implement science and technology projects in Russia titled 'Sirius. Summer: Launch Your Project'. As part of these programmes, 66 school students visited ROSATOM's enterprises and core universities in Saint Petersburg, Sosnovy Bor, Moscow and Obninsk; they also participated in career trials and training sessions organised by the Rosatom Corporate Academy. Since 2021, Sirius University has been running a Master's



degree programme in Mathematical Robotics and AI; it has also launched new programmes in Applied Robotics and CII Development.

Since 2022, ROSATOM has been running the AtomDiscovery science and education programme to support the highest-achieving participants of Russia's flagship youth projects across topic areas supervised by ROSATOM. In 2024, its participants included winners of two nationwide competitions, Big Break and Your Move, as well as participants of programmes run by the Sirius Educational Centre. As part of the programme, they visited nuclear towns and cities (Snezhinsk, Ozersk, Zarechny and Obninsk). They were also offered an opportunity to visit nuclear enterprises and ROSATOM's core universities.

The programme of the research and educational trip traditionally included three areas: Study Technology, Unlock Your Potential, and Discover Russia. Experts from the nuclear industry and ROSATOM's ambassadors acted as 'navigators' for the students.

Winners and runners-up of federal projects were invited to participate in the Icebreaker of Knowledge science and education project. The fifth expedition to the North Pole took place in August 2024; it was held as an international event for the first time. Over the course of 10 days, 63 school students travelled over 5,000 kilometres aboard the *50 Let Pobedy* icebreaker and visited the Franz Josef Land archipelago en route.

For details, see section 1.14.8 'Strategic Communications'.

In addition, a support programme for winners of federal projects was launched in 2023; to date, over 500 school and university students have participated in the programme. By the end of 2024, over 50% of high school students participating in the programme had been admitted to ROSATOM's core universities, while 30% of university students had received exclusive internship, work placement and employment offers.

A project titled ‘ROSATOM’s Employer Brand Ambassadors’ provides considerable support for career guidance initiatives in the nuclear industry. The project is aimed at raising awareness among school and university students; it is run by activists from among employees of nuclear enterprises and professors from ROSATOM’s core universities. The ambassador community comprises 168 members from 25 Russian towns and cities and three foreign countries, representing 50 nuclear enterprises. During 2024, the ambassadors published over 850 social media posts and organised more than 205 career guidance events.

Another key area of focus for ROSATOM is engagement with young employees. To date, 136 youth councils have been established in nuclear organisations; they are affiliated with ROSATOM’s Industry Youth Council.

In 2024, a number of activities were carried out across prioritised areas in cooperation with the Industry Youth Council: more than 600 safety patrols were conducted in 11 Divisions; a pool of 150 young experts was formed to participate in federal and international events; 405 employees from six Divisions in the nuclear industry participated in youth corporate entrepreneurship projects; 48 projects to reduce red tape were implemented in 11 Divisions; and three federal grants totalling RUB 1.8 million were secured to fund youth projects in ROSATOM’s host towns and cities.

Participation in the Industry Youth Council enables employees to gain leadership and project management experience, and participate in large-scale federal and international projects. It also provides them with an opportunity to engage in direct dialogue with ROSATOM’s executives, helping them to unlock their potential and develop within the Corporation.

Events held in 2024 included a Youth Communication Day, which attracted 4,000 participants, as well as a Youth Community Leaders’ Forum, which was attended by 234 representatives of industry communities. 186 young employees from 145 of ROSATOM’s enterprises joined an educational programme titled ‘School of Youth Community Leaders 2.0’.

In addition, in 2024, over 450 young employees participated in federal and international forums, including the Territory of Meanings, the Biryusa Forum, the Youth Days at the Saint Petersburg International Economic Forum (SPIEF) and the Russian Energy Week (REW), the BRICS Young Scientists Forum, the BRICS Youth Energy Summit and the World Youth Festival.

Every year, the AtomProfi forum is the highlight of the event calendar for representatives of all youth communities in the nuclear industry, as well as for winners of federal and industry competitions for school and university students. In 2024, the forum was held as a Youth Community Festival and attracted over 650 participants.

The Corporation works continuously to involve nuclear industry executives at all levels in developing ROSATOM’s youth policy. More specifically, in order to facilitate systematic efforts to attract, onboard and retain young people in ROSATOM’s organisations, the Council for Systematic Efforts to Attract, Onboard and Retain Young People in ROSATOM’s Organisations and an affiliated Expert Council were established in 2024; they comprise HR directors and heads of Divisions in the nuclear industry.

3.1.6. International cooperation in education

In order to strengthen ROSATOM’s position in the global market and promote Russian engineering education, infrastructure for personnel training is being established, and national nuclear education frameworks based on Russian technologies are being developed.

In 2024, as part of the International Cooperation in Nuclear Education project, more than 60 events were organised in over 40 countries with assistance from ROSATOM’s partner universities to promote Russian education. Six information centres operate successfully in ROSATOM’s partner countries.

As part of engagement with young talents, the Ambassadors of Russian Nuclear Education project is running successfully. As part of the project, more than 66 best foreign students from 28 countries participate in major international industry projects of the Corporation and actively promote Russian universities abroad. A scholarship programme for talented students from ROSATOM’s partner countries and the IAEA Marie Sklodowska-Curie Fellowship Programme to support girls are being implemented. Since 2020, 50 girls from Russia, Kazakhstan, the Kyrgyz Republic, India, Indonesia, Sri Lanka, Uzbekistan, Turkey, Egypt, Senegal, Uganda, Serbia, Cambodia, Myanmar, Nicaragua, Tanzania, the Philippines, Rwanda, Ethiopia and other countries have joined the programme.

Students show considerable interest in HackAtoms. These are competitions on nuclear topics for student teams. HackAtoms were held in Armenia, Bolivia, the Republic of Belarus, Myanmar and Kazakhstan.

Foreign students study nuclear and related disciplines at Russian universities. They study at National Research Nuclear University MEPhI, as well as at ROSATOM’s core universities and partner universities: Tomsk Polytechnic University (TPU), Saint Petersburg State University, St. Petersburg Polytechnic University, Mendeleev University of Chemical Technology of Russia, Moscow Power Engineering Institute, Far Eastern Federal University, the Ural Federal University, Moscow Institute of Physics and Technology, Moscow State University of Civil Engineering, Bauman Moscow State Technical University, Alekseev Nizhny Novgorod State Technical University and National University of Science and Technology MISiS. In the 2024/2025 academic year, more than 2,200 foreign students from 65 countries, including Armenia, Vietnam,



Rwanda, Bolivia, Uzbekistan, Turkey, Bangladesh, Jordan, Egypt, Algeria, Nigeria, Myanmar, Kenya, Kazakhstan, Congo, Ethiopia, Hungary, Serbia, Bulgaria, South Africa, Ghana and other countries, studied at Russian universities.

ROSATOM's core universities continue to successfully implement their international educational programmes in cooperation with foreign universities in partner countries (a total of 20 programmes).

The Corporation continues to develop overseas branches of its core universities. In the 2024 academic year, 309 students studied at the Tashkent branch of NRNU MEPhI, having enrolled through the admissions process between 2019 and 2024. In September 2022, NRNU MEPhI opened a branch in the Republic of Kazakhstan. In 2024, there were 124 students at the branch.

In order to help to provide employment for graduates of Russian universities which are members of the Association of Universities called 'Consortium of Core Universities of ROSATOM', a number of career events are held to establish contact between foreign employers and graduates. NRNU MEPhI and Tomsk Polytechnic University hosted ROSATOM's Career Days for international students, which were attended by representatives of foreign operators, regulators, national atomic energy commissions and nuclear infrastructure organisations. The events were attended by more than 350 students of core universities and 23 organisations from Azerbaijan, Armenia, the Republic of Belarus, Kazakhstan, the Kyrgyz Republic, Egypt, Ghana, Nigeria, Uzbekistan, Bangladesh, Brazil, Bolivia, Zambia, Rwanda, Myanmar and Sri Lanka.

Together with Russian universities, the Rosatom Technical Academy runs Train-the-Trainers professional development courses for educators and employees in the industry with a focus on the application of radiation and nuclear technologies in industry and education. The aim of the courses is to support talent development in a partner country. More than 300 foreign participants from 37 countries joined Train-the-Trainers courses in 2024.

ROSATOM attaches special importance to engaging with graduates of Soviet and Russian universities and developing alumni communities at its core universities. In 2024, more than 10 events were held, which were attended by over 150 foreign alumni of core universities.

3.1.7. Employees' participation in external and industry-wide professional competitions

ROSATOM's employees actively participate in the Leaders of Russia competition: 1,548 employees participated in the fifth season of the competition; 98 of them reached the finals; 15 employees reached the super finals; and five employees won the competition and were awarded grants for training. The Corporation's team traditionally ranks among leaders in terms of the medal count in professional skills competitions.

In 2024, ROSATOM's employees participated in Russian and international professional skills competitions. The 9th AtomSkills 2024 Industry-Wide Professional Skills Competition featured more than 2,000 participants from 12 countries and covered 42 competences. For the first time, the participants were divided into the main and student leagues.

As part of the Professionals Competition, ROSATOM set up career guidance stands for 3,000 school and university students and held strategic sessions focused on the development of the Professionality Project.

ROSATOM's team participating in the 3rd World Construction Championship competed in 20 categories. In the competition for specialists, ROSATOM's team ranked first in the Best Construction Site category and won all the top awards in the General Construction Work category.

ROSATOM's team was also among the winners of the BRICS Future Skills & Tech Challenge, an international competition showcasing future-oriented technologies and skills. The team competed in four categories and won seven awards (two gold, three silver and two bronze medals) in the Russian event, as well as two gold medals in the international event.

ROSATOM's participation in competitions and awards won in 2024

Competitions	Competences represented	Total medal count (including Russian / international events)	Gold	Silver	Bronze
High-Tech 2024	22	21	14	7	0
BRICS Future Skills & Tech hallenge	4	9 (2/7)	4 (2/2)	3 (3/0)	2 (2/0)
4th World Construction Championship	25	14	4	4	6
Total	**–**	**44**	**22**	**4**	**8**

3.1.8. Employee engagement and feedback

In 2024, the employee engagement rate in the industry stood at 82%, on a par with the world's best employers.

Changes in employee engagement rate in the industry, %



A change support team (CST) is a tool that promotes industry development by identifying key issues and areas for change. Participation in the project enables employees to develop their leadership and management skills. Survey findings show that CST members are more engaged than employees in the industry on average. In addition, 91% of CST members who took part in the survey said that they understood how their company contributed to achieving ROSATOM's 2030 Vision.

98 projects were implemented in 2024 (including 45 new projects), covering more than 42,000 employees of nuclear enterprises.

Throughout 2024, ROSATOM was actively developing a project titled 'New Opportunities Offered by Communication Days' to enable every employee in the industry to ask the management a question and get a reply; to learn directly from the management about the current situation and the development strategy in the enterprise and the industry as a whole. Over the past four years, the reach of Communication Day online broadcasts has expanded from 16,000 to 120,000 employees in 143 nuclear enterprises; the Atom Display system for centralised broadcasting on plasma display panels has been launched, with 82 organisations connected to the system; and activist groups from nuclear towns and cities have participated in GRI 2-26

the broadcasts. Employees working at overseas sites are connected to the broadcasts via the AtomSpace messaging app. The system for routing questions and answers has been migrated to a domestically developed platform. A display for the system for online broadcast view statistics has been developed.

For the third year in a row, employees have named the Communication Days as the most popular channel for obtaining information about the industry (77%).

Following the 2nd Communication Day held in 2024, 98% of employees expressed a positive opinion of the event, and 79% of employees who had submitted questions confirmed that they had received a reply.

Employee recognition programme

The employee recognition programme includes divisional, cross-divisional and corporate award categories, as well as special nominations put forward by the Director General and a special prize awarded by the Chairman of the Supervisory Board. The main selection criteria in these categories include performance, engagement, commitment to ROSATOM's values and professional qualities of the participants. An employee can become a nominee for the recognition programme independently, with approval from their line manager, or be nominated by their line manager or colleagues.

In 2024, new records were set in ROSATOM as part of the industry-wide recognition programme titled **'ROSATOM's Person of the Year'**: the organisers of the recognition programme processed 3,854 applications for participation in individual and team categories, which is 400% more than in 2013; overall, the programme covered about 15,000 employees. In 2024, 536 employees of 150 nuclear organisations, 13 Divisions and ROSATOM's Central Office reached the finals in 77 categories. Since the launch of the programme, a total of more than 23,000 applications have been submitted and more than 3,500 finalists have received awards.



GRI 3-3

3.1.9. Human rights

GRI 2-23

Human rights principles

ROSATOM actively supports and complies with employment standards pursuant to the legislation of the Russian Federation, industry-wide and internal regulations, the Social Charter of the Russian Business, and the Industry-Wide Agreement on Nuclear Power, Industry and Science.

The Industry-Wide Agreement on Nuclear Power, Industry and Science and ROSATOM's internal regulations contain no provisions barring people from being employed in the industry on the grounds of gender, ethnicity, background, the level of personal wealth, marital or social status, position, age, place of residence, attitude towards religion, political opinions or membership of public associations.

The principles of ROSATOM's Code of Ethics[1] and the Uniform Industry-Wide Human Rights Policy of ROSATOM and Its Organisations are aligned with regulations ratified by the Russian Federation, the Constitution of the Russian Federation, UN conventions, including the Universal Declaration of Human Rights, the Guiding Principles on Business and Human Rights, the OECD Guidelines for Multinational Enterprises, and the Voluntary Principles on Security and Human Rights. In 2020, the Corporation joined the United Nations Global Compact. ROSATOM is committed to complying with the Ten Principles of the United Nations Global Compact, including the principles pertaining to human rights.

The Industry-Wide Human Rights Policy prioritises ensuring people's safety, supporting them and respecting human rights. ROSATOM seeks to promote the well-being of its employees and their families, as well as local communities in its host regions. The industry-wide policy sets out seven key principles underpinning ROSATOM's approach to people:

- Occupational health and safety, which is central to the operation of the nuclear industry. People are the Corporation's main asset. Protecting their lives and health, improving safety and security is a top priority. The Corporation joined the Vision Zero campaign in 2019 and promotes the safety culture in the industry through training and risk awareness. The Corporation seeks to achieve a zero injury rate and works systematically towards this goal.
- Prevention of forced and child labour. ROSATOM opposes forced and child labour, and provides an environment in which people can work willingly and efficiently. The Corporation strictly adheres to the minimum age requirements for employment as set out in international conventions, and promotes these principles both in Russia and abroad.
- Prevention of harassment and abuse in any form: physical, verbal, psychological or sexual. ROSATOM and its organisations protect the dignity and equality of individuals from any such attacks.
- Prevention of discrimination. Every person has equal rights, regardless of ethnicity, colour, gender, religious beliefs or any other characteristics. ROSATOM values all its employees. Any personnel management decisions, from hiring to retirement, are based on the principle of equal opportunities.
- Equal access to opportunities and fair remuneration. All employees in the nuclear industry receive competitive salaries and have equal access to opportunities: social security and training enabling both professional and personal development. ROSATOM and its organisations comply with the laws and traditions of their host communities, ensuring their employees enjoy a good work-life balance.
- Freedom of association and the right to collective bargaining. ROSATOM and its organisations support freedom of association, recognise employees' inalienable right to collective bargaining and the right of each employee to collective representation of their interests, and respect employees' right to membership in organisations aimed at safeguarding and promoting their interests.

1. Full name: Code of Ethics and Professional Conduct for Employees of ROSATOM.

– Development of the regions of operation and local communities. ROSATOM and its organisations have adopted a responsible approach to respecting the rights and promoting the well-being of local communities in their regions of operation, cooperate with government bodies and treat local residents in their regions of operation with respect.

Code of Ethics and handling employee complaints and enquiries

The Uniform Industry-Wide Code of Ethics and Professional Conduct was adopted in 2024. It places greater responsibility on employers for respecting employee rights, promotes a culture of trust and cooperation, and establishes the rules of business conduct and procedures for handling complaints and enquiries.

GRI 2-23 Rules of ethical conduct are applied to ROSATOM's relations with business partners, suppliers and contractors through the following documents (including but not limited to):

– The Code of Ethics and Professional Conduct for Employees;
– The Uniform Industry-Wide HR Policy;
– The Uniform Industry-Wide Human Rights Policy;
– The Uniform Industry-Wide Guidelines on the Movement of Employees in Russia;
– The Uniform Industry-Wide Procedure for the Investigation of Reports on Corruption and Other Offences Received via the Hotline and Other Channels;
– The Uniform Industry-Wide Anti-Corruption Policy;
– The Industry-Wide Agreement on Nuclear Power, Industry and Science;
– Agreements with the trade union.

GRI 2-25 A three-level system of ethics committees was established in the industry in 2024. This included establishing committees in organisations and in the holding company and the Industry-Wide Ethics Committee in ROSATOM. The committees hold meetings to review ethics cases and matters related to the development of the ethical culture in the industry.

GRI 2-26 Employees have been informed about various channels available in the industry for submitting reports and enquiries, including the Russian Post and email, including the email address of the Director General. Reports and enquiries are recorded on the day when they are received; they are processed within the prescribed time frame, which includes conducting an investigation and, if necessary, a review by the Ethics Committee.

Reports and enquiries related to social and labour relations, including those related to ethics and human rights, are reviewed jointly with a representative body acting on behalf of employees.

Webinars on handling reports and enquiries from individuals were organised and held for more than 200 industry specialists responsible for handling reports and enquiries. The webinars covered such topics as the rules and procedure for handling reports and enquiries from individuals, practical cases illustrating complex issues, as well as a process for communication between various divisions in order to draft objective and comprehensive replies to reports and enquiries. ROSATOM will continue to organise and hold webinars on handling reports and enquiries from individuals in 2025.

456 enquiries on HR and social matters were reviewed in 2024, covering the following topics: employment and cooperation; remuneration and social issues; training, work placements and internships; labour relations; human rights and ethics; industrial safety and occupational health and safety.

The following educational programmes were developed:

– An online course titled 'Ethics in Practice: How to Follow the Code in the Course of Day-to-Day Work' was posted in the RECORD Mobile online training system and is available 24/7 to all employees in the industry;
– A programme for members of ethics committees was piloted, with plans to roll out the programme in 2025.

More than 50% of enquiries contain proposals for cooperation and requests to consider the possibility of employment, which reflects people's interest in the operations of the nuclear industry and demonstrates a high level of trust in cooperation with ROSATOM.

ROSATOM analyses systemic and recurrent enquiries in order to develop industry-wide approaches and solutions, establish procedures, analyse the risk of violation of ethical norms and human rights and prevent detected violations from recurring in the future.

Inclusion

ROSATOM systematically applies a tailored approach to working with people with special needs, providing a comfortable and inclusive workplace environment. This includes equal hiring practices, special onboarding and retraining programmes, and working conditions suited to each individual's health needs and abilities.

As at year-end 2024, there were 3,580 employees with special needs.

As part of the Personnel National Project, ROSATOM has developed an inclusive training course on the use of the Foresight analytical platform and a training programme titled 'Data Analysis Tools' (comprising 256 academic hours of training). Thanks to a combination of online lectures and workshops, dedicated mentors and tutoring support in chat rooms, this course provides training opportunities for people with special needs. The course is targeted at people with special needs, women on maternity leave, unemployed people and third-age employees.

An inclusive project titled 'The Sails of the Spirit in Nuclear Towns and Cities' has been run since 2019 in five regions, specifically in NPP satellite towns and cities: Volgodonsk (Rostov NPP), Balakovo (Balakovo NPP), Desnogorsk (Smolensk NPP), Zarechny (Beloyarsk NPP) and Kaliningrad (Baltic NPP). As part of the project, both people with special needs and able-bodied people are offered an opportunity to participate in a regatta and demonstrate their leadership qualities, sporting talents and strength of character as they pursue their goals.

Build a Dream is an inclusive competition for young people in construction professions, supported by ROSATOM. The competition is aimed at supporting people with special needs, helping them integrate into the workforce and reducing the shortage of skilled workers in the construction industry. In 2024, the competition was held as part of the 4th World Construction Championship in Yekaterinburg. School and university students competed in the following categories: Painting, Plastering, BIM Specialist, Architectural and Construction Design. Contestants presented their projects, which were then judged by a panel of experienced construction specialists. The event is organised by the National Association of Construction Engineering Consultants (NACEC).

The Stepping into Life project is a co-working space for people with special needs and disabilities in Ozersk (Chelyabinsk Region). It offers young people aged 14 to 35 an opportunity to learn everyday skills such as shopping, cooking, laundry, ironing, cleaning, sewing and knitting. In 2024, the project won the Social Leaders of Nuclear Towns and Cities grant competition organised by ROSATOM.

The Smart City platform developed by ROSATOM includes a special module, Ensuring Mobility. It enables people with special needs to plan routes to places they wish to visit independently or to identify where they will require assistance.

GRI 3-3

3.2. SOCIAL POLICY

3.2.1. Social policy approaches and principles

ROSATOM's social policy is designed to:

- Make the Corporation more attractive as an employer;
- Recruit and retain young professionals and highly skilled specialists;
- Improve the efficiency of social assistance and social expenditure.

ROSATOM's social policy is based on the following principles:

- Commitment to the UN Global Compact;
- Regular monitoring of the fulfilment of social responsibility commitments undertaken by ROSATOM;
- Information disclosure and transparency of social and labour relations.

Uniform Industry-Wide Social Policy of ROSATOM and Its Organisations

3.2.2. Social partnership in the nuclear industry

In 2024, ROSATOM adhered to the Industry-Wide Agreement on Nuclear Power, Industry and Science for 2023–2025 (the Agreement), which formalised the principles of social partnership. The Agreement is based on the established practice of social partnership in the nuclear industry and is aimed at implementing the Occupational Health and Safety Management System, the Integrated Standardised Remuneration System, and the Uniform Industry-Wide Social Policy. Under the Agreement, ROSATOM has assumed greater responsibility for observing and respecting human rights, the principles of equality and fairness, non-discrimination, informing employees about working conditions, ensuring the safety and protecting the health of employees, contractors' personnel and the population of the regions where it operates, regularly paying salaries, ensuring adequate social guarantees and job security and improving well-being, respecting the freedom of association and the right to collective bargaining, and developing the regions of operation and local communities.

The Agreement has been drafted and is being implemented jointly with the Russian Trade Union of Nuclear Power and Industry Workers (RTUNPIW). 146,224 employees of ROSATOM's organisations covered by the activities of the RTUNPIW, or 37.2% of the total headcount, are trade union members.

The Agreement gives priority to the protection of employees' lives and health. Jointly with the trade union, employers maintain records of and analyse morbidity among employees, including the findings of periodic medical examinations and records of sick leave, and develop a comprehensive health improvement programme titled 'Health'. The Agreement incorporates the opportunities provided by legislation with regard to special assessment of working conditions (SAWC). It also establishes an additional mechanism for cooperating with the trade union in carrying out SAWC and analysing its findings.

GRI 2-30
MED 32

The Agreement provides a basis for collective bargaining agreements concluded in nuclear organisations. The collective bargaining agreements support the implementation of the Agreement and regulate social and labour relations taking into account operational, technological and regional features of each organisation. The collective bargaining agreements cover 68.13% of employees in ROSATOM's enterprises.[1]

1. Based on the average headcount.

The Industry-Wide Agreement reflects commitments regarding salary indexation and social benefits, and gives trade unions a more prominent role in maintaining stability. In 2024, the RTUNPIW focused on ensuring compliance with the current Agreement, assisting in signing collective bargaining agreements, and participating in the work of the Russian Trilateral Commission on the Regulation of Social and Labour Relations.

Social and labour relations with employees not covered by collective bargaining agreements (31.87% of employees) are governed by local regulations in accordance with applicable labour laws of the Russian Federation.

For details on the implementation of the occupational safety and health policy, see also section 5.1. 'Occupational Health and Safety'.

GRI 403-6

3.2.3. Social programmes

Benefits provided to employees and retirees are aligned with the Uniform Industry-Wide Social Policy, which is based on standardised corporate social programmes.

The structure of corporate social programmes and the relevant expenses are determined on the basis of ROSATOM's priorities in personnel management:

- Importance of maintaining health and a long working life;
- Protecting the health of employees exposed to harmful working conditions (a significant amount of funding is allocated for additional personal insurance and health resort treatment for employees);
- Paying attention to retired employees who had worked in the industry for a long time;
- A policy focused on promoting the development of mass sports, providing additional pensions, and supporting families with children, young professionals and people in need.

During the Year of the Family, a programme was developed to support working parents and their children. The programme will be launched in 2025.

Given the importance of attracting young people to the industry, particularly young engineers and research workers, a youth support programme was developed in 2024. The programme will be launched in 2025.

Compensation and benefits under corporate social programmes implemented by the Corporation are provided to full-time employees.

In 2024, expenditure on programmes aimed at maintaining employees' health and promoting a healthy lifestyle accounted for 60% of the total expenditure on social programmes.



MED 28 **Expenditure on corporate social programmes in ROSATOM and its organisations,** RUB billion[1]

Corporate social programmes	2021	2022	2023	2024
Voluntary health insurance and personal insurance against accidents and illness	3.3	3.8	4.9	6.3
Health resort treatment and recreation for employees and their children, including:	1.0	1.5	1.9	2.2
health resort and rehabilitation treatment for employees	*0.7*	*1.1*	*1.4*	*1.5*
health resort treatment and recreation for children	*0.3*	*0.4*	*0.5*	*0.7*
Provision of housing for employees	0.8	0.9	1.0	1.2
Private pension plans	0.8	1.0	1.2	1.3
Support for retirees	1.2	1.8	1.4	1.4
Sporting and cultural events	1.6	2.0	2.7	2.8
Assistance to employees	1.8	2.4	3.1	4.2
Other	0.9	1.8	2.2	2.3
Total social expenses	**11.4**	**15.2**	**18.4**	**21.7**

As part of the Uniform Industry-Wide Social Policy, ROSATOM implements corporate social programmes focused on voluntary health insurance, voluntary insurance against accidents and illness, and health resort treatment for employees. Their main goal is to maintain and protect employees' occupational health, including rehabilitation and health improvement after occupational diseases and accidents.

In 2024, about 82.9% of employees in the industry (326,000 people) had quick access to medical care covered by voluntary health insurance. More than half of employees in the industry (206,000 people) had insurance against accidents and illness, i.e. were entitled to additional payments upon the occurrence of insurable events, which include not only workplace accidents but also non-occupational diseases.

In 2024, 100% of employees who needed health resort treatment based on the findings of a regular health check-up were given vouchers for health resort and rehabilitation treatment.

During the Year of the Family, social support measures for working parents, including those with three or more children, were systematised and updated.

To promote patriotic values among the children of ROSATOM's employees and residents of nuclear towns and cities, military patriotic games called 'Atomic Guard' were held for the first time in 2024 in three nuclear towns (Desnogorsk, Zelenogorsk and Novouralsk). A total of 320 girls and boys aged 14 to 17 from nine nuclear towns and cities took part in the games.

1. Compensation and benefits under corporate social programmes implemented by the Corporation are provided to full-time employees.

GRI 404-2

3.2.4. Support for pre-retirees, retirees and industry veterans

In 2024, ROSATOM continued to implement measures under a programme developed in 2019 to support soon-to-retire employees of the Corporation and its organisations. As part of the programme:

- 1,579 employees underwent health screenings;
- 701 employees were given vouchers for health resort treatment;
- 482 employees switched over to flexible working hours;
- 9,973 employees underwent training and retraining.

Nuclear enterprises continue to pay great attention to veterans and retirees who worked in the industry for more than 20 years (over 111,700 people): in 2024, 5,498 retirees were given vouchers for treatment at health resorts and wellness centres (worth a total of RUB 319.5 million); around 51,000 retirees received financial assistance totalling about RUB 714 million, and 18,900 retirees receive monthly supplements to state pensions (totalling RUB 229 million).

RUB **71.9** million

was spent on training provided to soon-to-retire employees[1]

3.2.5. Promotion of physical education and sports

ROSATOM attaches great importance to encouraging its employees, their family members and residents of its regions of operation to regularly exercise and do sports. One in every five employees in the industry regularly does sports. In 2024, the industry-wide Autonomous Non-Profit Organisation Atom-Sport celebrated its 65th anniversary.

The biggest sporting event over the past five years has been the Running Race of Nuclear Towns and Cities: the number of its participants increased from 7,000 people in 2019 to 25,900 people in 2024. Its geographical scope is continuously expanding: in 2024, ROSATOM's employees, their family members, students and residents of 31 of the Corporation's host towns and cities took part in this event.

The second most popular sports project is ROSATOM's Healthy Lifestyle Ambassador, an industry-wide initiative to encourage employees to adopt a healthy lifestyle. The project has been running for five years already, and the number of its participants is constantly growing.

Number of towns and cities covered by ROSATOM's Healthy Lifestyle Ambassador project, and number of participants

Indicator	2021	2022	2023	2024
Number of towns and cities	62	187	190	192
Number of participants	3,939	11,054	16,500	19,500

493 employees in the industry hold the title of Candidate for Master of Sports, and 310 employees hold the title of Master of Sports.

1. The decrease in training costs in this category in 2024 was due to the fact that additional large-scale occupational health and safety training under Decree No. 2464 of the Government of the Russian Federation dated 24 December 2021 on the Procedure for Occupational Health and Safety Training and Testing the Knowledge of Safety Rules, which is provided once every three years, was completed in 2023.

3.2.6. New engineering personnel for the industry

The Corporation continues to build an ecosystem for continuous development of engineering competences at each stage of the talent pipeline:

- ROSATOM's Juniors for schoolchildren aged between 10 and 17;
- New Talents for students aged between 17 and 25;
- ROSATOM's Professionals for industry employees aged 18+.

21 Junior Councils have been established in ROSATOM's host towns and cities, including one abroad. They have implemented over 30 projects and initiatives in these towns and cities, with more than 7,000 people participating in the initiatives. A total of five grants worth over RUB 1.5 million have been secured.

In 2024, more than 62,000 schoolchildren, more than 700 teachers and over 200,000 members of the parents' community were involved in activities forming part of ROSATOM's Juniors, a project aimed at promoting engineering and blue-collar skills prioritised by the Corporation. More than 500 people participated in ROSATOM's Juniors project engineering sessions.

A network of almost 300 schools with specialised nuclear, engineering, mining and Mendeleev classes operates in ROSATOM's host towns and cities. The network of nuclear classes is growing rapidly. Since the project was launched 11 years ago, their number has grown to 85 classes in 51 towns and cities.

The Network Engineering School project continued in 2024. The project includes an online platform, rosatomtalents.team, which is designed to provide training in engineering disciplines, including physics, mathematics and chemistry, for students of general schools. The project also involves establishing a network of engineering classes in ROSATOM's regions of operation. A total of 87 engineering classes have been opened in 29 towns and cities across Russia.

Over 1,000 college and university students attended the Corporation's Student Workshops. These are online workshops presented by leading teachers and industry experts in 22 competences. More than 2,500 students took mock exams in practical competences, which were assessed by industry engineers. With assistance from educational institutions, the Technical Academy runs a number of projects, including the Journey into the Profession, the AtomStory adventure game, and the IAEA Model business game for ROSATOM's Junior Council, as well as a project titled 'Family Traditions of Dynasties of the City of the First' and the Atomic Lesson.

In 2024, the Technical Academy hosted the IAEA Model business game, which was a simulation of a real IAEA meeting. The event was organised on the initiative of ROSATOM's Junior Council in Obninsk with support from the Rosatom Corporate Academy and the local government. 70 high school students who are fluent in English took part in the game, acting as 'IAEA delegates' from various countries and discussing the role of nuclear power in tackling climate change.

The Technical Academy, in collaboration with Sirius University of Science and Technology, is launching a large-scale project, the School of Nuclear Medicine. The School will offer unique educational programmes for young specialists in various fields, including professional development courses for medical chemists, radiochemists, radiopharmacists and medical physicists; training in radionuclide diagnostics and therapy and pharmaceutical regulation; and raising doctors' awareness of new developments and methods of treating diseases.

The ATOM LIVE 2024 series of festivals celebrating creativity and volunteering in nuclear towns and cities was held in Sosnovy Bor, Desnogorsk, Polyarnye Zori and Obninsk. These events were attended in person by over 21,000 visitors from nuclear towns and cities and neighbouring areas, and were viewed by more than 315,000 people online.

In 2024, the implementation of the Teacher for ROSATOM project continued. As part of the project, 390 students did teacher internships in schools in ROSATOM's host towns and cities, with 12 teachers hired after completing internships. 17 teachers were awarded the Istok Prize and RUB 250,000 certificates. A Festival of Teaching Excellence was held in Obninsk, with more than 100 physics and mathematics teachers from 18 Russian towns and cities, as well as young teachers from nuclear towns and cities participating in the Festival in person.

The Support Programme for Physics Teachers and Students of Physics at Teacher Training Colleges in the regions where the Power Engineering Division operates was implemented in full. The programme's key objectives are to improve the quality of education in the Division's host towns and cities, address the shortage of teachers, and increase the number of school students taking the Unified State Examination in core subjects. The programme includes training and development activities for physics teachers and students at teacher training colleges, as well as the provision of financial and non-financial support. The programme also involves developing new information products and events to promote physics as a school subject, the nuclear industry, and the Power Engineering Division. In 2024, expenditure on the programme to support teachers and students of teacher training colleges totalled RUB 66,300,000.

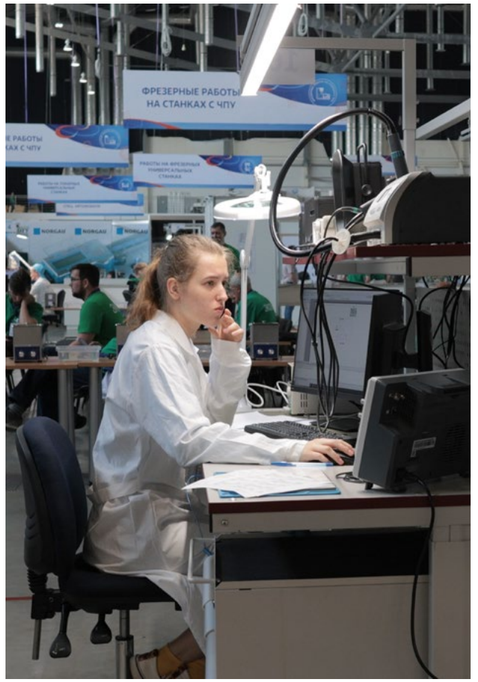
In December 2024, as part of the Rediscovering Russia Federal Project, the Power Engineering Division collaborated with the Higher School of Economics and Obninsk Institute for Nuclear Power Engineering (part of NRNU MEPhI) to launch a unique project for schoolchildren and students of teacher training colleges: an expedition 'Educational Lights: Polar Auroras'.

In 2024, the Parents' League, an educational platform for parents seeking to unlock their children's potential in collaboration with the best teachers and psychologists, and ROSATOM's Council of Educators, which comprises leading academics, mentors and winners of teaching excellence contests, continued their work. In 2024, more than 70,000 people from ROSATOM's host towns and cities, as well as from other regions of Russia, took part in the project's events online, while over 1,000 people attended in person. The 4th KaraKURAZH Family Festival of Inventors introduced 115 families from 62 Russian towns and cities and one foreign country (Egypt) to engineering.

The AtomSkills Student Forum was held as part of the AtomSkills 2024 Competition. Following its conclusion, seven teams comprising 40 students of core universities have launched their initiatives focused on the development of small towns, career guidance in enterprises, the development of mentoring, and vocational guidance for school and university students. Technical tours of the Nuclear Energy Information Centre (NEIC) and the NPP museum in Sosnovy Bor, the Atom Pavilion and an enterprise of ROSATOM in Moscow were organised for more than 300 student leaders in partnership with the More than Work Project.

In 2024, as part of the Professionality Federal Project, the Academy was involved in optimising educational programmes to meet the needs of nuclear enterprises, providing advanced training for teachers and managerial personnel, providing employment for graduates, upgrading and modernising the facilities and equipment of training workshops and laboratories.

More than 34 training programmes at six colleges were completely redesigned, and a further five educational institutions joined the project in 2025. A total of 2,000 people enrolled on programmes offered as part of the project between 2022 and 2024.



3.2.7. Cooperation with universities and attracting young talent

In 2024, the enrolment campaign at NRNU MEPhI concluded with a record-breaking result. According to the findings of the 2024 admissions quality monitoring conducted by the Higher School of Economics in cooperation with the Russian Ministry of Education and Science, NRNU MEPhI ranked second among all Russian universities in terms of admissions quality. Those who got state-subsidised places at NRNU MEPhI (Moscow) through the general admissions process achieved an average score of 95.7. Across all fields and specialisms, all those admitted through the selection process surpassed the 90-point threshold. Due to the fact that NRNU MEPhI runs a significant proportion (30%) of educational programmes in nuclear physics, the Nuclear Physics and Technology group of disciplines ranked second in the group ranking in terms of the average Unified State Examination score. In terms of the increase in average USE scores, the Nuclear Physics and Technology group ranks first. Seven branches of NRNU MEPhI offering higher education programmes were ranked in the top 10 in their region in terms of the quality of admissions in 2024, ahead of major leading regional universities.

The first stage of the programme to develop NRNU MEPhI in cooperation with ROSATOM until 2030 (the Programme) was successfully completed in 2024. The Programme is aimed at supporting the development of NRNU MEPhI for the benefit of the nuclear industry, including by training highly qualified specialists who have extensive fundamental knowledge and are equipped to work for ROSATOM's organisations.

The Programme comprises five focus areas: Leaders of Tomorrow, The Country of ROSATOM, New Horizons, The Global Challenge, and The Digital World. The first stage of the Programme produced the following results:

- The scholarship programme of ROSATOM's Nuclear Weapons Division was introduced for the first time, with 198 students awarded scholarships;
- The first cohort of 15 students enrolled on higher education programmes at the Novovoronezh branch of NRNU MEPhI;
- A new Pre-University Learning Centre affiliated with NRNU MEPhI was established in the town of Lesnoy;
- Six branches of NRNU MEPhI ranked among the top 20 universities in their respective regions;
- The process of increasing the specialisation of NRNU MEPhI's regional campuses was initiated: 14 new laboratories were opened and six competence centres were established;
- The Technology Project Accelerator at NRNU MEPhI was launched for the first time, with six projects receiving financial support to develop minimum viable products (MVPs);
- The first cohort of students graduated from the Tashkent branch in 2023, with 62 students awarded Bachelor's degree certificates;
- The Obninsk Tech project was launched: three new research laboratories were established and 212 students completed short-term training programmes;
- The MEPhI Global Alumni Network was established, with 700 graduates taking part in its events;
- The Digital Centre operated by NRNU MEPhI and ROSATOM was opened in Sirius;
- The first cohort of 52 students enrolled on the new Bachelor's degree programme in CII.

The implementation of the Programme is also closely linked to Priority 2030, a large-scale government programme aimed at establishing a group of universities that will lead the way in generating new scientific knowledge and developing technologies for use in the Russian economy and in the social sphere.

Educational programmes offered by NRNU MEPhI are aligned with national and international standards for engineering education. Over 160 of these programmes have been internationally accredited and have received vocational and public accreditation from the Council for Professional Qualifications in the Sphere of Nuclear Energy. In 2024, over 50 new higher and secondary vocational education programmes and modules were developed in collaboration with ROSATOM. These include: Design of Information Technology Systems and Complexes, Information and Software Support for Computing Equipment and Automated Systems, Digital Economy in Enterprises and Organisations, and Mathematical Modelling and Applied Data Analysis.

To coordinate efforts aimed at improving the system of specialised nuclear education, ROSATOM's Consortium of Core Universities has been established; it comprises 20 of the country's top universities that train specialists for the nuclear industry. The Consortium's main focus is on assessing demand for the training of specialists for the nuclear industry and providing qualified personnel for nuclear organisations, as well as collaborating on joint research and development projects and enhancing the quality of specialist training.

In 2024, the development of the National Centre for Physics and Mathematics (NCPM) continued, with the Sarov branch of Moscow State University (MSU Sarov) established in 2021 as its educational core. MSU Sarov was established in order to create a system for training highly qualified scientists, academics and teachers specialising in physics and mathematics to support Russia's high-technology industries and world-class scientific research, and respond to today's technological and geopolitical challenges. To deliver the highest standards of training for graduates, leading professors and scientists from Moscow State University and the Russian Academy of Sciences are involved in the educational process, and the development of top-quality infrastructure continues. Students acquire a high level of qualifications and knowledge, as well as extensive experience in scientific research. The educational process leverages unique state-of-the-art research and technological capabilities of ROSATOM and Moscow State University.

In June 2024, the second cohort of Master's degree students graduated from MSU Sarov. Of the 42 graduates with a Master's degree, 37 have found employment in ROSATOM and continue to participate in the implementation of the NCPM Research Programme.

In September 2024, the Faculty of Physics at Moscow State University launched a new specialist degree programme in theoretical physics in collaboration with ROSATOM. Almost 700 applications were submitted for the 24 places available. This is an in-depth training programme for theoretical physicists designed to provide students with knowledge of a variety of subjects and issues, including nuclear physics, elementary particle physics, laser physics, plasma physics, extreme states of matter, etc. It is unique in many ways. During the first four years, students will study at the Moscow campus of Moscow State University, with compulsory practical sessions at the Sarov branch. During the fifth and sixth years, the entire educational process will take place at MSU Sarov.

In 2024, the Corporation continued to support the implementation of the Advanced Engineering Schools (AES) Federal Project. The main goal of the AES Project is to train highly qualified personnel for Russian technology companies by providing practical training as part of Master's degree and continuing professional education (CPE) programmes tailored to the needs of industry partners.

ROSATOM's organisations have contributed to the establishment of 10 Advanced Engineering Schools. Total demand for graduates of AES Master's degree and continuing professional education programmes is estimated at approximately 3,000 people until 2030. It is expected that ROSATOM's organisations will require training for at least 900 people under AES higher and continuing professional education programmes in 2025 and 2026.

Since the launch of the project, Advanced Engineering Schools have offered 53 higher education programmes. To date, a total of 757 people have enrolled on higher vocational education programmes, including current students. In 2024, 103 AES graduates were hired by ROSATOM's enterprises.

68 continuing professional education programmes have been launched at Advanced Engineering Schools; to date, 549 engineers in the Corporation's enterprises have completed the programmes. A total of 84 R&D projects have been implemented, and 18 projects are ongoing.

3.3. CORPORATE VOLUNTEERING

3.3.1. Approaches and principles of volunteering

In 2018, ROSATOM made an official decision to launch a corporate volunteering programme. ROSATOM, jointly with volunteers from its key Divisions, has identified the following five main areas of volunteering:

- Environmental conservation (awareness campaigns, clean-ups, planting of seedlings, waste management);
- Supporting socially disadvantaged groups (low-income families, orphans, the elderly) and veterans;
- Promoting a healthy lifestyle (blood donations, sporting events);
- Career guidance and mentoring (lessons in schools, guided tours for the general public, intellectual games, competitions);
- Intellectual volunteering (leveraging employees' professional skills in the regions of operation).

In 2024, ROSATOM ran more than 570 volunteer initiatives (including 12 industry-wide initiatives). The total number of volunteers reached 57,000 people. The total number of beneficiaries exceeded 1 million people. A medal for the development of volunteering was introduced in the industry; it is awarded to leaders of the volunteer movement in the Corporation in recognition of their achievements.

In 2024, comprehensive efforts were underway to involve local residents in the Corporation's host towns and cities in ROSATOM's volunteer movement and initiatives focused on promoting social activism.

3.3.2. Prioritised areas of volunteer activity

ROSATOM's volunteers participate in annual industry-wide projects in various areas, such as blood donations, career guidance and mentoring, environmental volunteering, support for veterans, socially disadvantaged groups and animals. New initiatives are being actively developed; these include support for creative industries, the upgrade of public youth spaces, the implementation of cultural projects, urban improvement, and the development of infrastructure for waste sorting and recycling.

ROSATOM's volunteers and organisations continued to provide humanitarian aid to local residents in regions affected by emergencies. For instance, 179.8 tonnes of humanitarian supplies were collected and RUB 64.6 million was raised to provide assistance to affected residents of the Kursk Region.

More than 6,000 donors from ROSATOM (20% more than in 2023) took part in industry-wide blood donation campaigns. Active promotion of A Rare Match, an information resource on bone marrow donation launched jointly with the FMBA of Russia, has helped increase the number of employees registered on the Federal Register of Bone Marrow Donors to 1,000 people.

In 2024, as part of the Fluffy Atom initiative, which is a flagship project run by ROSATOM's volunteers to support homeless animals, organisations in the nuclear industry collected more than 16 tonnes of food, treats, harnesses and toys and raised more than RUB 3.8 million (including spending on medicines).

Traditionally, a large number of employees were involved in environmental volunteering campaigns. For example, about 40 nuclear organisations joined the federal waste paper collection campaign, BumBattle, and collected 50 tonnes of waste paper. More than 2 tonnes of waste were collected during the Green Distance plogging race. Volunteers also took part in campaigns forming part of federal projects, such as the Clean Arctic, Clean Games, the Garden of Memory, the River Day, etc.

ROSATOM continued to implement strategic initiatives as part of its partnership with the Dobro.rf Association to promote the Dobro.Centres social franchise in nuclear towns and cities, and to run awareness-raising campaigns focused on volunteering.

The Region track was introduced for the first time as part of the #WEARETOGETHER International Award, with ROSATOM as its title partner; the nuclear town of Usolye-Sibirskoye (Irkutsk Region) won in the Single-Industry Town category, with a total of five nuclear towns and cities reaching the final.

A project titled 'Energetic People at the NPP – Architects of an Environmentally Aware Future' run by Novovoronezh NPP reached the final in the Responsible Business category; and Maria Karpenko, the leader of the Second Life volunteer movement in Kurchatov, was named Volunteer of the Year and received the award from the Russian President Vladimir Putin.

GRI 3-3

3.3.3. Volunteering in ROSATOM's host town and cities

Special focus is given to engagement with local communities and social leaders in nuclear towns and cities. The traditional Sandbox.Fest Forum was held in six nuclear towns and cities (Novouralsk, Zarechny (Penza Region), Zarechny (Sverdlovsk Region), Glazov, Obninsk and Usolye-Sibirskoye) and was attended by more than 600 participants, who examined about 50 projects potentially eligible to receive grant support from ROSATOM.

In 2024, the format of the Sandbox.Fest Forum was expanded to include an open city-wide environmental festival. Once the project review was complete, a festival space was set up for local residents. There, they could attend themed lectures, exchange clothes and books, donate them to charity, hand over 17 types of waste for recycling and take part in workshops on reusing recycled materials. As part of the festivals, more than 430 kg of recyclable materials and more than 180 bags of items to be recycled or reused were collected in three host towns and cities.

In collaboration with experts from the Dobro.rf Association, an educational and acceleration programme titled 'Territory of Kindness' was implemented; as part of the programme, teams from 22 nuclear towns and cities developed projects aimed at promoting social activism. Projects submitted by finalists from Snezhinsk and Lesnoy were presented to Sergey Kirienko, First Deputy Chief of Staff of the Presidential Executive Office, at the #WEARETOGETHER Forum.

Educational programmes were run for CSR managers and leaders of non-profit organisations in ROSATOM's host towns and cities, with more than 200 participants completing training courses and drawing up their own programmes to develop social initiatives at grassroots level.



GRI 3-3

3.3.4. Corporate social responsibility initiatives

Social Leaders of Nuclear Towns and Cities Competition. The second season of the Social Leaders of Nuclear Towns and Cities grant competition was held in several nuclear towns and cities. The competition was launched in 2023 as part of the People, Towns and Cities programme in order to identify the best social and volunteer initiatives.

In 2024, applications for the competition were accepted from eight nuclear towns and cities: Udomlya, Zheleznogorsk, Novouralsk, Zarechny (Penza Region), Zarechny (Sverdlovsk Region), Obninsk, Balakovo and Volgodonsk.

The competition was open to non-profit and non-governmental organisations, government and municipal institutions, youth and volunteer associations, media outlets, individual volunteers and commercial organisations that implement social projects.

For the first time, an additional project acceleration stage was organised for competition participants, offering them an opportunity to have an online meeting with experts assisting in holding the competition, ask questions about their projects and improve their submissions. As a result, out of the 117 applications submitted for the competition, grants were awarded for 57 social and environmental projects.

Cooperation with SMEs on socially important creative projects

ROSATOM is actively developing a number of initiatives to support social entrepreneurship in its host towns and cities. As part of a project titled 'Creators from Nuclear Towns and Cities', an online catalogue of souvenir merchandise made by artisans from nuclear towns and cities has been produced (rosatomcreators.ru); by the beginning of 2025, the catalogue included more than 370 items. The project is expected to evolve into a full-scale programme including a training course and business events for the most active participants, which will help build a community of professionals in creative industries.

In December 2024, the first exhibition of merchandise was held as part of the Creators from Nuclear Towns and Cities project. Artists and artisans displayed jewellery, souvenirs, cotton wool Christmas ornaments, designer dolls inspired by Russian folklore, crockery, and other items of decor at the Mayak Academy in Nizhny Novgorod. Proceeds from the sales of merchandise went directly to the artisans.

A photography contest titled 'ROSATOM's People, Towns and Cities' was held for the first time in 2024. The main aim of the project is to promote the unique features of nuclear towns and cities, their natural, historical and cultural sites and traditions. The competition featured amateur and professional photographers who live in nuclear towns and cities or work for ROSATOM's organisations.

Works were submitted in eight categories: City, Hospitable Nuclear Towns and Cities, Culture and Art in Nuclear Towns and Cities, People, Nature and Ecology, Family, Territory of Kindness, and Technologies and Innovations of Nuclear Organisations. There were a total of 403 entries for the competition. The best 27 works by photographers from ROSATOM's host towns and cities were selected by the panel and by popular vote and were displayed at a touring exhibition.

ROSATOM's Hospitable Towns and Cities

An industry-wide programme was launched in May 2024 to support the development of the leisure and hospitality sector in nuclear towns and cities. Five pilot towns and cities were selected in the first year of the programme: Zheleznogorsk, Tryokhgorny, Udomlya, Polyarnye Zori and Volgodonsk. ROSATOM's Hospitable Accelerator was launched in order to provide training to local entrepreneurs; its participants included 24 entrepreneurs. Following training and presentations, six finalist projects received grants totalling RUB 3 million. RUB 25.2 million was raised to finance SME projects developed as part of ROSATOM's Hospitable Accelerator: The Northern Rubicon in Polyarnye Zori, and A Wonderful Place in Zheleznogorsk.

Teams from nuclear towns and cities drafted 21 strategies for the development of tourism as part of a continuing professional education programme titled 'Sustainable Development of Tourism in Towns and Cities Hosting Nuclear Enterprises'. Participants of the programme included 119 people from 21 towns and cities, including Akkuyu (Turkey).

Three Tours of Opportunities in Nuclear Towns and Cities were developed and held in Volgodonsk, Zheleznogorsk and Polyarnye Zori. The unique feature of the tours is that their participants immerse themselves in the urban environment, get acquainted with local residents and learn about social and economic opportunities. The tours showcase projects of SMEs that have completed training as part of ROSATOM's Hospitable Accelerator. The tours generated RUB 6.4 million in revenue of SMEs and tax payments to local budgets. 100% of surveyed participants of the tours were willing to recommend the tour; 83% of them were willing to work for the Corporation, and 33% were willing to relocate to the town or city in question.

3.4. LONG-TERM PROJECTS IN THE SPHERE OF HR AND SOCIAL POLICY

3.4.1. Building a talent development ecosystem

In 2024, ROSATOM continued to take active steps in the sphere of personnel training. A network of 300 schools with specialised engineering, nuclear, mining and Mendeleev classes operates in ROSATOM's host towns and cities. The number of nuclear classes has increased to 85 classes in 51 towns and cities, while the number of engineering classes has reached 87 classes in 29 towns and cities. ROSATOM is developing the Network Engineering School, an online platform (rosatomtalents.team) which school students use to study STEM disciplines, including physics, mathematics and chemistry.

Work is ongoing in the field of teacher training. As part of the Teacher for ROSATOM project, 390 university students did teacher internships, and 12 graduates were hired. 17 teachers were awarded the Istok Prize (RUB 250,000). More than 100 physics and mathematics teachers from 18 towns and cities participated in the Festival of Teaching Excellence in Obninsk.

Career guidance and talent development remain an important focus area for ROSATOM. As part of the Professionality Federal Project, 34 training programmes in 11 colleges were redesigned, with training provided in 40 professions; 400 teachers completed professional development courses. More than 90 learning spaces were created; 2,000 students were enrolled on programmes forming part of the project. Sirius University continues to run a Master's degree programme in Mathematical Robotics and AI; 10 students graduated in 2024, and two of them were hired. In addition, new Master's degree programmes were launched: Applied Robotics (21 students) and Critical Information Infrastructure (20 students).

Special focus is given to science communication initiatives. In 2024, 63 school students from Russia and 10 school students from foreign countries took part in the fifth Icebreaker of Knowledge expedition. As part of the AtomDiscovery project, 32 school and university students were offered an opportunity to visit nuclear towns and cities, leading universities and strategically important enterprises. Since 2022, a total of 150 people have participated in the programme.

In addition, in 2024, 70,000 people participated online and 1,000 people participated in person in the activities of the Parents' League and ROSATOM's Council of Educators. The second cycle of the 'Mission: Talent' accelerator was completed, with support provided for 20 educational projects.

These initiatives are aimed at supporting the development of engineering education, building the talent pipeline and integrating young people into the nuclear industry.



3.4.2. Development of the Professionality secondary vocational education system

ROSATOM is a key partner of the Professionality Federal Project, which involves optimising educational programmes to meet the needs of nuclear enterprises, providing advanced training for teachers and managerial personnel, and offering employment opportunities for graduates. The Corporation is also involved in upgrading and modernising the facilities and equipment of training workshops and laboratories. As at year-end 2024, the project covered 11 colleges, 40 professions and specialisms for which training programmes were offered, and 400 college teachers, mentors and experts from the Corporation's enterprises who had completed advanced programmes in theoretical and practical training.

More than 2,000 students participate in the project, with 70% of their training taking place in enterprises under the guidance of experienced employees; to date, more than 1,500 people have already completed work placements in the Corporation's enterprises.

Since the launch of the project in 2022, over 34 training programmes at six colleges have been completely redesigned, and a further five educational institutions will join the project in 2025. A total of 2,000 people enrolled on programmes offered as part of the project between 2022 and 2024. More than 90 learning spaces have been created for students enrolled on programmes forming part of the Professionality project.

Seven more educational institutions joined the network of partner colleges in 2024. The Corporation now has 11 clusters in the following towns and cities: Polyarnye Zori, Seversk, Krasnokamensk, Sarov, Novouralsk, Elektrostal, Yuryuzan, Glazov and Kursk, as well as two clusters in Ozersk.

In the reporting year, the project produced 150 graduates, 85% of whom have been hired by ROSATOM's enterprises. In 2024, 147 teachers mastered advanced educational technologies and 91 workshops were modernised.

To achieve the project's goals, colleges are developing high-technology products that are in demand. In 2024, 37 mechatronics stations were built by a college in Ozersk. These stations are also used by other colleges, as well as at the AtomSkills Professional Skills Competition and at the Federal Vocational Education Technology Park in Kaluga. This has enabled the college to increase its extra-budgetary income five-fold.

3.4.3. Ensuring succession for critical senior management positions

In order to ensure succession and train employees to be appointed to managerial positions, an executive succession pool (ESP) is being formed and developed in ROSATOM. A total of 6,700 people have been included in the ESP since its establishment. Over the past three years, 96% of ESP members have been promoted to managerial positions. In 2024, the share of ESP members among those appointed to vacant top and senior executive positions totalled 77.74%.

The number of executives who take part in the assessment of successors to be appointed to managerial positions is growing year by year. In 2024, more than 109 organisations carried out an assessment of successor candidates for higher management positions. A total of 2,080 successors were evaluated. More than 170 certified successor assessment experts work in the industry; 37 experts obtained certification in 2024.

3.4.4. Development of digital services for employees

ROSATOM is actively developing its own software products in order to replace imported solutions for HR process automation. In 2024, the Corporation started to integrate all its HR systems into a single ecosystem enabling employees to establish communication on HR processes and be provided with HR services on a one-stop-shop basis as fast as possible. The system combines the capabilities of HR systems used in the industry, such as the Personal Account, Record 2.0, ROSATOM Life and RECORD Mobile, into a single interface, enabling users to:

- Track and complete tasks;
- Request certificates and copies of documents;
- Arrange leave and business trips;
- Track their income;
- Plan their careers and pursue their goals;
- Manage teams;
- Receive training 24/7;
- Communicate with colleagues.

More than 2,000 employees in three nuclear enterprises have already become the first users of the system. Import substitution efforts are ongoing to develop and roll out the Atomkor HR information system designed in-house, which is expected to fully replace the personnel management and payroll functionality of the foreign SAP HCM system.

In 2024, the Atomkor system was rolled out in another 10 enterprises in the industry; thus, 20 enterprises with a total headcount of more than 25,000 employees have already switched over to Atomkor.

The Employee's Personal Account is available both as a desktop version for use at work and at home, and a mobile app, providing access to the most popular functions (arranging leave and business trips, viewing payslips and requesting statements and confirmations) from anywhere in the country. Nearly 150,000 employees in the industry, including 50,000 blue-collar workers, use the Personal Account in the workplace. Users of the Personal Account continue to give it the highest rating as compared to other HR services: 4.8 points out of 5.

More than 40,000 employees in more than 80 nuclear organisations use the mobile version of the Personal Account. In 2024, a number of additional functions were made available to users of the mobile version, including the approval of overtime pay and applications for working overtime and at weekends, the signing of orders on changes in salary, and paperwork for various types of leave, such as days off for working at weekends and during holidays, time off for overtime work, regular health screening, medical checkups, idle time, psychophysiological evaluation, etc.

In 2024, import substitution efforts were ongoing to develop a new electronic document management system for HR, the Atomkor Employee Account. In the future, it will replace the existing Employee Personal Account based on SAP HCM. In 2024, the system was successfully piloted and is now operational in a nuclear enterprise, offering basic functionality (arranging leave, requesting certificates, displaying information on income, an employee attendance calendar for the department, recording absence, viewing the organisational structure, etc.).

In 2024, the amount of training content available in the RECORD Mobile training system increased to 3,753 units, and more than 25,000 new users registered on the platform. At year-end 2024, a total of 252,000 employees used the platform, including 2,100 employees working abroad. Every day, more than 4,000 employees do professional development courses on the platform, which means that it is a key corporate training tool. The user rating given to the RECORD Mobile platform reached a high level of 4.5 out of 5 points, which proves that the system is efficient and in demand.

In 2024, the RECORD 2.0 system (a solution developed in-house that does not rely on imported technology) was available to more than 190,000 users in 137 of the Corporation's enterprises. The system is a powerful HR management tool that can be used to assess the performance of employees, their professional knowledge and skills, carry out a '360-degree assessment', as well as for training and career planning, successor assessment and selection of employees to be included in the succession pool, which supports employees' professional growth and development.

ROSATOM's integrated career development portal is a digital platform for recruiting and hiring candidates in the nuclear industry. In 2024, the portal was visited by more than 2 million people; over 74,000 candidates responded

to vacancies; more than 9,000 participants responded to announcements about events for young people. The user rating of the career development portal reached a record 4.9 out of 5 points.

In 2024, the development of the portal continued with the addition of a new section titled 'People about Careers', which features content focused on working in the nuclear industry. New artificial intelligence-powered features were introduced, enabling candidates to receive personalised recommendations for suitable vacancies based on their CVs and previous job searches.

In 2024, the functionality of the ROSATOM LIFE corporate social media platform was further expanded. This is a digital platform for communication and teamwork, which is available to more than 120,000 employees. In 2024, the platform was used by 92,000 employees; 960 communities are being actively developed; 44,000 posts have been published, and more than 1,000 surveys have been conducted, which helps to promptly receive feedback and supports effective communication among users in groups and communities.

3.4.5. Developing a culture of transparency and trust

The Corporation fosters a special culture of openness, trust, respect, fairness and equal opportunities, which is a necessary prerequisite for unlocking talent. This is accomplished through the use of a wide range of tools that have been proved to be effective. These include cascading a single message from the Director General to every employee, targeted engagement with the most active employees in the industry (young people, line managers, volunteers, change support teams, blue-collar workers and engineers), constantly requesting feedback from employees and immediately responding to it.

Throughout 2024, the Corporation's executives maintained an ongoing open dialogue with employees of enterprises and organisations in the industry. Executives answered questions during Communication Days and Director's Days, cascaded ROSATOM's 2030 Vision by outlining everyone's role in achieving the Corporation's strategic goals, and conducted pulse surveys and focus groups. These activities enabled ROSATOM to achieve an employee engagement rate of 82% at year-end, on a par with the world's best employers.

3.4.6. Improving the quality and accessibility of medical care in nuclear towns and cities

Since 2022, ROSATOM, together with the FMBA of Russia, has been implementing a project to improve the quality and accessibility of medical care in its host towns and cities. The number of towns and cities participating in the project increased from five in 2022 to 22 in 2025.

Over three years, RUB 1,855.8 million was allocated for the project by ROSATOM, and RUB 4,222.0 million was allocated by the FMBA of Russia.

Major repairs are being carried out in municipal polyclinics to make them more comfortable for patients, including for people with disabilities. Outpatient cancer care centres, women's health centres, and outpatient rehabilitation departments are being established. The modernisation of healthcare institutions is based on lean techniques. All these measures have led to a 50% increase in the number of visits for disease prevention purposes.

Over the course of three years, modern industrial medicine centres were opened in eight towns and cities. They have become a target model for the industrial medicine strategy within the system of the FMBA of Russia. Plans for 2025 include opening new industrial medicine centres in 22 healthcare institutions, once the construction is completed.

Following the implementation of the project, an independent survey was conducted in 2024 to assess the level of satisfaction with the medical care provided. Satisfaction levels increased from 39% to 71%.

As part of the project, steps are being taken to streamline the operation of the Coordination Centre for Oncology affiliated with the Federal Scientific Clinical Centre of the FMBA of Russia. The centre provides consultation on each newly detected case of cancer and coordinates the treatment plan for each patient.

Efforts to attract healthcare professionals to nuclear towns and cities are ongoing. Over the past three years, 61 apartments were purchased in these towns and cities for newly arriving medical specialists. A total of more than 1,000 new doctors were recruited during the period. In 2024, 76.5% of staffing requirements for primary care doctors were filled (compared to 62% in 2021).

The ROSATOM – Territory of Health forum was held. Activities held as part of the forum were aimed at informing local residents about the importance of preventive healthcare and promoting 'health schools'. More than 30% of the local residents (over 800,000 people) attended the forum.





4

80 YEARS OF RUSSIAN NUCLEAR INDUSTRY

REPORT ON THE DEVELOPMENT OF NUCLEAR TOWNS AND CITIES

Efim Slavsky (1898–1991)

During his tenure of almost 30 years as the head of the Ministry of Medium Machine-Building of the USSR, Efim Slavsky transformed the Ministry into an influential entity, which was described as ‘a state within the state’. He was actively involved in the development of nuclear towns and cities, and in the construction of nuclear power and nuclear industry facilities in the Urals, Siberia and in Central Asia, e.g. Shevchenko (currently Aktau, Mangystau Region), Ozersk (Chelyabinsk Region), Seversk, Zelenogorsk and Zheleznogorsk. Slavsky gave the approval for special construction divisions of the Ministry of Medium Machine-Building of the USSR to build the Akademgorodok (‘Academic Town’) research centres in Novosibirsk and Tomsk, the Belokurikha resort in Siberia, etc.

STATEMENT OF THE HEAD OF DEPARTMENT FOR LIAISON WITH REGIONS

Dear partners,

This report outlines our contribution to the development of nuclear towns and cities and the outcomes of our engagement with federal, regional and municipal authorities in 2024.

Our nuclear family already includes 31 towns and cities; however, we are actively preparing for a further rise in their numbers. ROSATOM is tasked with achieving a number of important and ambitious goals set by the President of Russia. One of these is to implement the General Scheme for the Locations of Power Facilities until 2042. As ordered by the President, this scheme gives special focus to the development of the country's nuclear industry. Over the next decade, nuclear power plants will start to supply affordable, carbon-free electricity to new regions, including those in the Far East and the Arctic. This will lead to an increase in the number of towns and cities involved in the nuclear industry.

We view these towns and cities, along with the enterprises located there, as a single organism. Comprehensive development of the real economy, infrastructure, the urban environment and the service sector is an essential prerequisite for successfully implementing our production plans and achieving our strategic objectives, including maintaining technological leadership.

Master plans have become an effective tool for implementing this approach. These plans outline strategies for urban development and enable all stakeholders to coordinate in advance the key measures that will shape the future of municipalities, as well as to determine sources of funding, set the time frame and allocate responsibilities. The nuclear towns and cities located in the Far East and the Arctic are pioneers in this area. The implementation of the master plan for the development of Krasnokamensk has been progressing successfully for a year now, as evidenced by the increase in the urban environment quality rating calculated by the Russian Ministry of Construction, Housing and Utilities. We expect the rating to grow in the towns of Pevek, Bilibino and Polyarnye Zori, whose master plans we will begin to implement in 2025. Overall, the quality of the urban environment in our towns and cities is invariably higher than the average across Russia. Some of them rank among the top towns and cities in the country, outperforming even some cities with populations of over one million. We must continue to maintain this high standard.

Today, ROSATOM has a nationwide network of representative offices. Thanks to the expertise of its government relations team, the Corporation is able to align the business strategies of its integrators and companies with the strategic development plans of constituent entities, leveraging ROSATOM's top achievements for the benefit of local residents in these regions. This complex and often delicate work has paved the way for projects in areas such as housing and utilities, energy, security, healthcare, transport and the introduction of digital solutions in municipal administration.

Concluding new and updating existing agreements with regional governments is an important aspect of our efforts. These documents make it possible to attract additional funding to ROSATOM's towns and cities, while also ensuring that their development remains high on the agenda of heads of regional governments.

Measures to support and develop culture and education in nuclear towns and cities are ongoing.

2025 will see the 19th anniversary of the launch of ROSATOM's Territory of Culture. Over nearly two decades since its launch, the programme has become an essential tool for developing the cultural environment in nuclear towns and cities. Today, the programme covers all nuclear towns and cities, providing a shared cultural space for their residents. More than 250 events spanning different types of art are held every year. Over the years, the programme has not only enriched the cultural landscape of these towns and cities but has also become a catalyst for the creative development of local communities, providing residents with an opportunity to experience high art and unlock their own creative potential.

ROSATOM's School will celebrate its 15th anniversary in 2025. The project offers teachers, children and parents an opportunity to discover and develop their hidden talents for the benefit of society. Since its launch, the project has grown to cover all Russian regions and 25 partner countries, with over 350 schools and 650 kindergartens taking part in its activities.

In 2024, ROSATOM collaborated with the Russian Znanie Society and NRNU MEPhI to deliver 22 lectures in nuclear towns and cities with a total reach of over 1,500 opinion leaders. The topics of the lectures included 'Russia of the Future', 'Modern Approaches to Public Administration' and 'National Development Goals'. As part of educational events, special emphasis was placed on the values and strategy of ROSATOM and the nuclear industry as a whole, in which Russia is a global leader.

ROSATOM is currently implementing high-technology projects that are unique both in Russia and worldwide. The key to the successful and timely implementation of these projects is people. This includes not only employees of ROSATOM's enterprises, but also all residents of nuclear towns and cities, who are crucial to the success of the nuclear industry and the state as a whole. Our objective is to ensure that their lives and work are comfortable and prestigious and fill them with optimism, and we are successful in accomplishing this objective.

Marina Kirdakova,
Head of Department
for Liaison with Regions

Key Results in 2024

- ROSATOM concluded 30 agreements with constituent entities of the Russian Federation. Four new regions were added in 2024.
- A total of more than RUB 4.5 billion was allocated under agreements with the regions in 2024.
- 14 of ROSATOM's host towns and cities became winners of the Competition for the Best Projects to Create a Comfortable Urban Environment organised by the Russian Ministry of Construction, Housing and Utilities. Investment totalled approximately RUB 1.8 billion, including RUB 1.1 billion allocated from the federal budget.
- In 2024, ROSATOM's enterprises increased their procurement from PDA residents by 30% compared to 2023.
- In 2024, PDA residents paid a cumulative total of more than RUB 1 billion in taxes to consolidated regional budgets.

Key Events in 2024

- Master plans were developed for ROSATOM's host towns of Polyarnye Zori, Bilibino and Pevek, which are core communities in the Russian Arctic.
- ROSATOM won the First National Award of the Russian Ministry of Construction, Housing and Utilities in the category 'For a Company's Contribution to Creating a Comfortable Urban Environment in Its Host Towns and Cities'.

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4.1. Development Priorities

The government's current approach to municipal development reflects stricter requirements for project breakdown, prioritisation, and funding allocation. ROSATOM's approach is aimed at promoting the development of its regions of operation in cooperation with government bodies at all levels.

At the federal level, the Corporation has assisted in drafting the Strategy for Spatial Development of the Russian Federation until 2030 with an outlook until 2036, which has been approved by the Government of the Russian Federation. In 2024:

- A single list of core communities in the Russian Federation was compiled; it includes 32 municipalities hosting nuclear organisations;
- The Corporation contributed to the development of master plans for three core communities in the Russian Arctic: Polyarnye Zori (Murmansk Region), and Pevek and Bilibino (Chukotka Autonomous District). The lists of key measures for both master plans include ROSATOM's projects (including the construction of Kola NPP-2 as part of the master plan for the Kirovsk – Apatity urban agglomeration);
- The development of master plans for the CATFs of Ozersk and Snezhinsk (Chelyabinsk Region) and the town of Usolye-Sibirskoye (Irkutsk Region) was initiated with support from the Corporation.

2024 saw the start of implementation of a long-term plan for comprehensive social and economic development of the town of Krasnokamensk until 2030. It builds on the master plan for the development of the town, which includes ROSATOM's projects (including the development of the Argunskoye and Zherlovskoye uranium deposits).

At the regional level, agreements have been signed with 30 constituent entities of the Russian Federation, 21 of which are ROSATOM's host regions.

At the municipal level the Corporation has participated in national, federal and departmental projects in order to attract additional investment to support urban development, including the implementation of the relevant master plans. ROSATOM provides methodological assistance and guidance to municipal and regional project teams.

ROSATOM works systematically to develop the urban environment in its host towns and cities:

- Lectures and expert discussions were organised; training was provided to municipal teams;
- Applications were prepared for participation in the National Competition for the Best Projects to Create a Comfortable Urban Environment (the Competition) held by the Russian Ministry of Construction, Housing and Utilities. As a result, 14 nuclear towns and cities won the Competition, and two towns won the 3rd Competition for the Best Projects to Create a Comfortable Urban Environment in the Regions of the Far Eastern Federal District. A total of 19 nuclear towns and cities participated in the Competition; five of them became winners for the fourth time.

Taxes paid by ROSATOM and its organisations, RUB billion

Tax payments	2021	2022	2023	2024
To the federal budget	170.5	213.0	278.1	286.2
To the budgets of constituent entities of the Russian Federation	78.2	77.8	164.5	149.6
To local budgets	0.5	0.6	0.5	0.6
Total	**249.2**	**291.4**	**443.1**	**436.4**

Urban environment quality ratings assigned to nuclear towns and cities

The urban environment quality rating (UEQR) is based on an assessment of six types of urban spaces: housing and adjacent spaces; street and road networks; green spaces; public and business infrastructure and adjacent spaces; social and leisure infrastructure and adjacent spaces; and common urban spaces. The quality of these spaces depends on the outcomes of participation of municipalities in the implementation of national projects, with scores assigned to each type of space when calculating the rating.

The average urban environment quality rating for 1,116 towns and cities of the Russian Federation stood at 220 points in 2024.[1] The urban environment quality ratings assigned to Moscow and Saint Petersburg stood at 312 points and 283 points respectively.

29 out of 30 nuclear towns and cities have been assigned an urban environment quality rating above the benchmark (180 points) and are characterised by a high standard of living. Although its UEQR currently stands at 177 points (indicating an unfavourable urban environment), the town of Usolye-Sibirskoye has demonstrated steady growth, with the UEQR increasing by 135% since 2018 (when it stood at 131 points).

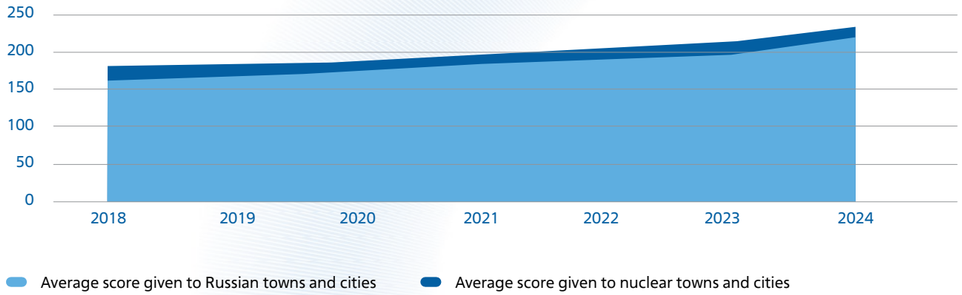
1. Methodology for calculating the urban environment quality rating (http://static.government.ru/media/files/wbRiqrDYKeKbPh9FzCHUwWoturf2Ud0G.pdf).

Changes in the UEQRs of constituent entities, administrative centres, and nuclear towns and cities in 2023 and 2024

Constituent entity of the Russian Federation	Average score given to the constituent entity in 2023	Average score given to the constituent entity in 2024	Increase, %	Administrative centre	Score given to the AC in 2023	Score given to the AC in 2024	Increase, %	Town/city	Score given to the town/city in 2023	Score given to the town/city in 2024	Increase, %
Nizhny Novgorod Region	207	235	114	Nizhny Novgorod	237	247	104	CATF of Sarov	244	265	109
Sverdlovsk Region	203	236	116	Yekaterinburg	213	245	115	CATF of Lesnoy	243	274	113
Kaliningrad Region	215	237	110	Kaliningrad	239	270	100	Neman	198	229	116
Saratov Region	201	215	107	Saratov	222	245	110	Balakovo	235	248	106
Penza Region	195	210	108	Penza	205	225	110	CATF of Zarechny	235	242	103
Moscow Region	231	260	113	Krasnogorsk	256	294	115	Elektrostal	230	262	114
Tomsk Region	197	212	108	Tomsk	207	228	110	CATF of Seversk	224	242	108
Sverdlovsk Region	203	236	116	Yekaterinburg	213	245	115	Zarechny	222	251	113
Vladimir Region	208	224	108	Vladimir	225	250	111	Kovrov	222	235	106
Chelyabinsk Region	202	230	114	Chelyabinsk	202	215	106	CATF of Ozersk	220	243	110
Kursk Region	205	205	100	Kursk	191	201	105	Kurchatov	220	220	100
Chelyabinsk Region	202	230	114	Chelyabinsk	202	215	106	CATF of Tryokhgorny	220	246	112
Kaluga Region	204	210	103	Kaluga	234	241	103	Obninsk	220	228	104
Tver Region	198	213	108	Tver	227	237	104	Udomlya	218	234	107
Ulyanovsk Region	198	213	108	Ulyanovsk	220	237	108	Dimitrovgrad	214	227	106
Smolensk Region	197	220	112	Smolensk	227	263	116	Desnogorsk	213	246	115
Krasnoyarsk Territory	192	204	106	Krasnoyarsk	208	214	103	CATF of Zheleznogorsk	212	227	107
Sverdlovsk Region	203	236	116	Yekaterinburg	213	245	115	CATF of Novouralsk	212	237	112
Voronezh Region	203	214	105	Voronezh	213	225	106	Novovoronezh	211	225	107
Irkutsk Region	172	187	109	Irkutsk	212	226	107	Angarsk	208	227	109
Murmansk Region	217	233	107	Murmansk	212	239	113	Polyarnye Zori	206	221	107
Udmurt Republic	198	211	107	Izhevsk	224	236	105	Glazov	205	220	107
Chelyabinsk Region	202	230	114	Chelyabinsk	202	215	106	CATF of Snezhinsk	204	233	114
Rostov Region	197	211	107	Rostov-on-Don	223	238	107	Volgodonsk	203	218	107
Krasnoyarsk Territory	192	204	106	Krasnoyarsk	208	214	103	CATF of Zelenogorsk	203	214	105
Leningrad Region	216	237	110	Gatchina	243	264	109	Sosnovy Bor	200	219	110
Chukotka Autonomous District	197	206	105	Anadyr	228	231	101	Pevek	188	202	107
Chukotka Autonomous District	197	206	105	Anadyr	228	231	101	Bilibino	175	184	105
Irkutsk Region	172	187	109	Irkutsk	212	226	107	Usolye-Sibirskoye	163	177	109
Zabaykalsky Territory	160	177	111	Chita	198	206	104	Krasnokamensk	156	189	121

12 nuclear towns and cities were assigned an UEQR that is higher than the average for the relevant constituent entity of the Russian Federation and the administrative centre of the relevant region (these towns and cities are highlighted in blue).

Average UEQR growth for all Russian towns and cities, and nuclear towns and cities between 2018 and 2024



Despite the high initial scores assigned to nuclear towns and cities, which make achieving significant growth more difficult, their performance and current ratings remain significantly higher than the national average.

Overall, 97% of nuclear towns and cities have a favourable urban environment. In 2024, the average urban environment quality rating of nuclear towns and cities increased by 20 points year on year to 230 points, which is 10 points higher than the national average. Furthermore, the average rating assigned to closed towns and cities stood at 242.3 points, while the average rating assigned to open towns and cities was 223.1 points. In 2024, the average rating assigned to open towns and cities increased by 49.2 points compared to 2018, when the urban environment quality rating averaged 173.9 points, which indicated an unfavourable urban environment. The average rating assigned to closed towns and cities increased by 53.1 points.

In 2024, the town of Krasnokamensk achieved a 33-point year-on-year increase in the rating and was ranked among towns and cities with a favourable urban environment; previously, between 2018 and 2023, it had ranked among towns and cities with an unfavourable urban environment.

The top ten towns and cities with the highest UEQR score included:

- The CATF of Lesnoy (274);
- The CATF of Sarov (265);
- Elektrostal (262);
- Zarechny (Sverdlovsk Region) (251);
- Balakovo (248);
- The CATF of Tryokhgorny and Desnogorsk (246);
- The CATF of Ozersk (243);
- The CATF of Zarechny and the CATF of Seversk (242);
- The CATF of Novouralsk (237);
- Kovrov (235).

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4.2. Contribution to the Implementation of National Projects

In 2024, ROSATOM continued to support the participation of its host towns and cities in national and federal projects pursuant to the relevant Decrees of the President of the Russian Federation.[1]

Funding for national projects in 27 of ROSATOM's host towns and cities between 2019 and 2024 totalled RUB 39,368.04 million, including RUB 6,805.13 billion in 2024.

Funding of national projects in ROSATOM's host towns and cities between 2019 and 2024, RUB million

Housing and Urban Environment	17,955.4
Education	6,251.37
Demography	5,122.61
Culture	1,359.97
Ecology	2,507.5
Safe and High-Quality Roads	5,904.5

Funding of national projects in ROSATOM's host towns and cities, RUB million

Indicator	2021	2022	2023	2024
Total	**5,762.53**	**6,800.53**	**8,824.21**	**6,805.13**
including capital investment	2,518.03	3,596.23	3,539.37	2,363.96

As part of the Housing and Urban Environment National Project, in 2024, steps were taken to reduce substandard housing stock in three towns and cities (Balakovo, Glazov and Elektrostal). A related federal project, Creating a Comfortable Urban Environment, is being implemented in all nuclear towns and cities. Another related federal project, Clean Water, was completed in 2024 and has helped significantly improve the water supply and sewerage systems in the CATFs of Ozersk and Seversk, the city of Obninsk and the town of Bilibino.

The majority of towns and cities take part in the Culture National Project (26 towns and cities). As part of the project, culture development centres, modular municipal libraries and virtual concert halls were established in 2024; children's art schools were provided with musical instruments; grants are awarded every year to support creative teams.

As part the Ecology National Project, 12 towns and cities participate in the Clean Country and the Integrated System for the Management of Municipal Solid Waste Federal Projects.

1. Decree No. 474 of the President of the Russian Federation dated 21 July 2020 on the National Development Goals of the Russian Federation until 2030 (Decree No. 474) and Decree No. 309 of the President of the Russian Federation dated 7 May 2024 on the National Development Goals of the Russian Federation until 2030 and for the Future until 2036 (Decree No. 309).

Developing the town of Usolye-Sibirskoye

ROSATOM continued to take steps to facilitate the implementation of industry projects in the town of Usolye-Sibirskoye and ensure that the town contributes to the achievement of development targets set by the President of the Russian Federation.

- The following industry-wide social initiatives are being implemented: ROSATOM's School, ROSATOM's Territory of Culture, educational projects run by the Rosatom Corporate Academy;
- The potential for business development at the site of Usolyekhimprom is being assessed, taking into account the construction of the Vostok industrial facility and the establishment of the Federal Chemical Industry Hub in Usolye-Sibirskoye as part of the relevant project;
- A master plan for comprehensive social and economic development of the town is being prepared.

As part of the initiative:

- Support was provided for a concert to celebrate the 355th anniversary of the foundation of the town (1,500 people);
- The Atomfest 2024 sports festival was held in the town (20,000 participants);
- An open space was created in Municipal State-Funded Educational Institution Gymnasium No. 9, which forms part of ROSATOM's School, an innovative network of educational institutions.

Plans for 2025 include implementing the master plan, and holding cultural, educational and sporting events, including as part of celebrations to mark the 80th anniversary of establishment of the nuclear industry.



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4.3. Contribution to the Economy

ROSATOM's organisations make significant contributions to budget revenue in nuclear towns and cities. The Corporation is a major taxpayer in Russia.

Between 2012 and 2024, ROSATOM's organisations paid a total of RUB 717.87 billion in taxes to the budgets of the constituent entities of the Russian Federation with which they had signed cooperation agreements (including RUB 117.3 billion in 2024).

During the period, a total of RUB 36.2 billion was allocated for various initiatives from regional budgets under these agreements (including RUB 5.5 billion in 2024).

Focus areas of initiatives funded out of regional budgets

National project	Funding
Capital construction (renovation)	35.5%
Urban improvement	25.4%
Major repairs of residential buildings; repairs of and provision of equipment for social facilities	21.0%

In addition, under the agreements, funds are allocated for the repairs of housing and utilities infrastructure, implementation of small business support programmes, and incorporation of comprehensive digital solutions developed by ROSATOM into the work of municipal governments in order to automate the provision of social services.

A set of measures is being implemented to improve municipal governance in nuclear towns and cities. The project titled 'ROSATOM's Smart City' is ongoing in 19 nuclear towns and cities; it is focused on the digitisation of municipal services. It is being implemented as part of the Housing and Urban Environment National Project and the Digital Economy National Programme with support from the Power Engineering Division, the administrations of ROSATOM's host towns and cities, and the Infrastructure Solutions Division. More than 100,000 people use services rolled out in nuclear towns and cities.

In 2024, the towns of Kurchatov, Zarechny (Sverdlovsk Region) and Sarov won the 1st Nationwide Competition for the Best Executive Authority in Terms of Management Innovations. The Competition is held by the Centre for Management Innovations of the Budget Publishing House jointly with the Financial University under the Government of the Russian Federation with support from the Public Finances Development Union.

Priority development areas (PDAs)

In 2024, there were 177 companies (including 20 companies of ROSATOM) registered in 12 PDAs (eight CATFs and four single-industry towns), with investments totalling RUB 78.6 billion and plans to create 11,142 jobs.

ROSATOM supports PDA residents (with 60% of them producing unique products and 80% producing products replacing imports), develops industrial parks (with one industrial park in operation and three under construction)

and is expanding the boundaries of PDAs (Zarechny and Ozersk are awaiting approval). The following results were achieved in 2024:

- PDA residents acquired property with a total area of 44,255.3 square metres worth RUB 111.2 million. In 2024, non-core property with a total area of 20,175.8 square metres previously owned by enterprises playing a central role in the local economy and located in PDAs was transferred to PDA residents;
- A Resident Day was held to inform potential and existing residents about business development opportunities in PDAs. More than 40 events were held (strategy sessions, tours of production sites, business breakfasts, etc.), and 12 cooperation agreements were signed with potential residents;
- A website (www.product-tor.ru) was launched which contains information about the products and services offered by PDA residents.

Generating employment through NPP construction

The construction and commissioning of nuclear facilities, including NPP power units, create new jobs, as organisations often hire employees from local communities.

The increase in the actual headcount in 2024 was driven by the transition of several overseas projects to the active construction phase.

Employment in key NPP construction projects as at 31 December 2024

Region	Actual headcount, including contractor organisations (2024), %	Including employees recruited from local communities (2024),[1] %	Number of local building contractors engaged in construction between 2021 and 2024
Russian Federation	40	86.9	28 (2021–2023)[2]
Foreign sites / representative offices	60	70.3	433

Performance of the network of ROSATOM's representative offices

To promote ROSATOM's products in domestic regional markets and facilitate effective communication between regions and organisations, a network of representative offices was established in seven federal districts in August 2022.

Representative offices are responsible for the following main communications and GR tasks:

- Negotiating with regional authorities;
- Organising meetings with heads of regional governments;
- Making arrangements for the signing of agreements;
- Securing financial support (subsidies, benefits, loans, preferences and third-party investment) from the region for project implementation;
- Providing regulatory and documentary support, such as approving regional and local regulations (allocation of land plots) and tariffing.

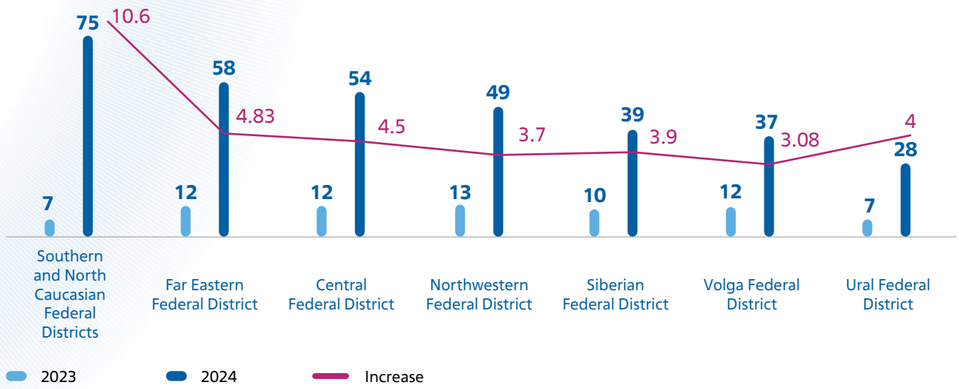
1. As a percentage of the total number of employees involved.
2. Information for 2024 cannot be disclosed because, pursuant to Order No. 233-rg of the Governor of the Kursk Region dated 7 August 2024, a region-wide state of emergency involving a regional level of response has been introduced for the administrative bodies and local teams of the Unified State System for Emergency Prevention and Response in the Kursk Region as from 7 August 2024.

The 2024 Consolidated Plan for Engagement with Regions included 340 events. Compared to the 2023 figure (73 events), the level of willingness of ROSATOM's organisations and integrators to engage with regions increased by a factor of 4.7 (467%).

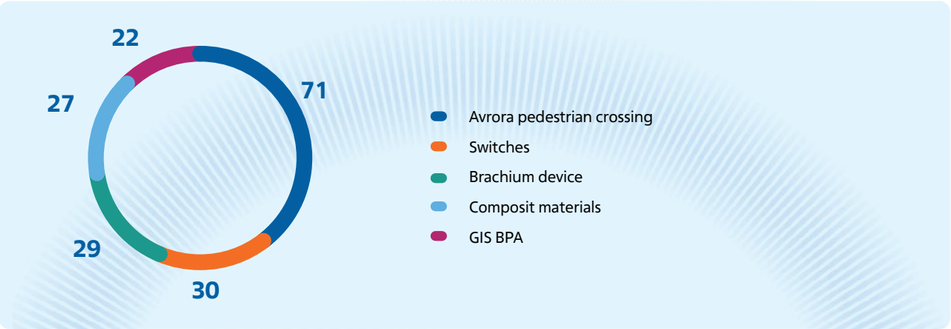
Changes in the level of willingness of ROSATOM's organisations and integrators to engage with regions

Federal district	Number of events included in the 2023 Consolidated Plan	Number of events included in the 2024 Consolidated Plan	Increase in the level of willingness to engage, %
Southern	7	75	10.6
Far Eastern	12	58	4.83
Central	12	54	4.5
Northwestern	13	49	3.7
Siberian	10	39	3.9
Volga	12	37	3.08
Ural	7	28	4.0
Total	**73**	**340**	**4.7**

Changes in the number of events included in the Consolidated Plan compared to 2023



Top proposals by ROSATOM's organisations included in the 2024 Consolidated Plan



In 2024, the main focus was on promoting light projection technologies for safe pedestrian crossings. The overall number of planned activities totalled 522, up by 53.5% compared to 2023.

To expand the regional footprint:

- Contracts worth RUB 288.6 million were signed;
- Subsidies and loans on preferential terms totalling RUB 1,849.3 million were agreed for three projects involving representative offices in the Northwestern and Far Eastern Federal Districts.

In 2024, ROSATOM introduced a new format, ROSATOM's Day. These are off-site business missions organised in cooperation with regional authorities. These events feature discussions, presentations and round-table meetings, whose main aim is to develop partnerships between the Corporation and regions in order to ensure Russia's technological sovereignty, consolidate the efforts of regional authorities and businesses to achieve Russia's national goals, and promote the comprehensive social and economic development of the regions and Russia's nuclear industry.

The sessions focus on new initiatives undertaken by the Corporation's organisations and enterprises, including cooperation in nuclear medicine, addressing environmental issues, introducing advanced technologies in construction and road maintenance, and developing logistics infrastructure. Digital solutions are proposed in order to optimise the work of executive authorities, municipalities and public utilities. Additionally, the principles of a lean regional economy are presented, including in healthcare, based on the experience of implementing the ROSATOM Production System (RPS) in constituent entities of the Russian Federation.

These events result in agreements on a mutually beneficial partnership between ROSATOM and the regions aimed at achieving Russia's overarching national goals, and the signing of cooperation road maps.

GRI 3-3

4.4. Social Development

Improving the standard of living in towns and cities is one of the top priorities of both ROSATOM's strategic agenda and the government. To attain this goal, a number of initiatives spanning various areas, including education, culture, healthcare, environmental protection, social support for local residents and the development of small and medium-sized enterprises, are being implemented in the regions.

ROSATOM's School industry-wide initiative

In 2024, a set of initiatives was implemented in 31 towns and cities as part of ROSATOM's School in order to promote the development of networked communities (public and professional, children's, parents' communities, etc.) aiming to give the younger generation an upbringing aligned with traditional Russian spiritual and moral values.

In the reporting year, more than 45,000 preschoolers, more than 65,000 school students and more than 12,000 teachers from 360 schools and 678 kindergartens took part in 189 events of ROSATOM's School.

Six new schools were added to the nuclear class network as part of ROSATOM's School in 2024. The nuclear class network covers more than 51,000 school students, providing them with opportunities to study STEM disciplines in depth.

Nine schools forming part of the nuclear class network (10%) were ranked among the top 300 schools in terms of performance (the RAEX ranking). Two final-year students from schools included in the nuclear class network of ROSATOM's School scored a total of 300 points in the Unified State Exam (USE) in 2024.

Schools participating in the nuclear class network held 52 online events focused on engineering and technology, with over 5,000 school students taking part. The schools engaged specialists from nuclear enterprises and ROSATOM's core universities to assist in organising the events.

Special mention should be made of the Academic Competition in Engineering Physics organised jointly with Alekseev Nizhny Novgorod State Technical University, with over 1,000 school students participating in this event. Winners have an advantage when applying to a university.

The community of teachers in nuclear towns and cities expanded to more than 23,000 people; they took part in 51 events.

In 2024, the Year of the Family in Russia, ROSATOM's School organised the Family Councils Festival, which featured more than 1,000 families from 22 nuclear towns and cities.

As part of the project titled 'Together Across Our Russia', 1,500 school students from nuclear towns and cities and new regions participated in joint expeditions across the country.

Competition programmes were organised for teachers, with 600 teachers presenting their educational projects. The best 50 programmes received support, including internships and rollout in the country's leading children's centres.



ROSATOM's Territory of Culture industry-wide initiative

More than 250 events across various types of art were held in 2024 as part of ROSATOM's Territory of Culture programme. Over the past six years, the number of towns and cities participating in the programme increased from 22 to 30.

A performance assessment of cultural institutions was carried out in all nuclear towns and cities. Its findings informed a large-scale educational programme that helps cultural institutions independently raise funds from federal and regional budgets for the implementation of government programmes.

In the reporting year, a large number of events included in the programme were held as part of the Year of the Family in Russia. These included:

- An exhibition titled 'Family History';
- The 2nd Family of Families Festival of Creative Traditions;
- The Running Book Nationwide Intellectual Running Race.

Key events in 2024 included the following:

- The 7th Music Academy of Nuclear Towns and Cities under the direction of People's Artist of the USSR Yury Bashmet in Novouralsk; the 2nd Art Academy of Nuclear Towns and Cities in Udomlya;
- The launch of a project titled 'Culture for School Students' implemented in partnership with the Ministry of Culture of the Russian Federation in nuclear towns and cities, with Zarechny (Penza Region) as the first town to host the project;
- Creative and engineering laboratories organised in five towns and cities;
- The launch of a series of creative laboratories and workshops on various arts, in which more than 1,000 children from various towns and cities took part.

ROSATOM's Territory of Culture places a special emphasis on systematic engagement with the nationwide volunteer movement, which makes it possible to involve volunteers from nuclear towns and cities in projects forming part of the programme. In 2024, ROSATOM's Territory of Culture joined the Coordination Council (the collective governing body) of the Volunteers of Culture movement.

For details, see section 3.3. 'Corporate Volunteering'.

Educational projects

ROSATOM, the Russian Znanie Society and Department No. 95 of NRNU MEPhI implemented a joint educational project for local residents in 22 nuclear towns and cities. Activities as part of the project were organised by municipal administrations and the Corporation's enterprises playing a central role in the local economy. More than 1,500 people participated in the project. Lectures covered topics such as Russia of the future, modern approaches to public administration, and national development goals, which were updated during the year pursuant to a decree of the President of the Russian Federation. A separate topic was focused on the nuclear industry, its values and strategy.

Nuclear Towns and Cities Union

Throughout 2024, the Nuclear Towns and Cities Union was implementing an integrated social planning programme aimed at improving the standard of living in nuclear towns and cities. As part of long-term projects, steps are taken every year to promote the professional growth of local residents in ROSATOM's regions of operation and help them unlock their creative potential. More than 300,000 people in 30 of ROSATOM's host towns and cities took part in 11 projects of the Union during the year.

The Atomic Quiz was one of the Union's key projects in 2024. Its participants included hundreds of thousands of people of various ages and professions. The project has helped create a community passionate about knowledge and scientific progress and recognising the importance of nuclear technologies for a sustainable future. In 2024, the main focus was on expanding the reach of the Atomic Quiz as much as possible. The Union engaged major partners and media outlets, such as the Znanie Society, the All-Russia People's Front, the Federal Agency for Youth Affairs, Tavrida.ART, the Russian Association for Local Self-Government Development (RALSGD), Digoria, Mashuk and NRNU MEPhI, to participate in the project. The Quiz questions were read out by prominent figures in the sphere of education and science and representatives of civic associations. This cooperation has enabled the project to expand beyond nuclear towns and cities and evolve into a nationwide and even international initiative. Between 1 and 14 September 2024, more than 57,000 people successfully completed the Quiz online on the website of the project in Russian and in English. In addition, offline venues were provided for the Atomic Quiz in the CATFs of Zelenogorsk and Novouralsk, as well as in Obninsk, Sarov, Bogdanovich, Krasnodar and Michurinsk.

Educational initiatives are an important focus area for the Nuclear Towns and Cities Union. In addition to the Atomic Quiz, a project titled **'Creators. People Transforming the World'** has also become an important educational initiative targeted at young people in ROSATOM's host towns and cities. The project is targeted at school and university students and young specialists in the nuclear industry who want to learn more about modern professions that are in demand, such as SMM management and blogging. In 2024, the project enabled the 300 most active young creators from nuclear towns and cities to acquire practical skills needed for a successful career.

The young people learned to create high-quality content, maintain a presence on social media, and promote their ideas in the digital space. Many of the participants put their ideas into practice, with topics related to nuclear power as the focus of their blogs. Creators is more than just a project; it is an investment in the future of the nuclear industry and our country. Plans include large-scale career guidance ambitions, new initiatives, scaling up best practices, and continued engagement with young people who are already changing the world for the better.

In addition to the Atomic Quiz and Creators, the **Digital Technology** project is yet another major educational initiative run in ROSATOM's host towns and cities. During the history of nuclear towns and cities, their residents have become accustomed to using state-of-the-art technology. In 2024, the project was targeted at local residents in nuclear towns and cities aged 14 to 55. As a result of the project, they were offered an opportunity to acquire up-to-date knowledge and practical skills in the sphere of digital technology, artificial intelligence and data analysis. The project gives special focus to the application of artificial intelligence for work and study and in day-to-day life. The project is aimed at nurturing a new generation of IT specialists in ROSATOM's host towns and cities who are capable of developing and improving the digital space.

In 2024, the Nuclear Towns and Cities Union made significant progress in supporting businesses and promoting social entrepreneurship in nuclear towns and cities. A project titled **'The ABC of SMEs'**, which is implemented in partnership with the administrations of ROSATOM's host towns and cities, is aimed at providing support to entrepreneurs at multiple levels, including access to educational programmes, expert support for the development of business strategies, and financing for the purchase of equipment following a successful presentation of projects. Associate professors from the Ural Institute of Management (a branch of RANEPA), a lecturer from the Department of Strategic and International Management of the HSE Graduate School of Business, the Research Director of the Youth Institute and a Deputy Director of the Centre 'School of Andragogy and Educational Design' of the RANEPA Graduate School of Public Administration acted as business coaches for the project; they are acknowledged experts with 20 years of experience in economics and innovation. Their proprietary methodologies combining theory and practice help entrepreneurs transform ideas into working business models even amid market turbulence.

As part of the ABC of SMEs, the Union provided support for 19 business projects. At least three social business initiatives are launched every year in each town and city participating

in the project; this makes it possible to use a systematic approach and achieve scalable results. In recognition of the efficiency of this model, in 2024, the Nuclear Towns and Cities Union was presented with the Force for Good Award from the Foundation of Regional Social Programmes 'Our Future' in the Top Company category. The project received high praise for its contribution to the development of social entrepreneurship at the federal level.

In 2024, a project titled **'ROSATOM's Family'** successfully accomplished its mission of strengthening the institution of the family and intergenerational ties in ROSATOM's host towns and cities. ROSATOM's Family is an integral part of the Union's project framework and perfectly complements such projects as the Atomic Longevity and 'Creators. People Transforming the World', helping create a single space for family creativity and development. The project has provided more than 700 proactive families from ROSATOM's regions of operation with unique opportunities for unlocking their potential and showcasing family traditions. Special focus was given to providing the younger generation with spiritual, moral and patriotic education.

The project culminated with the official award ceremony held in Moscow, where the winning family from Krasnokamensk was offered an opportunity to meet ROSATOM's Director General Alexey Likhachev in person. All participants of the project and runners-up were awarded valuable prizes, which highlighted the importance of their contribution to preserving and promoting family values.

In 2024, the **Atomic Longevity** project demonstrated its importance as one of the key social projects of the Nuclear Towns and Cities Union focused on promoting an active lifestyle among senior citizens in ROSATOM's host towns and cities. In the reporting year, the project covered more than 1,000 senior citizens in 15 nuclear towns and cities, which proves that it has become a truly large-scale and popular project. The Union organised more than 400 events in various formats ranging from educational lectures and practical legal advice to creative workshops, health and fitness activities, and exciting guided tours. Each of these events was tailored to the needs of the target audience.

Integration with the Union's other projects has produced a special synergy. For instance, both experienced and budding entrepreneurs participating in the ABC of SMEs project held a series of specialised events for senior citizens participating in the Atomic Longevity project. This experience has demonstrated how corporate social responsibility can contribute to shaping a sustainable community in nuclear towns and cities. As a result, the participants of both projects have found new opportunities for unlocking their potential. In addition to promoting the social well-being of senior citizens, this comprehensive approach has also provided a solid foundation for further development of human capital in ROSATOM's regions of operation.

In 2024, the **Best Municipal Practices** project was an important focus of the efforts of the Nuclear Towns and Cities Union to promote the development of ROSATOM's regions of operation. Run as a competition of municipal practices, the project has become an effective platform enabling municipalities to share their experience. The project has covered more than 200 successful practices applied in ROSATOM's host towns and cities across key areas of social and economic development ranging from environmental protection and education to culture and urban improvement. Representatives of local governments, municipal institutions and non-profit organisations, as well as social activists were actively involved in the project, which proved that it is a popular tool for professional engagement.

Strategic partnership with the Russian Association for Local Self-Government Development (RALSGD) has helped to take the project to a fundamentally new level. Prioritised areas for development were defined jointly with experts from the Association, and mechanisms were established for an effective roll-out. Major outcomes of the project included a Collection of the Best Municipal Practices and an Interactive Project Map, which are available on the website of the Nuclear Towns and Cities Union. Active participation of representatives of municipalities in the competition reflects its importance as a platform for sharing practices at the local level, making it possible to scale and further develop the best practices.

In 2024, a new project titled **'Green Atom'** was added to the framework of the Union's educational projects. The Green Atom project is aimed at developing an integrated environmental education system in ROSATOM's regions of operation by supporting local environmental projects and initiatives. During the year, the Nuclear Towns and Cities Union provided comprehensive support for more than 50 environmental campaigns and initiatives, whose participants included public figures, environmental activists and local associations. The implementation of the project in 2024 confirmed its importance as an effective tool for shaping the environmental culture. Integration with other projects of the Nuclear Towns and Cities Union, such as the Best Municipal Practices, has made it possible to apply a systematic approach to addressing environmental issues and has provided a solid foundation for further developing environmental initiatives in ROSATOM's regions of operation.

In 2024, a project titled **'The Atom Explained in Simple Terms'** successfully accomplished its mission of raising public awareness of the latest achievements of the Russian nuclear industry. In the context of efforts to ensure the country's technological sovereignty, the project has become an important tool for communication between the nuclear industry and the general public. The main channels of communication included the project's website and community pages on all available social media platforms.

In 2024, special emphasis was placed on ensuring that the information presented was relevant (i.e. that it reflected the latest developments), that hard-to-grasp topics were presented in an accessible way, and that the technologies presented had practical applications. The project has proved to be effective as a platform for shaping an objective view of the role of the Russian nuclear industry and its capabilities.

In 2024, the **Citizen of ROSATOM's Country** project demonstrated its importance as an effective platform for dialogue between local residents in nuclear towns and cities, government representatives and businesses. During the reporting year, the project achieved impressive results: the discussion platform at atomnews.ru was visited by more than 3.5 million people, which reflects a high level of local residents' trust in the project as an effective tool enabling them to express their opinions. The established feedback mechanism is particularly valuable, as it makes it possible to promptly respond to people's requests and take their opinions into account when implementing social and economic programmes. Along with the Union's other projects, the Citizen of ROSATOM's Country has contributed to developing a culture of responsible civic participation.

The Citizen of ROSATOM's Country project has not only strengthened its position as an important channel of communication between local residents, but has also provided a solid foundation for further development of a system of civic participation. Plans for the coming year include expanding the functionality of the platform in order to ensure the highest level of responsiveness to the opinions of all categories of residents of nuclear towns and cities.

For details, see also section 3.3.4. 'Corporate Social Responsibility Initiatives'.

GRI 2-29
GRI 413-1

4.5. Work of ROSATOM's Public Council and Community Relations

ROSATOM's Public Council was established in 2006 as a collective expert body tasked with providing support for communication and cooperation between the Corporation's organisations and individuals, non-profit organisations, regional and local governments in Russia and abroad. In 2024, ROSATOM's Public Council held seven virtual meetings.

In July 2024, ROSATOM's Public Council held an off-site meeting in the CATF of Sarov. The participants of the meeting visited the Sarov technology park and the NCPM, and had an opportunity to learn about state-of-the-art projects in laser technology.

In October 2024, the Public Council held an international public dialogue forum as part of the Belarusian Energy and Ecology Forum. Topics addressed at the dialogue forum included youth engagement, collaboration with non-governmental organisations, environmental awareness, waste management and joint projects of

the two countries. Over the course of two days, experts discussed strategic cooperation, social and economic changes, and the environmental safety of nuclear technologies. The main focus was on safety issues, new technologies and public engagement.

Throughout the year, members of the Public Council took an active part in technical tours, round-table discussions, field trips and environmental campaigns.

In 2024, there were four permanent commissions under the Public Council: the Healthcare Commission; the Regional Development Commission, the Environmental Commission, and the Commission on the Russian Arctic and the Northern Sea Route.

Environmental Commission

In September 2024, a seminar on addressing nuclear legacy in the Far East was held in Vladivostok. As decided by the organising committee, Oleg Muratov, a member of the Public Council, moderated the presentation session and presented a report on public participation in the decision-making process and the implementation of projects to rehabilitate 'nuclear legacy' sites. Efforts to eliminate the nuclear legacy related to Soviet nuclear submarines that have reached the end of their service life have largely been completed in the Far East to date.

The participants of the seminar were given technical tours of the sites, during which specialists gave detailed presentations and answered questions. This included a technical tour of the shipyard where the *Lider* nuclear icebreaker is being built to enable year-round navigation along the Northern Sea Route.

In accordance with the decision adopted in 2023 at a meeting of the Environmental Commission of the Public Council on monitoring the development of industrial facilities, ROSATOM organised a survey of various components of the environment (soil, groundwater, vegetation, water bodies and bottom sediments) in areas adjacent to the industrial facilities. The aim of this survey is to determine the concentration of potential pollutants before the industrial facility begins operation, in order to assess its potential negative environmental impact.

The surveys involved determining the background levels of potential pollutants in the soil, surface water, groundwater and bottom sediments, assessing the status of vegetation, and issuing environmental passports for the sites. These findings will inform the assessment of the potential environmental impact of industrial facilities for the processing, recycling and treatment of hazard class 1 and 2 waste. Recommendations were issued regarding the environmental control and monitoring of various components of the environment during the operation of the industrial facilities with the aim of regularly assessing their environmental impact.

Members of the commission participated in over 150 events focused on sharing experience and discussing topical issues related to environmental protection and sustainable development in the nuclear industry.

Environmental monitoring in environmental technology parks

As part of public oversight of the implementation of the Ecology National Project and in order to increase the transparency of ROSATOM's activities, background environmental monitoring was completed with expert support from the Environmental Commission in the vicinity of the Gorny, Schuchye, Kambarka and Maradykovsky environmental technology parks in 2024 prior to their commissioning. These activities were initiated and the rationale for them was provided by experts from the Environmental Commission of the Public Council.

To this end, the Commission held dedicated meetings and organised consultations, which involved a thorough discussion of the parameters for the monitoring survey.

As a result, in the autumn of 2024, the Department of Environmental Protection and Natural Resources of the Ministry of Natural Resources and Environmental Protection of the Udmurt Republic, in collaboration with Vyatka State University, conducted environmental surveys in areas adjacent to the industrial facilities.

A soil condition and contamination survey was carried out across 36 metrics and covered at least four sites in four directions relative to the industrial facilities. A survey of the condition and pollution of surface water in water bodies located in the immediate vicinity of the industrial facilities was carried out across 31 metrics. This survey also included an assessment of water quality status based on the species composition and population size of aquatic macroinvertebrates. The condition of the water bodies was assessed based on bioindicators, with results ranging from 'very clean' to 'moderately polluted' (quality grades 1 to 3).

The condition and pollution of bottom sediments were surveyed across 35 metrics to determine the condition and background levels of potential pollutants. A groundwater survey was carried out across 30 metrics using networks of observation wells at the industrial facilities. A vegetation survey included determining the species composition, the stage of plant development (phenophase), the height of the plants, foliage projective cover and the overall health, as well as examining vegetation samples (pine needles and lichen) based on 12 metrics (heavy metal concentrations). As a result, the status and composition of the vegetation, as well as the background levels of potential pollutants were determined.

These findings will inform the assessment of the potential environmental impact of the operation of industrial facilities for the processing, recycling and treatment of hazard class 1 and 2 waste. The findings of regular monitoring during the operation of the industrial facilities, supported by background monitoring data, will provide ROSATOM's enterprises with objective information and specific data for communicating with local communities in the regions where the industrial facilities operate, in order to provide assurance that the enterprises are absolutely safe for people's health and the environment.

In 2024, Mendeleev University of Chemical Technology hosted a special meeting of the R&D board of the federal operator responsible for the management of hazard class 1 and 2 waste. Members of the Environmental Commission reviewed technological solutions for waste recycling intended for use as part of the operation of the industrial facilities, asked relevant questions and put forward recommendations.

Activities of the Public Council Community Liaison Offices

Community liaison offices of the Public Council serve as moderators of negotiation processes in nuclear towns and cities and as a platform for dialogue with the general public, civic associations, regional and local governments, professional associations and nuclear organisations.

Community liaison offices played an active role in the field of environmental protection, healthcare, culture, promotion of a sporting lifestyle, development of the urban environment, primary and higher education, the youth policy, etc.

Community liaison offices of ROSATOM's Public Council operate in 16 nuclear towns and cities. In 2024, over 3,017 requests and enquiries were submitted by individuals to the community liaison offices; in 93% of cases, a positive resolution was achieved.



5

80 YEARS OF RUSSIAN NUCLEAR INDUSTRY

SAFETY REPORT

Yuliy Khariton (1904–1996)

Yuliy Khariton was the chief design engineer at the country's first nuclear centre established in Sarov in 1946. He assumed full responsibility not only for all aspects of the development and continuous improvement of nuclear weapons, but also for the safety of the production, testing and use of these weapons, whose destructive power is unparalleled. Yuliy Khariton was the first to formulate safety requirements for nuclear weapons and repeatedly emphasised that it is vital to eliminate the possibility of a nuclear explosion in any accidental situation that might involve nuclear weapons. His exacting attitude and thoughtfulness helped the nuclear industry to avoid accidents involving nuclear weapons.

STATEMENT OF THE INSPECTOR GENERAL

> ‘Safety is our top priority. In the course of our work, we primarily ensure the complete safety of people and the environment.
>
> There are no trifles in safety – we know safety rules and follow them, preventing violations and protecting people’s health and lives.’
>
> ROSATOM’s values

In today’s world, where sustainable development and social responsibility are key to success, ensuring the safety of our operations is our absolute priority.

The 80-year history of Russia’s nuclear industry has seen it progress from building a ‘nuclear shield’ to becoming a technological leader in the peaceful use of nuclear energy. Today, the nuclear industry not only contributes to ensuring the country’s energy security but also shapes global trends in science and manufacturing. At the same time, ROSATOM is the undisputed leader among major Russian companies and foreign peers in terms of all aspects of safety.

In 2024, there were no nuclear or radiation incidents at nuclear facilities rated above level 1 on the International Nuclear and Radiological Event Scale (INES). There were no instances of limits on radiation exposure of employees being exceeded or man-made radioactive contamination of sites in 2024. Radionuclide content in various components of the environment (air, water, soil, vegetation, etc.) did not exceed reference levels.

ROSATOM achieved the lowest injury rate in 2024, with an LTIFR of 0.07, which is the best result among major Russian companies and foreign peers. The number of occupational injuries has decreased nine-fold since 2001. In 2024, there was one fatality per 403,000 employees, as against 40 fatalities per 301,000 employees in 2001.

In terms of industrial safety, no accidents have occurred at hazardous industrial facilities during the entire period since Federal Law No. 116-FZ dated 21 July 1997 on Industrial Safety of Hazardous Industrial Facilities came into force.

In 2024, ROSATOM’s organisations prioritised environmental compliance and the adoption of environmentally friendly and best available technologies to prevent negative environmental impacts of their operations.

Safety initiatives in the industry are implemented on a regular basis. Preventive efforts are focused on implementing proactive measures, such as improving the regulatory framework, providing personnel training, holding forums, seminars and meetings, establishing internal safety controls, addressing operational risks, and promoting a safety culture. These measures, combined with prompt incident response, will drive a strong performance across all aspects of safety in the industry.

At the 7th Industry-Wide Dialogue Forum titled ‘Nuclear Power and Industry Safety Day’ held in 2024, the decision was made to develop safety performance targets until 2030. This large-scale, ambitious programme will determine the safety strategy for each area of safety, for each organisation, and for the industry as a whole over the next five years.

I am confident that, by working together, we will be able to put all our plans into practice and meet new, higher standards of sustainable and safe development in the industry.

Sergey Adamchik,

Inspector General

Key Results in 2024

- There were no events rated above level 1 on the INES scale.
- The injury frequency rate and the lost time injury frequency rate (LTIFR) stood at 0.27 and 0.07 respectively.
- Individual radiation risk was calculated for 69,020 people using the IRAW system.
- There were no accidents at hazardous industrial facilities.
- Occupational safety and health costs totalled RUB 20.4 billion.

Key Events in 2024

- At the 7th Industry-Wide Dialogue Forum titled ‘Nuclear Power and Industry Safety Day’, strategic safety goals until 2030 were defined.
- ROSATOM, as a leader in occupational health and safety, acted as the general partner of the Russian Occupational Safety Week.
- In 2024, radiation monitoring systems at several NPPs located closer to the country’s western border operated in high alert mode. These included Kursk, Rostov, Smolensk and Leningrad NPPs. The radiation levels at these and other facilities were within the normal range.
- Progress made over the first five years since ROSATOM joined the Vision Zero international campaign to achieve zero injuries and launched an industry-wide programme to develop a culture of safe behaviour was reviewed.

GRI 3-3

5.1. OCCUPATIONAL HEALTH AND SAFETY

GRI 403-1

5.1.1. Occupational health and safety management system

One of the top priorities for ROSATOM is to ensure occupational safety and protect the life and health of employees in the course of operations.

ROSATOM adheres to the Uniform Industry-Wide Policy on Occupational Safety and Health, which stipulates the goals, key principles and obligations of ROSATOM in the sphere of occupational safety and health. Its principles underpin the occupational health and safety management systems used by ROSATOM’s organisations.

GRI 403-3

The Uniform Industry-Wide Policy on Occupational Safety and Health is designed to support the implementation of the main provisions of the Constitution and legislation of the Russian Federation, the norms of international law recognised by the Russian Federation and the provisions of international treaties, the Basic Principles of Government Policy on Nuclear and Radiation Safety in the Russian Federation until 2025 and other fundamental documents supporting the main areas of government policy of the Russian Federation in the field of occupational safety and health and national regulatory requirements for occupational safety and health.

The policy applies to all of ROSATOM’s employees; in addition, ROSATOM requires its contractors and subcontractors to comply with occupational safety and health standards adopted in the Corporation.

The key principles underlying occupational safety initiatives of ROSATOM and its organisations include the following:

- Minimising risks and preventing the threat of workplace injuries and occupational diseases;
- Improving systems for monitoring and managing working conditions;
- Ensuring that every employee assumes personal responsibility for complying with occupational safety rules, and encouraging employees to contribute to ensuring compliance of workplaces with occupational safety rules adopted in the organisation;
- Ensuring that employees in nuclear organisations are committed to achieving the zero injury rate, in line with the Vision Zero framework of the International Social Security Association (ISSA), and to the principles of the culture of safe behaviour;
- Creating the prerequisites for decision-making aligned with national occupational health and safety regulations at all levels of operations management;
- Promoting comprehensive communication and cooperation with employees and their representatives on occupational health and safety matters taking into account voluntary occupational health and safety commitments, including the provisions of the Industry-Wide Agreement on Nuclear Power, Industry and Science for the period from 2023 through 2025 and beyond.

GRI 403-5

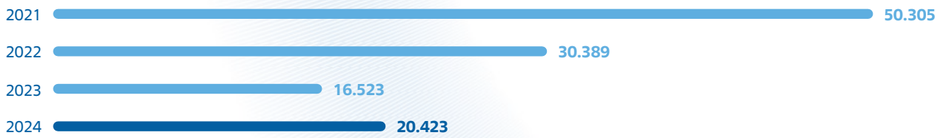
The following measures are implemented on an ongoing basis:

- A comprehensive programme of measures to prevent workplace injuries in the industry;
- Prioritised measures to prevent accidents during the operation of metal-working machines in the Corporation's organisations;
- Measures to prevent road accidents that are not related to operations but have negative consequences for employees;
- Instructions from the Director General of ROSATOM on the implementation of safety measures to prevent any injuries, regardless of their severity.

MED 27

Occupational safety and health costs

Occupational safety and health costs in ROSATOM, RUB billion



RUB 20.423 billion

Occupational safety and health costs in 2024

The increase in occupational health and safety costs in 2024 compared to 2023 was due to the following:

1. A special assessment of working conditions (SAWC) was conducted for new workplaces.
2. Additional personal protective equipment (PPE) was purchased based on the findings of occupational risk assessment.
3. Organisational and technical measures were implemented to improve employees' working conditions.
4. Prices for PPE and professional occupational health and safety services (e.g. special assessments of working conditions, occupational risk assessments, etc.) increased.

GRI 403-2

5.1.2. Managing occupational safety and health risks

GRI 403-3

ROSATOM and its organisations operate and continuously improve an industry-wide system for identifying, assessing and managing occupational risks. The occupational risk management commission annually reviews the findings of the monitoring of occupational risk assessment and management activities in order to ensure that all measures at the planning and implementation stages have been implemented in full and on time. Based on the results of the review, a plan of corrective actions (measures) is developed in order to improve the effectiveness of occupational risk management.

Accidents are investigated by commissions set up in ROSATOM's organisations in accordance with the Labour Code of the Russian Federation and Order No. 223n of the Ministry of Labour and Social Protection of the Russian Federation dated 20 April 2022 on Approval of the Regulations on the Special Features of Investigation of Industrial Accidents in Certain Industries and Organisations, Document Forms, the Relevant Classification Systems Required for Investigation of Industrial Accidents. Following the investigation, the organisation issues an order stipulating measures to prevent similar accidents.

ROSATOM has set up and operates a hotline to receive employees' enquiries and reports concerning working conditions and occupational safety and health. To enhance the safety culture and encourage employees to assume greater personal responsibility for ensuring safe working conditions, the Corporation is introducing a practice whereby employees may suspend or refuse to perform any work that poses a threat to their life and health.

At the 7th Industry-Wide Dialogue Forum titled 'Nuclear Power and Industry Safety Day' in October 2024, ROSATOM's strategic safety goals until 2030 and measures required to achieve them were defined. The current safety status and key mechanisms for preventing injuries were reviewed; best practices and the outcomes of initiatives focused on occupational safety and health, industrial, nuclear and radiation safety, environmental protection and the culture of safe behaviour were presented.

A project is underway to introduce the Integrated Industry-Wide Occupational Safety System, a digital tool designed to automate and digitise occupational health and safety and occupational risk assessment processes.

GRI 2-25

Prevention and minimisation of occupational injuries

Senior executives and line managers in the industry contribute to ensuring workplace safety and continuously improving operational processes to provide a safe working environment.

Organisations in the industry implement a number of measures on an ongoing basis as approved by ROSATOM's Director General in accordance with the following documents:

- The List of Instructions of ROSATOM's Director General on Preventing Injuries When Working with Electrical Equipment;
- The List of Instructions of ROSATOM's Director General on Improving Process Discipline in ROSATOM's Organisations during Construction, Renovation, Upgrade and Repairs of Facilities;
- The Order of ROSATOM on Approval of an Action Plan for the Prevention of Occupational Injuries at the Facilities of ROSATOM's Organisations When Working at Heights;
- The Order of ROSATOM on Approval of an Industry-Wide Plan of Urgent Measures to Ensure Safety and Reduce Occupational Injuries;
- The Order of ROSATOM on Approval of a Comprehensive Programme for Preventing Occupational Injuries in the Nuclear Industry;
- The Directive of ROSATOM on Approval of an Action Plan to Minimise Risks of Road Accidents in ROSATOM's Organisations;
- The List of Instructions of ROSATOM's Director General Based on the Findings of Industrial Safety, Occupational Safety and Health and Environmental Safety Audits Conducted by Internal Safety and Quality Control Bodies.



5.1.3. Safety culture

In order to prevent accidents, ROSATOM's organisations work continuously to enhance the workplace safety culture. Key objectives of the process include providing employees with an insight into their role in the safety management system, ensuring that they are committed to achieving the zero injury rate, and creating an atmosphere of openness and trust based on the Seven Golden Rules for Vision Zero.

Established in 2021, the Club of Safety Culture Leaders aims to promote and continuously improve the dissemination of best practices in safety culture and employees' commitment to safety at work.

To reward organisations and employees who are leaders in safety culture, the Corporation plans to hold a competition called 'ROSATOM's Best Organisation in Terms of Occupational Safety and Health' and to encourage industry teams to participate in nationwide occupational health and safety competitions.

In 2024, 74 of the Corporation's organisations had a GOST R ISO 45001 or ISO 45001-certified occupational health and safety management system. In 2024, the Corporation did not conduct internal audits of the OHSMS. GRI 403-8

GRI 403-4

Worker participation, consultation, and communication on occupational health and safety

Employee communication process

Communication within the OHSMS provides a basis for coordinated efforts of executives and specialists at all management levels.

In 2024, the Uniform Industry-Wide Guidelines for Developing and Improving an Occupational Health and Safety Management System in ROSATOM's Organisations were approved pursuant to Order No. 1/1329-P of ROSATOM dated 18 July 2024.

Information support within the OHSMS of an organisation is designed to:

- Promptly notify employees of the organisation and its contractors;
- Present the findings of investigation of accidents, incidents and workplace injuries and preventive action plans to employees of the organisation;
- Visualise safe working practices and the consequences of non-compliance with occupational safety rules on the part of employees of the organisation;
- Enable executives and specialists to review federal and industry-wide occupational health and safety standards and rules, and inform them in a timely manner about changes in legislation.

Provision of information to employees of an organisation includes the mandatory communication of the following information, to be acknowledged by an employee's signature:

- The organisation's occupational health and safety policy and goals;
- Risks of damage to health;
- Findings of special assessment of working conditions in the workplace;
- Personal protective equipment required to be provided to employees;
- The occupational health and safety status and requirements in the workplace;
- Guarantees and compensations to be provided to employees;
- Local regulations on occupational safety and health adopted in the organisation.

The requirements of the OHSMS are binding on suppliers and contractors operating at ROSATOM's facilities. In addition, contractors undertake to comply with occupational safety and health legislation and to ensure compliance by their subcontractors. The Corporation does not impose any other occupational safety and health requirements on suppliers and contractors. GRI 403-7

Joint occupational health and safety committees

To enable cooperation between the management, employees and the trade union, the organisation has established an Occupational Health and Safety Committee. The Committee helps prevent workplace injuries and occupational diseases, and protect employees' health. The Committee forms part of the organisation's occupational health and safety management system (OHSMS) and is a form of employee participation in occupational health and safety management. The Committee's work is based on the principles of social partnership and organised in accordance with the Standard Regulations on Occupational Health and Safety Committees (Commissions) as approved by Order No. 650n of the Ministry of Labour and Social Protection of the Russian Federation dated 22 September 2021.

The frequency of the Committee's meetings is determined by the internal regulations of ROSATOM's organisation. At its meetings, the Committee hears reports from employer representatives, heads of divisions and other employees on the fulfilment of their commitments related to ensuring safe working conditions, occupational health and safety in the workplace, and safeguarding employees' rights to occupational health and safety. The Committee also reviews proposals for producing recommendations to improve employees' working conditions.

GRI 403-9

5.1.4. Occupational safety and health performance

In accordance with the Economic Development Plan of the Russian Federation, ROSATOM's portfolio was expanded to include new areas of business in 2024. Significant changes were made to the Divisions' business development programmes. The number of organisations within the scope of consolidation of ROSATOM increased by more than 30% in 2024 compared to 2023. However, in some of the newly acquired organisations, the level of compliance with occupational health and safety requirements did not meet the high standards established for nuclear organisations.

Due to objective and subjective factors, the number of occupational injuries in the industry increased by 37% compared to 2023. Injuries caused by a fall on the premises as a result of personal negligence on the part of the injured persons and deteriorating health accounted for more than 32% of the total number. At the same time, the number of fatalities decreased significantly: in 2024, there was one fatal accident as against eight in 2023. The total number of serious and fatal accidents remained unchanged compared to 2023, accounting for 25% of the total number of accidents.

The injury rate decreased compared to 2023 in the Mechanical Engineering, Fuel, Research, and Wind Power Divisions; however, the injury rate increased in the Nuclear Weapons, Environmental Solutions, Power Engineering, Mining, Security, Composite Materials, Arctic, and Infrastructure Solutions Divisions.



Occupational safety and health performance of ROSATOM's organisations in 2024

Indicator	Value
Number of man-hours worked	587,100,748
Number of serious injuries	22
Number of people newly diagnosed with an occupational disease	30
Fatality rate (per 1 million man-hours)	0.002
Fatality rate (per 200,000 hours)	0.0003
Serious injury rate (per 1 million hours)	0.037
Serious injury rate (per 200,000 hours)	0.007
Recordable occupational injury rate (excluding / including fatalities) (per 1 million hours)	0.15/0.153
Recordable occupational injury rate (excluding / including fatalities) (per 200,000 hours)	0.03/0.031
Occupational disease rate (per 1 million hours)	0.051
Occupational disease rate (per 200,000 hours)	0.01
Lost day and absenteeism rate	1.00005
Number of people injured in accidents in contractor organisations[1]	13
Number of people injured in accidents in contractor organisations with severe consequences	4

MED 29

Occupational injury rates in ROSATOM in 2024

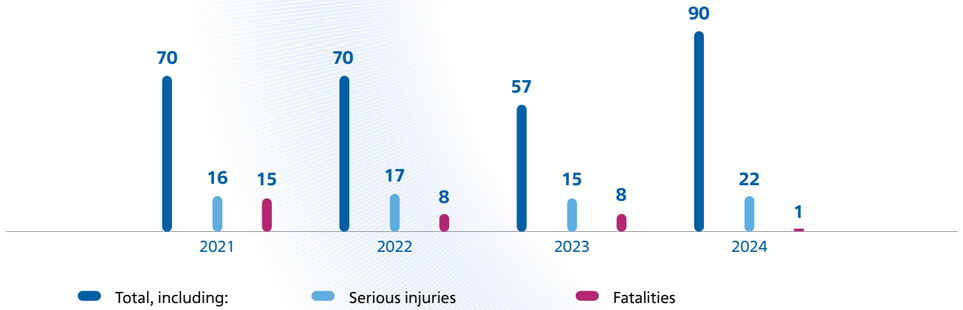
Indicator	2021	2022	2023	2024
Number of people injured in accidents	70	73	57	90
Number of fatalities	15	8	8	1
Injury frequency rate (FR)	0.24	0.25	0.19	0.27
LTIFR[2]	0.08	0.11	0.06	0.07
Number of people newly diagnosed with an occupational disease	6	16	12	30

1. No data are available on man-hours worked or newly diagnosed occupational diseases in contractor organisations.
2. Lost Time Injury Frequency Rate (LTIFR) = number of lost time injuries / man-hours worked × 1 million man-hours.

Number of injured persons by injury factor in ROSATOM

Injury factor	2021	2022	2023	2024
Falling from a height	2	8	5	2
Electric shock	6	2	3	6
Falling on the premises (on the surface of the same level, etc.)	18	24	15	29
Road accident	25	8	8	12
Impact of moving or scattering objects, structures or parts	4	12	13	11
Fall of an object on the victim	5	8	7	6
Burns (thermal, etc.)	5	4	3	3
Other (unclassified factors)	1	2	0	12
Sports-related injury	1	1	1	6
Animal bite	1	0	0	0
Poisoning	0	4	0	0
Impact from physical contact/crushing	2	0	2	3
Total	**70**	**73**	**57**	**90**

Changes in the number of injured persons



A total of 90 people were injured in 2024, including 69 men and 21 women. This included 22 people who suffered serious injuries and 1 fatality.

In 2024, there was a decrease in the number of accidents involving the fall of an object on the victim, falling from a height, and the impact of moving or scattering objects, structures or parts. At the same time, the number of people injured as a result of falling on the premises, electric shock, road accidents and sports-related injuries increased.

Causes of accidents in 2024

Negligence, carelessness, haste	36%
Inadequate work organisation, lack of supervision	16%
Sudden onset of illness	11%
Damage caused by a third party's wrongdoing	11%
Damage to health caused by a road traffic violation committed by another road user	8%
Non-compliance with operational procedures, improper operation of equipment	4%
Violation of workplace rules and regulations by an employee	4%
Violations of safety regulations and rules for operating machinery, equipment and vehicles	3%
Road traffic violation	2%
Flaws in operational procedures	2%
Poor reliability and design flaws in process equipment	2%

Between 2021 and 2024, six fatalities were women, while the remaining fatalities were men. In 2024, there was one fatality (a man).

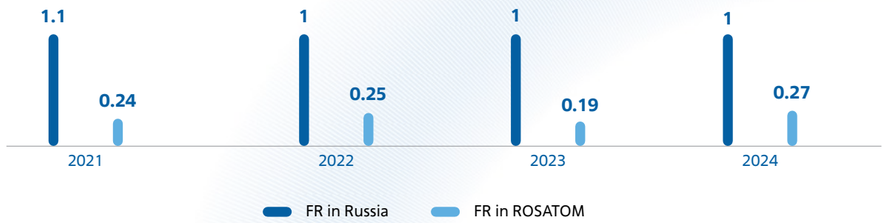
Number of fatalities* in ROSATOM between 2021 and 2024

Region	2021	2022	2023	2024
Zabaykalsky Territory			1 m	
Leningrad Region		1 m	2 m,1 f	
Murmansk Region		2 m		
Nizhny Novgorod Region			1 m	
Kursk Region	2 m			
Rostov Region		2 m		
Primorsky Territory				
Chelyabinsk Region				
Saratov Region				
Kurgan Region		1 m		
Moscow Region	1 m	2 m	1 m	1 m
Smolensk Region	1 m			
Samara Region	3 m			
Sverdlovsk Region	4 m, 5 f		1 m	
Khabarovsk Territory			1 m	
Total	**15 (10 m, 5 f)**	**8 (m)**	**8 (7 m, 1 f)**	**1 (1 m)**

*where 'm' stands for male, and 'f' stands for female

In 2024, the injury frequency rate (FR) stood at 0.27, as against 1.0 across Russia.

Comparative data on industrial injuries in Russia and in ROSATOM, injury frequency rate (FR)



In addition to the injury frequency rate (FR), ROSATOM also uses the lost time injury frequency rate (LTIFR), which enables it to benchmark the injury rate in the Corporation against that of other companies and countries. The LTIFR has been included in the KPI maps of all Division executives.

The LTIFR reference value for the Divisions, units, holding companies and ROSATOM as a whole has been set at 0.5, which is a good result for any company in any country in the world.

Average LTIFR values achieved in Divisions, units and holding companies within ROSATOM over the previous three years have been accepted as baseline (initial, to be improved) values for those Divisions, units and holding companies.

The LTIFR targets are set individually for the Divisions, units and holding companies within ROSATOM but do not exceed the baseline values.

LTIFR between 2021 and 2024

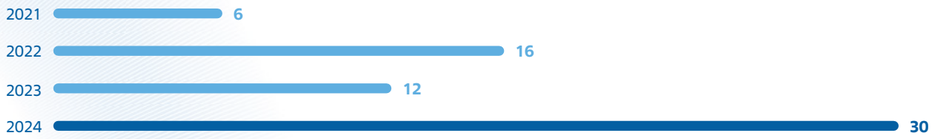
Division/complex/unit	2021	2022	2023	2024
Mining Division	0.22	0.2	0.24	0.16
Fuel Division	0.05	0.09	0.04	0.02
Mechanical Engineering Division	0.07	0.19	0.1	0.09
Engineering Division	0.05	0.04	0	0.03
Power Engineering Division	0.04	0.12	0.05	0.05
Environmental Solutions	0.18	0.12	0.12	0.06
Nuclear Weapons Division	0.11	0.08	0.05	0.05
Innovation Management Unit	0.06	0.06	0.13	0.04
Average across ROSATOM	**0.08**	**0.11**	**0.06**	**0.07**[1]

1. The LTIFR calculation does not include 46 people injured in accidents caused by third parties (including road accidents) and those whose health suddenly deteriorated due to an illness. Nine injured persons were included in the calculation for 2025 as the investigation of the accident is ongoing. At the same time, four employees injured in 2023 were included following the conclusion of accident investigations in 2024. The calculation includes a total of 39 people injured in accidents.

In order to reduce the number of injuries, ROSATOM's organisations implement measures focused on improving production processes, upgrading machining equipment, enhancing control on the part of line managers, and encouraging employees to assume greater individual responsibility for compliance with safety rules.

GRI 403-10

Number of people newly diagnosed with occupational diseases



The occupational disease risk remains high in the Mining Division. A total of 30 people were newly diagnosed with occupational diseases in 2024.

The main occupational hazards posing a high risk of occupational diseases include general and local impacts of vibration on the body and noise exposure affecting hearing. The most common types of occupational diseases include disorders of the peripheral nervous system and musculoskeletal disorders, followed by hand-arm vibration syndrome (HAVS), cancer and sensorineural hearing loss (SNHL). Measures taken by ROSATOM to prevent occupational diseases included the following: operating personnel more closely monitoring the condition of ventilating equipment supplying clean air to workspaces; installation of additional DV-1000 doors to prevent contaminated air from entering mine workings; and timely personnel rotation.

Special assessment of working conditions (SAWC)

Share of employees exposed to occupational hazards, %

Occupational hazard	Share of employees, %			
	2021	2022	2023	2024
Ionising radiation	18	17	17	15
Physically demanding work process	15	15	14	14
Noise	15	16	16	17
Chemical exposure	6	6	6	6
Intensity of the work process	4	4	4	3
Light environment	0.6	0.5	0.3	0.4

GRI 403-9

Occupational safety in contractor organisations

In 2024, the total number of injured persons in contractor organisations increased slightly. There was one fatality as a result of a road accident caused by a third party.

Number of injured persons in contractor organisations



Main causes of industrial injuries in contractor organisations in 2024, %

Third-party violations of safety regulations during vehicle operation	38
Inadequate work organisation	15
Design flaws and poor reliability of machinery, mechanisms and equipment	15
Negligence, carelessness, haste	8
Flaws in operational procedures	8
Lack of training	8
Violation of workplace rules and regulations	8

Injury factors in contractor organisations by number of injured persons

Falling from a height, including with a difference in heights	8
Road accident while travelling to or from work using a vehicle belonging to the employer or a third-party contractor	5

The main causes of accidents included inadequate work organisation and improper operation of equipment.

An increase in injury rates in contractor organisations was caused by inadequate supervision of adherence to safe working practices by the contractors' executives and violation of procedures regulating the issue of permits for high-risk work.

Occupational health and safety plans for 2025

In 2025, ROSATOM will continue to work systematically to improve the occupational health and safety management system and promote the culture of safe behaviour:

- Develop measures to achieve safety performance targets by 2030, taking into account the special characteristics of the Divisions' operations;
- Update methodological guidelines on occupational risk management in ROSATOM's organisations;
- Arrange ROSATOM's participation in the business programme of the Russian Occupational Safety Week, including holding a series of industry-specific events;
- Hold the 2025 Nuclear Power and Industry Safety Day Dialogue Forum to facilitate the sharing of best safety practices;
- Gather and verify information from the Divisions, and subsequently hold an industry-wide competition titled 'ROSATOM's Best Organisation in Terms of Occupational Safety and Health'.



GRI 3-3

5.2. NUCLEAR, RADIATION, INDUSTRIAL AND FIRE SAFETY

Key results in 2024

- There were no events rated above level 1 on the INES scale.
- There were no accidents at facilities posing nuclear and radiation hazards.

5.2.1. Nuclear and radiation safety management system

Prioritising safety is the fundamental principle governing the use of nuclear energy.

The nuclear industry has established a system for ensuring nuclear and radiation safety, which is successfully functioning and evolving. This system includes:

- A well-developed regulatory framework;
- A framework comprising a governing body, operating, research, design and expert organisations, all of which are involved in ensuring safety;
- The implementation of a set of organisational and technical measures to ensure nuclear and radiation safety;
- The selection, training and ongoing professional development of managers and personnel at nuclear facilities;
- A strong safety culture.

The Corporation is responsible for drafting the Basic Principles of Government Policy on Nuclear and Radiation Safety and coordinating their implementation.

5.2.2. Nuclear and radiation safety at nuclear facilities

In 2024, ROSATOM ensured safe and steady operation of nuclear organisations in terms of nuclear and radiation safety.

There were no events involving radiation leaks. Limits on employee radiation exposure were not exceeded.

In 2024, 29 organisations were issued documents certifying that they were qualified to operate a nuclear facility, a radiation source or a storage facility, and to handle nuclear materials and radioactive substances.

At year-end 2024, there were a total of 183 operating organisations recognised as qualified by the Corporation.

Nuclear power plants

In 2024, there were no events rated above level 1 on the international INES scale at Russian nuclear power plants.

Changes in the number of deviations in NPP operation according to the INES scale

	2021	2022	2023	2024
Total, including:	**34**	**37**	**44**	**34**
Level 0 and out of scale	34	37	42	32
Level 1	0	0	2	2

In 2024, all deviations in NPP operation were investigated in accordance with the established procedure. Key causes of deviations included individual equipment components going out of service (failing) before the end of the operating time specified by manufacturers, and inadequate techniques for diagnostic assessment and monitoring of the technical condition of individual components of equipment in operation.

ROSATOM rated each event that had occurred in accordance with the INES Scale User's Manual and developed corrective measures to prevent similar failures in the future.

Nuclear research facilities

In 2024, there were no events (deviations) rated above level 0 on the INES scale at nuclear research facilities in ROSATOM's organisations.

Changes in the number of deviations in the operation of nuclear research facilities



In 2024, deviations in the operation of nuclear research facilities were caused by faults (failures) in power supply to the facilities.

There were no violations of safe operating limits or conditions for nuclear research facilities, no radioactive emissions or discharges; the statutory limit on radiation exposure of personnel operating nuclear research facilities was not exceeded.

All events were investigated by commissions established by the operators of the facilities; their causes were determined, and the relevant measures were developed.

Marine nuclear propulsion units

In 2024, there were no events rated above level 1 on the international INES scale during the operation of nuclear-powered vessels.

Changes in the number of deviations in the operation of marine nuclear propulsion units



In 2024, all deviations were caused by the faulty operation of electrical equipment.

There were no violations of safe operating limits or conditions for propulsion units of nuclear-powered vessels in 2024; the radiation level remained within permitted limits. No events rated higher than level 0 on the INES scale were detected.

5.2.3. Physical protection of nuclear facilities

The security and physical protection of ROSATOM's facilities posing nuclear and radiation hazards, as well as of nuclear materials and radioactive substances, including during their transportation, complies with Russian legislation and the Convention on the Physical Protection of Nuclear Material and is aligned with the recommendations of the IAEA.

In 2024, ROSATOM continued to improve the regulatory and methodological framework in the sphere of physical protection and security (including anti-terrorism security) of nuclear facilities (premises).

Two decrees of the Government of the Russian Federation, as well as eight documents governing relations in the sphere of physical protection and security (including anti-terrorism security) of facilities in the industry were drafted and issued; the documents were approved by orders of the Corporation.

The main mechanisms for ensuring physical protection and anti-terrorism security include the following:

- Monitoring of the physical protection and anti-terrorism security of ROSATOM's facilities (premises) by the relevant departments;
- Reliable operation of existing physical protection and security equipment at facilities, as well as its scheduled modernisation and improvement;
- Strict compliance with the requirements of federal and industry-wide regulations.

As part of departmental monitoring in accordance with the Corporation's Consolidated Plan of Inspections, 12 inspections of the physical protection of nuclear materials, nuclear facilities and nuclear material storage sites were conducted in 2024 in ROSATOM's organisations, including the inspection of their anti-terrorism security status.

Number of internal inspections



The findings of all inspections were documented in reports; plans of corrective measures were developed. Progress in eliminating the deficiencies identified in the course of inspections and implementing recommendations from the commissions is being monitored.

Proposals were prepared to conduct inspections of physical protection as part of departmental monitoring at 10 nuclear facilities in 2025. The proposals were included in ROSATOM's Consolidated Plan of Inspections for 2025.

ROSATOM continued to improve the integrated information system for monitoring the status of the physical protection system at its facilities posing nuclear and radiation hazards.

As part of the import substitution policy, cross-platform software designed to collect and analyse data from ROSATOM's nuclear facilities in real time through secure communication channels was improved; this software can be run on various operating systems. In the reporting period, the software was rolled out in three of ROSATOM's organisations. The cross-platform software forming part of the domestically developed integrated information system for monitoring the status of the physical protection system will continue to be rolled out at ROSATOM's facilities in 2025.

As part of the Corporation's approved programmes, efforts to improve physical protection and security equipment at facilities posing nuclear and radiation hazards continued in 2024. All physical protection and security equipment is fully operational; its maintenance is carried out as scheduled. New equipment (that has been in operation for less than 10 years) accounts for 73% of all physical protection equipment at nuclear facilities (74%, 73% and 74% in 2021, 2022 and 2023 respectively).

Scheduled work was carried out to maintain automated security systems for transportation installed in control centres and special vehicles (railway cars, special motor vehicles and vessels) and replace equipment that had reached the end of its specified service life.

Pursuant to instructions and directives of the President of the Russian Federation and the Government of the Russian Federation, and recommendations from the Security Council of the Russian Federation and the National Antiterrorism Committee issued in connection with the special military operation conducted by the Russian Federation, a set of additional measures was adopted and implemented to ensure the security of the Corporation's facilities.

Further steps were taken to improve the protection of the Corporation's protected facilities against the illegal use of unmanned aerial vehicles.

Measures taken in cooperation with the Federal Security Service of Russia, the Federal National Guard Service and the Ministry of Internal Affairs of Russia made it possible to prevent unlawful acts against nuclear facilities.

In 2024, as in previous years, there were no violations of access control or internal security regulations at ROSATOM's facilities that could have resulted in the theft of nuclear materials, terrorist acts or sabotage at nuclear facilities.

5.2.4. Emergency preparedness and special transportation

In order to protect employees, the local population and regions against the possible impacts of accidents (emergencies), ROSATOM operates and improves a functional subsystem for emergency prevention and response that covers the organisations (facilities) managed by ROSATOM. It forms part of the integrated state system for emergency prevention and response.

In 2024, ROSATOM continued to implement the Action Plan for the Implementation of the Programme for the Development of ROSATOM's Emergency Preparedness and Response System until 2035 and Beyond approved by order of ROSATOM.

As at 31 December 2024, 19 professional and 65 volunteer emergency response teams had undergone certification and were in a state of readiness for emergency response in ROSATOM. A total of 2,850 emergency response workers have undergone certification.

In the reporting year, the needs of organisations in the industry for special cargo transportation were fully met. All shipments of nuclear materials, radioactive substances and products made from them fully complied with established requirements. Steps are being taken to improve the industry-wide automated system for safe transportation of radioactive substances (ASST-RS). Work was continued to produce and upgrade special vehicles and equip them with modern automated security systems.

5.2.5. Industry-Wide Radiation Monitoring System

There were no deviations in the Corporation's enterprises that could lead to a breach of defence-in-depth and have an impact on people and the environment

Radiation monitoring in the Russian Federation is carried out as part of the Integrated State Automated Radiation Monitoring System (ISARMS). The Industry-Wide Radiation Monitoring System (IRMS)[1] is in operation in the nuclear industry as a functional subsystem of the ISARMS.

The main objective of the IRMS is to perform regular radiation monitoring in designated areas, namely in buffer areas and radiation control areas at the locations of nuclear facilities, detect changes in radiation levels in a timely manner, forecast and minimise the potential negative impacts of radiation on people and the environment.

Currently, state radiation monitoring is performed by 30 of ROSATOM's organisations covered by the IRMS. Local radiation monitoring data are accumulated in the information and analysis centre forming part of ROSATOM's departmental radiation monitoring subsystem (ISARMS DIAC).

Local radiation monitoring in buffer areas and radiation control areas is performed using portable, mobile and fixed equipment for monitoring radionuclide content in the lowest layer of the atmosphere, atmospheric precipitation, soil, surface water bodies, bottom sediments, aquatic organisms, groundwater, vegetation, as well as in locally produced food products and fodder.

In 2024, local radiation monitoring systems performed more than 185,000 measurements (in addition to IARMS data received automatically). The results of processing and analysis of radiation monitoring findings suggest that normal operation of nuclear facilities has no significant impact on radiation levels. Radiation monitoring data for Russia transmitted to the ISARMS are published in an annual report titled 'Radiation Levels in Russia and Neighbouring States'. It is available online at https://egasmro.ru/.

To assess the long-term impact of nuclear organisations on the environment, subsoil condition monitoring is performed at the locations of nuclear facilities. It provides information on the status of the geological environment and makes it possible to assess and forecast its changes taking into account protective properties of geological and man-made barriers.

Annual Report 'Radiation Levels in Russia and Neighbouring States'

In order to promptly respond to any changes in radiation levels in buffer areas and radiation control areas at the locations of nuclear facilities, automated radiation monitoring systems (ARMSs) integrated into the IARMS are in operation Real-time data from ARMS stations located in buffer areas and radiation control areas of nuclear organisations are available online at https://egasmro.ru.

In 2024, radiation levels in the areas where nuclear facilities of ROSATOM's organisations are located were within the range of natural background radiation and remained unchanged compared to previous years.

Radiation levels in Russia (real-time data)

Radiation monitoring is one of the key tasks in the sphere of environmental protection. To further develop the IRMS, the Corporation has adopted and is implementing the IRMS Development Programme for the period from 2021 through 2030 (the Programme).

In 2024, work was underway in the following focus areas of the Programme:

- Improving the existing components and developing new components of the IRMS;
- Providing research and methodological support for the operation of the IRMS;
- Equipping and upgrading environmental radiation monitoring laboratories;
- Establishing the main laboratory in order to develop equipment and methodological guidelines for the IRMS;
- Developing digital information infrastructure for the IRMS;
- Ensuring the uniformity of measurements and verifying data collected by local monitoring systems;
- Personnel training.

The implementation of the Programme enables ROSATOM to obtain, analyse and report the findings of radiation monitoring and data on radionuclide content in various components of the environment using a modern research and methodological framework, domestically developed software and hardware in order to take necessary measures to prevent or reduce the radiation impact on local residents and the environment.

The comprehensive approach to radiation monitoring used by the Corporation helps provide full and objective information on the safe operation of nuclear facilities in the Russian Federation.

1. Pursuant to Article 20 of Federal Law No. 170-FZ of 21 November 1995 on the Use of Nuclear Energy, ROSATOM performs state radiation monitoring in the Russian Federation at the locations of nuclear facilities owned by operators with regard to which ROSATOM exercises government control over the use of nuclear energy.

5.2.6. Industrial safety

As at 31 December 2024, ROSATOM's organisations had 825 hazardous industrial facilities registered in the departmental section of the State Register of Hazardous industrial Facilities.

Number of hazardous industrial facilities

Hazard class	2021	2022	2023	2024
1	9	7	7	12
2	33	34	36	35
3	287	291	301	334
4	396	404	406	444
Total	**725**	**736**	**750**	**825**

All equipment used at hazardous industrial facilities of ROSATOM's organisations undergoes timely technical inspection and industrial safety assessment. Compulsory insurance is arranged in accordance with the law on compulsory third-party liability insurance for the owner of a hazardous facility for potential damage from an accident at the hazardous facility. Personnel operating hazardous industrial facilities have undergone a comprehensive industrial safety certification and are provided with special clothing and personal protective equipment of appropriate quality.

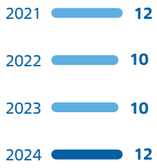
There were no accidents at hazardous industrial facilities over the entire period of statistical observation in the industry. Calculations of metrics reflecting the probability of negative consequences of non-compliance with industrial safety requirements at hazardous industrial facilities show that the level of risk of accidents is acceptable.

5.2.7. Fire safety

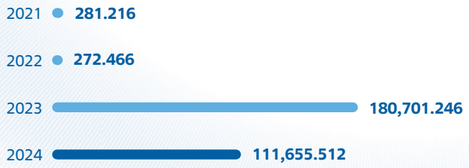
The fire situation at ROSATOM's facilities is stable.

There were no violations of the limits or conditions of safe operation of the facilities.

Number of fires at facilities operated by ROSATOM



Total cost of damage from fires, RUB '000



The high cost of damage in 2024 was due to a fire on a research vessel operating on the Northern Sea Route, which caused property damage worth RUB 109.463 million. The fire was caused by a leakage in the fuel system of the vessel's main engine.

There was one fire at nuclear facilities under construction in 2024; there were no injured persons or damage to property.

5.2.8. Radiation exposure of employees

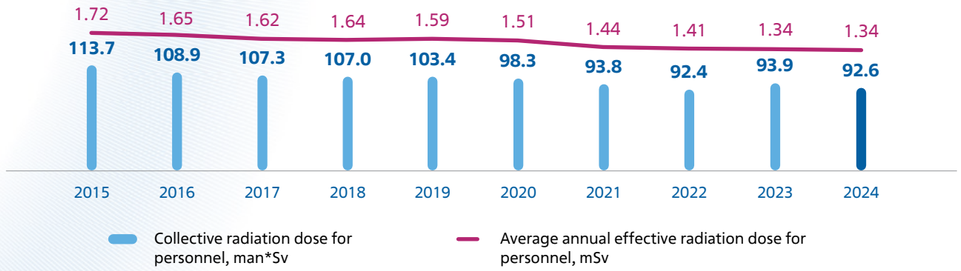
Ionising radiation is an occupational hazard specific to ROSATOM's organisations. Radiation safety criteria for personnel are laid down in the Radiation Safety Standards (NRB-99/2009), the Basic Sanitary Rules of Radiation Safety (OSPORB-99/2010) and other regulations. Nuclear organisations provide workplace conditions that fully meet the requirements set out in these documents.

Average annual effective radiation dose for employees

As at 31 December 2024, 69,020 people (group A personnel) in ROSATOM's organisations were under individual radiation exposure monitoring. This number decreased by ~1.5% compared to 2023 but increased by ~4.1% over the last 10 years.

In 2024, the average annual effective radiation dose for ROSATOM's employees totalled 1.34 mSv. The average annual effective radiation dose for employees has been declining over the past 10 years (down by 22% compared to 2015).

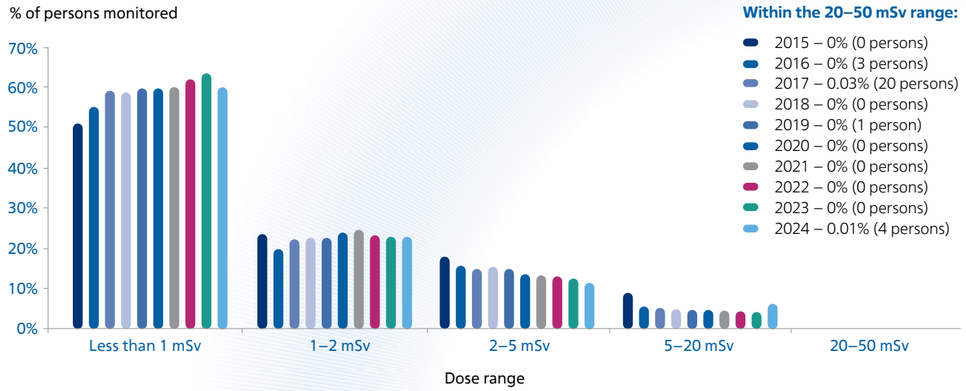
Changes in the collective and average annual effective radiation dose for employees of ROSATOM's organisations



The statutory limit on radiation exposure of employees was not exceeded in 2024. There were no persons with a total effective dose of more than 100 mSv over five consecutive years (from 2020 through 2024). The annual exposure limit of 50 mSv was not exceeded.

In the structure of radiation exposure of employees, the share of employees with doses ranging between 2 and 20 mSv tends to decrease (from ~26% in 2015 to ~18% in 2024).

Distribution of group A personnel by dose range, %



GRI 403-2

Individual radiation risks

Developed by ROSATOM in cooperation with the Russian Scientific Commission for Radiological Protection, the IRAW system is used to assess the radiation risks faced by individuals exposed to ionising radiation in the workplace.

In 2024, individual risk was calculated for 69,020 people, or 100% of group A personnel. Over the past few years, the average individual radiation risk across ROSATOM has not exceed 6.4% of the standard value (2024: 5.6%), and the maximum individual risk has been decreasing steadily.

Changes in the key indicators of the IRAW system in ROSATOM, %

Indicator	2020	2021	2022	2023	2024
Share of employees exposed to negligible and acceptable occupational risk	98.83	98.85	98.96	99.07	99.07
Share of employees in the high-risk group	1.17	1.15	1.04	0.93	0.93
Share of employees in the industry undergoing individual radiation exposure monitoring and included in the IRAW system	100.0	100.0	100.0	100.0	100.0

Changes in the average individual radiation risk level of personnel, relative units

Division/complex/unit	2021	2022	2023	2024
Power Engineering Division	$9.6•10^{-5}$	$9.0•10^{-5}$	$7.2•10^{-5}$	$7.8•10^{-5}$
Mechanical Engineering Division	$3.9•10^{-5}$	$4.1•10^{-5}$	$3.1•10^{-5}$	$3.1•10^{-5}$
Fuel Division	$2.6•10^{-5}$	$2.5•10^{-5}$	$2.6•10^{-5}$	$2.7•10^{-5}$
Mining Division	$2.9•10^{-5}$	$3.2•10^{-5}$	$3.0•10^{-5}$	$3.2•10^{-5}$
Nuclear Weapons Division	$4.5•10^{-5}$	$4.5•10^{-5}$	$4.4•10^{-5}$	$4.5•10^{-5}$
Environmental Solutions	$3.7•10^{-5}$	$3.8•10^{-5}$	$3.8•10^{-5}$	$3.8•10^{-5}$
Research Division	$7.2•10^{-5}$	$7.4•10^{-5}$	$7.4•10^{-5}$	$6.4•10^{-5}$
Engineering Division	$1.7•10^{-5}$	$6.9•10^{-6}$	$2.4•10^{-6}$	$1.0•10^{-6}$
Arctic Division	$3.8•10^{-5}$	$3.7•10^{-5}$	$3.3•10^{-5}$	$2.9•10^{-5}$
Total across ROSATOM	**$6.4•10^{-5}$**	**$6.1•10^{-5}$**	**$5.4•10^{-5}$**	**$5.6•10^{-5}$**

In 2024, nuclear and radiation safety inspections were conducted at 156 nuclear facilities; following 73 routine inspections, including ongoing monitoring, at 96% of the facilities no violations were detected that could affect their safe operation.

The number of violations detected by supervisory authorities at potentially hazardous nuclear facilities in 2024 decreased by 31.21% as compared to the findings of previous inspections. Supervisory authorities inspected 34 organisations of ROSATOM, including their branches, and conducted 41 routine benchmarking inspections, with 90.2% of the inspections conducted by commissions, including authorities responsible for ongoing monitoring. 35% of inspections conducted by supervisory authorities in twelve organisations and their branches revealed no issues.

In 2024, all nuclear facilities operated reliably and safely, with no deviations from the established safe operating limits and conditions.

5.2.9. Functioning of systems for technical regulation, standardisation, conformity assessment and ensuring the uniformity of measurement

Main outcomes of standardisation activities

In 2024, pursuant to Articles 8 and 10 of Law No. 317-FZ, as well as Decree No. 669 of the Government of the Russian Federation dated 12 July 2016 on Approval of the Regulations on Standardisation with Regard to Products (Work, Services) Subject to Requirements for the Safe Use of Nuclear Energy, as well as Processes and Other Subjects of Standardisation Related to Such Products:

- Two amendments to ROSATOM's Standardisation Programme were approved by orders of the Corporation.
- The following documents developed in accordance with ROSATOM's Standardisation Programme were approved in accordance with the established procedure:
  - Nine national standards;

- Three amendments to national standards;
- One provisional national standard;
- 11 corporate standards of ROSATOM;
- One amendment to a corporate standard of ROSATOM.

The standardisation documents approved in 2024 establish the following:

- Terms and definitions related to information modelling in urban planning;
- A procedure for organising and conducting interlaboratory tests of reference standards for nuclear materials when the number of participating laboratories is small;
- A procedure for setting and applying measurement accuracy indicators and acceptance values in regulations and documents developed for application with regard to the use of nuclear energy;
- Basic nuclear safety rules for the production, use, processing, storage and transportation of nuclear fissile materials;
- A classification methodology based on the impact on the safety of NPP systems and components;
- Requirements for aerial surveys using unmanned aircraft during the construction of nuclear facilities;
- Requirements for the performance of concreting operations in hot climates during the construction of nuclear facilities;
- A procedure for carrying out inspections of products used at nuclear facilities;
- Basic principles and rules for inspecting welded joints at small nuclear power plants;
- Hardware requirements for instrumentation and control systems that are important for the safety of nuclear power plants;
- Requirements for the selection and evaluation of devices containing embedded software or electronically configured digital circuits with highly specialised, limited or specific functionality;
- Requirements for strength assessment of fuel elements for sodium- and lead-cooled reactors;
- Requirements for the determination of the specifications of structural materials necessary for assessing the strength and thermomechanical behaviour of fuel assemblies and fuel elements for sodium-cooled reactors;
- Specifications for the materials, designs, dimensions, fabrication and inspection of joints of threaded brazed elements of nuclear power installations;
- Requirements for the water chemistry and water quality control for marine nuclear propulsion units and spent nuclear fuel storage facilities on nuclear maintenance ships;
- Regulations governing the monitoring of the physical and chemical properties and the shape characteristics of radioactive waste to ensure that it meets the criteria for disposal;
- Regulations governing the quality control of engineering safety barriers at radioactive waste storage and disposal facilities.

In order to address the special characteristics and needs of the nuclear industry when developing and updating standardisation documents, ROSATOM's organisations are members of 56 technical committees for standardisation and one project technical committee for standardisation, and are observers on one technical committee for standardisation.

The secretariat of the Technical Committee of the International Electrotechnical Commission (IEC) on Nuclear Instrumentation (IEC/TC 45) has been assigned to the Russian Federation. ROSATOM supports the activities of the primary organisation in charge of the IEC/TC 45 secretariat.

In 2024, following an assessment of the performance of technical committees on standardisation in 2023 by the Federal Agency for Technical Regulation and Metrology (Rosstandart), TC 322 (Nuclear Engineering) ranked seventh among 244 technical committees in the relevant ranking.

The Russian Federation is a full member of the Technical Committee on Additive Manufacturing (ISO/TC 261). ROSATOM's specialists act as official representatives of the Russian Federation on the ISO/TC 261 Technical Committee.

ROSATOM maintains the Consolidated List of Documents on Standardisation, which contains information about the documents (sections of documents) on standardisation whose application is mandatory.

The updated consolidated list of standardisation documents is available on ROSATOM's official website.

Main outcomes of conformity assessment activities

Mandatory product certification

To ensure the safety of nuclear facilities, in 2024, certification bodies and testing laboratories accredited in the use of nuclear energy continued to perform the certification of various products subject to requirements for the safe use of nuclear energy and intended for operation (use) at nuclear power and nuclear industry facilities.

As at 31 December 2024, there were 10 certification bodies accredited in the use of nuclear energy.

In 2024, 500 certificates of conformity were entered in the relevant register following the completion of certification (no targets are set for the issuance of certificates, and, accordingly, there were no deviations from targets).

Evaluation of technical documentation

As at 31 December 2024, there were 23 expert organisations. In the reporting year, 944 expert opinions on the compliance of technical documentation with mandatory requirements were entered in the register, and 2,275 amendments to technical documentation were approved.

Certification testing

As at 31 December 2024, there were six main materials science organisations responsible for conformity assessment in the form of tests (certification testing). In the reporting year, the following certificates were entered in the register:

- 653 certificates for new welding technologies;
- 12 certificates for non-destructive testing systems;
- One certificate for new materials;
- One certificate for new steel melting and casting technologies;
- Three certificates for new heat treatment technologies;
- Eight certificates for new pressure treatment technologies.

Certification of personnel performing non-destructive and destructive testing of metal

Pursuant to federal standards and rules on the use of nuclear energy NP-071-18 Rules for Assessing Compliance of Products Subject to Requirements for the Safe Use of Nuclear Energy and Processes for Product Engineering (Including Surveys), Manufacture, Construction, Assembly, Adjustment, Operation, Storage, Transportation, Sales, Dismantling and Disposal, as approved by Order No. 52 of the Federal Environmental, Industrial and Nuclear Supervision Service of Russia dated 6 February 2018 (registered with the Ministry of Justice of the Russian Federation on 7 March 2018, registration No. 50282), 15 documents on personnel certification in non-destructive and destructive testing of metal in the nuclear industry were developed and came into force as at 31 December 2024. Four bodies were authorised to perform personnel competency verification.

In 2024, 13,271 personnel certification procedures were performed, and 3,801 certificates were issued.

Main outcomes of the accreditation of certification bodies and testing laboratories (centres) and certification of accreditation experts in 2024

Accreditation of certification bodies and testing laboratories and certification of accreditation experts are carried out as part of the provision of public services pursuant to Federal Law No. 210-FZ dated 27 July 2010 on the Provision of Public and Municipal Services and Decree No. 612 of the Government of the Russian Federation dated 20 July 2013 on Accreditation in the Use of Nuclear Energy.

In 2024, ROSATOM received 135 requests for the provision of government accreditation services in the use of nuclear energy (two requests were subsequently withdrawn by the applicant) and issued 30 accreditation certificates (following initial accreditation and/or reissue).

The following decisions were made:

- To grant accreditation to three organisations (three testing laboratories (centres));
- To deny accreditation to four organisations (four testing laboratories (centres));
- To expand the scope of accreditation of 14 organisations;
- To reduce the scope of accreditation of nine organisations;
- To refuse to expand the scope of accreditation of eight organisations;
- To refuse to reduce the scope of accreditation of 16 organisations;
- To renew the accreditation certificates for two organisations that had complied with instructions;
- To invalidate the accreditation certificates of five organisations.

In 2024, 36 scheduled inspections were carried out. Based on the findings of the inspections, ROSATOM issued instructions to three inspected organisations and, accordingly, suspended three accreditation certificates. To date, in one instance the relevant instructions have been carried out, and the competency of the accredited entity has been confirmed.

In 2024, two unscheduled inspections were conducted, based on the findings of which ROSATOM issued instructions to two inspected organisations and, accordingly, suspended two accreditation certificates. To date, in one instance, instructions have been carried out, and the competency of the accredited entity has been verified; in the other instance, instructions have not been carried out, and the accreditation certificate has been invalidated.

Overall, as at 31 December 2024, ROSATOM accredited (as a cumulative total since the start of provision of the relevant government service by ROSATOM) 10 certification bodies and 66 testing laboratories (centres).

Information about the accredited entities is available on ROSATOM's official website.[1]

In 2024, ROSATOM received 15 requests for the provision of government services involving the certification of experts on accreditation in the use of nuclear energy and issued five expert certificates.

The following decisions were made:

- To grant certification to one expert on the accreditation of testing laboratories (centres);
- To confirm the competency of 10 accreditation experts;
- To invalidate four expert certificates.

As at 31 December 2024, certification was granted to a cumulative total of 44 accreditation experts, including 12 experts on the accreditation of certification bodies and 32 experts on the accreditation of testing laboratories (centres). Proper organisation and the high quality of accreditation and certification of experts enabled ROSATOM to avoid any appeals from applicants, accredited entities or persons seeking the status of accreditation experts in 2024.

Regulatory framework underlying the system for ensuring the uniformity of measurements in the use of nuclear energy

National standard GOST R 8.933-2024 'State System for Ensuring the Uniformity of Measurements. Establishment and Application of Precision Measurements and Acceptance Values in the Use of Nuclear Energy' was developed and approved. Measures were developed to establish uniform approaches in the nuclear industry for conducting metrological evaluations of technical documentation based on GOST R 8.1015-2022 'State System for Ensuring the Uniformity of Measurements. Metrological Evaluation of Regulatory and Technical Documentation on the Use of Nuclear Energy. Organisation and Basic Content Requirements'.

Information system and expert activities aimed at ensuring the uniformity of measurements in the use of nuclear energy

Pursuant to Order No. 2037 of the Ministry of Industry and Trade of Russia dated 10 October 2014 on Approval of the Procedure for the Organisation and Maintenance of Sections of the Federal Information Fund for Ensuring the Uniformity of Measurements in the Use of Nuclear Energy, 14,636 entries concerning measurement techniques (methods), standards of measurement, reference standards and measuring instruments of the approved type and 1,137,646 entries on the results of calibration testing of measuring instruments were made in the relevant section of the Federal Information Fund for Ensuring the Uniformity of Measurements in the Use of Nuclear Energy as at 28 December 2024.

The following documents were reviewed in 2024:

- 199 sets of files on the testing of measuring instruments applied in the use of nuclear energy in order to approve their type, and amendments to entries on approved types of measuring instruments;
- 20 sets of files on the certification of standards of measurement applied in the use of nuclear energy;
- Two sets of files on the testing of reference standards applied in the use of nuclear energy in order to approve their type.

1. http://www.rosatom.ru/about/tekhnicheskoe-regulirovanie/akkreditatsiya-v-oblasti-ispolzovaniya-atomnoy-energii-/

In accordance with the Procedure for Mandatory Metrological Evaluation in the Use of Nuclear Energy (approved by Order No. 1693 of the Ministry of Industry and Trade of Russia dated 29 May 2017), mandatory metrological evaluation of 30 draft national standards and technical specifications developed for the use of nuclear energy was carried out in order to include them in the consolidated list of documents on standardisation; in addition, metrological evaluation of 57 draft industry standards and technical specifications applied in the use of nuclear energy was carried out.

Calibration system in ROSATOM

A Calibration System for the Use of Nuclear Energy functions in accordance with Order No. 1/1210-P of ROSATOM dated 1 December 2017 on Approval of the Regulations on the Calibration System for the Use of Nuclear Energy.

In 2024, as part of the Calibration System for the Use of Nuclear Energy, the competency of six of ROSATOM's organisations was verified (the competency of two organisations was confirmed based on the findings of competency assessment; four organisations successfully passed inspections), and 59 calibration techniques were developed.

Interlaboratory comparisons

As part of the system of interlaboratory comparisons (ILCs), ILCs were conducted in 2024 to verify:

1. The quality of measurements performed as part of ultrasonic inspection in accordance with the ILC provider's programme. The qualification was verified using specially manufactured 'blind' carbon steel inspection samples to check the following parameters:
   - Residual thickness (defect depth) in accordance with GOST R 50.05.03;
   - Defect depth in accordance with GOST R 50.05.02;
   - Equivalent defect area in accordance with GOST R 50.05.02;
   - Defect indication length in accordance with GOST R 50.05.02;
   - Defect indication height in accordance with GOST R 50.05.02;
2. The quality of gamma-ray spectrometric measurements of uranium isotopic composition in accordance with the ILC provider's programme. The verification was carried out using industry reference standards and involved measuring the mass fraction of the uranium-235 isotope in uranium;
3. The quality of linear measurements in accordance with the ILC provider's programme. The verification was carried out using specially manufactured gauge blocks to measure length;
4. The quality of measurements of surface contamination with alpha-emitting radionuclides in accordance with the ILC provider's programme. The verification was carried out using 'blind' check sources to measure the alpha particle flux density;
5. The quality of beta-particle flux density measurements in accordance with the ILC provider's programme. The verification was carried out using 'blind' check sources;
6. The quality of measurements of ambient gamma radiation dose equivalent rates, in accordance with the ILC provider's programme. The verification was carried out using a calibration rig with a preset value;
7. The quality of measurements of specific activity of gamma-emitting radionuclides in soils in the energy range of 0.2–2.8 MeV in accordance with the ILC provider's programme. The verification was carried out using mock-ups of real samples, which were specially manufactured for qualification verification;
8. The quality of measurements of radiometric characteristics of aquatic environments as part of environmental monitoring in accordance with the ILC provider's programme. The verification was carried out using mock-ups of real samples, which were specially manufactured for qualification verification, and involved checking the specific activity of emitter radionuclides in aquatic environments:
   - Alpha-emitting radionuclides (^{239}Pu+^{240}Pu and uranium isotopes);
   - Beta-emitting radionuclides (^{90}Sr+^{90}Y);
   - Gamma-emitting radionuclides (^{137}Cs);
9. The quality of measurements of personal photon radiation dose equivalent rates in accordance with the ILC provider's programme. The verification involved using the participants' specially irradiated personal dosimeters.

A total of 277 testing laboratories (centres) took part in the ILCs in 2024.

Inspection of the condition and use of measuring instruments, compliance with metrological rules and standards, and evaluation of measurement capabilities in ROSATOM's organisations

ROSATOM's organisations carry out annual inspections of the condition and use of measuring instruments, standards of measurement, measurement, testing and monitoring techniques (methods), reference standards, certified items, testing equipment, standard reference data, tolerance monitoring instruments, compliance with metrological rules and standards (metrological supervision) and evaluation of measurement capabilities in measurement and testing laboratories.

In 2024, metrological supervision was performed in 31 organisations of ROSATOM, and measurement capabilities were assessed in 79 laboratories.

Based on the findings of metrological supervision, a consolidated report was prepared and submitted to Rosstandart in 2024 as part of federal metrological supervision.

Standard Reference Data Service in the use of nuclear energy

In the reporting year, 24 data sets applied in the use of nuclear energy were certified as 'recommended' and 'standard' reference data,[1] including the following:

a) Evaluated data on the decay rates of 22 radionuclides used for a variety of applications, including medicine and biological research;

b) Values of short-term mechanical properties of E-110 and E-635 zirconium alloy products before reactor irradiation.

The following were reviewed and approved:

a) Proposals on the draft Road Map for the Implementation of the Concept of Development of the SRDNE for the Period from 2021 through 2027;

b) The final version of the draft national standard GOST R 'State System for Ensuring the Uniformity of Measurements. Thermophysical Properties of Liquid Lead in the Temperature Range of 330°C to 1000°C'.

30 entries on standard and recommended reference data were added to the relevant section of the Federal Information Fund for Ensuring the Uniformity of Measurements in the Use of Nuclear Energy in accordance with Procedure No. 1-8.16/018-2017 'Standard Reference Data on Physical Constants and Properties of Substances and Materials' for making entries in the relevant section of the Federal Information Fund for Ensuring the Uniformity of Measurements in the Use of Nuclear Energy.

1. Pursuant to Decree No. 596 of the Government of the Russian Federation dated 20 August 2001 on Approval of the Regulations on the National Service of Standard Reference Data on Physical Constants and Properties of Substances and Materials.

A draft standard of the Fuel Division, STO 54-2024 Procedure for the Determination of Properties and Their Numerical Values Necessary for Assessing Strength and Thermomechanical Behaviour, was reviewed and approved.

The Service of Standard Reference Data on Physical Constants and Properties of Substances and Materials in the Use of Nuclear Energy in cooperation with the SRDNE reference data centres organised and held two research and methodology seminars: 'Expert Review and Certification of Reference Data, Sources of Data for Certification of Thermophysical Properties of Coolants and Methods of Obtaining Such Data' and 'Activities of the Standard Reference Data Service in the Use of Nuclear Energy Focused on the Development and Certification of Thermophysical Properties of Coolants'.

Plans for 2025

- To prepare proposals for Decree No. 1488 of the Government of the Russian Federation dated 30 December 2012 on Approval of the Regulations on the Special Features of Ensuring the Uniformity of Measurements in the Use of Nuclear Energy regarding the development and approval of standard reference data applied in the use of nuclear energy.
- To issue a national GOST R standard for the quality control of chemical agents applied in the use of nuclear energy.
- To pilot the Metrology integrated industry-wide system in order to provide a digital platform for metrological support in the nuclear industry.
- To conduct ILCs focused on measurements of ambient gamma radiation dose equivalent rates, measurements of alpha and beta radiation flux density, measurements of specific activity of ionising radiation, and measurements of uranium content.



5.3. RAW AND SNF MANAGEMENT AND DECOMMISSIONING OF FACILITIES POSING NUCLEAR AND RADIATION HAZARDS

Key results in 2024

- All targets of FTP NRS 2 were achieved; progress in the achievement of the Programme's main goal totalled 40.5% (as against the target of 39.6%).
- The construction of the second start-up facility of the Pilot and Demonstration Centre for SNF Reprocessing was completed. A commissioning permit was obtained.
- The dismantling of a large nuclear submarine and a nuclear maintenance ship was completed, with the reactor compartment unit of the submarine placed into long-term onshore storage.

5.3.1. Outcomes of the Federal Target Programme on Nuclear and Radiation Safety for the period from 2016 through 2020 and for the period until 2035 (FTP NRS 2)

In 2024, ROSATOM continued to actively implement FTP NRS 2, including the following projects:

- Decommissioning industrial uranium-graphite reactors and the BR-10 research reactor;
- Decommissioning disused buildings and structures at the radiochemical plant and liquid radioactive waste storage sites in the town of Ozersk;
- Decommissioning a radiochemical production facility in Moscow;
- Maintaining the following facilities in a safe condition: the Techa Cascade of Reservoirs (in accordance with the developed Strategic Master Plan for Addressing Issues Related to the Techa Cascade of Reservoirs) and a RAW storage site (Reservoir No. 9);
- Preparing the shut-down power units at Leningrad, Bilibino, Beloyarsk and Kursk Nuclear Power Plants for decommissioning;
- Ongoing construction of SNF and RAW management infrastructure at Leningrad and Smolensk Nuclear Power Plants;
- Ongoing rehabilitation of radiation-contaminated sites (contaminated sites with a total area of 12,500 square metres were rehabilitated in the reporting year).

The decommissioning of buildings 120/1 and 172, and building 453a (a gas holder) of the ADE-5 industrial uranium-graphite reactor was completed.

At year-end 2024, all targets under FTP NRS 2 were achieved, with progress towards the achievement of the main goal of FTP NRS 2 totalling 40.5% against the target of 39.6%.

5.3.2. Development of the integrated national system for RAW management

Volume of accumulated RAW

At year-end 2024, the volume of radioactive waste (RAW) totalled 5.72×10^8 m³, of which 5.53×10^8 m³ were classified as accumulated RAW ('nuclear legacy').

RAW generation in 2024, m³

	Very low-level waste	Low-level waste	Intermediate-level waste	High-level waste
Solid RAW	6.72×10^5	1.08×10^4	3.22×10^3	3.58×10^2
Liquid RAW	–	5.91×10^5	3.20×10^4	2.21×10^4

In 2024, work on the third stage of development of the Integrated National System for RAW Management (INS RWM) continued.

No RAW disposal facilities were commissioned in 2024.

Outcomes and progress on plans for the construction and renovation of RAW management infrastructure

The Corporation continued to build an underground research laboratory to support the construction of the first stage of a permanent disposal facility (deep repository) for class 1 and class 2 RAW (Nizhne-Kansky Rock Massif, Krasnoyarsk Territory).

As part of the projects to build a near-surface disposal site for class 3 and 4 solid RAW (Chelyabinsk Region, Ozersk Urban District) and a near-surface disposal site for class 3 and 4 solid RAW (Tomsk Region, Seversk), in-situ concreting of some of the modular structures for waste burial was completed in 2024. Construction of complexes of auxiliary buildings and structures and warehouses, transport infrastructure, an access road to the site, internal and external utility networks continued.

Disposal of class 3 and class 4 RAW continued; 3,000 m³ of RAW were accepted for disposal in the reporting year.

Three deep repositories for class 5 liquid RAW were in operation in the CATFs of Dimitrovgrad (Ulyanovsk Region), Seversk (Tomsk Region) and Zheleznogorsk (Krasnoyarsk Territory).

5.3.3. SNF management

As at 31 December 2024, the volume of SNF accumulated in the Russian Federation totalled 27,099 tonnes (tHM[1]), including 16,517 tonnes of SNF in federal ownership. In the reporting year, 453 tonnes of SNF were accumulated.

During the reporting year, 1,054.21 tonnes of SNF were removed from nuclear facilities in the Russian Federation, and 134.5 tonnes of various types of SNF were reprocessed (including 22.42 tonnes of SNF in federal ownership). Reprocessed SNF accounted for 22.9% of the total volume of SNF generated in the Russian Federation during the year.

1. Tonnes of heavy metal.

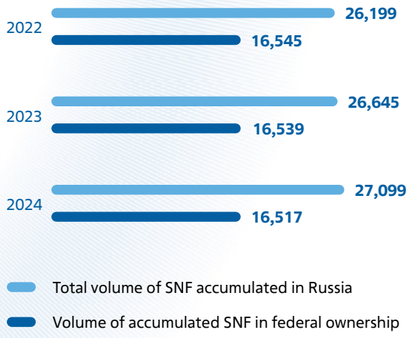
SNF management activities in 2024

Reactor type	Number of SFAs	Description
RBMK-1000	13,824	Removal and placement in centralised dry storage
VVER-1000	337	Removal and placement in temporary storage for subsequent reprocessing
VVER-1000	200	Removal for reprocessing
VVER-440	96	
BN-600	244	
BN-800	521	

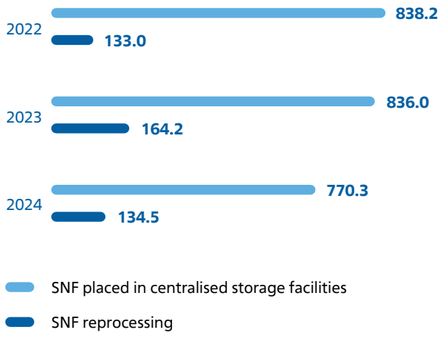
Removal of SNF from the sites of research institutes continued.

In the reporting year, the construction of the second start-up facility of the Pilot and Demonstration Centre (PDC) for SNF Reprocessing was completed. The commissioning permit was issued on 5 November 2024. The PDC is expected to become a leading-edge SNF reprocessing plant with a high level of environmental and economic performance.

SNF accumulation in Russia, tonnes



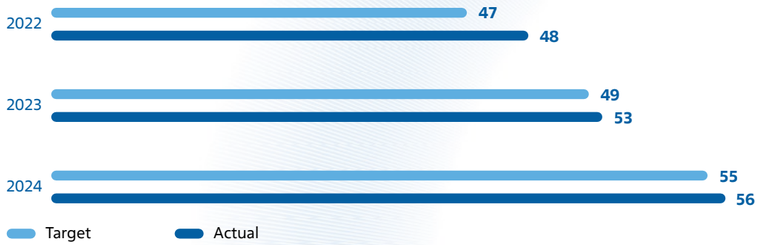
SNF placed in storage and reprocessed, tonnes



5.3.4. Decommissioning and dismantling of facilities posing nuclear and radiation hazards

In 2024, three facilities posing nuclear and radiation hazards were decommissioned.

Decommissioning and dismantling of facilities posing nuclear and radiation hazards
(as a cumulative total since 2016)



5.3.5. Dismantling of nuclear submarines

The most important outcomes of work performed in 2024 included the following:

- The dismantling of a large nuclear submarine was completed and the reactor compartment was prepared for and placed into long-term storage;
- The dismantling of a nuclear maintenance ship was completed;
- The decommissioning of a reactor unit forming part of the KV-2 test facility was completed;
- The hull unit of the nuclear maintenance ship was moved to the dismantling site, lifted and placed on a solid base at the disassembly site;
- The bow and stern sections of the *Admiral Lazarev* heavy nuclear-powered guided-missile cruiser were dismantled;
- The disposal of 3,142 spent fuel assemblies (SFAs) from military nuclear power systems containing 5.715 tonnes of SNF was completed;
- Spent nuclear fuel was prepared for unloading, unloaded from dry storage tanks at the Andreev Bay facility and prepared for transportation to a reprocessing facility (a total of 16 transportation casks);
- The spent removable core from the prototype of the KM-1 military nuclear power unit at the Gremikha site in the Murmansk Region was prepared for dismantling and dismantled; 37 SFA bundles from the spent removable core were prepared for transportation to a reprocessing facility;
- 1,000 m^3 of solid radioactive waste were conditioned;
- A total of 433 m^3 of contaminated soil resulting from the clean-up of a nuclear submarine accident in Sysoyev Bay in the Primorsky Territory was separated and prepared for transfer to a disposal site;
- The decommissioning of the buildings of technical facilities of the former coastal maintenance base of the Navy in Krasheninnikov Bay continued;
- Revenue from the sale of residual products from the dismantling projects totalling RUB 377.2 million was contributed to the federal budget.

5.3.6. Plans for 2025 and for the medium term

ROSATOM will continue to implement the Federal Target Programme on Nuclear and Radiation Safety for the Period from 2016 through 2020 and until 2035, including:

- Transporting the accumulated SNF from NPP sites to long-term storage facilities;
- Rehabilitating radiation-contaminated sites and decommissioning facilities posing nuclear and radiation hazards.
- Condition solid radioactive waste accumulated during the past operation of nuclear submarines, surface ships with nuclear propulsion units and nuclear maintenance ships (1,000 m^3 per year);
- Decommission the buildings of technical facilities of the former coastal maintenance base of the Navy in Krasheninnikov Bay;
- Continue to implement projects expected to deliver the final outcomes in later periods.

In terms of the dismantling of nuclear submarines, surface ships with a nuclear propulsion unit and nuclear maintenance ships and the clean-up of facilities posing radiation hazards, ROSATOM plans to:

- Dismantle a special-purpose nuclear submarine, unload SNF from the reactors of a nuclear cruiser submarine and dispose of it, unload SNF from the reactors of an ocean-going nuclear submarine;
- Dismantle the multi-compartment reactor unit of a nuclear submarine, dismantle the fairwaters and missile tube covers from two strategic nuclear cruiser submarines being dismantled (to ensure the fulfilment of Russia's international commitments on further reduction and restriction of offensive weapons);
- Prepare the reactor compartment of a dismantled nuclear submarine and place it into long-term onshore storage;
- Dismantle the *Admiral Lazarev* heavy nuclear-powered guided-missile cruiser and the hull unit of a floating maintenance base;
- Continue to unload, remove for disposal and dispose of spent fuel assemblies from military nuclear power systems;

As part of the development of SNF management efforts, the Corporation will begin to implement the Strategic Industry-Wide Programme for the Development of Radiochemical Operations. This programme is aimed at:

- Meeting the demand of the two-component nuclear power industry for reprocessed nuclear materials (uranium and plutonium), and conserving natural resources by recycling nuclear materials;
- Addressing the issue of 'nuclear legacy' and SNF accumulation in Russia by reprocessing SNF from Russian NPPs with minimal RAW generation;
- Building industrial infrastructure for large-scale SNF reprocessing (with a total installed capacity of more than 1,000 tHM/year) taking into account plans for the development of the nuclear power industry (including SNPPs and floating power units) and the nuclear-powered icebreaker fleet;
- Expanding ROSATOM's footprint and making its offers more competitive in the global NFC and NPP construction markets.

5.4. ENVIRONMENTAL SAFETY

Key results in 2024

- Expenditure on environmental protection totalled RUB 36.44 billion (2023: RUB 29.0 billion).
- ROSATOM's organisations accounted for 0.2% of the total emissions in the Russian Federation.

GRI 3-3

5.4.1. Environmental safety and environmental protection management

100% of nuclear facilities make a moderate or insignificant environmental impact (in accordance with the criteria set by Russian environmental legislation)

The environmental footprint of the nuclear power industry is smaller than that of carbon-based power generation using fossil fuels. Emissions of hazardous chemicals, including those that destroy the ozone layer or contribute to the greenhouse effect, from nuclear power plants are close to zero. ROSATOM and its organisations attach great importance to environmental safety and environmental protection and operate responsibly in accordance with the following principles:

- Giving priority to preserving natural ecosystems;
- Making use of the latest scientific achievements and ensuring environmental safety as a mandatory requirement;
- Ensuring transparency and making information about the environmental aspects of operations of nuclear organisations publicly available.

The Corporation's environmental priorities and values are reflected in the Uniform Industry-Wide Environmental Policy of ROSATOM and Its Organisations.[1]

In order to prevent non-compliance with legislative and regulatory requirements for environmental protection, as part of the internal safety control system functioning in ROSATOM, inspection visits are carried out, including inspections of environmental protection at production facilities in the industry; the findings of these inspections provide a basis for managerial decisions aimed at improving environmental safety performance. Organisations in the industry continue to develop and implement environmental, energy and quality management systems, as well as occupational health and safety management systems. GRI 2-25

To enhance the efficiency of initiatives forming part of ROSATOM's environmental policy and to recognise the Corporation's most environmentally responsible organisations, the Environmentally Exemplary Organisation of the Nuclear Industry competition is held annually. ROSATOM's organisations are rewarded for meeting targets across all areas of environmental management, including environmental impacts, the efficiency of management and organisation of environmental initiatives, commitment to a transparent environmental policy, etc.

Nuclear enterprises operated steadily in 2024; there were no accidents or incidents that could have had a negative impact on the environment.

1. See: https://rosatom.ru/upload/iblock/5c3/5c3ce2206d4406f2686f2e1fdec013c5.pdf

5.4.2. Financing of environmental measures

RUB 36.44 billion – ROSATOM's expenditure on environmental protection in 2024

In 2024, expenditure on environmental protection in ROSATOM's organisations totalled RUB 36.44 billion, including expenditure on environmental measures totalling RUB 30.1 billion and fixed asset investment for environmental purposes totalling RUB 6.34 billion. Environmental costs increased by RUB 7.44 billion year on year due to the expansion of environmental protection facilities at Novovoronezh NPP. The share of the average annual cost of fixed assets for environmental protection tripled compared to 2023.

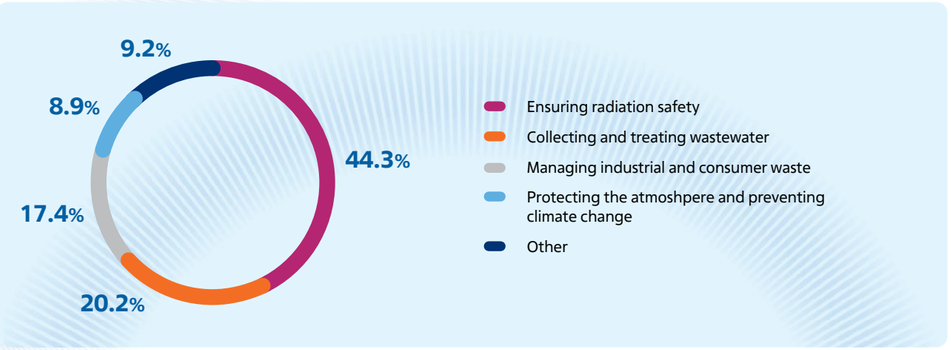
Allocation of ROSATOM's environmental costs, RUB billion

MED 21
MED 10

Indicator	2021	2022	2023	2024
Expenditure on environmental measures	19.79	19.75	22.50	30.10
Fixed asset investment for environmental purposes	1.31	4.90	6.50	6.34
Total	**21.10**	**24.65**	**29.00**	**36.44**

The largest portion of expenditure on environmental measures was allocated for ensuring radiation safety (44.3%).

Environmental cost structure



A major part of fixed asset investment was allocated for the protection and sustainable use of water resources (65.4%) and the protection of the atmosphere (29.7%).

Branches of the Power Engineering Division account for 78.7% of the total fixed asset investment of ROSATOM's organisations aimed at environmental protection. ROSATOM's organisations account for 1.7% of the total amount of environmental investment in the Russian Federation.[1]

GRI 2-27

5.4.3. Environmental charges and fines

Environmental charges

In 2024, charges for the negative environmental impact totalled RUB 94.1 million, including charges for allowable emissions and discharges of pollutants, disposal of industrial and consumer waste totalling RUB 60.5 million (64.3%), and charges for excess emissions and discharges totalling RUB 33.6 million (35.7%).

Charges for the negative environmental impact, RUB million

Item	2021	2022	2023	2024
Charges for allowable emissions (discharges) of pollutants (disposal of industrial and consumer waste), total, including:	**41.6**	**33.8**	**49.8**	**60.5**
– into water bodies	4.1	3.1	3.6	8.8
– into the atmosphere	4.0	3.4	5.3	6.3
– for the disposal of industrial and consumer waste	33.3	27.3	40.9	45.4
Charges for excess emissions (discharges) of pollutants (disposal of industrial and consumer waste), total, including:	**75.3**	**99.6**	**34.7**	**33.6**
– into water bodies	18.3	31.2	19.5	20.9
– into the atmosphere	9.6	2.7	6.9	7.6
– for the disposal of industrial and consumer waste	47.4	65.7	8.3	5.1
Charges for allowable and excess emissions (discharges) of pollutants (disposal of industrial and consumer waste), total	**116.9**	**133.4**	**84.5**	**94.1**

Fines

In 2024, government supervision agencies in the field of natural resource management detected 29 violations in nuclear organisations, for which they imposed administrative penalties in the form of fines. Fines levied on the Corporation's organisations for environmental non-compliance totalled RUB 3.5 million.

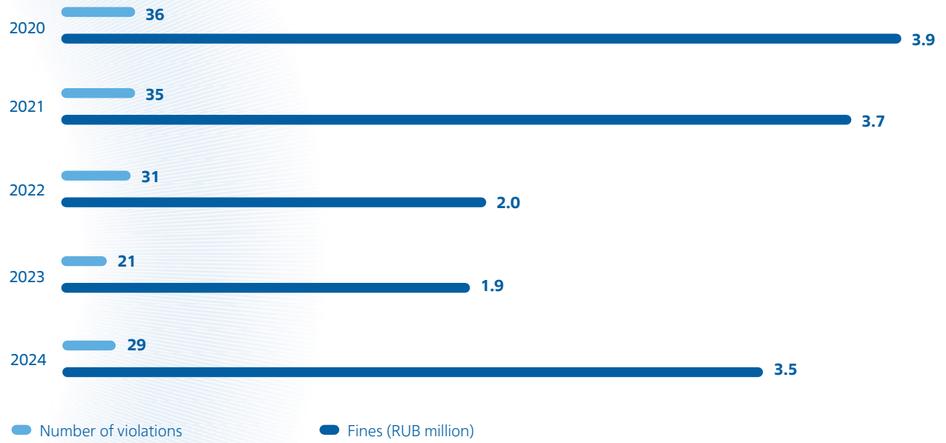
The number of administrative violations detected in the reporting period increased by eight violations (38.1% of the total) compared to 2023, while the total amount of fines increased by RUB 1.6 million (84.2% of the total).

No administrative penalties in the form of administrative suspension of operations were imposed on nuclear organisations in 2024; violations detected by the government supervision agencies were local in scale and did not pose a threat to various components of the environment.

An increase in the total amount of fines in 2024 was due to stricter requirements of environmental legislation and an increase in the number of organisations managed by ROSATOM.

In 2024, government agencies responsible for environmental supervision put forward a claim for a total of RUB 0.379 million against an enterprise of ROSATOM for damage to a water body.

Number of violations of environmental legislation by ROSATOM's organisations and the amount of fines between 2020 and 2024



GRI 305-7

MED 19

5.4.4. Pollutant emissions into the atmosphere

In 2024, pollutant emissions into the atmosphere totalled 51,000 tonnes; the pollutant capture rate reached 73.6%.

In 2024, ROSATOM's organisations accounted for 0.2% of the total emissions in the Russian Federation.[1]

0.2% – share of pollutant emissions from ROSATOM's organisations in the total emissions in Russia

1. Based on data provided in the Government Report on the Status and Protection of the Environment of the Russian Federation in 2023.

1. Based on data provided in the Government Report on the Status and Protection of the Environment of the Russian Federation in 2023.

Pollutant emissions into the atmosphere, '000 tonnes

Emissions	2021	2022	2023	2024
Total, including:	**37.0**	**39.1**	**50.6**	**51.0**
Particulate emissions	13.5	11.7	11.4	10.4
NO_x emissions	7.4	10.0	20.2	26.0
SO_2 emissions	9.8	10.7	10.6	5.4
CO emissions	3.8	4.3	6.4	7.2
Hydrocarbon emissions, including:	2.1	2.0	1.6	1.6
Methane emissions	*0.7*	*0.7*	*0.4*	*0.3*
Volatile organic compounds	*1.3*	*1.0*	*1.0*	*1.1*
Other gases and liquids	0.4	0.4	0.4	0.4

Pollutant emissions into the atmosphere increased slightly compared to 2023 (by 400 tonnes).

Pollutant emissions from individual groups of pollution sources, '000 tonnes

Indicator	From fuel combustion for electricity and heat generation	From production and other processes
Particulate matter	9.1	1.3
NO_x	24.6	1.4
SO_2	4.9	0.5
CO	5.8	1.4
Hydrocarbons, including volatile organic compounds (excluding methane)	0.01	1.3

GRI 305-6

Emissions of major ozone-depleting substances, tonnes of chlorofluorocarbon-11 equivalent[1]

Substance	2021	2022	2023	2024
Dichlorodifluoromethane (Freon 12)	72.24	14.05	16.58	3.821
Chlorodifluoromethane (Freon 22)	0.21	0.13	0.09	0.09
Chlorotrifluoromethane (Freon 13)	164.21	123.75	0.11	0.00
Tetrafluoromethane (Freon 14)	6.24	0.24	0.22	0.17
Total	**242.90**	**138.17**	**17.00**	**4.081**

Ozone-depleting substances are used as a chemical agent for chemical tests in laboratories, for the filling and refilling of compressors, air conditioning units and industrial air conditioners, and in refrigeration equipment in enterprises.

1. The data are presented taking into account the ozone depletion potential of substances under the Montreal Protocol on Substances that Deplete the Ozone Layer. The calculations have been made for those ozone-depleting substances that are reported in Form 2-TP (Air) as specific pollutants.

In 2024, emissions of ozone-depleting substances decreased as a result of direct improvements and a reduction in the duration of a production process contributing to ODS emissions in an enterprise in the Fuel Division.

Initiatives to reduce harmful emissions into the air

Key measures implemented in 2024 included the following:

- At the Schuchye environmental technology park, the main production facilities were equipped with gas scrubbing systems, which will ensure the pollutant removal efficiency of up to 90%;
- At the Mikhailovsky environmental technology park, a multi-stage flue gas treatment system was installed at thermal decontamination units forming part of the industrial facility. This system complies with the standards for the best available technologies (ITS 9-2020 and ITS 52-2022) and will enable pollutant removal ensuring that pollutant levels are below the maximum permissible limits for emissions into the atmosphere;
- At the Pilot and Demonstration Engineering Centre, the power supply system was upgraded; this involved replacing diesel generators, which has helped reduce the number of stationary sources of emissions and cut annual pollutant emissions by 25%;
- The branch of the Infrastructure Solutions Division in Seversk carried out a technical upgrade of the ash collector of boiler unit No. 13 at the CHPP, which will help improve the performance of gas scrubbers to 99%;
- In the Power Engineering Division: at Balakovo NPP, ventilation systems were upgraded, which involved replacing FP-200 iodine filters with VUI-1500 charcoal adsorbers, making it possible to remove up to 99% of molecular iodine from ventilation air; at Kola NPP, oil cleaning equipment at diesel oil and fuel oil storage facilities was upgraded, which will prevent the risk of air pollution and will help reduce emissions of petroleum products by 5%;
- In the Mechanical Engineering Division (Moscow), two gas scrubbers were upgraded at a pilot plant, which has helped reduce abrasive dust emissions by 20%.

GRI 3-3

5.4.5. Water use

8.8% – share of water withdrawal from natural sources by ROSATOM's organisations in the total water withdrawal in Russia

GRI 303-1
GRI 303-2

The nuclear industry is a major water user. The systematic approach to water use management is underpinned by water accounting data covering all water resources used in the industry (surface water, groundwater, reused and recycled water). Furthermore, industrial facilities are designed and their locations are selected with due regard for uneven geographical distribution of natural water resources. Wastewater quality assurance approaches and methods used by the Corporation are based on scientific research and are aimed at preserving the natural water quality and minimising pollutant discharges into water bodies, thus ensuring the sustainability of water resources in the regions of operation.

Water withdrawal and discharge for the needs of ROSATOM's organisations is regulated by water use agreements and fully complies with prescribed limits.

Sustainable use of water resources is achieved through:

- The use of water recycling and reuse systems;
- Wastewater treatment using mechanical, biological, and physical and chemical methods;

- Minimising freshwater consumption in regions with access to seawater;
- Continuous monitoring of wastewater quality and compliance with statutory limits;
- The implementation of investment projects focused on the construction and renovation of wastewater treatment facilities and water supply networks.

In 2024, water withdrawal from natural sources by ROSATOM's organisations made up 8.8%[1] of the total water withdrawal in the Russian Federation. The main water consumers among ROSATOM's organisations are Leningrad NPP and Kola NPP (72.2% of the total water withdrawal).

GRI 303-3

In the reporting year, water withdrawal by ROSATOM's organisations totalled 6,075.3 million m³, which is 436.5 million m³ more than in 2023. This was caused by an increase in seawater consumption at Leningrad NPP due to increased electricity output at power units No. 3 and 4 equipped with RBMK-1000 reactors, which have a once-through cooling system, rather than power units equipped with VVER-1200 reactors, which have a closed-circuit cooling system with evaporative cooling towers.

Total water withdrawal, million m³

Source	2021	2022	2023	2024
Seawater	2,672.3	2,930.1	2,769.1	3,089.7
Fresh surface water, including rivers, marshes and lakes	2,204.5	2,505.0	2,702.4	2,798.4
including in regions with the scarcest water resources	-	*59.6*	*83.5*	*82.5*
Groundwater	82.1	81.5	135.1	140.4
including in regions with the scarcest water resources	-	*4.5*	*13.1*	*12.8*
Rainwater	2.4	2.3	2.3	4.9
Third-party water	17.9	17.3	29.9	41.9
Total	**4,979.2**	**5,536.1**	**5,638.8**	**6,075.3**
including in regions with the scarcest water resources	-	*64.1*	*96.6*	*95.3*

ROSATOM's regions of operation include regions with the smallest total amount of water resources, namely the Kursk and Kurgan Regions.[2] The volume of water used by the Corporation's organisations in water recycling and reuse systems totalled 37,442.5 million m³ in 2023.

MED 14

Volume of recycled and reused water, million m³

Indicator	2021	2022	2023	2024
Total volume of recycled and reused water, million m³	37,974.6	37,623.7	37,764.1	37,442.5
Water withdrawal, million m³ (% of the volume of recycled and reused water)	4,979.2 (13.1)	5,536.1 (14.7)	5,638.8 (14.9)	6,075.3 (16.2)
Total, million m³	**42,953.8**	**43,159.8**	**43,402.9**	**43,517.8**
Volume of recycled and reused water as a percentage of water withdrawal volume, %	762.7	679.6	669.7	616.3

1. Based on data provided in the Government Report on the Status and Protection of the Environment of the Russian Federation in 2023.
2. Based on data provided in the Government Report on the Status and Use of Water Resources of the Russian Federation in 2020.

MED 13

The volume of water used by ROSATOM's organisations for their own needs in 2024 totalled 5,925.4 million m³, which is 437.5 million m³ more than in 2023. This was due to an increase in seawater consumption at Leningrad NPP as a result of increased electricity output.

Water consumption for own needs, million m³

Type of consumption	2021	2022	2023	2024
Drinking and sanitary purposes	37.0	38.1	50.8	55.1
Operational needs	4,810.5	5,364.1	5,404.8	5,827.0
Other types	33.7	32.0	32.3	43.3
Total	**4,881.2**	**5,434.2**	**5,487.9**	**5,925.4**

GRI 303-2

Water discharge

Water discharge by ROSATOM's organisations is regulated by the relevant permits. Pollutant content in wastewater is monitored by in-house laboratories as part of industrial environmental control; compliance with statutory limits is confirmed as part of monitoring and supervision by the Federal Service for Supervision of Natural Resources. In some cases, water from natural water sources does not meet quality standards, and an organisation withdraws water for its own needs that has already been contaminated. In these cases, water is also treated before discharge to ensure compliance with statutory limits, where possible.

GRI 303-4

In 2024, wastewater discharge by ROSATOM's organisations totalled 5,036.7 million m³ (including 34.4 million m³ in water-stressed regions), with clean water compliant with regulatory requirements accounting for 95.2% of the total volume, while the share of treated wastewater compliant with regulatory requirements and contaminated wastewater was 0.9% and 3.9% respectively.

In the structure of wastewater discharge, the main destinations include seas (3,032.5 million m³, or 60.2%), lakes (1,383.0 million m³, or 27.5%) and rivers (505.6 million m³, or 10.0%).

Wastewater discharge increased by 431.0 million m³ compared to 2023 due to an increase in seawater consumption at Leningrad NPP.

In the reporting year, discharge of treated wastewater compliant with regulatory requirements totalled 46.9 million m³, of which 25.0% was treated using the biological method, 3.3% was treated using the physical and chemical method, and 71.7% was treated using the mechanical method.

Contaminated wastewater discharge by ROSATOM's organisations accounted for 1.8% of the total volume of discharges in Russia in 2024.[1]

Total wastewater discharge, million m³

Total wastewater discharge	5,036.7
Total discharge with a breakdown by destination, including:	
Surface water, including marshes, rivers and lakes	2,004.2
Seawater	3,032.5

1. Based on data provided in the Government Report on the Status and Protection of the Environment of the Russian Federation in 2023.

Total wastewater discharge, million m³

MED 15

Water category	2021	2022	2023	2024
Clean water compliant with regulatory requirements	4,075.1	4,636.4	4,385.6	4,793.9
Treated wastewater compliant with regulatory requirements	40.1	32.1	37.2	46.9
Contaminated wastewater	149.3	180.8	182.9	195.9
Total	**4,264.5**	**4,849.3**	**4,605.7**	**5,036.7**

Pollutant content in wastewater, kg

Pollutant	2021	2022	2023	2024
Chemical oxygen demand	13,833,926.355	5,720,214.386	4,490,882.31	24,885,837.850
Suspended matter	1,803,633.000	2,570,261.000	2,303,814.000	3,097,070.000
Phosphates (phosphorus contained)	32,902.000	35,795.000	155,433.000	287,405.000
Hexavalent chromium	64.595	102.118	284.413	366.290
Trivalent chromium	62.828	133.695	447.372	608.372
Manganese	633.565	640.469	551.768	605.839
Iron	23,198.916	35,296.603	47,274.337	204,798.432
Nickel	72.753	82.803	209.265	304.613
Copper	408.081	560.388	624.046	516.550
Zinc	577.472	695.118	997.442	1,031.517
Molybdenum	457.754	622.000	467.168	191.610
Cadmium	1.521	1.608	1.358	1.979
Lead	13.199	25.091	15.063	28.546
Total	**13,892,319.04**	**8,364,430.280**	**7,001,001.542**	**28,478,766.60**

Initiatives to reduce discharges of harmful substances into water bodies

Key measures implemented in 2024 included the following:

- An enterprise in the Mechanical Engineering Division (Moscow Region) upgraded three wastewater treatment facilities, which will enable a 35% increase in the efficiency of removal of suspended solids and petroleum products from industrial wastewater and storm water runoff;
- An enterprise in the Nuclear Weapons Division (Snezhinsk) renovated effluent treatment facilities, which will enable the removal of pollutants from storm water runoff and meltwater in compliance with the established limits for allowable discharges;
- An enterprise in the Nuclear Weapons Division (CATF of Tryokhgorny) commissioned on-site wastewater treatment facilities in Mechanical Assembly Shop No. 25 to remove mechanical contaminants and petroleum products from industrial wastewater. This will reduce the concentration of pollutants in discharges from wastewater outlet No. 2 by 82%;
- An enterprise in the Nuclear Weapons Division (Nizhny Novgorod) completed the technical upgrade of its wastewater treatment facilities to ensure compliance with the established limits for allowable discharges.

MED 18

5.4.6. Industrial and consumer waste management

0.4% – share of industrial and consumer waste generated in ROSATOM's organisations in the total volume of waste generation in Russia

11.2% – reduction in the generation of industrial and consumer waste compared to 2023

99.99% – share of low-hazard and virtually non-hazardous industrial and consumer waste in the total volume (this includes mainly overburden produced in the course of operations of the Mining Division)

GRI 306-1

In 2024, nuclear organisations produced 32.6 million tonnes of industrial and consumer waste, which is 4.1 million tonnes (11.2%) less than in 2023. 99.99% of the generated waste is hazard class 4 and 5 waste (low-hazard and virtually non-hazardous waste). This waste is primarily produced during mining operations. A reduction in waste generation in 2024 was caused by the suspension of operations of an enterprise in the Mining Division due to a change of operating contractor. Industrial and consumer waste generated in ROSATOM's organisations accounted for 0.4% of the total volume of waste generation in Russia in 2024.[1]

GRI 306-2

The Corporation takes measures to prevent waste generation. Part of construction waste is a mixture of virtually non-hazardous waste containing loose overburden, which is placed in internal dumps of an open-pit coal mine of an enterprise in the Mining Division (Zabaykalsky Territory) for subsequent technical reclamation.

ROSATOM's organisations manage industrial and consumer waste both independently, under waste management licences, and under contracts with organisations licensed to collect, transport, process, recycle, treat and dispose of hazard class 1 to 4 waste.

95.2% of the total amount of waste generated and received by ROSATOM's organisations was recycled; 0.003% was treated. The weight of transferred waste totalled 451,700 tonnes, including 36,100 tonnes of municipal solid waste (MSW) transferred to a regional operator.

1. Based on data provided in the Government Report on the Status and Protection of the Environment of the Russian Federation in 2023.

Industrial and consumer waste management, ‘000 tonnes

Year	Amount at the beginning of the year	Waste generated and received during the year	Recycling and treatment of generated and received waste		Trans-ferred to third-party organisa-tions	Storage in enterprises	Amount at the end of the year
			Amount	%			
2021	444,378.2	33,811.0	27,663.0	81.8	224.4	5,529.1	445,078.6
2022	442,544.9	33,532.9	30,447.4	85.7	226.1	2,759.9	446,146.0
2023	475,833.2	36,608.7	30,532.7	83.4	285.8	5,699.4	476,438.5
2024	487,312.3	32,568.3	31,006.1	95.2	451.7	778.7	488,189.4

In 2024, ROSATOM did not transport, import, export or process waste classified as ‘hazardous’ according to Annexes I, II, III, and VIII of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.

Industrial and consumer waste management by hazard class in 2024, ‘000 tonnes

MED 17

GRI 306-5

GRI 306-4

GRI 306-3

Waste hazard class	Amount at the beginning of the year	Waste gener-ated and received in the reporting year	Recycling of generated and received waste		Treatment of generated and received waste		Waste transfer to third-party organisa-tions	Waste stored at the sites operated by ROSATOM in the reporting year, ‘000 tonnes		Amount at the end of the year
			‘000 tonnes	%	‘000 tonnes	%		Total	Including burial	
Class 1	0.077	1.151	0.000	0.0	0.214	18.6	0.206	0.000	0.000	0.807
Class 2	0.096	0.937	0.000	0.0	0.622	66.4	0.284	0.000	0.000	0.127
Class 3	0.645	7.198	0.044	0.6	0.0003	0.004	7.257	0.011	0.000	0.541
Class 4	4,765.847	171.930	12.496	7.3	0.001	0.006	151.679	6.281	4.144	4,769.467
Class 5	482,545.647	32,387.060	30,993.547	95.7	0.0001	0.000	292.270	772.388	228.394	483,418.507
Total	**487,312.312**	**32,568.276**	**31,006.087**	**95.2**	**0.837**	**0.003**	**451.696**	**778.68**	**232.538**	**488,189.449**

1. ROSATOM's organisations keep records on waste management in accordance with Order No. 1028 of the Ministry of Natural Resources and Environment of Russia dated 8 December 2020 and annually submit statistical reports using Form 2-TP (Waste) to the Federal Service for Supervision of Natural Resources.

GRI 304-2

5.4.7. Impact on local flora and fauna

In terms of environmental performance, nuclear power is much more attractive than thermal power, since nuclear power plants consume no oxygen and emit no harmful chemicals, which benefits living organisms.

The results of long-term radiation monitoring show that the content of radioactive substances in various types of crops corresponds to the background radiation level, that the species composition of flora and fauna is practically unchanged, with no hazards that can affect their existence, and that the growth rate of the amount of dead wood is within permissible limits. In addition, the close proximity of NPPs to nature reserves also provides evidence of biodiversity conservation at their locations. The Lapland State Nature Reserve is located within a 30-kilometre radius of Kola NPP, and 16 nature monuments and 33 wildlife sanctuaries are located within a 30-kilometre radius of Kalinin NPP. This shows that the radiation impact of nuclear technologies and production facilities on the natural environment poses no danger to living organisms or their habitat and, accordingly, cannot be assessed as negative.

All organisations in the nuclear industry take measures to prevent the degradation of natural ecosystems as a result of their operation. Measures aimed at preserving the diversity of flora and fauna include the following:

- Equipping tailings ponds with bird deterrents to prevent birds from landing on the water surface;
- Equipping water intake facilities with fish screens in order to prevent young fish from swimming or getting drawn into them;
- Equipping transformer substations, their components and operating mechanisms with special devices (fences, casings, etc.) to prevent animals from entering the premises of the substation and getting into these units and mechanisms;



- Installing bird guards on power lines;
- Maintaining fences along the perimeter of industrial sites in good condition, including in order to prevent animals from entering the premises of organisations;
- Ensuring that motor vehicles and special machinery travel on paved roads and providing special parking lots for them;
- Using machines and mechanisms that are in good condition, with adjusted fuel fittings preventing losses of fuel and lubricants and their spills onto the ground and vegetation;
- Taking measures to protect the atmosphere, which help to minimise the amount of pollutants inhaled by animals and humans, as well as the deposition of pollutants on vegetative parts of plants, further spread of harmful substances along the food chains and their accumulation in living organisms;
- Arranging waste accumulation sites compliant with technical and sanitary standards; removing waste and transporting it to designated locations in a timely manner;
- Implementing fire prevention measures in order to ensure that industrial sites comply with fire safety requirements and to prevent the death of living organisms in fires;
- Providing protection against noise exposure (using equipment that is less noisy; more effective soundproofing, etc.);
- Lighting of industrial sites at night.

In 2024, organisations in ROSATOM's Power Engineering Division took steps to replenish aquatic wildlife:

- At Novovoronezh NPP, juvenile herbivorous fish (silver carp) were released into the cooling pond at power unit No. 5 in order to maintain the ecosystem of the cooling pond, maintain a balance of fish species and curb the growth of phytoplankton;
- At Rostov NPP, compensatory measures were taken to replenish wildlife; this involved releasing grass carp and common carp into the Tsimlyansk Reservoir, which will help prevent the Tsimlyansk Reservoir from becoming overgrown with aquatic macrophytes;
- At Beloyarsk NPP, the Beloyarsk Reservoir was stocked with bighead carp, grass carp and black carp, which will help preserve the diversity of fish species in the water body and support the safe operation of heat exchangers;
- At Smolensk NPP, silver carp were released into the Desnogorsk Reservoir in order to maintain and preserve the diversity of fish species and prevent the cooling pond from becoming overgrown;
- At Kalinin NPP, the Udomlya Reservoir was stocked with juvenile black carp, bighead carp and common carp;
- At Kursk NPP, the cooling pond of stages 1 and 2 was stocked with bighead carp and grass carp, which will help prevent the shoreline around the cooling pond from becoming overgrown and will curb the development of phytoplankton.

Measures to replenish aquatic wildlife were also taken in other Divisions:

- In the Mining Division (Republic of Buryatia), juvenile Siberian sturgeon were released into the Selenga River;
- In the Fuel Division (Seversk), juvenile nelma were released into the Tom River in order to restore the fish population.

GRI 304-3

5.4.8. Rehabilitation of disturbed areas

0.530 hectares – area of rehabilitated (restored) land

1,196.9 hectares – area of restored forests

12,500 m² – area of rehabilitated radiation-contaminated land

At year-end 2024, the area of land disturbed by ROSATOM's organisations totalled 8,200 hectares.

Breakdown by type of operations that caused land disturbance in 2024, '000 hectares

Type of operations	Area of disturbed land
Mining	0.069
Construction	0.086
Waste disposal	0.007
Other operations	0.018
Total	**0.180**

In 2024, ROSATOM's organisations implemented a set of measures to restore the productivity and economic value of disturbed lands and improve the environment. In the reporting year, the area of rehabilitated (restored) land totalled 0.53 hectares.

As part of their efforts to protect and restore habitats, ROSATOM's organisations collaborate with local governments and other stakeholders. ROSATOM engages volunteers and representatives of municipal and non-profit organisations to assist with reforestation and biodiversity preservation projects.



Land rehabilitation in ROSATOM's organisations, hectares

Region, town/city	2021	2022	2023	2024
Sakha Republic (Yakutia)	0.00	41.05	0.00	0.00
Podolsk	0.10	0.05	0.00	0.034
Novosibirsk	0.00	2.45	0.04	0.00
Lesnoy (Sverdlovsk Region)	0.84	0.06	1.61	0.134
Snezhinsk	0.22	0.17	0.10	0.00
Sarov	0.5	0.5	0.00	0.200
Ozersk	0.47	0.08	0.04	0.113
Volgodonsk	0.00	0.00	0.05	0.00
Glazov	0.00	0.00	0.00	0.049
Total	**2.13**	**44.36**	**1.84**	**0.530**

In 2024, ROSATOM's organisations carried out reforestation activities, with the area of restored forests totalling 1,196.995 hectares.



Reforestation activities in ROSATOM's organisations, hectares

Region	2022	2023	2024
Kurgan Region	0.00	43.40	100.0
Republic of Buryatia	166.90	32.10	1,093.78
Leningrad Region	19.67	25.74	–
Novovoronezh Region	15.80	10.75	–
Kursk Region	–	–	3.2
Ulyanovsk Region	0.0075	0.015	0.015
Total	**202.38**	**112.01**	**1,196.995**

5.4.9. Emissions and discharges of radionuclides

Emissions of radionuclides

The total activity of radionuclides released into the atmosphere by ROSATOM's enterprises in 2024 amounted to $4.87 \cdot 10^{16}$ Bq.

Beta-emitting radionuclides accounted for 98.07% of the total activity ($4.77 \cdot 10^{16}$ Bq).

Actual and permitted emissions of radionuclides by enterprises in the industry in 2024

Type of radionuclides	Permitted emission, Bq	Actual emission, Bq	Percentage of the permitted level
Alpha-emitting	$5.41 \cdot 10^{15}$	$9.38 \cdot 10^{14}$	17.33
Beta-emitting	$4.02 \cdot 10^{18}$	$4.77 \cdot 10^{16}$	1.19

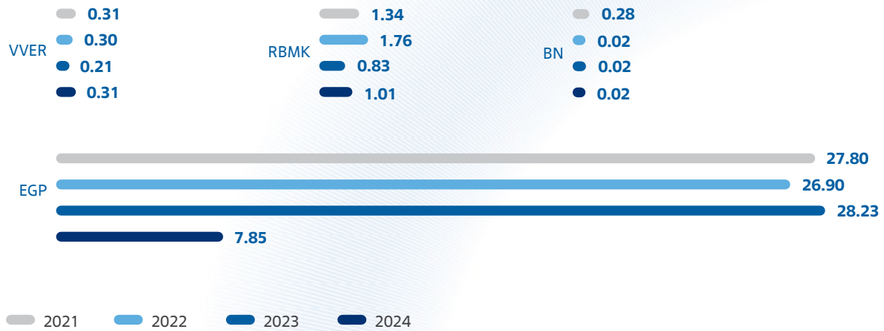
Gas and aerosol emissions from NPPs

Factors behind the exposure of local residents and the environment to radiation from nuclear power plants include emissions of radioactive substances from NPPs into the atmosphere. The radiation impact of emissions of radioactive substances on local residents and the environment is regulated by statutory limits for NPPs established by the Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor). Emissions of all radionuclides subject to the limits are continuously monitored at all nuclear power plants to make sure that they are within the limits.

In 2024, as in previous years, gas and aerosol emissions from NPPs were significantly lower than the allowable limits set by Rostekhnadzor for emissions of radioactive substances into the atmosphere. Actual emissions of radioactive substances calculated under a conservative accounting procedure did not exceed:

- 7.85% of the permitted amount for inert radioactive gases;
- 31.7% of the permitted amount for tritium;
- 16.4% of the permitted amount for carbon.

Emissions of inert radioactive gases from NPPs by type of reactors, % of the permitted amount





Discharges of radionuclides

Nuclear enterprises discharged 146.63 million m^3 of wastewater with a total activity of $8.07 \cdot 10^{13}$ Bq into surface water bodies.

Actual and permitted radionuclide discharge by enterprises in the industry in 2024

Type of radionuclides	Permitted discharge, Bq	Actual discharge, Bq	Percentage of the permitted level
Alpha-emitting	$1.20 \cdot 10^{13}$	$3.21 \cdot 10^{10}$	0.27
Beta-emitting	$2.53 \cdot 10^{15}$	$8.07 \cdot 10^{13}$	3.19

Contaminated sites and their remediation

At year-end 2024, there were radionuclide-contaminated sites in 16 nuclear enterprises.

The area of contaminated sites totalled 107.22 km^2, including:

- 24.16 km^2 at industrial sites;
- 82.96 km^2 in buffer areas;
- 0.1 km^2 in radiation control areas.

Radioactive contamination is caused mainly by caesium-137 and strontium-90 nuclides, as well as natural uranium and its decay products. Approximately 77% (82.23 km^2) of radionuclide-contaminated sites are located in Ozersk in the Chelyabinsk Region (they were contaminated as a result of an accident in 1957).

In 2024, nuclear enterprises did not remediate contaminated sites.

5.4.10. Radiation impact on the population and the environment

0.04% – contribution of the Corporation's enterprises using nuclear technologies to the total radiation exposure of local residents, which also includes exposure from natural and medical sources

0.27% – actual discharges of alpha-emitting radionuclides by nuclear organisations as a percentage of the permitted level; for beta-emitting radionuclides, this figure stood at 3.19% of the permitted level

According to the findings of radiation and hygienic certification in the Russian Federation for 2023,[1] average additional radiation exposure per person of the population at the locations of nuclear enterprises associated with their day-to-day operation did not exceed 1.0% of the basic dose limit for the population

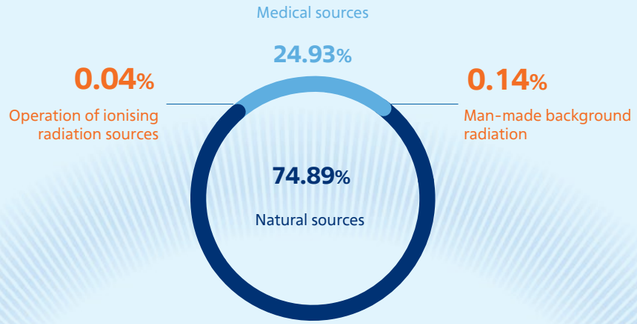
1. Findings of radiation and hygienic certification of organisations and areas presented by the State Research Centre Burnasyan Federal Medical Biophysical Centre of the FMBA of Russia.

set in the NRB-99/2009 Standard (1 mSv on average for any consecutive five years). The highest level of radiation exposure among local residents was recorded in Ozersk in the Chelyabinsk Region (7.6% of the basic dose limit for the population), which is consistent with previous years.

According to the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor),[1] the key factors behind radiation exposure of the population are natural and medical sources of ionising radiation. In 2023, the average contribution of natural sources of ionising radiation to the total radiation exposure of local residents across Russia stood at 74.9%, while medical sources accounted for 24.9%. The contribution of enterprises using nuclear technology is estimated at a fraction of a percent (0.04%). The average contribution of medical sources to radiation exposure of local residents across the Russian Federation increased by approximately 2.7% year on year.

In 2023, average total radiation exposure of local residents from all radiation sources across the Russian Federation stood at 4.45 mSv per resident.

Breakdown of radiation exposure of the population, %



Contribution of NPPs to measurable background radiation

The gamma radiation ambient dose equivalent rate (ADER) is monitored continuously at the locations of NPPs, and radiation levels are monitored on a regular basis in designated areas, namely in buffer areas and radiation control areas.

The analysis of findings of ADER monitoring and the monitoring of radiation levels in various components of the environment in buffer areas and radiation control areas shows that radiation levels at the locations of NPPs were within the range of natural background radiation and remained unchanged compared to previous years. This confirms that in the course of normal operation, NPPs make no significant impact on local residents or the environment.

1. Data book: Radiation Levels in the Russian Federation in 2023, Ramzayev Saint Petersburg Research Institute of Radiation Hygiene, Saint Petersburg, 2024.

5.5. Key NRS Projects

In 2024, a draft uniform procedure for the exchange of radiation monitoring data between the CIS member states was developed with assistance from experts from the ISARMS DIAC under the intergovernmental agreement on the exchange of radiation monitoring data.

In 2024, ROSATOM initiated the development of an investment project to draft ROSATOM's nuclear safety standard for uranium/plutonium fuel production based on calculations of safe and permissible parameters of uranium/plutonium fuel. It is intended that the project deliverables will be submitted to ROSATOM's investment decision-making body for review in 2025.





APPENDICES



APPENDIX No. 1. REPORT PROFILE

The public annual report of State Atomic Energy Corporation Rosatom for 2024 (the Report) has been prepared on a voluntary basis and approved by ROSATOM's Director General; it is intended for a wide range of stakeholders.

The prioritised topic of the Report is 'Contribution of the Nuclear Industry to Ensuring Safety, Reliability and Self-Reliant Technological Development in Russia'.

The present Report has been prepared in an integrated format and provides a comprehensive picture of the following:

- The implementation of ROSATOM's strategy, including contribution to the sustainability of the Corporation's business, as well as short-, medium- and long-term plans;
- Significant financial, economic and operating results of the Corporation's core businesses;
- Results achieved in the sphere of nuclear and radiation safety, environmental protection, contribution to the development of nuclear towns and cities, implementation of the social policy and other aspects of sustainable development;
- The economic, environmental and social impact on the external and internal environment;
- The Corporation's management approaches to various aspects of its business.

Given a large target audience, this Report has been prepared in a modular format and includes the following:

- Chapter 1. Strategic Report;
- Chapter 2. Business Development Report;
- Chapter 3. Social Report;
- Chapter 4. Report on the Development of Nuclear Towns and Cities;
- Chapter 5. Safety Report.

In addition to the Report, the following standalone reports have been prepared:

- The Sustainability Report;
- Reports of ROSATOM's Divisions.

Standards and regulatory requirements

The Report has been prepared in accordance with the following documents:

- The Sustainability Reporting Standards of the Global Reporting Initiative (GRI);
- The IIRC International Integrated Reporting Framework;
- The Uniform Industry-Wide Public Reporting Policy of ROSATOM;
- The Uniform Industry-Wide Methodological Guidelines on Public Reporting of ROSATOM and Its Organisations;
- The AccountAbility AA1000 guidelines;
- The Conceptual Framework for the Development of Public Non-Financial Reporting in Russia (approved by Order No. 876-r of the Government of the Russian Federation dated 5 May 2017);
- The Recommendations of the Russian Union of Industrialists and Entrepreneurs for Use in Governance Practice and Corporate Non-Financial Reporting (basic performance indicators);
- The Methodological Recommendations on Sustainability Reporting (approved by Order No. 764 of the Ministry of Economic Development of the Russian Federation dated 1 November 2023).

ROSATOM's internal regulations stipulate an annual reporting cycle. GRI 2-3

The Report covers the Corporation's operations during the period from 1 January 2024 through 31 December 2024.

The reporting period for financial reporting coincides with the reporting period for the annual report. The publication date of the report is the third quarter of 2025.

Report boundaries

GRI 3-1

The Report contains information on the operations of ROSATOM and its organisations in Russia and abroad. In order to ensure compliance with Russian legislation, the disclosure of information on the day-to-day operation of the Nuclear Weapons Division is restricted. The Report covers several scopes of consolidation.

Integrated performance indicators are disclosed for ROSATOM's organisations within the scope of budget consolidation as at 31 December 2024.

GRI Standards disclosures that belong to the Environmental category are reported for all significant organisations within ROSATOM which provide information on their environmental performance using corporate reporting forms (297 organisations (legal entities and branches) in 2024).

Financial, economic and social indicators are disclosed for the part of the scope of the Corporation's consolidated IFRS financial statements for which information is publicly available.

Process for determining the Report content

The 2024 Report has been prepared in accordance with the GRI Standards and the International Integrated Reporting Framework (International <IR> Framework). Both standards require that material topics to be disclosed in the Report should be determined. The list of material topics has been informed by the impact assessment carried out in 2022.

GRI 3-1

Materiality process

	2024		2025	
Objectives	Updating the longlist of impacts	Updating the Impact Index	Prioritising impacts for disclosure	Formulating material topics for disclosure in the 2024 Report
Actions	Reviewing requests received during the 2023 public consultations; best integrated reporting practices; corporate reporting and transparency ranking criteria; the business context and media coverage, as well as significant impacts for the previous year	– Questionnaire surveys among internal and external stakeholders on the newly identified impacts; – Supplementing the list of impact with proposals from stakeholders; – Calculating the impact significance index for the additional impacts	Recalculating the impact significance index[1]	Foresight dialogue involving experts and users of information	Formulating material topics and mapping them against the GRI Standards

1. The methodology for quantifying significance has been revised; this included revising the calculation formula taking into account the estimated likelihood of consequences of potential impacts.

	2024		2025		
Objectives	Updating the longlist of impacts	Updating the Impact Index	Updating the Impact Index	Prioritising impacts for disclosure	Formulating material topics for disclosure in the 2024 Report
Participants	Working group on public reporting involving experts	Questionnaire surveys were conducted among 19 stakeholder representatives and experts	Working group on public reporting involving experts	Participants of the foresight dialogue included 18 experts on impacts and users of information	Working group on public reporting involving experts
Outcome	7 new impacts added to the longlist of impacts	– Assessment of 8 new impacts; – Impact significance index calculated for 41 impacts	Impact significance index updated for the longlist of 41 impacts	List of impacts prioritised for disclosure for the 2024 reporting year *(in accordance with the GRI Standards)* and list of additional significant impacts for disclosure for the 2024 reporting year *(outside the scope of the GRI Standards)*	List of material topics for disclosure in the 2024 Report, which includes all prioritised impacts
Period	**November 2024 – January 2025**			**February 2025**	

ROSATOM's working group reviewed the outcomes of the materiality process and developed a list of material and significant topics.

GRI 3-2

List of material topics

1. ROSATOM's contribution to financial stability and the achievement of Russia's national goals.
2. ROSATOM's contribution to ensuring reliable energy supply.
3. Contribution to ensuring the safety of nuclear facilities and preparedness for emergencies caused by natural disasters/external impacts.
4. Environmental impacts, including the impact on water resources.
5. Promoting the well-being of our employees.
6. Developing the regions and countries of operation and improving the standard of living.

List of significant topics

1. Contribution of strategy implementation to the achievement of the national development goals of the Russian Federation and the UN SDGs.
2. The Corporation's contribution to enhancing energy security in its host countries.
3. Contribution to the implementation of the Ecology National Project.
4. The Corporation's programmes and projects focused on preserving biodiversity in its regions of operation (including as part of the NSR project).

Disclosure of the prioritised topic and material topics[1] covered in the Report in the reports of the Divisions

ROSATOM's topic	Mining Division	Engineering Division	Mechanical Engineering Division	Fuel Division	Power Engineering Division	Sales and Trading Division
Contribution of the nuclear industry to ensuring safety, reliability and self-reliant technological development in Russia (prioritised topic)	+	+ Development of the Division and achievement of strategic goals in the context of global challenges (prioritised topic)	+	+	+	–
ROSATOM's contribution to financial stability and the achievement of Russia's national goals	Contribution to the achievement of strategic goals in the context of global challenges. Development of the project quality management system. Intellectual property of the Division. Import substitution as a competitive advantage. Assessment of suppliers' and contractors' compliance with sustainability requirements	R&D aimed at improving technologies, including for the implementation of breakthrough projects. Assessment of suppliers' and contractors' compliance with sustainability requirements. Intellectual property of the Division	Contribution to the achievement of strategic goals in the context of global challenges. Promoting import substitution in Russia	The Division's contribution to promoting import substitution in Russia. Contribution to the digitisation of ROSATOM's operations and the Russian economy: digitisation and digital products. The Division's contribution to the development of a new technological paradigm (developing alternative energy, new businesses, etc.)	–	Prevention of corruption. Quality management. Compliance with laws and business ethics
ROSATOM's contribution to ensuring reliable energy supply	–	Reducing the duration and cost of NPP cconstruction. Improvement of NPP designs taking into account implementation history and best practices	Contribution to the country's technological development through R&D to improve technology, optimise the timing and cost of equipment production	–	Innovation and science development	–
Contribution to ensuring the safety of nuclear facilities and preparedness for emergencies caused by natural disasters/ external impacts	The Division's contribution to improving occupational safety throughout the supply chain	Developing the quality management system for the Division's projects. Import substitution as a competitive advantage. Developing a safety culture	Ensuring reliable supplies of equipment for energy projects by providing national power machine engineering capabilities	-	Safety of nuclear power	Safety
Environmental impacts, including the impact on water resources	Impact of enterprises on the flora and fauna, water, air and land	Environmental impact during construction (waste, consumption of water, energy, etc.). Developing a safety culture	Impact on water resources, including water withdrawal, consumption and discharge. Environmental impact of enterprises' operations during equipment production	Impact on land and habitats. Impact of the enterprises on the atmosphere. Impact of the Division's operations involving RAW and SNF management on the flora and fauna, water, air and land	Impact on water resources, including water withdrawal, consumption and discharge. Emissions. Waste	Environmental management. Safety. Environmental impacts
Promoting the well-being of our employees	The Division's contribution to improving occupational safety throughout the supply chain. Providing employment for personnel. Impact on personnel qualifications	Unlocking talent. Industrial and occupational safety at construction sites. Developing a safety culture	Providing employment for personnel. Impact on the safety and health of personnel in the workplace. The Division's contribution to improving occupational safety throughout the supply chain	–	–	Respect for human rights. Employee relations. Occupational safety and health

1. The prioritised topic is the main thematic focus of the Report; there is no clearly defined methodology or requirements for its disclosure. Material topics are those topics that reflect the organisation's most significant impacts; they are disclosed in accordance with the GRI Standards.

ROSATOM's topic	Mining Division	Engineering Division	Mechanical Engineering Division	Fuel Division	Power Engineering Division	Sales and Trading Division
Developing the regions and countries of operation and improving the standard of living	Potential impact of enterprises' operations on personnel and residents of the host regions	Developing a safety culture	–	–	Developing the regions and countries of operation and improving the standard of living	Transparency and openness to dialogue. Community relations
Topics specific to the Divisions	–	Ensuring the fulfilment of the company's obligations under contracted projects. Differences in customer requirements in various countries of NPP construction. Compliance of the Division with modern requirements for engineering companies abroad	–	–	–	–

Stakeholder engagement as part of the Report preparation process

To improve transparency and accountability and to determine the materiality of information to be disclosed, the Report has been prepared in cooperation with stakeholders in accordance with the AA1000AP AccountAbility Principles (2018) and the AA1000SES Standard (2015), the GRI Sustainability Reporting Standards and the International Integrated Reporting Framework (International <IR> Framework). The following activities were carried out:

- Surveys among stakeholders and experts to identify significant impacts;
- A foresight dialogue in order to prioritise significant impacts for disclosure in the 2024 Report (14 February 2025). 18 people took part in the dialogue, including representatives of ROSATOM, nuclear organisations, the expert community, rating agencies, data aggregators, research and analytics companies and an audit company;
- Public consultations with ROSATOM's stakeholders on the draft 2024 Report (23 May 2025).

The Report incorporates key recommendations and requests made by stakeholder representatives.

For details, see section 1.14.8. 'Strategic Communications'.

GRI 2-5

Verification of reporting information

Reporting information has been certified as accurate and reliable by:

- An independent auditor which certifies IFRS financial statements;
- An independent auditor which has confirmed the Report's compliance with the GRI Sustainability Reporting Standards.

For details, see Appendix 6 'Independent Auditor's Report on the Non-Financial Statements of State Atomic Energy Corporation Rosatom'.

ROSATOM's Internal Audit Department has conducted an internal audit of the business process 'Public Reporting Procedure in ROSATOM'.

For details, see Appendix 5 'Report of the Internal Audit Department of State Atomic Energy Corporation Rosatom'.

Representatives of key stakeholders have provided public assurance of the Report in accordance with the AA1000 SES guidelines (2015), which has confirmed the materiality and completeness of information disclosed in the Report and the Corporation's responsiveness to stakeholders' requests when preparing the Report.

For details, see the section 'Statement of Public Assurance'.

Disclaimer

The Report contains information about ROSATOM's medium- and long-term objectives and initiatives. The objectives are forward-looking, and their actual achievement depends, among other things, on a number of economic, political and legal factors beyond ROSATOM's control (the global financial, economic and political environment; the pandemic and measures aimed at containing it; the situation on the key markets; amendments to the tax, customs and environmental legislation, etc.). Therefore, actual performance in the future years may differ from the forward-looking statements contained herein

APPENDIX No. 2. GRI CONTENT INDEX

Statement of use	ROSATOM has reported in accordance with the GRI Standards for the period from 1 January through 31 December 2024.
GRI 1 used	GRI 1: Foundation 2021
Applicable GRI Sector Standard(s)	Not applicable

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
General disclosures					
GRI 2: General Disclosures 2021	2-1 Organisational details	Section 'About ROSATOM', p. 10 Section 2.2.1. 'Promoting ROSATOM's Technologies on Foreign Markets', p.209 Contact Details, p. 388 The Corporation has been established by the Russian Federation in the form of a state-owned corporation (in accordance with Federal Law No. 317-FZ of 1 December 2007).			
	2-2 Entities included in the organisation's sustainability reporting	ROSATOM's Report covers all organisations included in JSC Atomenergoprom's annual report; in addition, the Report covers ROSATOM, security units and organisations forming part of the following Divisions: the Engineering Division, the Nuclear Weapons Division, the Northern Sea Route, Research, Environmental Solutions, etc., which are outside the scope of JSC Atomenergoprom.			
	2-3 Reporting period, frequency and contact point	Appendix No. 1. Report Profile, p. 357 Contact Details, p. 388			
	2-4 Restatements of information	Chapter 1. Section 'Financial and Economic Performance', p. 18			

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
GRI 2: General Disclosures 2021	2-5 External assurance	Appendix No. 1. Report Profile, p. 363 Appendix No. 6. Independent Auditor's Report on the Non-Financial Statements of State Atomic Energy Corporation Rosatom, p. 386 The Corporation's policy with regard to seeking external assurance is set out in the Uniform Industry-Wide Methodological Guidelines on Public Reporting of ROSATOM and Its Organisations.			
	2-6 Activities, value chain and other business relationships	Section 1.14.1. 'Corporate Governance', p. 151 Section 1.3. 'Value Creation and Business Model', p. 41 Section 1.4. 'Markets Served by ROSATOM', p. 46 Section 2.2.1. 'Promoting ROSATOM's Technologies on Foreign Markets', p. 209			
	2-7 Employees	Section 3.1.2. 'Key Personnel Characteristics', p. 236 Appendix 4. Total Number of Employees, p. 381			
	2-8 Workers who are not employees	Section 3.1.2. 'Key Personnel Characteristics', p. 237	Types of workers who are not employees and types of work that they perform	The information is not available	The Corporation plans to consider recording the data in the medium term.
	2-9 Governance structure and composition	Section 1.14.1. 'Corporate Governance', p. 147			
	2-10 Nomination and selection of the highest governance body	Section 1.14.1. 'Corporate Governance', p. 147			
	2-11 Chair of the highest governance body	Section 1.14.1. 'Corporate Governance', p. 147			

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
GRI 2: General Disclosures 2021	2-12 Role of the highest governance body in overseeing the management of impacts	Section 1.14.1. 'Corporate Governance', pp. 148, 149			
	2-13 Delegation of responsibility for managing impacts	In accordance with Article 25 of Law No. 317-FZ, the Supervisory Board holds its meetings at least once every three months. For information on the allocation of responsibility for impact management in the Corporation, see the Annual Report for 2023, pp. 34–35.			
	2-14 Role of the highest governance body in sustainability reporting	The Supervisory Board approves the annual report submitted by ROSATOM to the Government of the Russian Federation. The Supervisory Board does not approve ROSATOM's public reports			
	2-15 Conflicts of interest	Law No. 317-FZ does not provide for the involvement of the Supervisory Board in the prevention of conflicts of interest.			Information pertaining to the disclosure is not disclosed.
	2-16 Communication of critical concerns	Section 1.14.1. 'Corporate Governance', p.148 Critical concerns are communicated to the Supervisory Board during meetings of the Supervisory Board, which are held at least once every three months in accordance with the Law on State Atomic Energy Corporation Rosatom.			
	2-17 Collective knowledge of the highest governance body	Section 1.2.4. 'Fulfilment of Responsible Business Commitments', p. 38 The Supervisory Board did not undergo sustainability training in the reporting year.			
	2-18 Evaluation of the performance of the highest governance body	No formalised performance evaluation of the Supervisory Board is carried out. Pursuant to Law No. 317-FZ, the scope of responsibilities of the Supervisory Board does not include self-assessment.			

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
GRI 2: General Disclosures 2021	2-19 Remuneration policies	Section 1.14.1. 'Corporate Governance', pp. 147, 149 There are no sign-on bonuses or recruitment incentive payments for members of the highest governance body or senior executives. There are no termination payments or retirement benefits.			
	2-20 Process to determine remuneration	Section 3.1.3. 'Remuneration System', p. 239 Consultants have not been involved in determining remuneration.			
	2-21 Annual total compensation ratio	The indicator has not been disclosed.	Ratio of the annual total compensation for the organisation's highest-paid individual to the median annual total compensation for all employees	The information is not available	Detailed data on employees of the Corporation's subsidiaries are not available. No methodology for calculating the indicator has been approved. The Corporation plans to examine the possibility of data consolidation for the calculation of the indicator in the medium term.
	2-22 Statement on sustainable development strategy	Statement of the Chairman of the Supervisory Board, p. 8 Statement of the Director General, p. 14			
	2-23 Policy commitments	Section 1.2.4. 'Fulfilment of Responsible Business Commitments', p. 37 Section 3.1.9. 'Human Rights', pp. 257, 258 For information on the levels at which the policy commitments were approved within the organisation, see the Annual Report for 2023, pp. 34–35. Additional information on the use of the precautionary principle is provided in the Unified Industry Policy on Sustainable Development of ROSATOM.			

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
GRI 2: General Disclosures 2021	2-24 Embedding policy commitments	Section 1.2.4. 'Fulfilment of Responsible Business Commitments', p. 37			
	2-25 Processes to remediate negative impacts	Section 1.14.3. 'Internal Control System', p. 169 Section 3.1.9. 'Human Rights', p. 258 Section 1.14.4. 'Prevention of corruption and other offences', p. 174 Section 5.1.2. 'Managing Occupational Safety and Health Risks', p. 304 Section 5.4.1. 'Environmental Safety and Environmental Protection Management', p. 336			
	2-26 Mechanisms for seeking advice and raising concerns	Section 3.1.8. 'Employee Engagement', p. 255 Section 3.1.9. 'Human Rights', p. 258 Contact Details, p. 338			
	2-27 Compliance with laws and regulations	Section 5.4.3. 'Environmental Charges and Fines', p. 338 There were no significant instances of non-compliance with laws and regulations, i.e. instances that resulted in administrative suspension of operations of an organisation of ROSATOM, in 2024.	Information on fines (other than fines for environmental non-compliance)	The information is not available	Government and corporate statistical reports prepared by ROSATOM provide no statistics on this topic. The Corporation has no plans to disclose the indicator in the future.
	2-28 Membership of associations	Section 1.5.2. 'Cooperation with International Organisations', p. 66 Section 2.2.1. 'Promoting ROSATOM's Technologies on Foreign Markets', p. 211 ROSATOM is a member of the World Nuclear Association (WNA).			
	2-29 Approach to stakeholder engagement	Section 1.14.8. 'Strategic Communications', pp. 188, 193 Section 4.5. 'Work of ROSATOM's Public Council and Community Relations', p. 295			
	2-30 Collective bargaining agreements	Section 3.2.2. 'Social Partnership in the Nuclear Industry', p. 261			

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
GRI 3: Material Topics 2021	3-1 Process to determine material topics	Appendix No. 1. Report Profile, p. 358			
	3-2 List of material topics	Appendix No. 1. Report Profile, p. 359			
ROSATOM's contribution to financial stability and the achievement of Russia's national goals					
GRI 3: Material Topics 2021	3-3 Management of material topics	Section 1.2.1. 'Key Sustainable Development Results', p. 33 Section 1.7. 'Technological Sovereignty', p. 79 Section 1.10. 'Digital Transformation', p. 101 Section 1.12. 'Research and Innovations', p. 111 Section 2.1. 'Business Diversification', pp. 203, 205, 207 Section 4.2. 'Contribution to the Implementation of National Projects', p. 285 Section 4.3. 'Contribution to the Economy', p. 287			
GRI 203: Indirect Economic Impacts 2016	203-2 Significant indirect economic impacts	Section 4.3. 'Contribution to the Economy', p. 287 Section 1.13.4. 'Engineering Division', p. 142			
ROSATOM's contribution to ensuring reliable energy supply					
GRI 3: Material Topics 2021	3-3 Management of material topics	Section 1.4.2. 'New Markets', p. 55 Section 2.2.1. 'Promoting ROSATOM's Technologies on Foreign Markets', p. 209			
Environmental impacts, including the impact on water resources					
GRI 3: Material Topics 2021	3-3 Management of material topics	1.9. 'Implementation of the Ecology National Project' p. 94 Section 1.4.2. 'New Markets', p. 59 Section 2.1. 'Business Diversification', p. 207 (subsection 'Environmental Protection') Section 5.4.1. 'Environmental Safety and Environmental Protection Management', p. 336 Section 5.4.5. 'Water Use', p. 341			

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
GRI 303: Water and Effluents 2018	303-1 Interactions with water as a shared resource	Section 5.4.5. 'Water Use', p. 341			
	303-2 Management of water discharge-related impacts	Section 5.4.5. 'Water Use', pp. 341, 343			
	303-3 Water withdrawal	Section 5.4.5. 'Water Use', p. 342 The Corporation does not draw formation water or other types of water produced as a result of extraction, processing or use of any raw materials.	In terms of breakdown into freshwater and other water	The information is not available	The information is not provided in statistical reports.
	303-4 Water discharge	Section 5.4.5. 'Water Use', p. 343	In terms of breakdown into freshwater and other water	The information is not available	The information is not provided in statistical reports.
	303-5 Water consumption	Water consumption calculated in accordance with the methodology described in the GRI Standards (total water withdrawal minus water discharge) totals 1,038.6 million m^3, including 60.9 million m^3 in water-stressed areas.			
GRI 304: Biodiversity 2016	304-2 Significant impacts of activities, products and services on biodiversity	Section 5.4.7. 'Impact on Local Flora and Fauna', p. 347			
	304-3 Habitats protected or restored	Section 5.4.8. 'Rehabilitation of Disturbed Areas', p. 349			
GRI 305: Emissions 2016	305-6 Emissions of ozone-depleting substances (ODS)	Section 5.4.4. 'Pollutant Emissions into the Atmosphere', p. 340			
	305-7 Nitrogen oxides (NOx), sulphur oxides (SOx), and other significant air emissions	Section 5.4.4. 'Pollutant Emissions into the Atmosphere', p. 339 The Corporation does not produce POPs emissions.	Emissions of hazardous air pollutants (HAP)	The information is not available	Data on HAP emissions cannot be obtained from government statistical reporting forms.
GRI 306: Waste 2020	306-1 Waste generation and significant waste-related impacts	Section 5.4.6. 'Industrial and Consumer Waste Management', p. 345			

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
GRI 306: Waste 2020	306-2 Management of significant waste-related impacts	Section 5.4.6. 'Industrial and Consumer Waste Management', p. 345			
	306-3 Waste generated	Section 5.4.6. 'Industrial and Consumer Waste Management', p. 346			
	306-4 Waste diverted from disposal	Section 5.4.6. 'Industrial and Consumer Waste Management', p. 346 The disclosure is provided in part, with no breakdown by waste management method as stipulated in the GRI Standards. Data on waste management are disclosed with a breakdown by waste management method as listed in the statistical reporting form 2-TP (Waste), due to a lack of waste management accounting practices aligned with the GRI 306 Standard (2020) in Russia.			
	306-5 Waste directed to disposal	Section 5.4.6. 'Industrial and Consumer Waste Management', p. 346 The disclosure is provided in part, with no breakdown by waste management method as stipulated in the GRI Standard. Data on waste management are disclosed with a breakdown by waste management method as listed in the statistical reporting form 2-TP (Waste), due to a lack of waste management accounting practices aligned with the GRI 306 Standard (2020) in Russia.			
Contribution to ensuring the safety of nuclear facilities and preparedness for emergencies caused by natural disasters/external impacts					
GRI 3: Material Topics 2021	3-3 Management of material topics	Section 5.2. 'Nuclear, Radiation, Industrial and Fire Safety', p. 314			

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
Promoting the well-being of our employees					
GRI 3: Material Topics 2021	3-3 Management of material topics	Section 5.1.1. 'Occupational Health and Safety Management System', p. 301 Section 3.1.1. 'HR Policy Approaches and Principles', p. 236 Section 3.1.9. 'Human Rights', p. 257 Section 3.2. 'Social Policy', p. 260			
GRI 401: Employment 2016	401-1 New employee hires and employee turnover	Section 3.1.2. 'Key Personnel Characteristics', p. 238 With regard to turnover, the 'adjusted turnover' rate has been disclosed, which includes the termination of an employment contract on certain grounds.	In terms of breakdown by age group, gender and region. Total number of employees dismissed on all grounds for the termination of an employment contract, except for reassignment to a different position within the nuclear industry, in accordance with the methodology described in the GRI Standards, and the relevant turnover rate	The information is not available	The indicator has been disclosed in part, with no breakdown by age group, gender and region, due to the lack of the relevant records. The Corporation plans to provide the required breakdown in the medium term.
GRI 403: Occupational Health and Safety 2018	403-1 Occupational health and safety management system	Section 5.1.1. 'Occupational Health and Safety Management System', p. 301			
	403-2 Hazard identification, risk assessment, and incident investigation	Section 5.1.2. 'Managing Occupational Safety and Health Risks', p. 303 Section 5.2.8. 'Radiation Exposure of Employees', p. 322 In accordance with the Labour Code of the Russian Federation (Articles 216 and 379), the Corporation's employees have the right to refuse to perform work if there is a hazard to their life and health due to non-compliance with occupational safety requirements until the hazard has been eliminated, except as otherwise provided in federal laws.			
GRI 403: Occupational Health and Safety 2018	403-3 Occupational health services	Section 5.1.1. 'Occupational Health and Safety Management System', p. 301 Section 5.1.2. 'Managing Occupational Safety and Health Risks', p. 303			
	403-4 Worker participation, consultation, and communication on occupational health and safety	Section 5.1.3. 'ROSATOM's Safety Culture', p. 305			
	403-5 Worker training on occupational health and safety	Section 3.1.5. 'Employee Training', p. 247 Section 5.1.1. 'Occupational Health and Safety Management System', p. 302			
	403-6 Promotion of worker health	Section 3.2.3. 'Social Programmes', p. 261			
	403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	Section 5.1.3. 'Safety Culture', p. 305			
	403-8 Workers covered by an occupational health and safety management system	Section 5.1.3. 'Safety Culture', p. 305	Number of employees of ROSATOM's organisations and workers who are not employees but whose work and/or workplace is controlled by the Corporation covered by a certified occupational health and safety management system in accordance with the GOST R ISO 45001 and ISO 45001 standards	The information is not available	No occupational safety and health records are kept for this type of workers.

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
	403-9 Work-related injuries	The number of persons injured in accidents includes employees at the sites of ROSATOM's organisations, including abroad, provided that the employee works for an organisation within the scope of consolidation of ROSATOM, is employed under Russian law, and the accident has been investigated under Russian law. Section 5.1.4. 'Occupational Safety and Health Performance', pp. 306, 312	Injury rates for workers who are not employees but whose work and/or workplace is controlled by the organisation; micro-injuries (microtrauma) suffered by employees and requiring medical assistance beyond first aid	The information is not available	No records of hours worked by contractors are kept. No records of micro-injuries (microtrauma) with a breakdown by type of required medical assistance are kept.
	403-10 Work-related ill health	Section 5.1.4. 'Occupational Safety and Health Performance', p. 311	Information on work-related ill health for workers who are not employees but whose work and/or workplace is controlled by the organisation; information on fatalities among employees and other workers as a result of work-related ill health	The information is not available	No occupational safety and health records are kept for these groups of employees.
GRI 404: Training and Education 2016	404-1 Average hours of training per year per employee	Section 3.1.5. 'Employee Training', p. 242			
	404-2 Programmes for upgrading employee skills and transition assistance programmes	Section 3.1.5. 'Employee Training', p. 242 Section 3.2.4. 'Support for Pre-Retirees', p. 263			

GRI Standard	Disclosure	Location	Omission		
			Requirement(s) omitted	Reason	Explanation
Developing the regions and countries of operation and improving the standard of living					
GRI 3: Material Topics 2021	3-3 Management of material topics	Section 2.1. 'Business Diversification', p. 205 Section 2.2.7. 'New Products for International Markets', p. 215 Section 3.3.3. 'Volunteering in ROSATOM's Host Towns and Cities', p. 269 Section 3.3.4. 'Corporate Social Responsibility Initiatives', p. 270 Section 4.1. 'Development Priorities', p. 280 Section 4.2. 'Contribution to the Implementation of National Projects', p. 285 Section 4.3. 'Contribution to the Economy', p. 287 Section 4.4. 'Social Development', p. 290			
GRI 203: Indirect Economic Impacts 2016	203-2 Significant indirect economic impacts	Section 4.3. 'Contribution to the Economy', p. 287			
GRI 408: Child Labour 2016	408-1 Operations and suppliers at significant risk for incidents of child labour	ROSATOM's organisations and suppliers have no risk of incidents of child labour.			
GRI 409: Forced or Compulsory Labour 2016	409-1 Operations and suppliers at significant risk for incidents of forced or compulsory labour	ROSATOM's organisations and suppliers have no risk of incidents of forced labour.			
GRI 413: Local Communities 2016	413-1 Operations with local community engagement, impact assessments, and development programmes	Section 4.5. 'Work of ROSATOM's Public Council and Community Relations', p. 295 ROSATOM's organisations participate in the implementation of agreements concluded by ROSATOM with constituent entities of the Russian Federation.			

APPENDIX No. 3. ALIGNMENT WITH THE METHODOLOGICAL RECOMMENDATIONS ON SUSTAINABILITY REPORTING OF THE MINISTRY OF ECONOMIC DEVELOPMENT OF THE RUSSIAN FEDERATION

No.	Indicator	Value	Comments
Economic indicators			
1	Revenue (or a similar indicator)	RUB 3,087.7 billion	
2	Value added	Not disclosed	
3	Net value added	Not disclosed	
4	Total R&D costs	R&D costs: RUB 7.3 billion	
5	Labour productivity	RUB 5,570,000 per person	
6	Amount of accrued mandatory payments (excluding fines and penalties), total, including: – Taxes and duties – Insurance premiums – Other mandatory payments	Not disclosed	
7	Amount of mandatory payments made by the Corporation (excluding fines and penalties), total, including: – Taxes and duties – Insurance premiums – Other mandatory payments	Total amount of taxes and duties paid: RUB 436.4 billion. Data on the total amount of insurance premiums paid by the Corporation and other mandatory payments have not been disclosed.	
8	Share of purchases of Russian goods, work and services in the total volume of purchases of goods, work and services	97%	For details on procurement, see section 1.14.6. ‘Procurement Management’
9	Share of goods, work and services purchased from small and medium-sized enterprises in the total volume of purchases from Russian organisations	More than 16%	
10	Sustainable investments, including green investments	Investments in wind power totalled RUB 9.5 billion Fixed asset investment for environmental purposes totalled RUB 6.34 billion The total amount of sustainable investments in 2024 and green investments has not been disclosed	
11	Investments in projects related to the achievement of technological sovereignty and structural adaptation of the economy of the Russian Federation	Not disclosed	
12	Economic vulnerability of business and other activities to climate risks	Not disclosed	
Environmental indicators			
13	Volume of water used from all water sources	5,925.4 million m³	Volume of water used by ROSATOM’s organisations for their own needs
14	Volume of recycled and reused water	37,442.5 million m³	
15	Volume of contaminated wastewater discharge, total, including untreated wastewater	Total wastewater discharge: 5,036.7 million m³ Contaminated wastewater discharge: 195.9 million m³	
16	Water use efficiency (‘specific water use’)	Not disclosed	
17	Hazard class 1–5 waste generation, total, including: Class 1 Class 2 Class 3 Class 4 Class 5	Waste generated and received during the reporting year: 32,568,333 tonnes, including: Hazard class 1: 1,151 tonnes Hazard class 2: 937 tonnes Hazard class 3: 7,198 tonnes Hazard class 4: 171,977 tonnes Hazard class 5: 32,387,070 tonnes	For details on industrial and consumer waste management by waste hazard class in 2024, see section 5.4.6 ‘Industrial and Consumer Waste Management’
18	Hazard class 1–5 waste management, total, including, by category: – Recycling – Treatment – Burial – Reuse – Processing – Reduction of waste generation	Waste recycled and treated during the year: 31,006,900 tonnes Waste burial during the year: 232,538 tonnes Data on the amount of processed and reused waste have not been disclosed During the year, waste generation was reduced by 4.1 million tonnes (11.2%) compared to 2023	For details on industrial and consumer waste management by waste hazard class in 2024, see section 5.4.6 ‘Industrial and Consumer Waste Management’

No.	Indicator	Value	Comments
19	Weight of air pollutant emissions from stationary sources	Total weight of pollutant emissions: 51,000 tonnes	For details on pollutant emissions into the atmosphere, see section 5.4.4 ‘Pollutant Emissions into the Atmosphere’
20	Greenhouse gas emissions	Assessment of GHG emissions in accordance with international standards: Total: 20.332 million tonnes of CO_2e, including: – Direct (Scope 1) emissions: 17.628 million tonnes of CO_2e; – Indirect (Scope 2) emissions: 2.704 million tonnes of CO_2e Assessment of GHG emissions in accordance with Russian legislation: direct (Scope 1) emissions: 17.667 million tonnes of CO_2e	For details on greenhouse gas emissions, see section 1.2.2 ‘Assessment of Greenhouse Gas Emissions’
21	Expenditure on the implementation of environmental protection measures, total, including: – Protecting the atmosphere – Preventing climate change – Wastewater collection and treatment – Waste management – Biodiversity conservation – Protection of natural sites	Expenditure on environmental measures: RUB 30.10 billion, including: – Protecting the atmosphere and preventing climate change: RUB 2,678.9 million – Wastewater collection and treatment: RUB 6,080.2 million – Waste management: RUB 5,237.4 million Information on expenditure on biodiversity conservation and protection of natural sites has not been disclosed	
22	Renewable and low-carbon energy consumption	Water consumption: 1,815,089,760 m^3 Information on other energy sources is not available	
23	Energy efficiency: energy consumption per unit of net value added	Not disclosed	
Social indicators			
24	Payroll costs, total	Payroll: RUB 652.851 billion	
25	Average headcount, total, including the number of people with disabilities	Average headcount: 393,500 people Data on the number of employees with disabilities have not been disclosed	
26	Average salary, total, including: – By job group – By gender – By age group	Average salary: RUB 137,190 Data on the average salary with a breakdown by age group, job group and gender have not been disclosed	

No.	Indicator	Value	Comments
27	Occupational health and safety costs, total, including average per employee	Occupational health and safety costs: RUB 20,423 million Average occupational health and safety costs per employee: RUB 51,638	
28	Expenditure on organising and hosting social, sporting and recreational, and healthcare events for employees and members of their families	Expenditure on corporate social programmes in ROSATOM and its organisations: RUB 21.7 billion	
29	Number of people injured in workplace accidents resulting in time lost from work of one working day or more, including fatalities	Number of people injured in accidents: 90 people, including 1 fatality	
30	Employee training costs, total, including average per employee	Not disclosed	
31	Average hours of training per year per employee by job group	Average training hours per employee: 52	For details on average hours of training per employee in the nuclear industry by job group (category), see section 3.1.5. ‘Employee Training’
32	Share of employees covered by a collective bargaining agreement as a percentage of the average headcount	68.13%	
33	Personnel turnover rate	13.87%	
34	Expenditure on supporting social programmes not targeted at employees and their families, total, including: – Charity – In the housing sector – In healthcare – In education – Support for people in need of social assistance	Not disclosed	
Governance indicators			
35	Existence of a sustainable development policy and/or other strategic documents in this field	The Corporation has adopted the Unified Industry Policy on Sustainable Development. The sustainable development agenda is incorporated into the Business Strategy until 2030	
36	Number of meetings of the Supervisory Board and attendance rate	14 meetings; attendance rate: 94%	

No.	Indicator	Value	Comments
37	Number of members of the Supervisory Board, total, including by age group	The Supervisory Board consists of 9 members. Number of members of the Supervisory Board by age group: – Under 50: 1 person; – Aged 50 to 60: 2 people; – Over 60: 6 people	
38	Number of meetings of the audit committee and attendance rate	The indicator is not applicable as there is no audit committee under the Supervisory Board of the Corporation	
39	Inclusion in sustainability (ESG) indices and rankings	7 ratings and rankings	For details on the inclusion of ROSATOM in rankings, on scores and changes in scores over the past few years, see section 1.2.6 ‘ESG Ratings’
40	Number of recorded violations of the rights of indigenous minorities in the Russian Federation	No violations of the rights of indigenous minorities have been recorded	
41	Share of employees holding positions with a high corruption risk	Not disclosed	
42	Average hours of anti-corruption training per employee	Not disclosed	In 2024, more than 12,800 employees of ROSATOM and its organisations received training as part of anti-corruption training programmes, including online training courses
43	Number of cases of administrative sanctions imposed on the organisation, its subsidiaries and affiliates for corruption offences	Not disclosed	
44	Share of female executives in the total number of executives, total, including on the Supervisory Board	Share of female executives: 21.38% Share of women on the Supervisory Board: 11%	

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APPENDIX No. 4. TOTAL NUMBER OF EMPLOYEES

Number of employees with a breakdown by gender and type of employment (as at 31 December 2024)[1]

Indicator	Women	Men	Total
Number of employees	137,990	280,395	418,385
Number of permanent employees	127,507	222,311	349,818
Number of temporary employees	10,483	58,084	68,567
Number of full-time employees	132,598	276,153	408,751
Number of part-time employees	5,392	4,242	9,634

Number of employees with a breakdown by type of employment and region of the Russian Federation (as at 31 December 2024)

Region / city	Number of employees	Number of permanent employees	Number of temporary employees	Number of full-time employees	Number of part-time employees
Moscow	59,128	55,576	3,552	55,632	3,496
Nizhny Novgorod Region	34,538	33,346	1,192	33,909	629
Chelyabinsk Region	33,592	32,189	1,403	33,159	433
Kursk Region	26,167	14,475	11,692	25,651	516
Sverdlovsk Region	22,508	21,728	780	21,915	593
Saint Petersburg	17,626	16,920	706	17,063	563
Moscow Region	14,518	13,930	588	14,173	345
Leningrad Region	12,177	11,561	616	11,839	338
Voronezh Region	10,808	10,152	657	10,697	112
Rostov Region	10,295	9,830	465	10,118	177
Krasnoyarsk Territory	8,744	8,590	154	7,719	1,025
Murmansk Region	7,619	7,413	206	7,583	36
Tomsk Region	6,657	6,263	394	6,584	73
Zabaykalsky Territory	7,197	6,859	338	7,149	48
Saratov Region	7,169	6,829	340	7,092	77
Penza Region	6,569	6,542	27	6,557	12
Smolensk Region	6,299	6,165	134	6,240	59

1. There are no non-guaranteed hours employees. Data are provided on the number of employees, regardless of the full-time equivalent value.

Region / city	Number of employees	Number of permanent employees	Number of temporary employees	Number of full-time employees	Number of part-time employees
Primorsky Territory	6,036	5,768	268	6,007	29
Udmurt Republic	5,905	5,758	147	5,824	81
Ulyanovsk Region	4,491	4,202	289	4,324	167
Novosibirsk Region	4,381	3,981	400	4,291	90
Vladimir Region	4,222	4,147	75	4,129	93
Perm Territory	3,592	3,553	39	3,466	126
Kaluga Region	3,444	3,103	341	3,356	88
Krasnodar Territory	2,369	1,733	636	2,335	34
Irkutsk Region	2,001	1,502	499	1,960	41
Belgorod Region	1,820	1,752	68	1,789	31
Tver Region	2,376	2,308	68	2,368	8
Republic of Karelia	1,512	1,401	111	1,480	32
Lipetsk Region	1,500	1,480	20	1,497	3
Chukotka Autonomous District	1,210	1,141	69	1,207	3
Kurgan Region	1,166	925	241	1,162	4
Republic of Bashkortostan	281	264	17	279	2
Republic of Buryatia	809	590	219	808	1
Republic of Tatarstan	803	781	22	790	13
Oryol Region	687	687	0	687	0
Tambov Region	603	591	12	601	2
Tula Region	577	575	2	574	3
Sakhalin Region	565	563	2	565	0
Volgograd Region	483	441	42	475	8
Sakha Republic	444	390	54	444	0
Republic of Mordovia	365	359	6	360	5
Khabarovsk Territory	310	299	11	300	10
Yaroslavl Region	298	296	2	272	26
Stavropol Territory	276	274	2	276	0
Republic of Khakassia	270	266	4	270	0
Omsk Region	244	214	30	243	1
Samara Region	237	225	12	231	6
Kaliningrad Region	235	216	19	230	5
Arkhangelsk Region	231	224	7	230	1
Astrakhan Region	223	221	2	220	3
Ryazan Region	215	211	4	214	1
Kirov Region	206	166	40	206	0
Tyumen Region	147	143	4	145	2
Kemerovo Region	119	119	0	119	0
Vologda Region	102	101	1	102	0
Ivanovo Region	91	91	0	90	1
Orenburg Region	83	58	25	83	0
Amur Region	80	80	0	80	0
Altai Territory	73	73	0	73	0
Republic of Adygea	57	57	0	57	0
Republic of Dagestan	45	33	12	43	2
Kamchatka Territory	40	38	2	39	1
Chechen Republic	23	23	0	23	0
Yamalo-Nenets Autonomous District	21	19	2	20	1
Magadan Region	20	20	0	20	0
Khanty-Mansi Autonomous District – Yugra	19	19	0	19	0
Other regions	10,794	10,756	38	10,763	31

Number of employees in ROSATOM's overseas branches and organisations with a breakdown by type of employment[1] (as at 31 December 2024)

Country	Number of employees	Number of permanent employees	Number of temporary employees	Number of full-time employees	Number of part-time employees
Egypt	25,338	563	24,775	25,317	21
Bangladesh	15,566	714	14,852	15,540	26
Turkey	14,954	14,764	190	14,947	7
Kazakhstan	2,144	1,902	242	2,117	27
Hungary	668	253	415	645	23
Republic of Belarus	542	260	282	516	26
Iran	478	0	478	477	1
South Korea	291	291	0	291	0
China	209	115	94	209	0
Czech Republic	205	173	32	202	3
Bolivia	55	24	31	51	4
India	43	0	43	43	0
Finland	43	40	3	39	4
Cyprus	32	32	0	32	0
Hong Kong	24	24	0	24	0
Tanzania	18	17	1	18	0
Namibia	11	11	0	11	0
Other countries	52	31	21	46	6

1. Data are provided on the number of employees, regardless of the full-time equivalent value. There are no non-guaranteed hours employees.

APPENDIX No. 5. REPORT OF THE INTERNAL AUDIT DEPARTMENT OF STATE ATOMIC ENERGY CORPORATION ROSATOM

REPORT

of the Internal Audit Department of State Atomic Energy Corporation Rosatom
on the findings of internal audit of the business process
'Public Reporting Procedure in ROSATOM'

Internal audit of the business process 'Public Reporting Procedure in ROSATOM' has been performed pursuant to the Consolidated Monitoring Plan of Specialised Internal Control Bodies of ROSATOM for the Second Half of 2025 signed off by the Director General of ROSATOM and approved by the Chairman of the Supervisory Board of ROSATOM.

The audit has involved:

- An assessment of efficiency of internal controls in the public reporting process;
- An assessment of compliance of the public reporting procedure with applicable legislation, international standards and internal regulatory requirements for public reporting;
- Producing recommendations for improving internal controls in public reporting and enhancing the efficiency of this process.

The findings of the audit suggest that the business process 'Public Reporting Procedure in ROSATOM' complies with applicable legislation, international standards and internal regulatory requirements governing the public reporting process. At the same time, the auditors would like to highlight the need for more detailed disclosure of information as required by individual provisions of internal regulations. The shortcomings revealed during the audit did not have a significant impact on the reliability and quality of the public annual report.

Head of the audit team P.P. Gosteva

Member of the audit team E.D. Glinkina

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APPENDIX No. 6. INDEPENDENT AUDITOR'S REPORT ON THE NON-FINANCIAL STATEMENTS OF STATE ATOMIC ENERGY CORPORATION ROSATOM

https://report.rosatom.ru/ar2024

List of Abbreviations and Acronyms

ARMS	Automated radiation monitoring system
CATF	Closed administrative and territorial formation
CHPP	Combined heat and power plant
ESG	Environmental, social and corporate governance
ESP	Executive succession pool
FMBA	Federal Medical and Biological Agency of Russia
FS	Feasibility study
GRI	Global Reporting Initiative (an organisation developing sustainability reporting standards)
IAEA	International Atomic Energy Agency
IARMS	Industry-Wide Automated Radiation Monitoring System
IRAW	Individual risk assessment workstation
KPI	Key performance indicator
LTIFR	Lost Time Injury Frequency Rate
MIC	Military–industrial complex
NCPM	National Centre for Physics and Mathematics
NEIC	Nuclear Energy Information Centre
NFA	Nuclear fuel assembly
NFC	Nuclear fuel cycle
NFE	Nuclear fuel element
NPP	Nuclear power plant
NPU	Nuclear propulsion unit
NRS	Nuclear and radiation safety
NRTC	Nuclear Research and Technology Centre
NWD	Nuclear Weapons Division
PDEF	Pilot and Demonstration Energy Facility
R&D	Research and development
RAW	Radioactive waste
RBMK	High-power channel-type reactor
RCP	Reactor coolant pump
RMS	Risk management system
RPS	ROSATOM Production System
SFA	Spent (irradiated) fuel assembly
SNF	Spent nuclear fuel
tHM	Tonne of heavy metal
TPP	Thermal power plant
VVER	Water-cooled water-moderated power reactor
WPP	Wind power plant

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Anti-corruption hotline

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Email: 0707@rosatom.ru

Official corporate website

https://www.rosatom.ru/en/index.html

Official reporting portal

https://www.report.rosatom.ru/en/

Official website for placement of orders for the procurement of goods, work and services for ROSATOM

http://zakupki.rosatom.ru/

Official group on VKontakte

http://vk.com/rosatomru

Official Telegram channel

https://t.me/rosatomru

Feedback Form

Dear readers,

You have read the public report of State Atomic Energy Corporation Rosatom, which is intended for a wide range of stakeholders. We attach great importance to the opinion of the readers of our report. We would appreciate it if you helped improve the quality of the Corporation's reports by completing the questionnaire below.

Please return the completed form by mail to the Communications Department at 24 Bolshaya Ordynka Street, Moscow, 119017 or by email (EAMamy@rosatom.ru).

1. Please assess the Report using the following criteria:

Accuracy and objectivity

☐ Excellent ☐ Good ☐ Satisfactory ☐ Poor

Completeness and relevance of information

☐ Excellent ☐ Good ☐ Satisfactory ☐ Poor

Report structure, ease of reference, wording

☐ Excellent ☐ Good ☐ Satisfactory ☐ Poor

2. Please specify which sections of the Report you have found to be relevant and useful:

3. What topics do you think should be covered in the next Report?

4. Your recommendations and additional comments:

5. Please specify which stakeholder group you represent:

- [ ] Employee of ROSATOM
- [ ] Employee of an organisation forming part of ROSATOM
- [ ] Representative of the federal government
- [ ] Representative of a regional government
- [ ] Representative of a local government
- [ ] Representative of a contractor / supplier
- [ ] Representative of a customer / consumer of goods and services
- [ ] Representative of a business partner
- [ ] Representative of a non-governmental organisation
- [ ] Representative of the media
- [ ] Representative of the expert community
- [ ] Other (please specify)



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